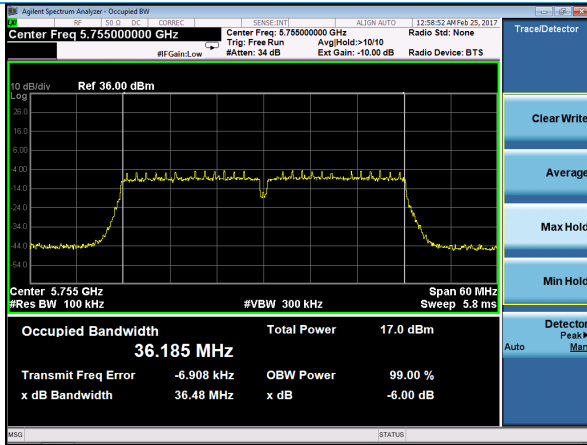
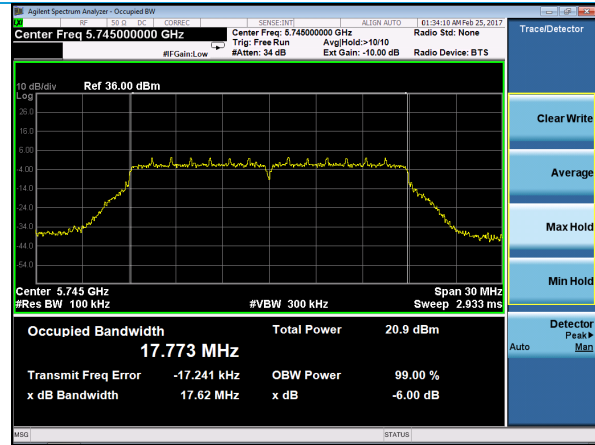


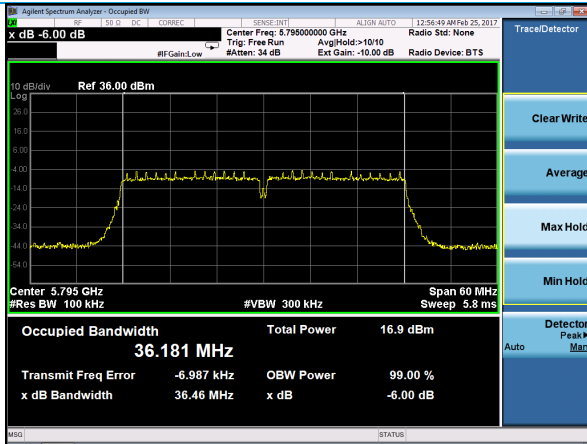
Plots – U-NII-3 Minimum 6 dB BW, continued



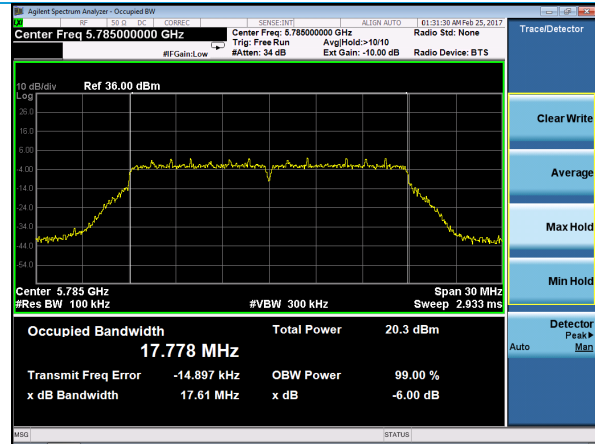
Low Channel – 802.11ac HT-40



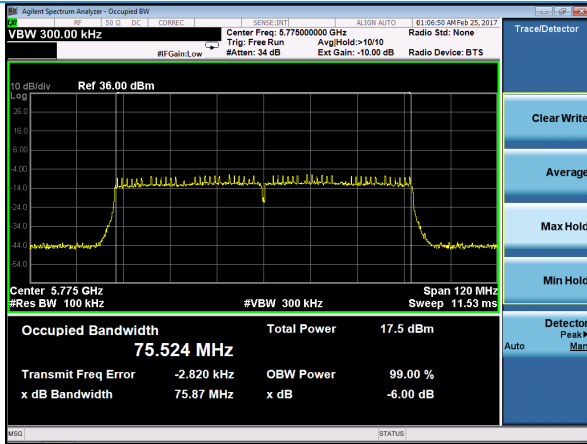
Low Channel – 802.11n HT-20



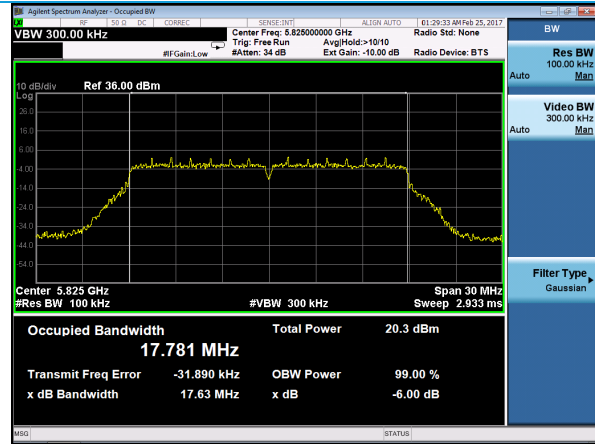
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

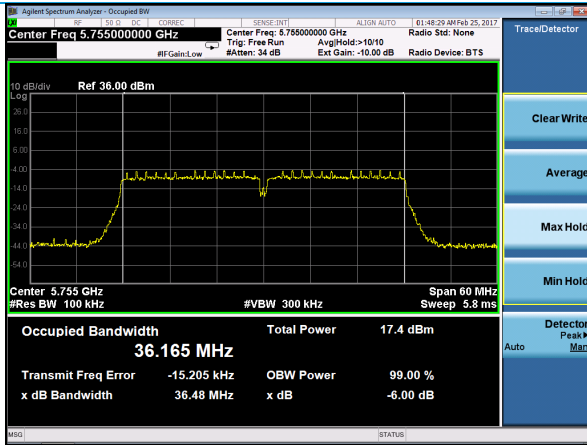


Only Channel – 802.11ac HT-80

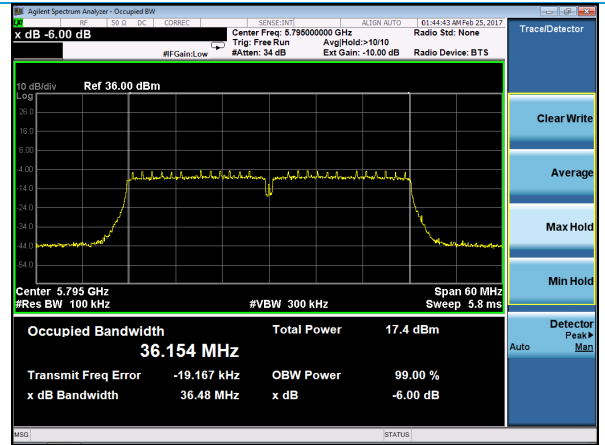


High Channel – 802.11n HT-20

Plots – U-NII-3 Minimum 6 dB BW, continued



Low Channel – 802.11n HT-40



High Channel – 802.11n HT-40

Company: LSR a Laird Buissness	Page 36 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

5.1.3 Antenna Port Conducted Emissions – Conducted Output Power

Operator	Kimberly Bay
QA	Aidi Zainal / Shane Dock
Test Date	U-NII-1: March 6, 2017; U-NII-2A: March 15, 2017 U-NII-2C: March 27, 2017; U-NII-3: February 28, 2017
Location	Conducted RF Test Bench
Temp. / R.H.	21°- 22°C / 30%-53% RH
Requirement	FCC 15.407 (a)(1)(iv), (a)(2), (a)(3) RSS 247 Issue 2 Sections 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Method	KDB 789033 D02 v01r04 Section II.E.2.d Method SA-2 U-NII-2C HT-20 signals: KDB 789033 D02 v01r04 Section II.E.2.b Method SA-1

Limits:

U-NII Band	FCC Limit	ISED Limit
U-NII-1	24 dBm	Lesser of: 23 dBm or $[10\text{dBm} + 10\log(99\%BW)]$ e.i.r.p.
U-NII-2A	Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(26\text{ dB BW})]$	1) Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(99\% BW)]$ 2) Lesser of: 30 dBm or $[17\text{ dBm} + 10\log(99\% BW)]$ e.i.r.p
U-NII-2C	Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(26\text{ dB BW})]$	1) Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(99\% BW)]$ 2) Lesser of: 30 dBm or $[17\text{ dBm} + 10\log(99\% BW)]$ e.i.r.p
U-NII-3	30 dBm	30 dBm

Test Parameters

Settings	<u>802.11a HT-20, 6 Mbps:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only) MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11ac HT-20, MCS0:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5720 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11ac HT-40, MCS0:</u> 5190, 5230 MHz (U-NII-1); 5270, 5310 MHz (U-NII-2A); 5510, 5550, 5710 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3)
Settings	<u>802.11ac HT-80, MCS0:</u> 5210 MHz (U-NII-1); 5290 MHz (U-NII-2A); 5530, 5610 (FCC Only), 5690 MHz (U-NII-2C); 5775 MHz (U-NII-3)
Settings	<u>802.11n HT-20, MCS0:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11n HT-40, MCS0:</u> 5190, 5230 MHz, (U-NII-1); 5270, 5310 MHz(U-NII-2A); 5510, 5550, 5670 MHz(U-NII-2C); 5755, 5795 MHz (U-NII-3)
Note	Maximum antenna gain: 4 dBi
Note	U-NII-1, U-NII-2A, and U-NII-3 each have only two HT-40 channels and one HT-80 channel. U-NII-2C has only two HT-40 channels in 802.11n mode.
Note	U-NII-2C 802.11ac HT-80 frequency 5610 MHz tested here, but not used in Canada. U-NII-2C 802.11ac HT-80 has only two available ISED channels.
Example Calculation	<u>ISED EIRP Margin = ISED Limit – (Measured Pout + Correction Factor + Antenna Gain)</u> Ex: 23 dBm – (5.61 dBm + 0.292 + 4 dBi) = 23 dBm (limit) – 9.902 dB = 13.098 dB margin

Instrumentation



Date: 6-Feb-2017

Type Test: Conducted RF Measurements

Job #: C-2602

Prepared By: Kim

Customer: LSR

Quote #: 316356

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
2	AA 960143	Phaseflex	Gore	EKD01D01048.0	5546519	6/26/2015	6/25/2017	Active Calibration
3	AA 960172	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-1	387	5/16/2016	5/16/2017	Active Verification

Company: LSR a Laird Business	Page 38 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

Table – U-NII-1 Conducted Output Power

Mode	Frequency (MHz)	Data Rate	BW	Correction Factor (dB)	Pout Measured (dBm)	Pout (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP margin (dB)
802.11a	5180	6 Mbps	HT-20	0.132	11.69	11.82	24.00	12.18	22.26	6.44
802.11a	5200	6 Mbps	HT-20	0.132	11.36	11.49	24.00	12.51	22.26	6.77
802.11a	5220 (ISED)	6 Mbps	HT-20	0.132	11.20	11.33	24.00	12.67	22.25	6.92
802.11a	5240 (FCC)	6 Mbps	HT-20	0.132	10.94	11.07	24.00	12.93	22.26	7.19
802.11ac	5180	MCSO	HT-20	0.132	9.47	9.61	24.00	14.40	22.55	8.95
802.11ac	5200	MCSO	HT-20	0.132	9.09	9.23	24.00	14.78	22.55	9.33
802.11ac	5220 (ISED)	MCSO	HT-20	0.132	8.88	9.01	24.00	14.99	22.55	9.54
802.11ac	5240 (FCC)	MCSO	HT-20	0.132	8.83	8.97	24.00	15.04	22.55	9.58
802.11ac	5190	MCSO	HT-40	0.292	5.61	5.91	24.00	18.09	23.00	13.09
802.11ac	5230	MCSO	HT-40	0.292	5.13	5.42	24.00	18.58	23.00	13.58
802.11ac	5210	MCSO	HT-80	0.555	4.90	5.46	24.00	18.54	23.00	13.54
802.11n	5180	MCSO	HT-20	0.132	9.53	9.67	24.00	14.34	22.55	8.88
802.11n	5200	MCSO	HT-20	0.132	9.28	9.41	24.00	14.59	22.55	9.13
802.11n	5220 (ISED)	MCSO	HT-20	0.132	9.10	9.24	24.00	14.76	22.54	9.31
802.11n	5240 (FCC)	MCSO	HT-20	0.132	8.86	9.00	24.00	15.00	22.54	9.55
802.11n	5190	MCSO	HT-40	0.292	5.74	6.04	24.00	17.97	23.00	12.97
802.11n	5230	MCSO	HT-40	0.292	5.35	5.64	24.00	18.36	23.00	13.36



Table – U-NII-2A Conducted Output Power

Mode	Frequency (MHz)	Data Rate	BW	Correction Factor (dB)	Pout Measured (dBm)	Pout (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Limit (dBm)	ISED Margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP margin (dB)
802.11a	5260	6 Mbps	HT-20	0.132	13.66	13.79	24.00	10.21	23.27	9.48	29.27	11.48
802.11a	5300	6 Mbps	HT-20	0.132	13.63	13.76	24.00	10.24	23.31	9.54	29.31	11.54
802.11a	5320	6 Mbps	HT-20	0.132	12.38	12.51	24.00	11.49	23.29	10.77	29.29	12.77
802.11ac	5260	MCS0	HT-20	0.177	11.64	11.81	24.00	12.19	23.55	11.74	29.55	13.74
802.11ac	5300	MCS0	HT-20	0.177	11.52	11.70	24.00	12.30	23.58	11.88	29.58	13.88
802.11ac	5320	MCS0	HT-20	0.177	11.39	11.57	24.00	12.43	23.57	12.00	29.57	14.00
802.11ac	5270	MCS0	HT-40	0.386	7.66	8.05	24.00	15.95	24.00	15.95	30.00	17.95
802.11ac	5310	MCS0	HT-40	0.386	7.43	7.81	24.00	16.19	24.00	16.19	30.00	18.19
802.11ac	5290	MCS0	HT-80	0.580	7.14	7.72	24.00	16.28	24.00	16.28	30.00	18.28
802.11n	5260	MCS0	HT-20	0.223	11.50	11.73	24.00	12.27	23.57	11.85	29.57	13.85
802.11n	5300	MCS0	HT-20	0.223	11.38	11.60	24.00	12.40	23.56	11.96	29.56	13.96
802.11n	5320	MCS0	HT-20	0.223	11.50	11.73	24.00	12.28	23.56	11.84	29.56	13.84
802.11n	5270	MCS0	HT-40	0.339	7.64	7.98	24.00	16.02	24.00	16.02	30.00	18.02
802.11n	5310	MCS0	HT-40	0.339	7.37	7.71	24.00	16.29	24.00	16.29	30.00	18.29



Table – U-NII-2C Conducted Output Power

Mode	Frequency (MHz)	Data Rate	BW	Correction Factor (dB)	Pout Measured (dBm)	Pout (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Limit (dBm)	ISED Margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP margin (dB)
802.11a	5500	6 Mbps	HT-20	0.00	14.13	14.13	24.00	9.87	23.25	9.12	29.25	11.12
802.11a	5580	6 Mbps	HT-20	0.00	15.15	15.15	24.00	8.85	23.26	8.10	29.26	10.10
802.11a	5700	6 Mbps	HT-20	0.00	15.02	15.02	24.00	8.98	23.27	8.25	29.27	10.25
802.11ac	5500	MCS0	HT-20	0.00	13.15	13.15	24.00	10.85	23.56	10.41	29.56	12.41
802.11ac	5580	MCS0	HT-20	0.00	12.80	12.80	24.00	11.20	23.55	10.75	29.55	12.75
802.11ac	5710	MCS0	HT-20	0.00	12.93	12.93	24.00	11.08	23.55	10.62	29.55	12.62
802.11ac	5510	MCS0	HT-40	0.315	9.06	9.38	24.00	14.62	24.00	14.62	30.00	16.63
802.11ac	5550	MCS0	HT-40	0.315	8.85	9.16	24.00	14.84	24.00	14.84	30.00	16.84
802.11ac	5710	MCS0	HT-40	0.315	9.36	9.68	24.00	14.32	24.00	14.32	30.00	16.33
802.11ac	5530	MCS0	HT-80	0.580	8.43	9.01	24.00	14.99	24.00	14.99	30.00	16.99
802.11ac	5610	MCS0	HT-80	0.580	8.87	9.45	24.00	14.55	24.00	14.55	30.00	16.55
802.11ac	5690	MCS0	HT-80	0.580	9.06	9.64	24.00	14.36	24.00	14.36	30.00	16.36
802.11n	5500	MCS0	HT-20	0.00	13.17	13.17	24.00	10.83	23.55	10.38	29.55	12.38
802.11n	5580	MCS0	HT-20	0.00	12.81	12.81	24.00	11.19	23.56	10.75	29.56	12.75
802.11n	5700	MCS0	HT-20	0.00	12.90	12.90	24.00	11.10	23.55	10.65	29.55	12.65
802.11n	5510	MCS0	HT-40	0.315	9.16	9.48	24.00	14.52	24.00	14.52	30.00	16.52
802.11n	5550	MCS0	HT-40	0.315	8.77	9.09	24.00	14.91	24.00	14.91	30.00	16.91
802.11n	5670	MCS0	HT-40	0.315	8.87	9.19	24.00	14.81	24.00	14.81	30.00	16.81

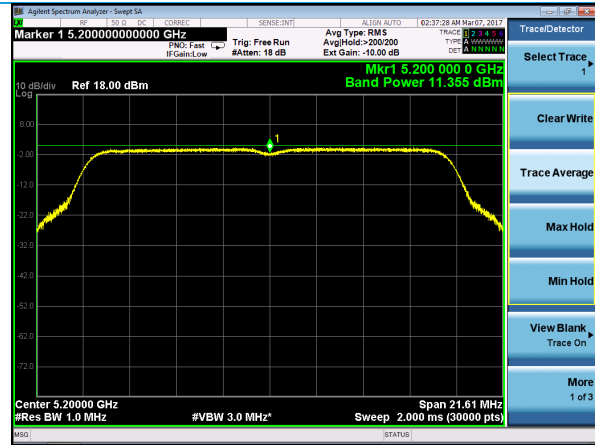
Table – U-NII-3 Conducted Output Power

Mode	Frequency (MHz)	Data Rate	BW	Correction Factor (dB)	Pout Measured (dBm)	Pout (dBm)	Limit (dBm)	Margin (dB)
802.11a	5745	6 Mbps	HT-20	0.132	15.64	15.77	30.0	14.23
802.11a	5785	6 Mbps	HT-20	0.132	15.13	15.26	30.0	14.74
802.11a	5825	6 Mbps	HT-20	0.132	15.16	15.29	30.0	14.71
802.11ac	5745	MCS0	HT-20	0.155	13.47	13.63	30.0	16.37
802.11ac	5785	MCS0	HT-20	0.155	12.81	12.96	30.0	17.04
802.11ac	5825	MCS0	HT-20	0.155	12.92	13.07	30.0	16.93
802.11ac	5755	MCS0	HT-40	0.315	9.81	10.12	30.0	19.88
802.11ac	5795	MCS0	HT-40	0.315	9.23	9.54	30.0	20.46
802.11ac	5775	MCS0	HT-80	0.555	9.22	9.77	30.0	20.23
802.11n	5745	MCS0	HT-20	0.177	13.56	13.74	30.0	16.26
802.11n	5785	MCS0	HT-20	0.177	12.84	13.02	30.0	16.98
802.11n	5825	MCS0	HT-20	0.177	13.05	13.23	30.0	16.77
802.11n	5755	MCS0	HT-40	0.315	9.69	10.01	30.0	19.99
802.11n	5795	MCS0	HT-40	0.315	9.38	9.69	30.0	20.31

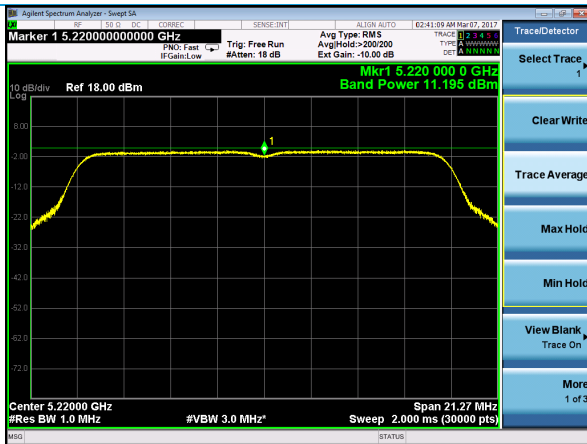
Plots – U-NII-1 Conducted Output Power



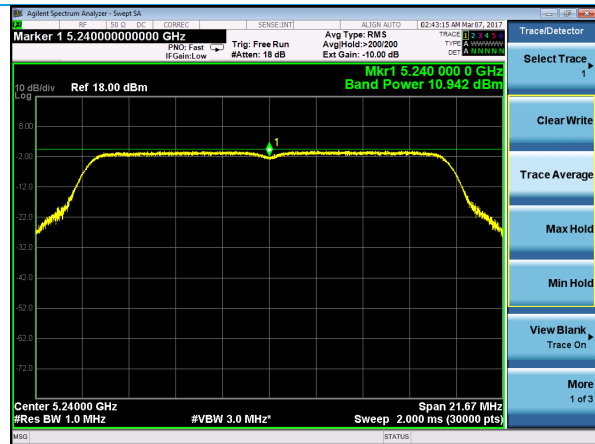
Low Channel – 802.11a HT-20



Mid Channel – 802.11a HT-20



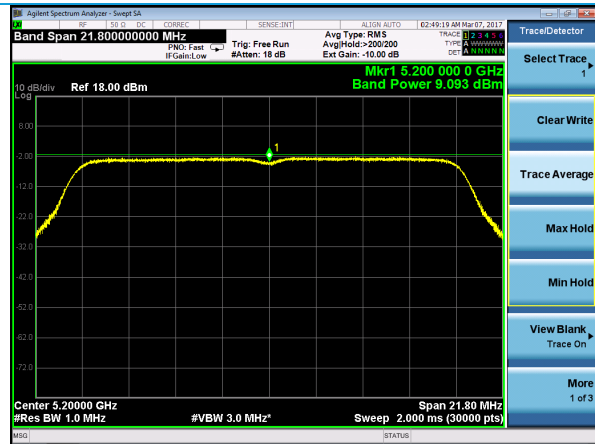
ISED High Channel – 802.11a HT-20



FCC High Channel – 802.11a HT-20

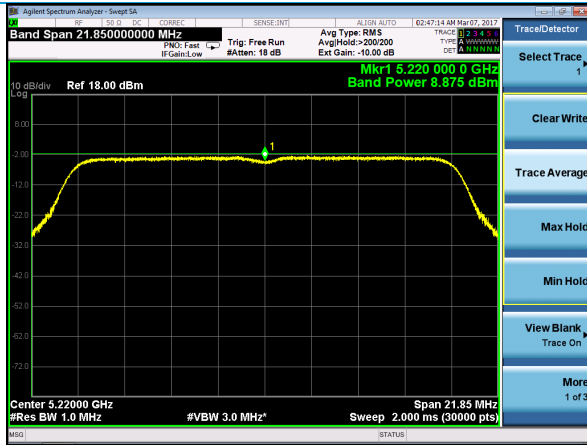


Low Channel – 802.11ac HT-20

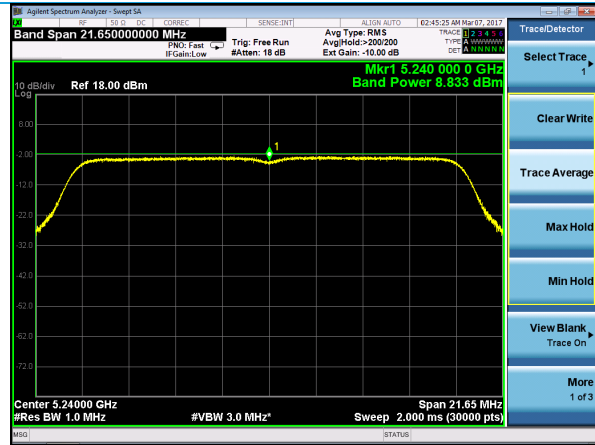


Mid Channel – 802.11ac HT-20

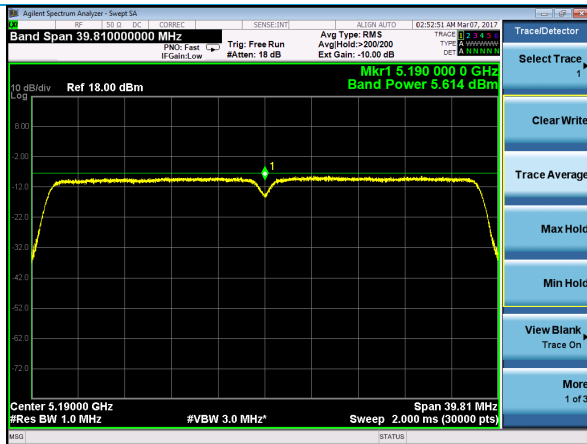
Plots – U-NII-1 Conducted Output Power, continued



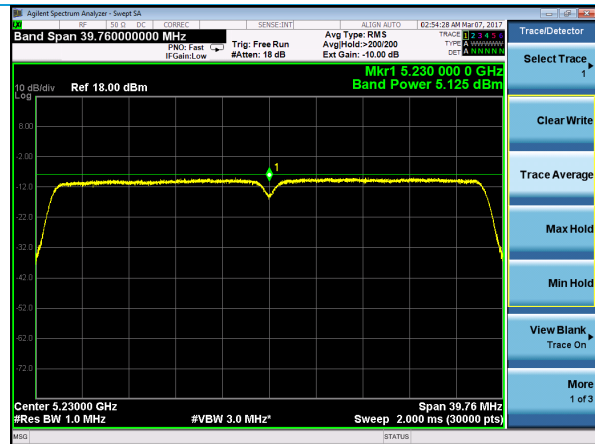
ISED High Channel – 802.11ac HT-20



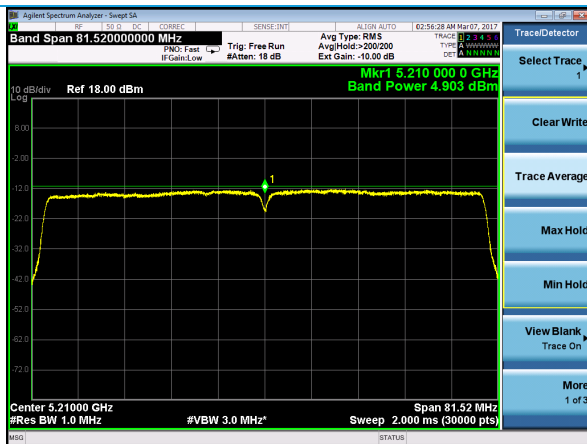
FCC High Channel – 802.11ac HT-20



Low Channel – 802.11ac HT-40



High Channel – 802.11ac HT-40



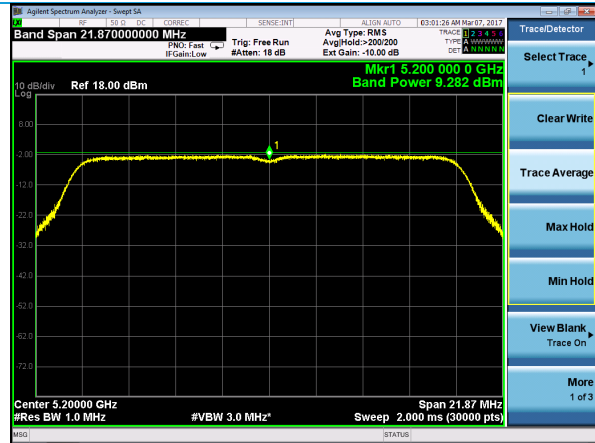
Only Channel – 802.11ac HT-80

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Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

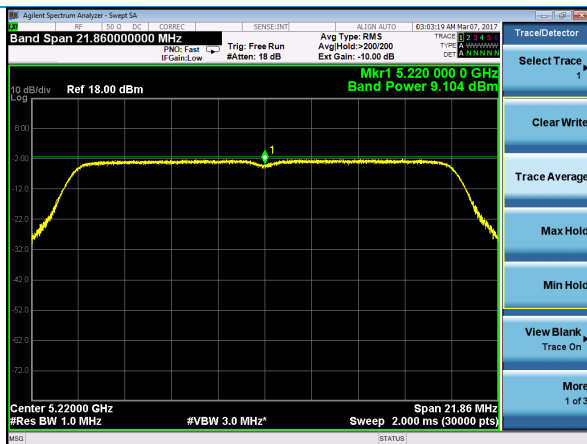
Plots – U-NII-1 Conducted Output Power, continued



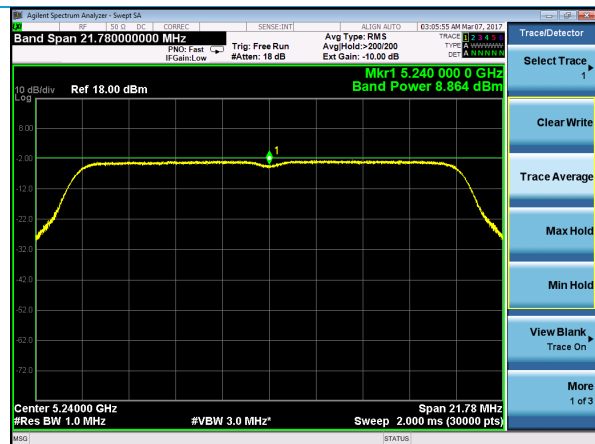
Low Channel – 802.11n HT-20



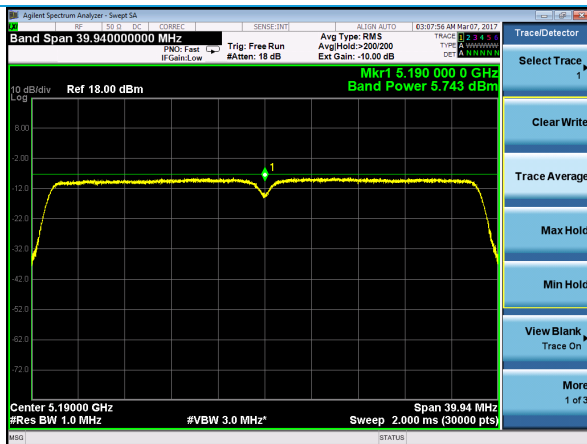
Mid Channel – 802.11n HT-20



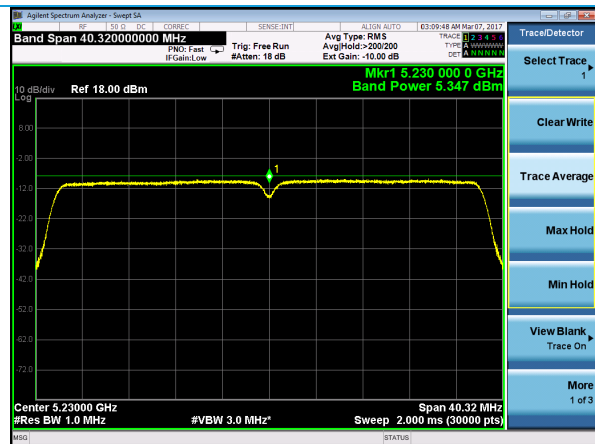
ISED High Channel – 802.11n HT-20



FCC High Channel – 802.11n HT-20



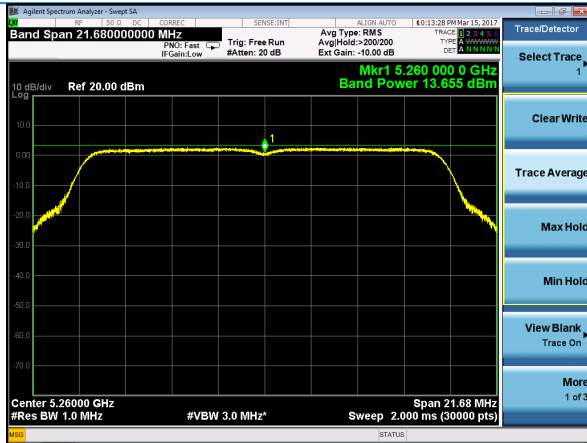
Low Channel – 802.11n HT-40



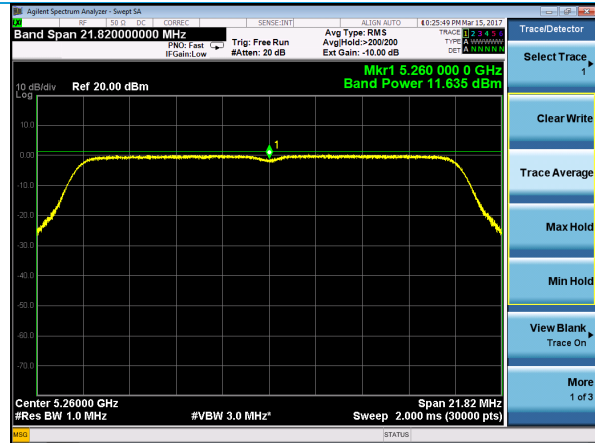
High Channel – 802.11n HT-40

Company: LSR a Laird Business		Name: Sterling-LWB5
Report: TR 316356 C (U-NII)	Page 45 of 149	Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

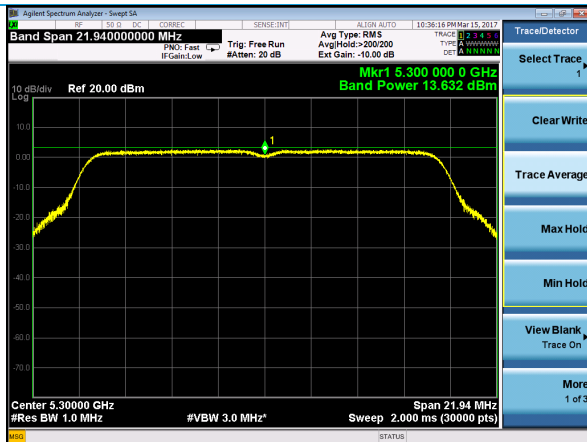
Plots – U-NII-2A Conducted Output Power



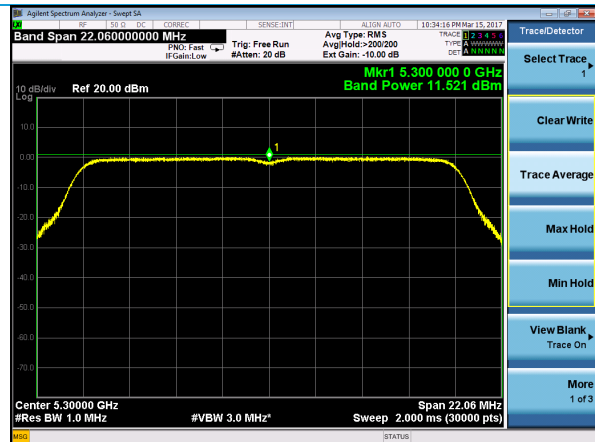
Low Channel – 802.11a HT-20



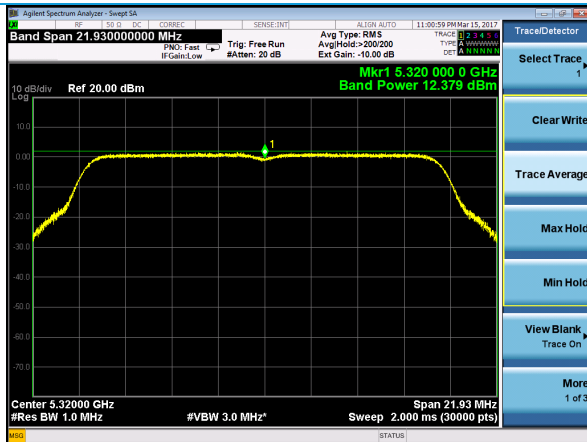
Low Channel 802.11ac HT-20



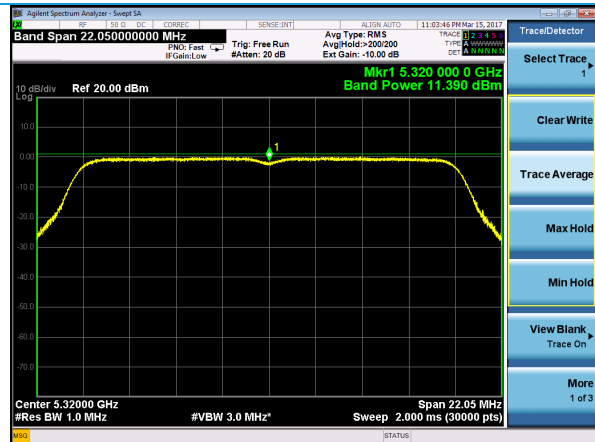
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20

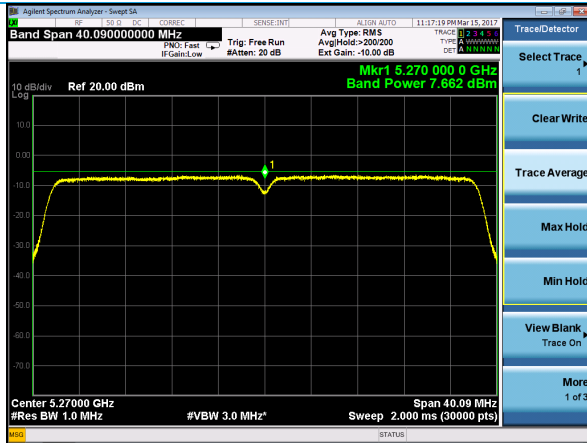


High Channel – 802.11a HT-20

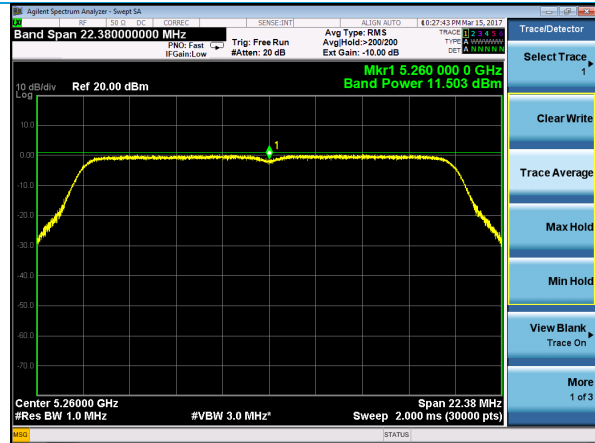


High Channel – 802.11ac HT-20

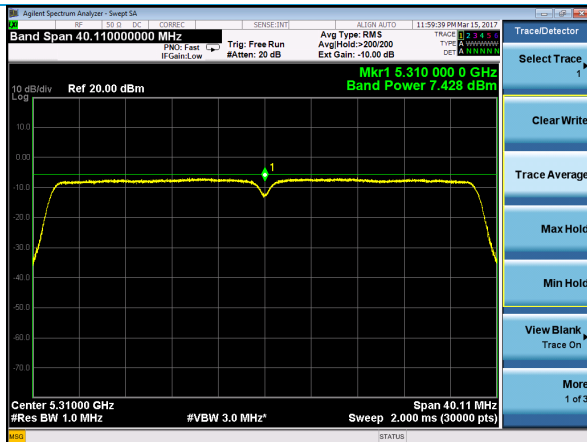
Plots – U-NII-2A Conducted Output Power, continued



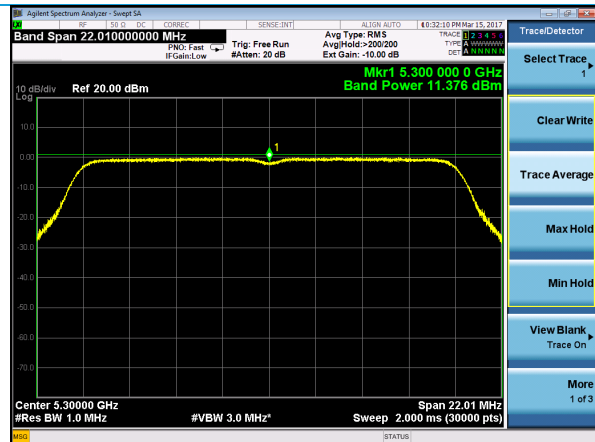
Low Channel – 802.11ac HT-40



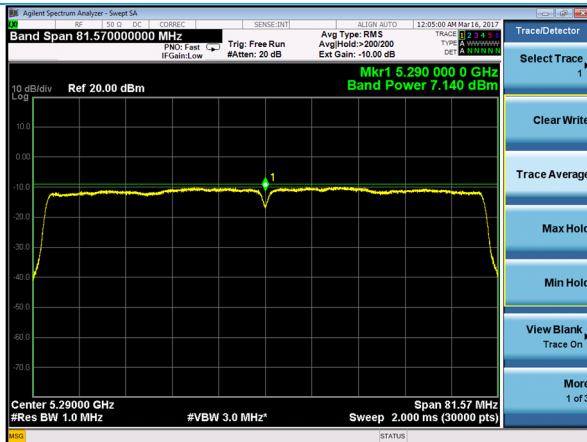
Low Channel – 802.11n HT-20



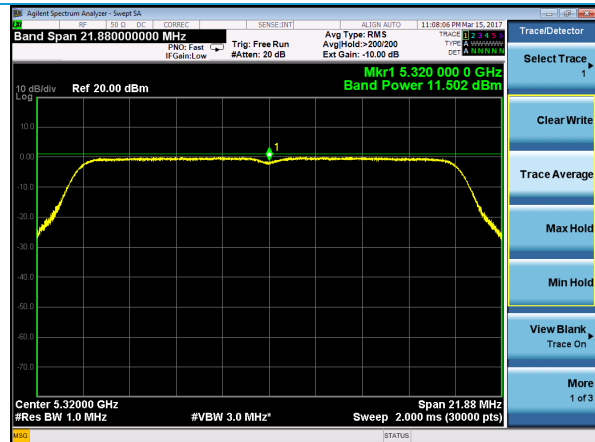
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

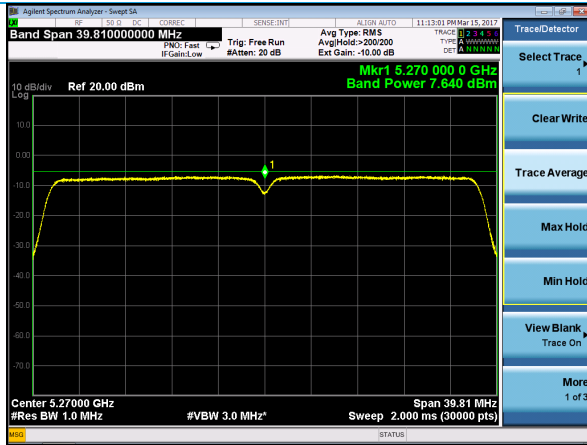


Only Channel – 802.11ac HT-80

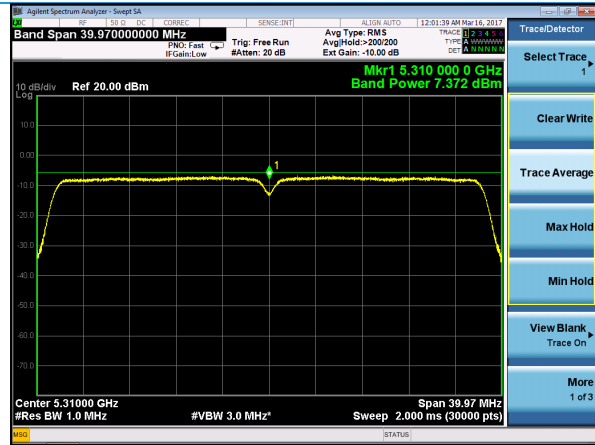


High Channel – 802.11n HT-20

Plots – U-NII-2A Conducted Output Power, continued

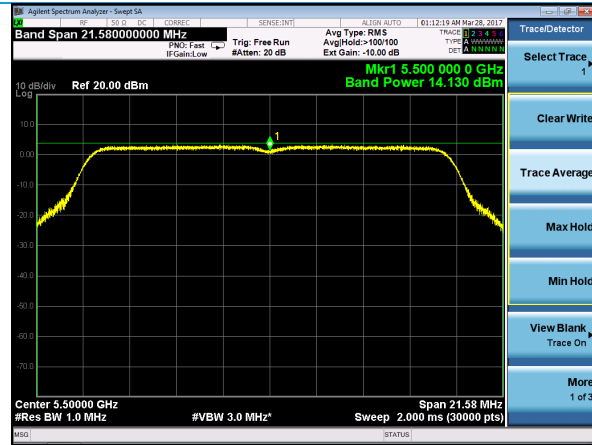


Low Channel – 802.11n HT-40

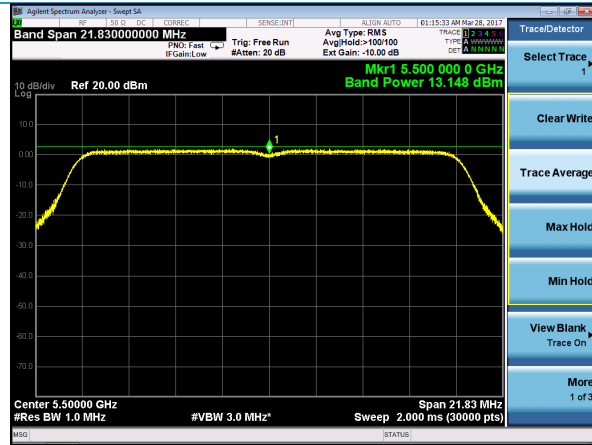


High Channel – 802.11n HT-40

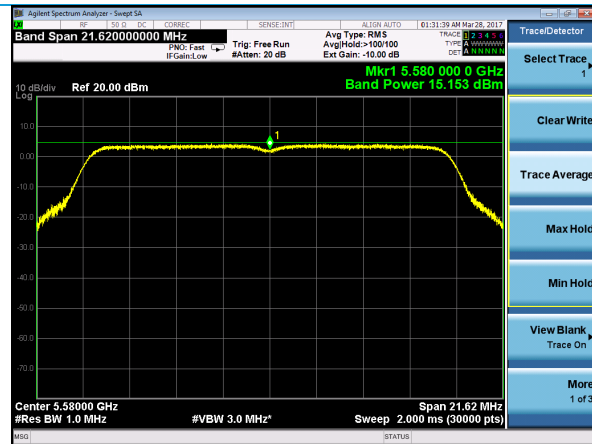
Plots – U-NII-2C Conducted Output Power



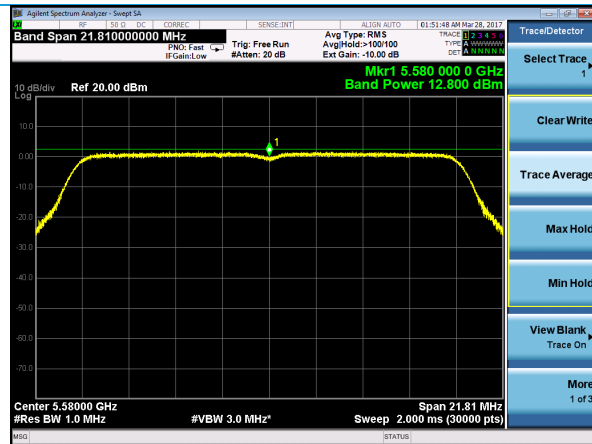
Low Channel – 802.11a HT-20



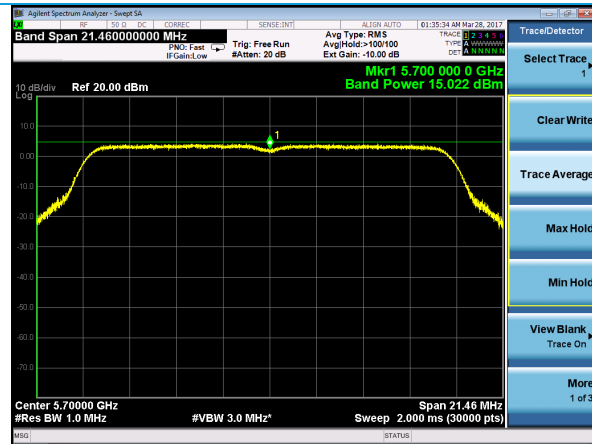
Low Channel – 802.11ac HT-20



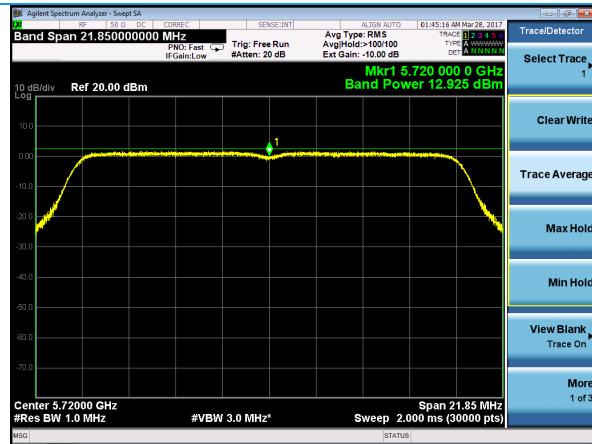
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20



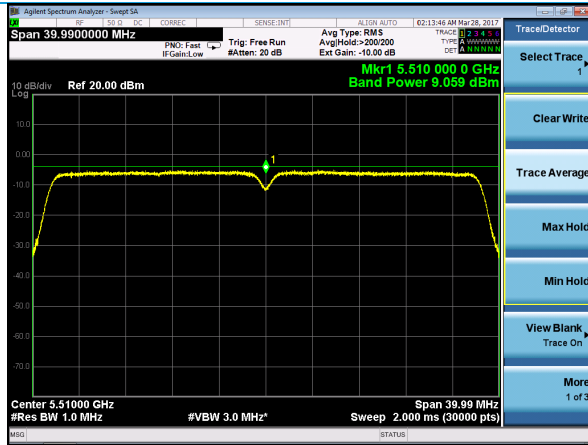
High Channel – 802.11a HT-20



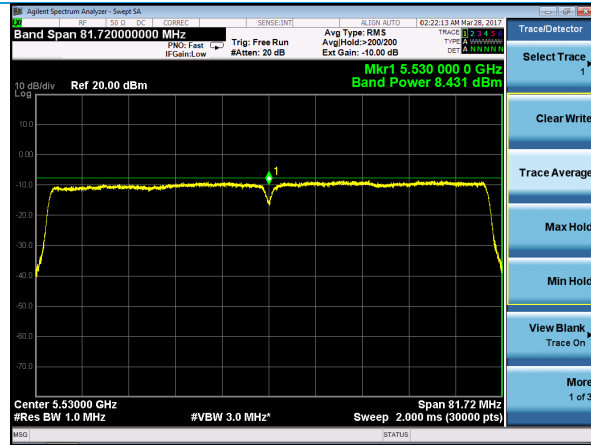
High Channel – 802.11ac HT-20

Company: LSR a Laird Business		Name: Sterling-LWB5
Report: TR 316356 C (U-NII)	Page 49 of 149	Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

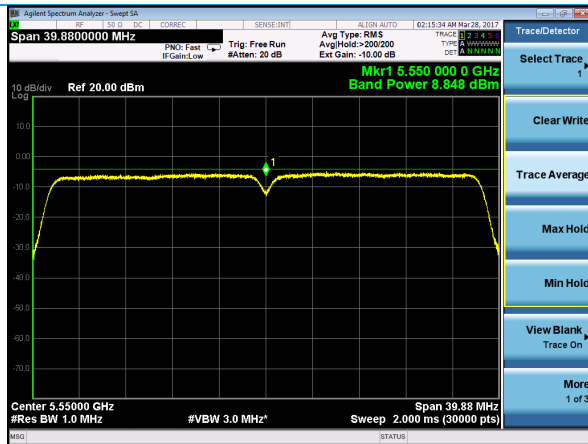
Plots – U-NII-2C Conducted Output Power, continued



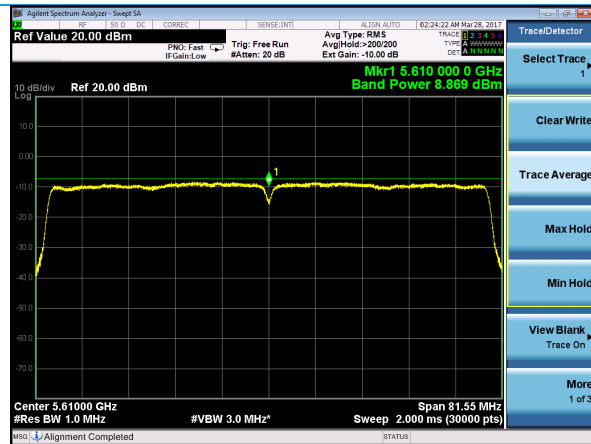
Low Channel – 802.11ac HT-40



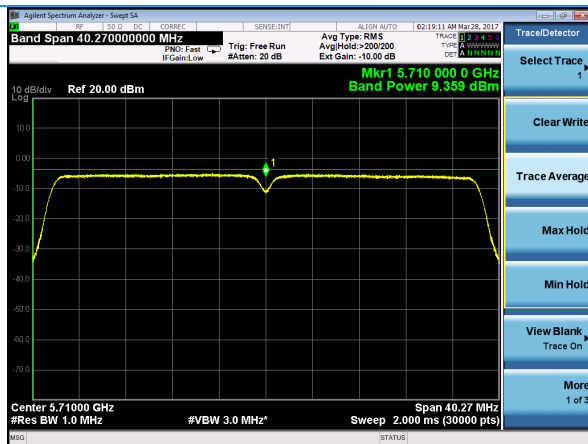
Low Channel – 802.11ac HT-80



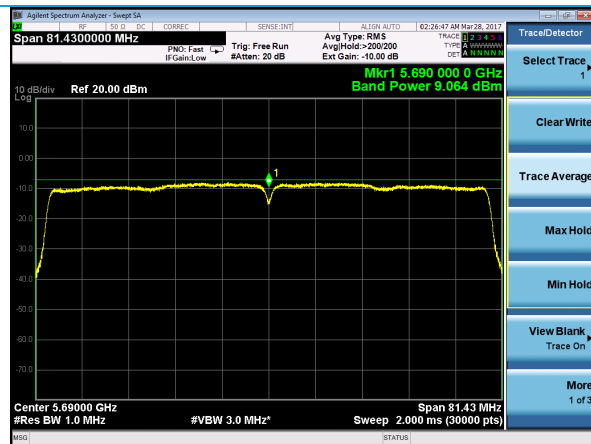
Mid Channel – 802.11ac HT-40



Mid Channel – 802.11ac HT-80

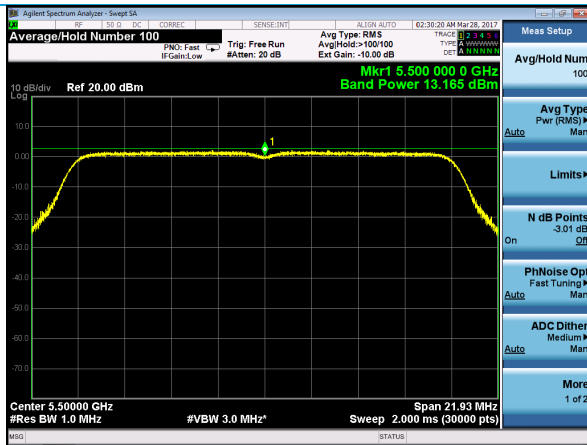


High Channel – 802.11ac HT-40

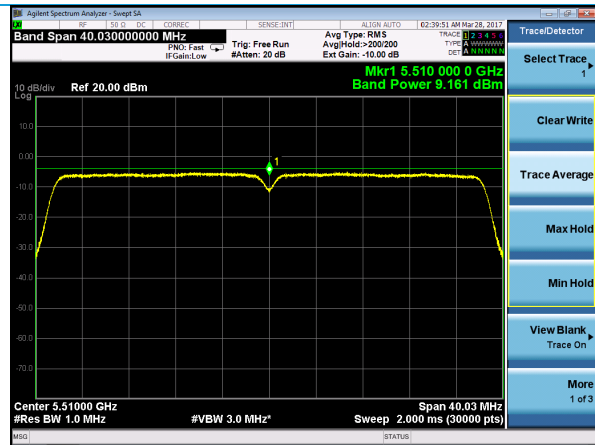


High Channel – 802.11ac HT-80

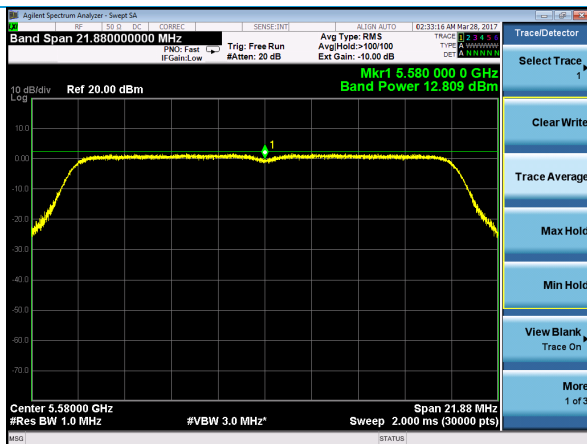
Plots – U-NII-2C Conducted Output Power, continued



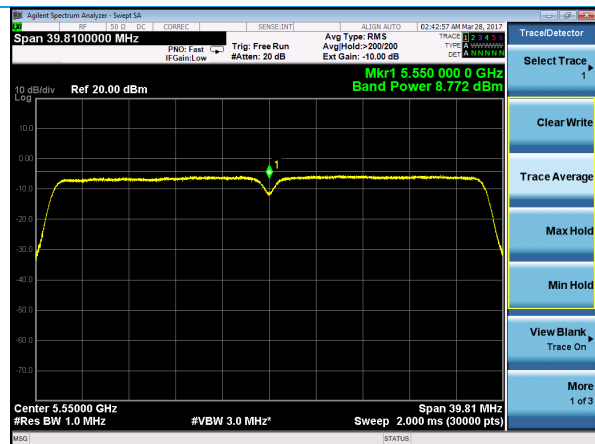
Low Channel – 802.11n HT-20



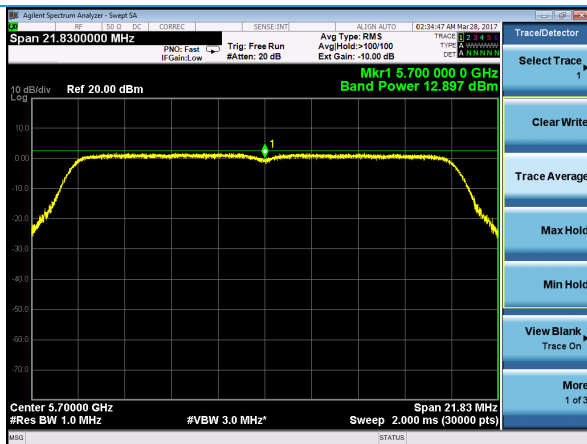
Low Channel – 802.11n HT-40



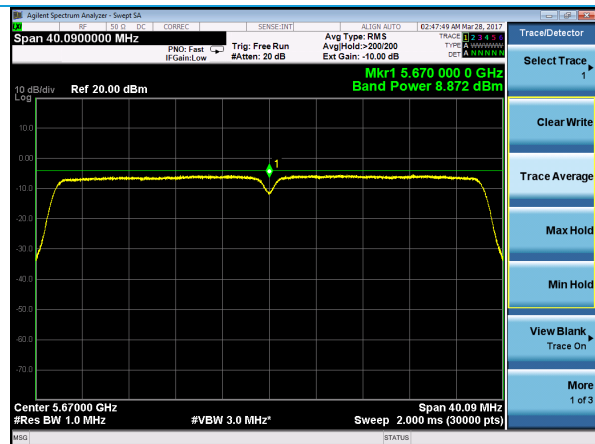
Mid Channel – 802.11n HT-20



Mid Channel – 802.11n HT-40

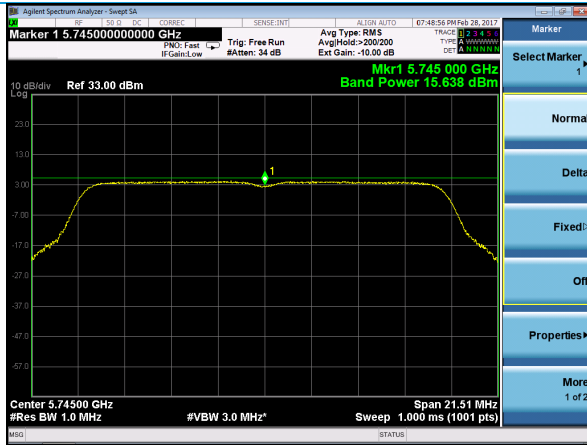


High Channel – 802.11n HT-20

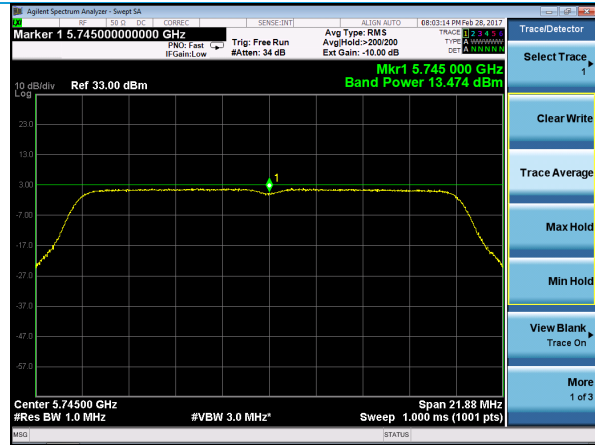


High Channel – 802.11n HT-40

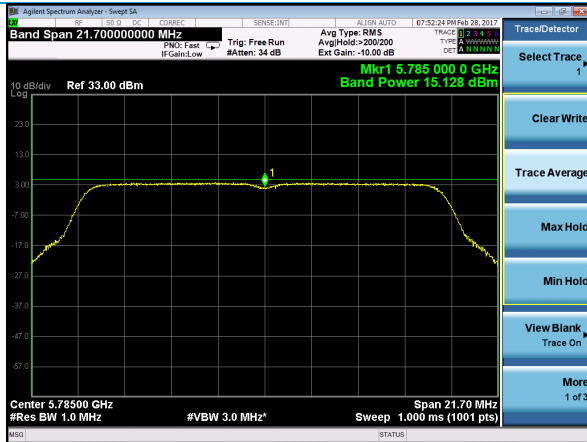
Plots – U-NII-3 Conducted Output Power



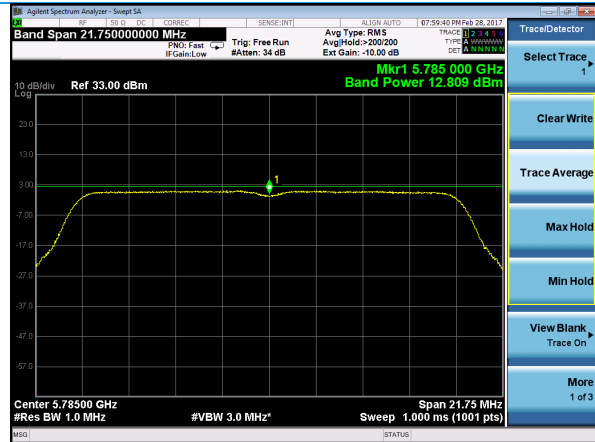
Low Channel – 802.11a HT-20



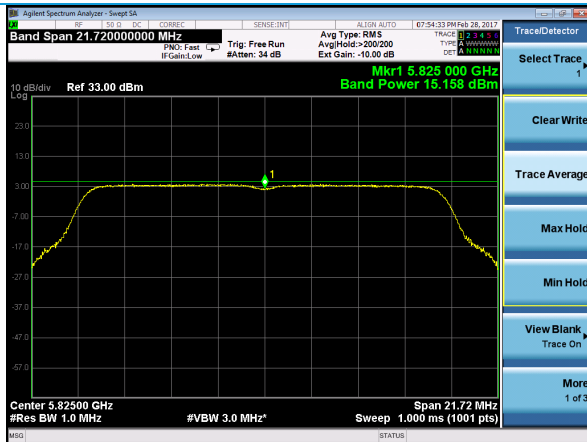
Low Channel – 802.11ac HT-20



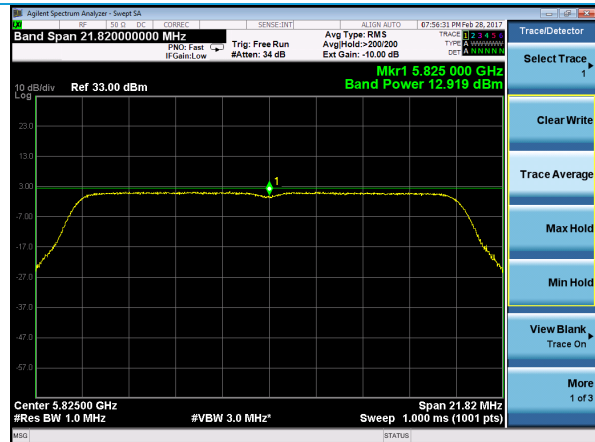
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20



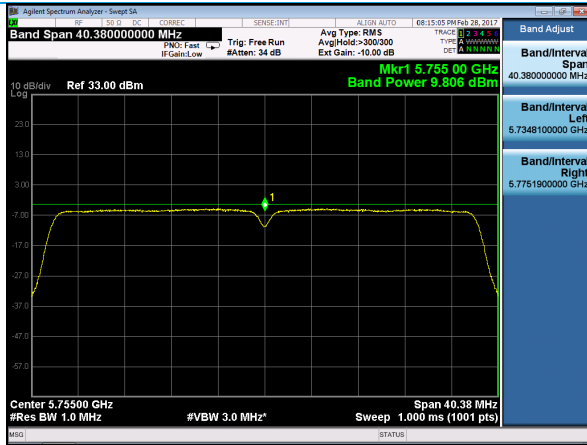
High Channel – 802.11a HT-20



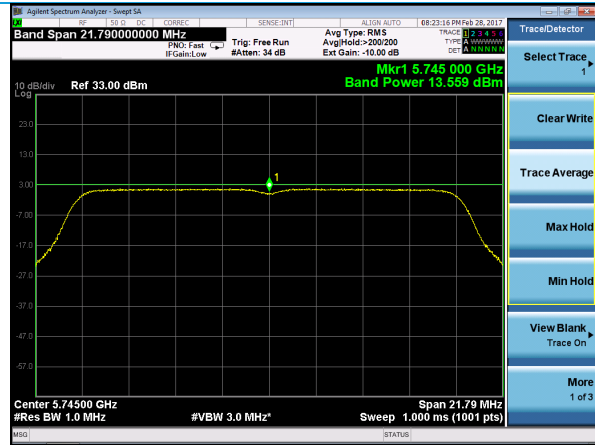
High Channel – 802.11ac HT-20

Company: LSR a Laird Business	Page 52 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

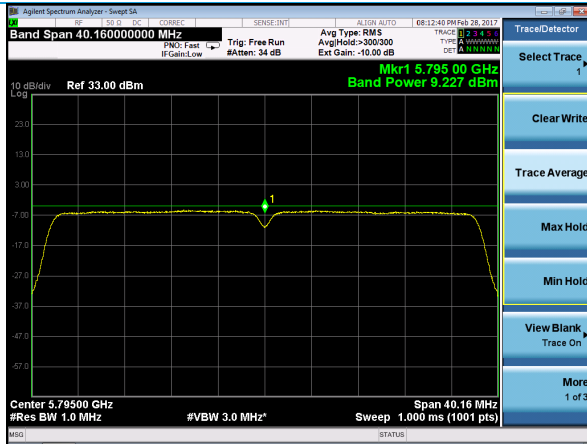
Plots – U-NII-3 Conducted Output Power, continued



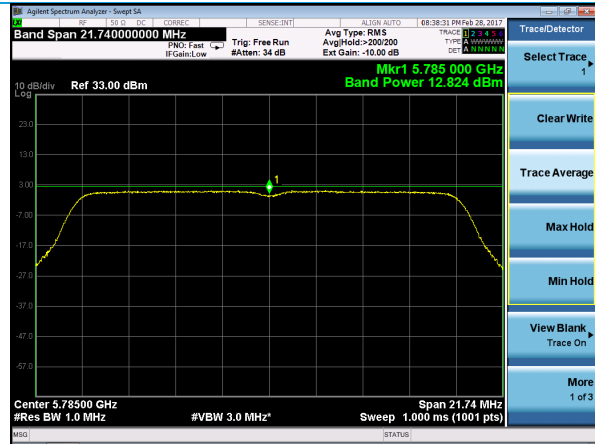
Low Channel – 802.11ac HT-40



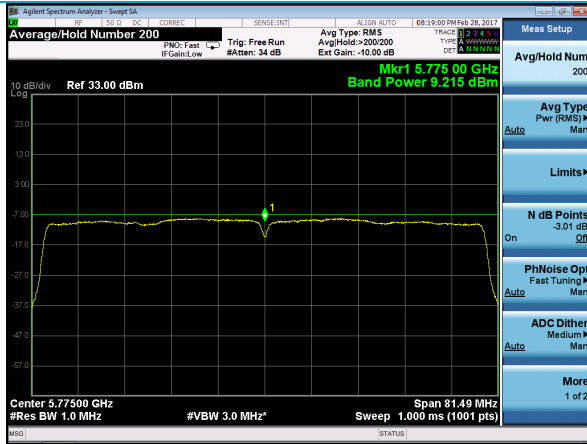
Low Channel – 802.11n HT-20



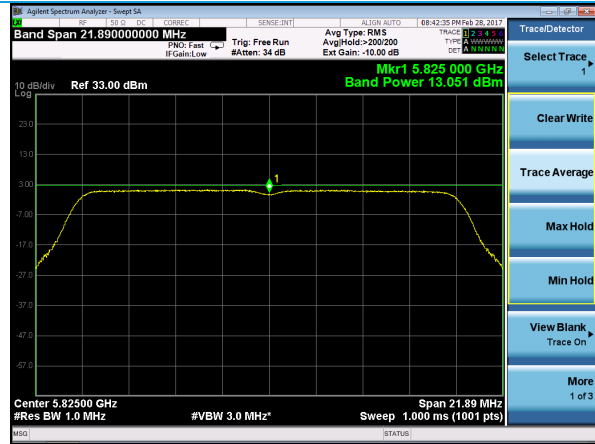
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

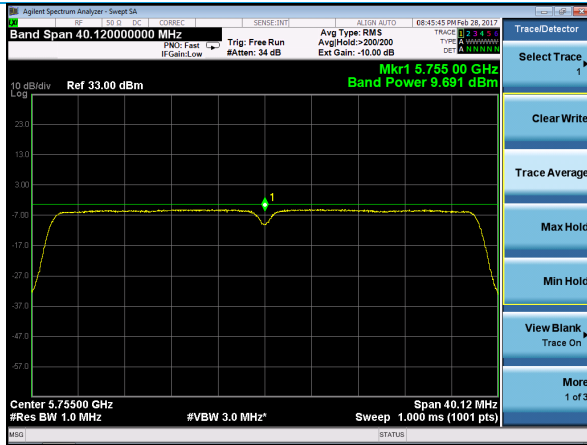


Only Channel – 802.11ac HT-80

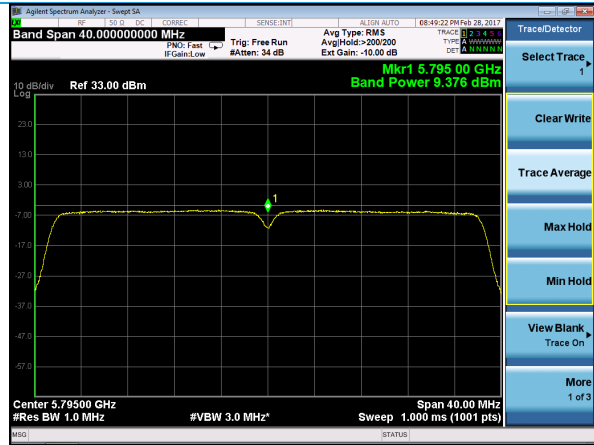


High Channel – 802.11n HT-20

Plots – U-NII-3 Conducted Output Power, continued



Low Channel – 802.11n HT-40



High Channel – 802.11n HT-40

Company: LSR a Laird Buiness	Page 54 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

5.1.4 Antenna Port Conducted Emissions – Power Spectral Density (PSD)

Operator	Kimberly Bay
QA	Aidi Zainal / Shane Dock
Test Date	U-NII-1: March 7, 2017; U-NII-2A: March 15, 2017 U-NII-2C: March 27-28, 2017; U-NII-3: February 28, 2017
Location	Conducted RF Test Bench
Temp. / R.H.	21°- 22°C / 30%-43% RH
Requirement	FCC 15.407 (a)(5) RSS 247 Issue 2 Sections 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Method	KDB 789033 D02 v01r04 Section II.F

Limits:

U-NII Band	FCC Limit	ISED Limit
U-NII-1	11 dBm in 1 MHz	10 dBm in 1 MHz e.i.r.p.
U-NII-2A	11 dBm in 1 MHz	11 dBm in 1 MHz
U-NII-2C	11 dBm in 1 MHz	11 dBm in 1 MHz
U-NII-3	30 dBm in 500 kHz	30 dBm in 500 kHz

Test Parameters

Settings	<u>802.11a HT-20, 6 Mbps:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only) MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11ac HT-20, MCS0 :</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5720 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11ac HT-40, MCS0:</u> 5190, 5230 MHz (U-NII-1); 5270, 5310 MHz (U-NII-2A); 5510, 5550, 5710 MHz (U-NII-2C); 5755, 5795 MHz (U-NII-3)
Settings	<u>802.11ac HT-80, MCS0:</u> 5210 MHz (U-NII-1); 5290 MHz (U-NII-2A); 5530, 5610 (FCC Only), 5690 MHz (U-NII-2C); 5775 MHz (U-NII-3)
Settings	<u>802.11n HT-20, MCS0:</u> 5180, 5200, 5220 (ISED only), 5240 (FCC only)MHz (U-NII-1) 5260, 5300, 5320 MHz (U-NII-2A) 5500, 5580, 5700 MHz (U-NII-2C) 5745, 5785, 5825 MHz (U-NII-3)
Settings	<u>802.11n HT-40, MCS0:</u> 5190, 5230 MHz, (U-NII-1); 5270, 5310 MHz(U-NII-2A); 5510, 5550, 5670 MHz(U-NII-2C); 5755, 5795 MHz (U-NII-3)
Note	Maximum antenna gain: 4 dBi
Note	<u>U-NII-3 RBW Adjustment</u> = $10 \log(500\text{kHz}/\text{RBW})$ to adjust for RBW setting of 100 kHz, rather than 500 kHz. Unable to set analyzer RBW to 500 kHz.
Note	U-NII-1, U-NII-2A, and U-NII-3 each have only two HT-40 channels and one HT-80 channel.
Note	U-NII-2C 802.11ac HT-80 channel 5610 MHz tested here, but not used in Canada. U-NII-2C 802.11ac HT-80 has only two available ISED channels.
Example Calculations	<u>FCC Margin:</u> FCC PSD Limit – (PSD measurement + correction factor) Ex: $11 \text{ dBm/MHz} - (3.853 \text{ dBm} + 0.132) = 7.015 \text{ dB FCC margin}$ <u>ISED Margin:</u> ISED EIRP PSD Limit – (PSD measurement + correction factor + antenna gain) Ex: $10 \text{ dBm/MHz} - (3.853 \text{ dBm} + 0.132 + 4 \text{ dBi}) = 2.015 \text{ dB ISED margin}$
U-NII-3 Example Calculation	<u>Margin:</u> PSD Limit – (PSD measurement + correction factor + RWB adjustment [see note above]) Ex: $30 \text{ dBm}/500 \text{ kHz} - (-4.395 + 0.132 + 7) = 27.263 \text{ dB margin}$

Instrumentation



Date: 6-Feb-2017

Type Test: Conducted RF Measurements

Job #: C-2602

Prepared By: Kim

Customer: LSR

Quote #: 316356

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
2	AA 960143	Phaseflex	Gore	EKD01D01048.0	5546519	6/26/2015	6/25/2017	Active Calibration
3	AA 960172	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-1	387	5/16/2016	5/16/2017	Active Verification

Table – U-NII-1 PSD

Mode	Data Rate	BW	Frequency (MHz)	Correction Factor (dB)	PSD Measured (dBm)	PSD (dB)	FCC Limit (dBm/MHz)	FCC Margin (dB)	ISED EIRP Limit (dBm/MHz)	ISED Margin (dB)
802.11a	6 Mbps	HT-20	5180	0.132	3.853	3.985	11	7.015	10	2.015
802.11a	6 Mbps	HT-20	5200	0.132	3.784	3.916	11	7.084	10	2.084
802.11a	6 Mbps	HT-20	5220 (ISED)	0.132	3.736	3.868	11	7.132	10	2.132
802.11a	6 Mbps	HT-20	5240 (FCC)	0.132	3.530	3.662	11	7.338	10	2.338
802.11ac	MCS0	HT-20	5180	0.132	1.388	1.52	11	9.48	10	4.48
802.11ac	MCS0	HT-20	5200	0.132	1.412	1.544	11	9.456	10	4.456
802.11ac	MCS0	HT-20	5220 (ISED)	0.132	1.308	1.44	11	9.56	10	4.56
802.11ac	MCS0	HT-20	5240 (FCC)	0.132	1.169	1.301	11	9.699	10	4.699
802.11ac	MCS0	HT-40	5190	0.292	-5.013	-4.721	11	15.721	10	10.721
802.11ac	MCS0	HT-40	5230	0.292	-4.972	-4.68	11	15.68	10	10.68
802.11ac	MCS0	HT-80	5210	0.555	-8.393	-7.838	11	18.838	10	13.838
802.11n	MCS0	HT-20	5180	0.132	1.472	1.604	11	9.396	10	4.396
802.11n	MCS0	HT-20	5200	0.132	1.55	1.682	11	9.318	10	4.318
802.11n	MCS0	HT-20	5220 (ISED)	0.132	1.498	1.63	11	9.37	10	4.37
802.11n	MCS0	HT-20	5240 (FCC)	0.132	1.412	1.544	11	9.456	10	4.456
802.11n	MCS0	HT-40	5190	0.292	-5.036	-4.744	11	15.744	10	10.744
802.11n	MCS0	HT-40	5230	0.292	-5.381	-5.089	11	16.089	10	11.089

Table – U-NII-2A PSD

Mode	Data Rate	BW	Frequency (MHz)	Correction Factor (dB)	PSD Measured (dBm)	PSD (dB)	PSD Limit (dBm/MHz)	PSD Margin (dB)
802.11a	6 Mbps	HT-20	5260	0.132	2.554	2.686	11	8.314
802.11a	6 Mbps	HT-20	5300	0.132	2.736	2.868	11	8.132
802.11a	6 Mbps	HT-20	5320	0.132	1.564	1.696	11	9.304
802.11ac	MCS0	HT-20	5260	0.177	0.458	0.635	11	10.365
802.11ac	MCS0	HT-20	5300	0.177	0.067	0.244	11	10.756
802.11ac	MCS0	HT-20	5320	0.177	0.181	0.358	11	10.642
802.11ac	MCS0	HT-40	5270	0.386	-6.597	-6.211	11	17.211
802.11ac	MCS0	HT-40	5310	0.386	-6.662	-6.276	11	17.276
802.11ac	MCS0	HT-80	5290	0.580	-9.794	-9.214	11	20.214
802.11n	MCS0	HT-20	5260	0.223	0.262	0.485	11	10.515
802.11n	MCS0	HT-20	5300	0.223	0.138	0.361	11	10.639
802.11n	MCS0	HT-20	5320	0.223	0.253	0.476	11	10.524
802.11n	MCS0	HT-40	5270	0.339	-6.639	-6.300	11	17.300
802.11n	MCS0	HT-40	5310	0.339	-6.703	-6.364	11	17.364

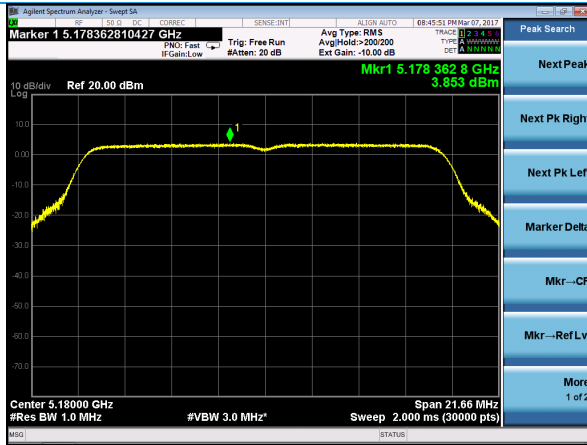
Table – U-NII- 2C PSD

Mode	Data Rate	BW	Frequency (MHz)	Correction Factor (dB)	PSD Measured (dBm)	PSD (dB)	PSD Limit (dBm/MHz)	PSD Margin (dB)
802.11a	6 Mbps	HT-20	5500	0.000	3.362	3.362	11	7.638
802.11a	6 Mbps	HT-20	5580	0.000	4.458	4.458	11	6.542
802.11a	6 Mbps	HT-20	5700	0.000	4.382	4.382	11	6.618
802.11ac	MCS0	HT-20	5500	0.000	1.410	1.41	11	9.590
802.11ac	MCS0	HT-20	5580	0.000	1.755	1.755	11	9.245
802.11ac	MCS0	HT-20	5710	0.000	2.166	2.166	11	8.834
802.11ac	MCS0	HT-40	5510	0.315	-5.467	-5.152	11	16.152
802.11ac	MCS0	HT-40	5550	0.315	-5.435	-5.12	11	16.120
802.11ac	MCS0	HT-40	5710	0.315	-5.520	-5.205	11	16.205
802.11ac	MCS0	HT-80	5530	0.580	-8.509	-7.929	11	18.929
802.11ac	MCS0	HT-80	5610	0.580	-8.238	-7.658	11	18.658
802.11ac	MCS0	HT-80	5690	0.580	-8.204	-7.624	11	18.624
802.11n	MCS0	HT-20	5500	0.000	1.979	1.979	11	9.021
802.11n	MCS0	HT-20	5580	0.000	2.143	2.143	11	8.857
802.11n	MCS0	HT-20	5700	0.000	1.807	1.807	11	9.193
802.11n	MCS0	HT-40	5510	0.315	-5.742	-5.427	11	16.427
802.11n	MCS0	HT-40	5550	0.315	-5.342	-5.027	11	16.027
802.11n	MCS0	HT-40	5670	0.315	-5.360	-5.045	11	16.045

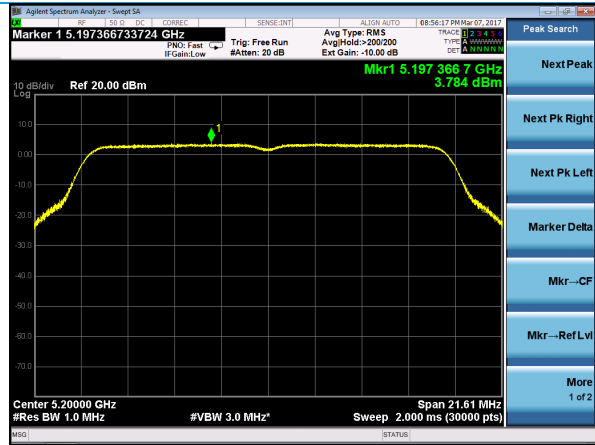
Table – U-NII-3 PSD

Mode	Data Rate	BW	Frequency (MHz)	Correction Factor (dB)	PSD Measured (dBm)	RBW Adjustment (dB)	PSD (dB)	PSD Limit (dBm/500 kHz)	PSD Margin (dB)
802.11a	6 Mbps	HT-20	5745	0.132	-4.395	7	2.737	30	27.263
802.11a	6 Mbps	HT-20	5785	0.132	-4.817	7	2.315	30	27.685
802.11a	6 Mbps	HT-20	5825	0.132	-4.788	7	2.344	30	27.656
802.11ac	MCS0	HT-20	5745	0.155	-7.566	7	-0.411	30	30.411
802.11ac	MCS0	HT-20	5785	0.155	-7.873	7	-0.718	30	30.718
802.11ac	MCS0	HT-20	5825	0.155	-7.924	7	-0.769	30	30.769
802.11ac	MCS0	HT-40	5755	0.315	-14.062	7	-6.747	30	36.747
802.11ac	MCS0	HT-40	5795	0.315	-14.367	7	-7.052	30	37.052
802.11ac	MCS0	HT-80	5775	0.555	-17.138	7	-9.583	30	39.583
802.11n	MCS0	HT-20	5745	0.177	-7.323	7	-0.146	30	30.146
802.11n	MCS0	HT-20	5785	0.177	-7.815	7	-0.638	30	30.638
802.11n	MCS0	HT-20	5825	0.177	-7.615	7	-0.438	30	30.438
802.11n	MCS0	HT-40	5755	0.315	-13.982	7	-6.667	30	36.667
802.11n	MCS0	HT-40	5795	0.315	-14.371	7	-7.056	30	37.056

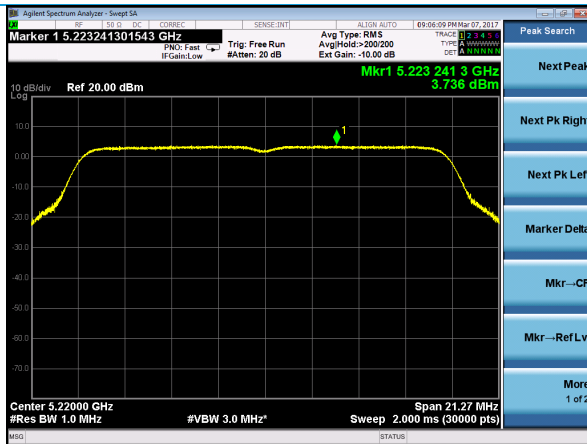
Plots – U-NII-1 PSD



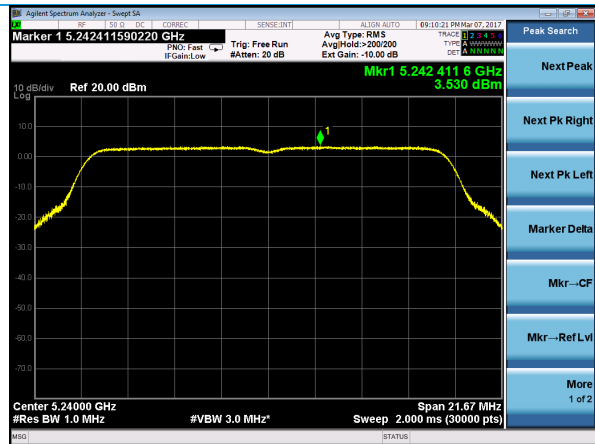
Low Channel – 802.11a HT-20



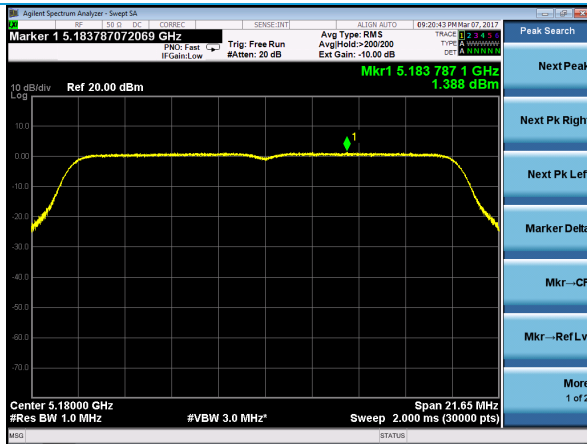
Mid Channel – 802.11a HT-20



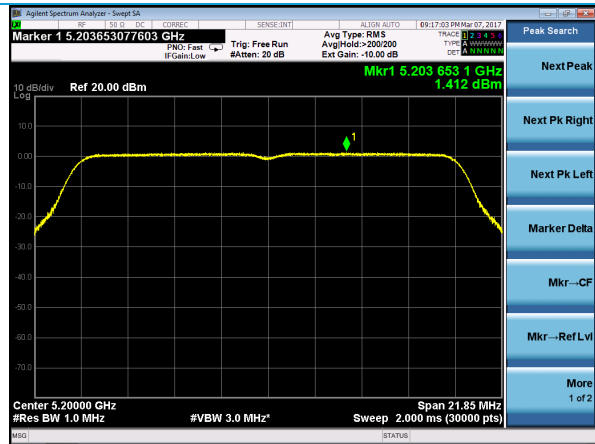
ISED High Channel – 802.11a HT-20



FCC High Channel – 802.11a HT-20



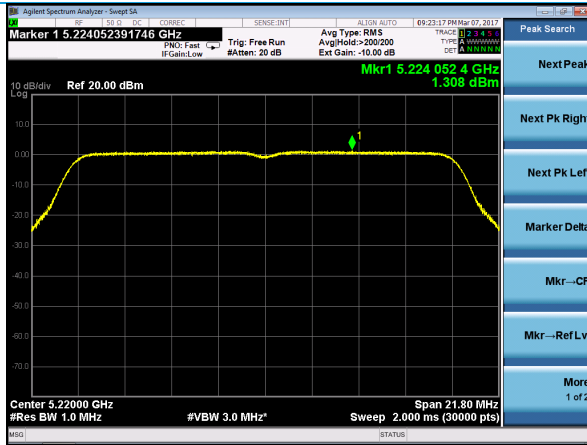
Low Channel – 802.11ac HT-20



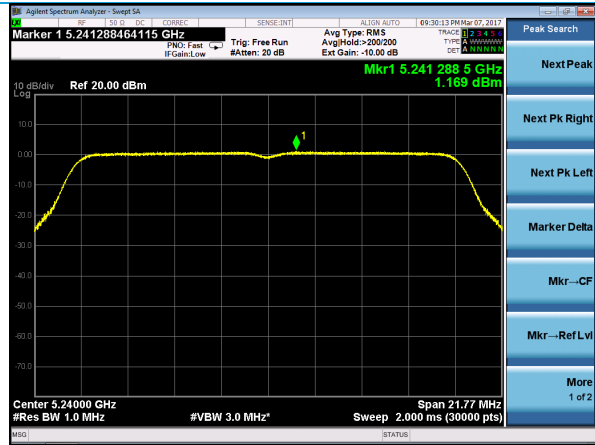
Mid Channel – 802.11ac HT-20

Company: LSR a Laird Business	Page 61 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

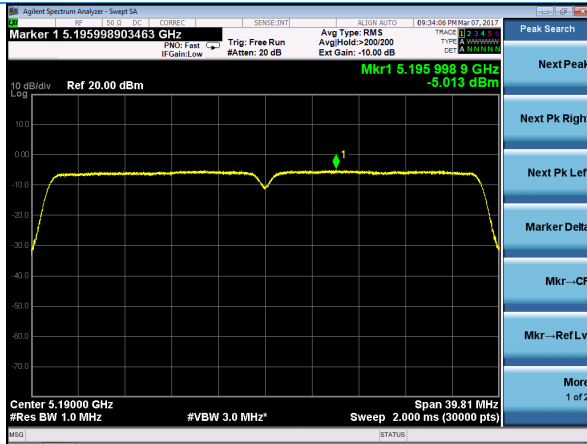
Plots – U-NII-1 PSD, continued



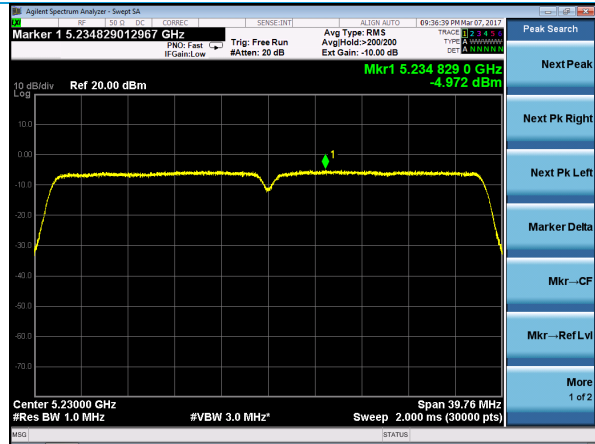
ISED High Channel – 802.11ac HT-20



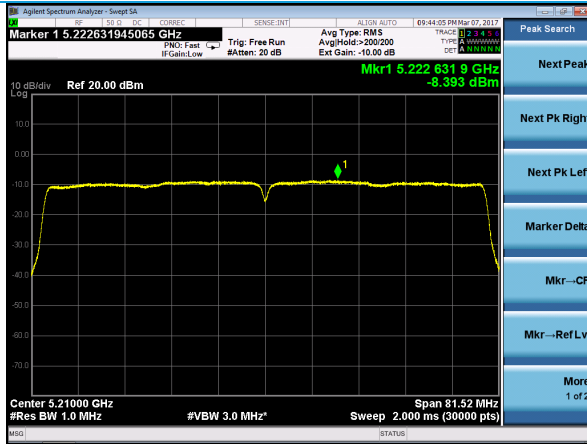
FCC High Channel – 802.11ac HT-20



Low Channel – 802.11ac HT-40



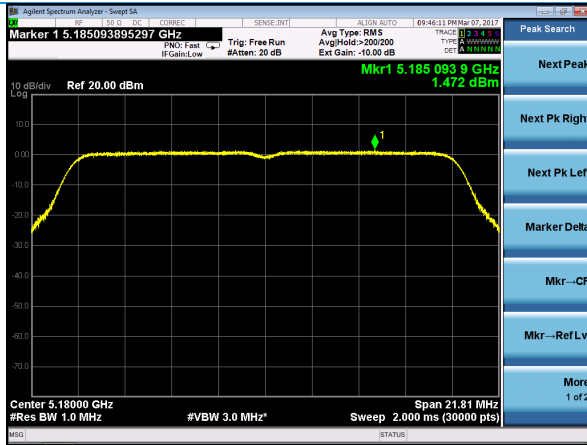
High Channel – 802.11ac HT-40



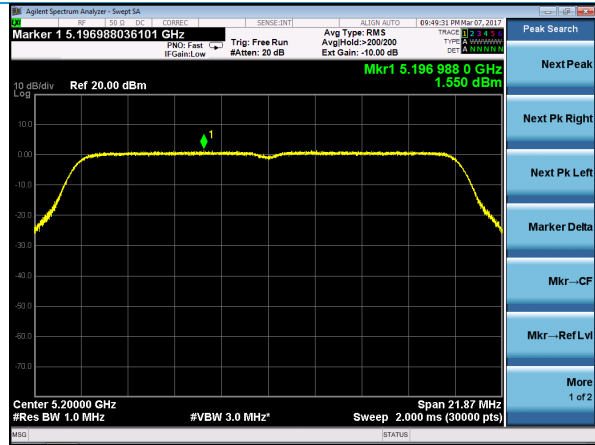
Only Channel – 802.11ac HT-80

Company: LSR a Laird Business	Page 62 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

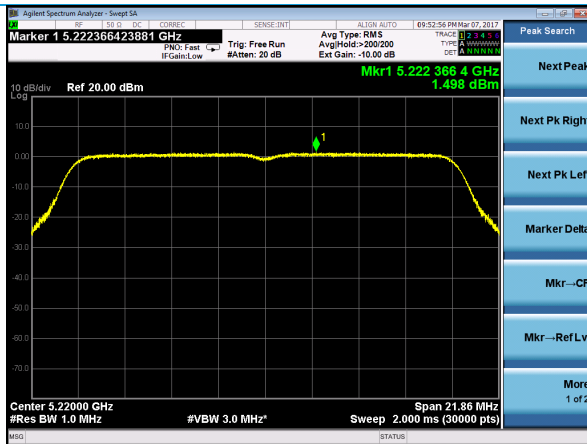
Plots – U-NII-1 PSD, continued



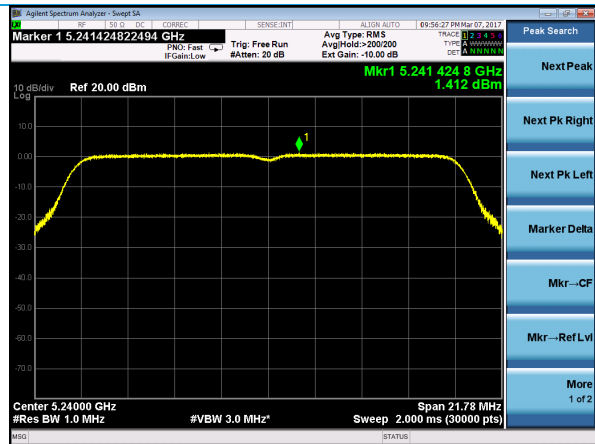
Low Channel – 802.11n HT-20



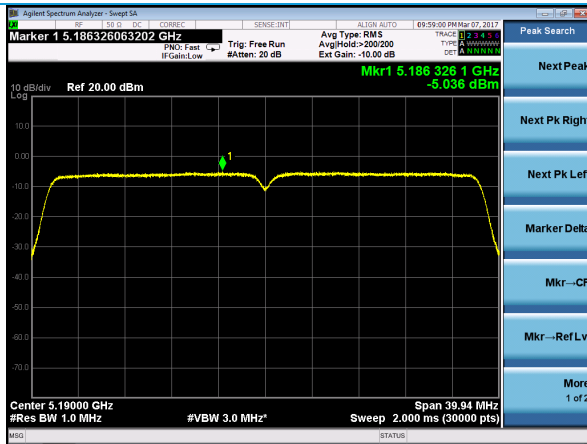
Mid Channel – 802.11n HT-20



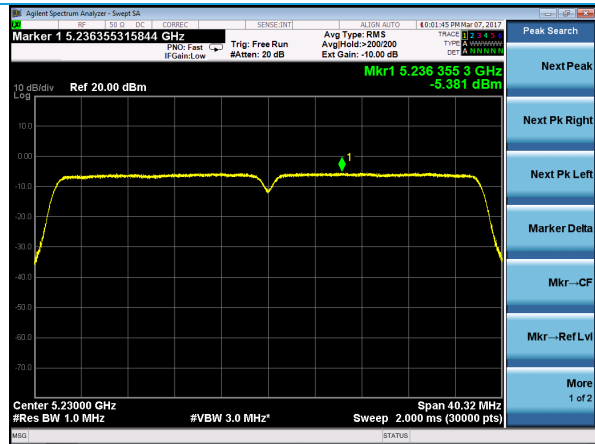
ISED High Channel – 802.11n HT-20



FCC High Channel – 802.11n HT-20



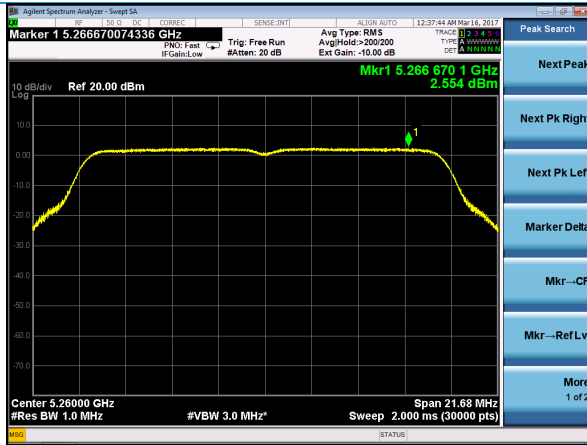
Low Channel – 802.11n HT-40



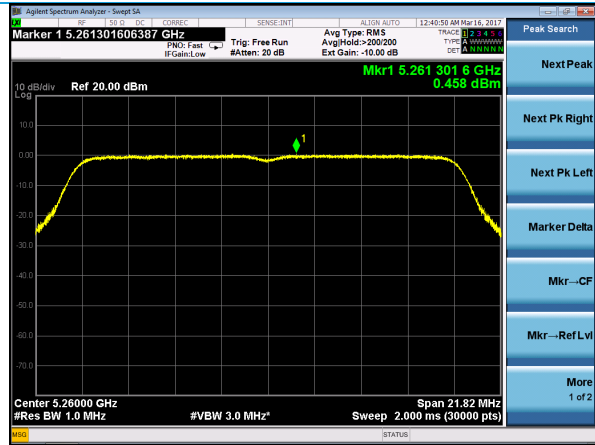
High Channel – 802.11n HT-40

Company: LSR a Laird Business	Page 63 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

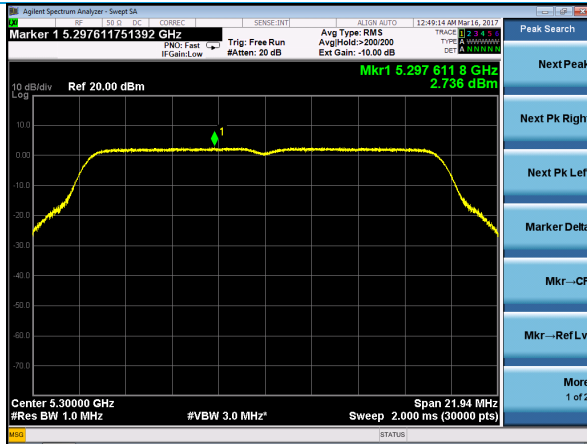
Plots – U-NII-2A PSD



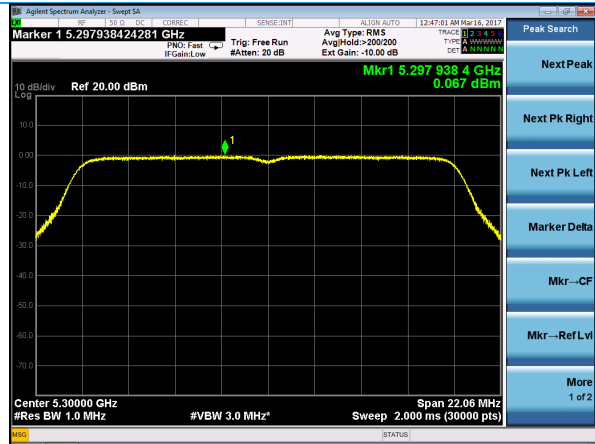
Low Channel – 802.11a HT-20



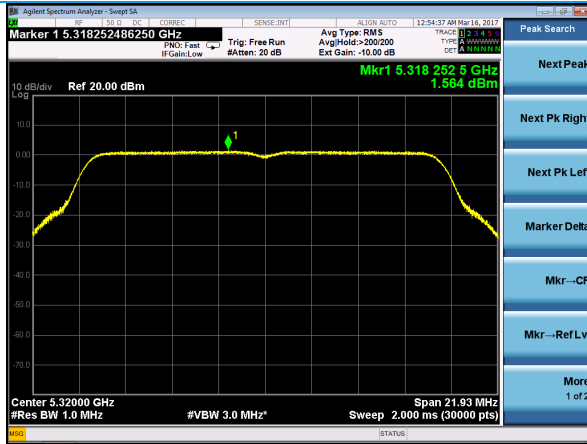
Low Channel 802.11ac HT-20



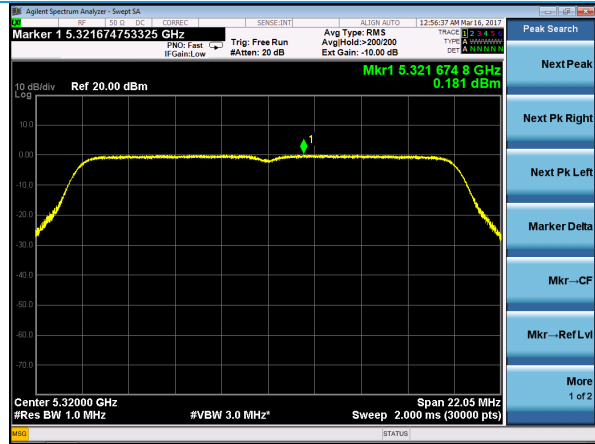
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20



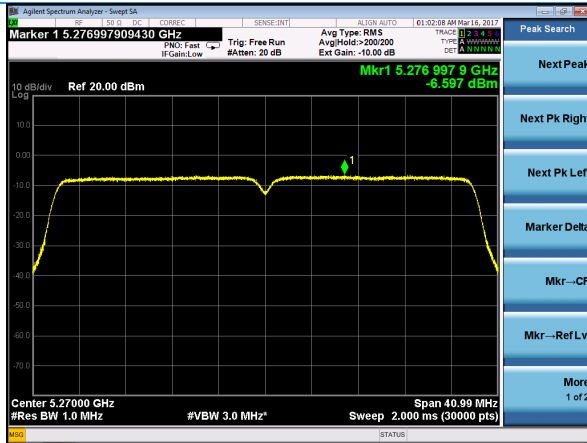
High Channel – 802.11a HT-20



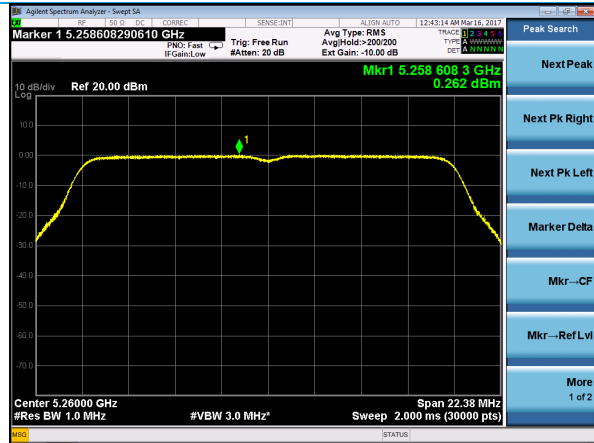
High Channel – 802.11ac HT-20

Company: LSR a Laird Buissness	Page 64 of 149	Name: Sterling-LWB5
Report: TR 316356 C (U-NII)		Model: Sterling-LWB5
Job: C-2602		Serial: 00008, 00035

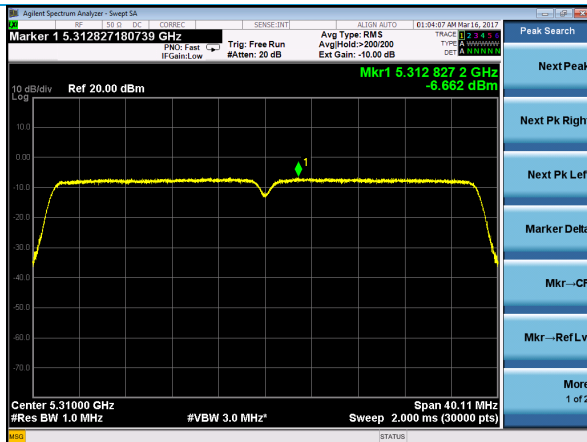
Plots – U-NII-2A PSD, continued



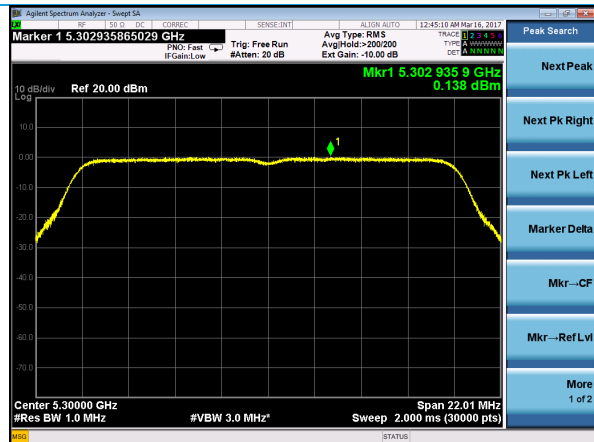
Low Channel – 802.11ac HT-40



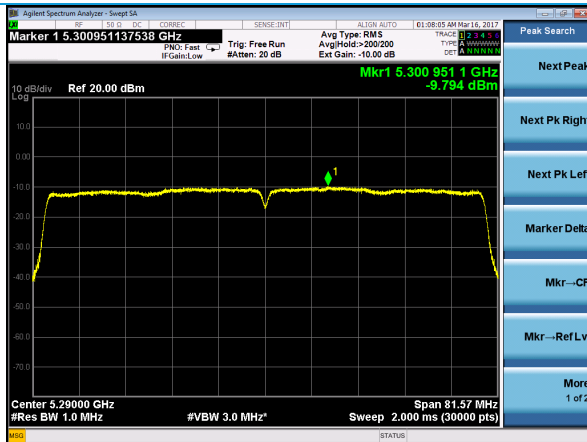
Low Channel – 802.11n HT-20



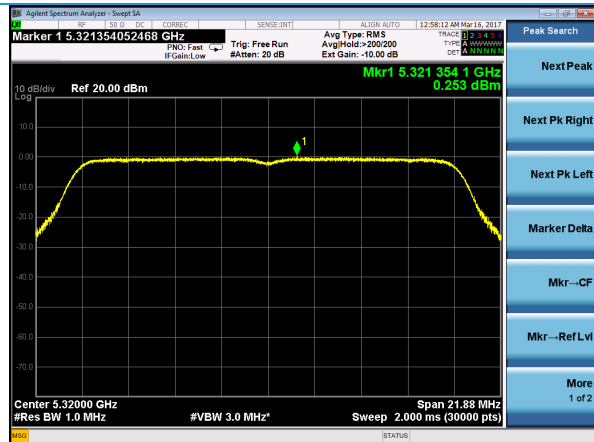
High Channel – 802.11ac HT-40



Mid Channel – 802.11n HT-20

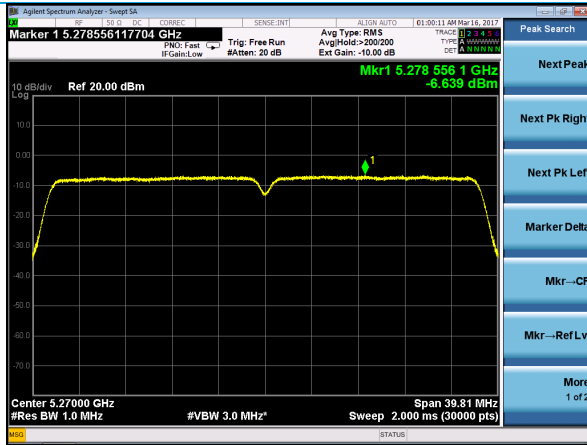


Only Channel – 802.11ac HT-80

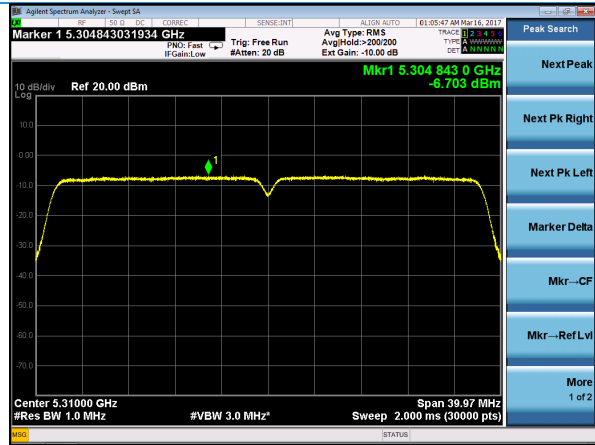


High Channel – 802.11n HT-20

Plots – U-NII-2A PSD, continued

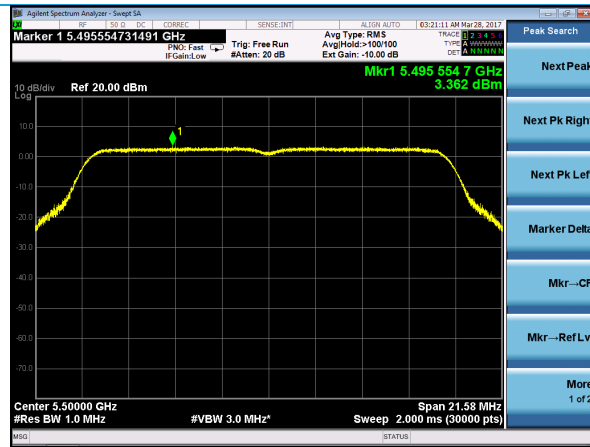


Low Channel – 802.11n HT-40

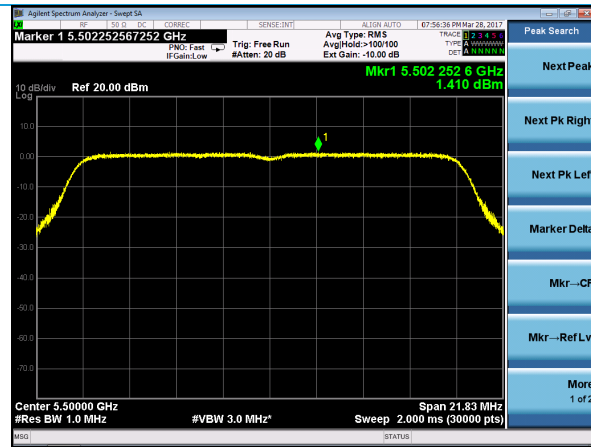


High Channel – 802.11n HT-40

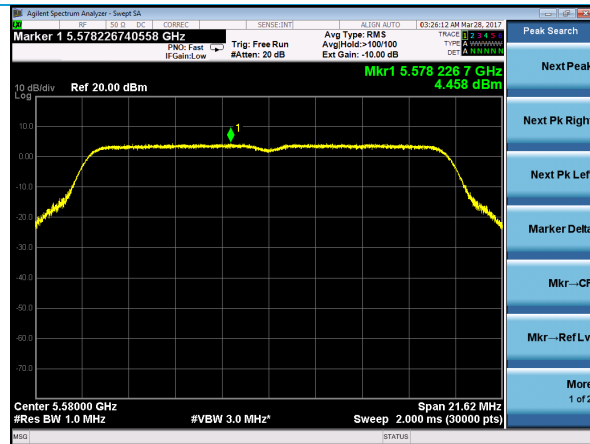
Plots – U-NII-2C PSD



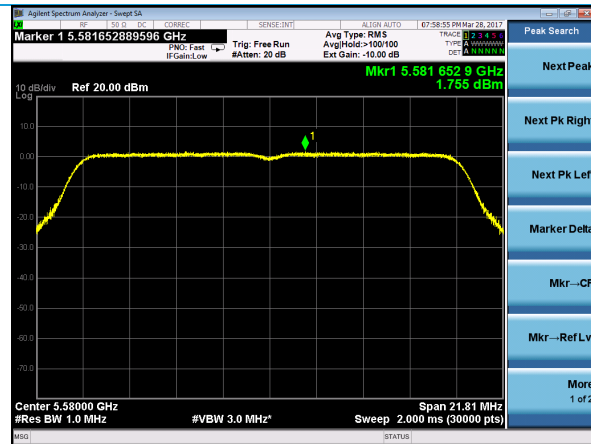
Low Channel – 802.11a HT-20



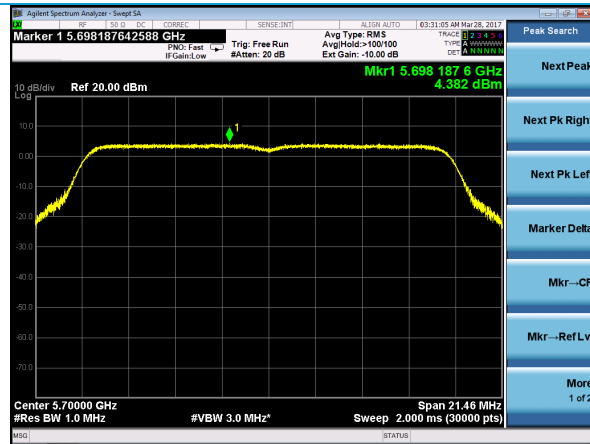
Low Channel – 802.11ac HT-20



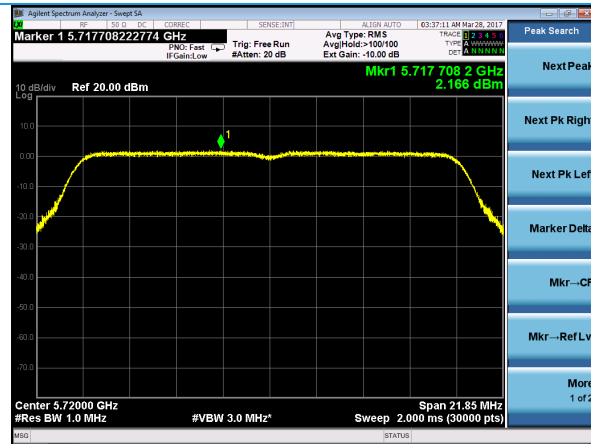
Mid Channel – 802.11a HT-20



Mid Channel – 802.11ac HT-20



High Channel – 802.11a HT-20



High Channel – 802.11ac HT-20