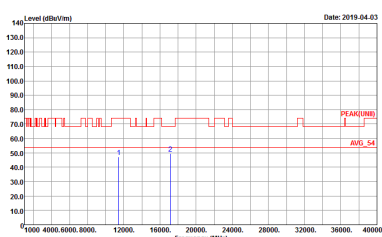
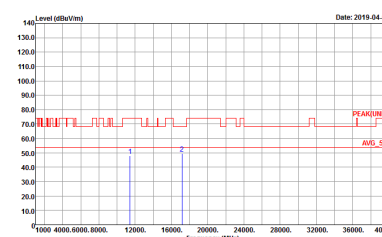
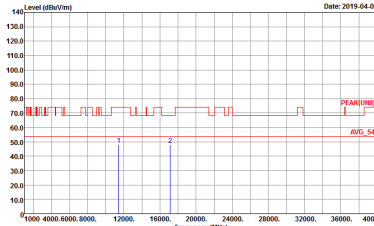
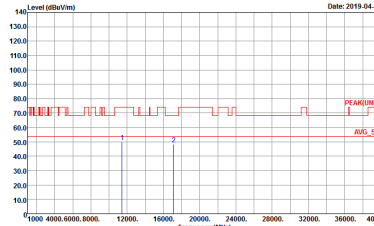




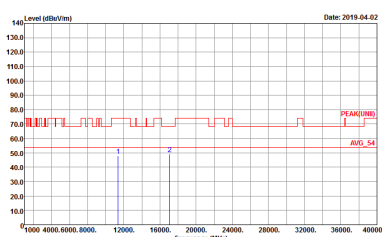
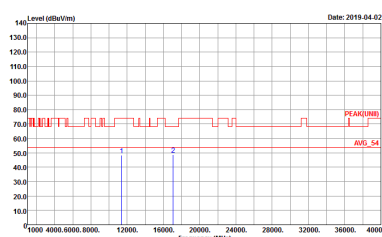
Band 3 – Straddle Channel
WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI	Band 3 Straddle Channel Harmonic @ 3m	
ANT	802.11ac VHT20 CH144 5720MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-11Y Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 911110 Mode : 100	 Site : 03CH15-11Y Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 911110 Mode : 100

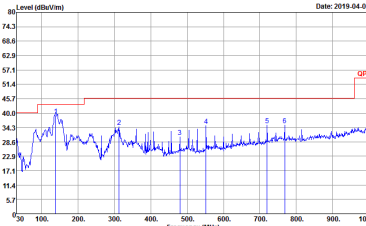
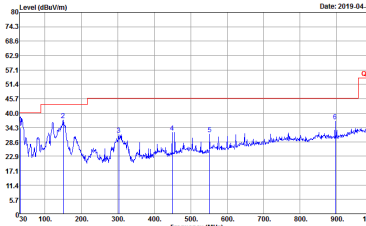
Band 3 – Straddle Channel
WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI	Band 3 Straddle Channel Harmonic @ 3m	
ANT	802.11ac VHT40 CH142 5710MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-11Y Condition : PEAK(UNB) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 911110 Mode : 104	 Site : 03CH15-11Y Condition : PEAK(UNB) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 911110 Mode : 104

Band 3 – Straddle Channel
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 3 Straddle Channel Harmonic @ 3m	
ANT	802.11ac VHT80 CH138 5690MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-11Y Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 911110 Mode : 107	 Site : 03CH15-11Y Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 911110 Mode : 107

Emission below 1GHz
5GHz WIFI 802.11ac VHT80 (LF)

WIFI	5GHz WIFI	
ANT	802.11ac VHT80 LF	
1+2	Horizontal	Vertical
QP / Peak	 Site : 03CH15-11Y Condition : QP 3m BIL06_15_41912 HORIZONTAL Detector : Peak Project : 911110 Mode : 163	 Site : 03CH15-11Y Condition : QP 3m BIL06_15_41912 VERTICAL Detector : Peak Project : 911110 Mode : 163

Annex. A Receiver Radiated Emission Measurement

A.1 Limit of Receiver Radiated Emission

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

A.2 Measuring Instruments

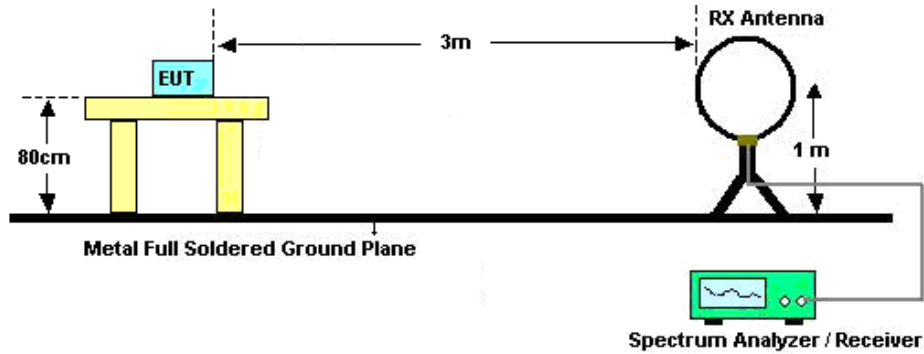
See list of measuring equipment of this test report.

A.3 Test Procedures

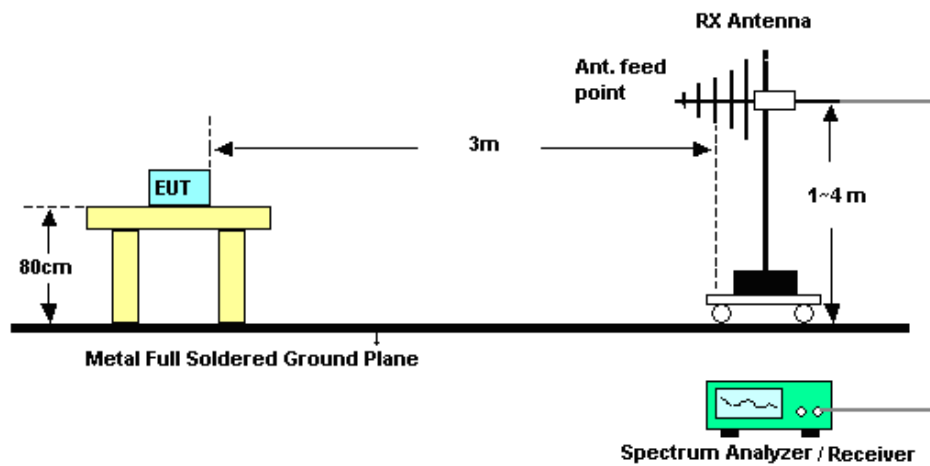
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest radiation.
5. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
6. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
8. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
9. Emission level (dBμV/m) = 20 log Emission level (μV/m)
10. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

A.4 Test Setup

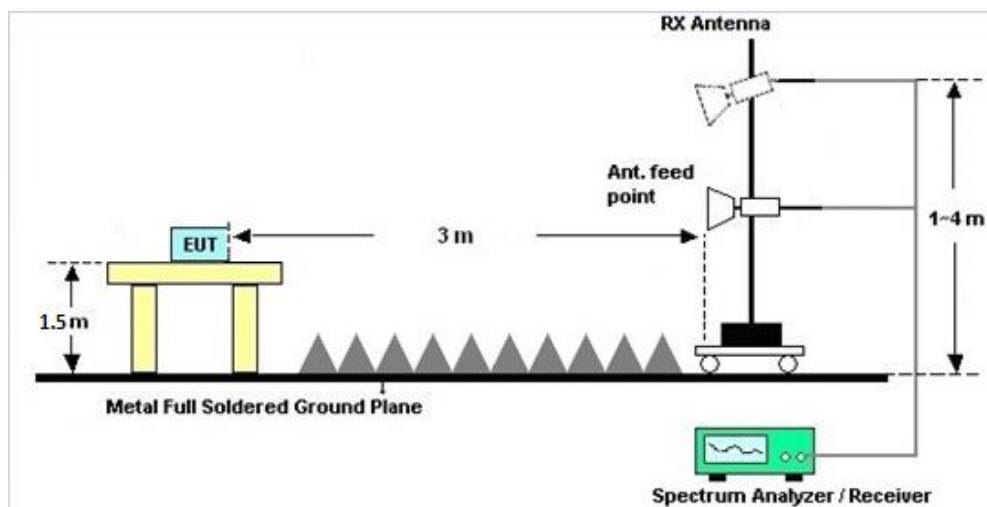
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

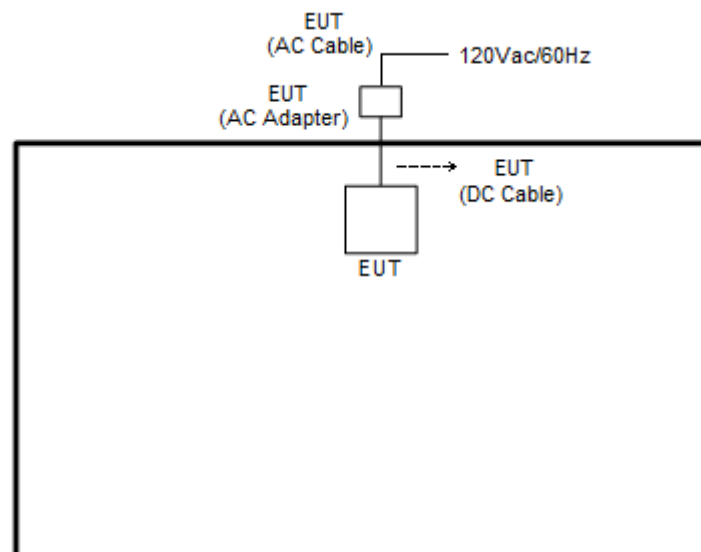


A.5 Test Result of Receiver Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per NCC LP0002 section 5.13 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

A.6 Connection Diagram of Test System



A.7 Test Result of Receiver Radiated Spurious Emission (30MHz ~ 5th Harmonic)

Test Engineer :	Watt Tseng, Karl Hou, and BigShow Wang	Temperature :	24~26°C
		Relative Humidity :	52~57%
Frequency	140.580 MHz	Margin	Under 1.83 dB for Quasi-Peak
Test Mode	WLAN (5GHz) Rx + USB Cable (Charging from Adapter)		

Idle Mode

Horizontal

Vertical

Peak

Avg.

Level (dBuV/m)

140

130

120

110

100

90

80

70

60

50

40

30

20

10

0

50

1000

3000

5000

7000

9000

11000

13000

15000

18000

1

2

3

4

5

6

7

8

9

10

11

12

PLAN(UNII)

Avg_54

Site : 03CH15-HV
Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL
Detector : Peak
Project : 911110
Mode : S

	Freq	Level	Over	Limit	ReadAntenna	Cable	Pream	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	Loss	dB	cm	deg
1	70.74	32.54	-7.46	40.00	51.55	12.45	1.02	32.56	---	Peak
2	140.58	41.67	-1.83	43.50	55.11	17.54	1.42	32.50	225	282 QP
3	303.54	32.75	-13.25	46.00	43.78	19.30	2.08	32.54	---	Peak
4	439.34	25.73	-20.27	46.00	32.84	22.89	2.48	32.56	---	Peak
5	686.69	29.01	-16.99	46.00	31.63	26.60	3.09	32.43	---	Peak
6	863.23	31.45	-14.55	46.00	30.53	29.10	3.47	31.85	---	Peak
7	1034.00	41.76	-26.44	68.20	42.50	25.40	5.10	31.24	---	Peak
8	2710.00	46.35	-27.65	74.00	42.98	27.93	6.21	30.77	---	Peak
9	8452.00	45.80	-28.20	74.00	55.41	36.50	11.64	58.35	---	Peak
10	11147.00	48.89	-25.11	74.00	57.01	39.95	13.09	61.71	---	Peak
11	12962.00	46.82	-21.38	68.20	53.46	39.10	14.50	60.76	100	0 Peak
12	16141.00	46.20	-27.80	74.00	52.91	37.25	16.67	61.11	---	Peak

Site : 03CH15-HV
Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL
Detector : Peak
Project : 911110
Mode : S

	Freq	Level	Over	Limit	ReadAntenna	Cable	Pream	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	Loss	dB	cm	deg
1	37.76	37.62	-2.38	40.00	48.34	21.12	0.76	32.61	100	175 QP
2	147.37	35.58	-7.92	43.50	49.15	17.36	1.45	32.50	---	Peak
3	287.05	27.63	-18.37	46.00	38.92	19.04	2.02	32.53	---	Peak
4	307.62	29.26	-16.74	46.00	40.29	19.30	2.09	32.54	---	Peak
5	714.82	31.33	-14.67	46.00	33.54	26.89	3.15	32.37	---	Peak
6	896.21	37.34	-8.66	46.00	36.47	28.82	3.51	31.67	---	Peak
7	2350.00	45.38	-28.62	74.00	42.76	27.70	5.80	30.88	---	Peak
8	3916.00	49.07	-24.93	74.00	42.38	29.70	7.36	30.37	---	Peak
9	7814.00	44.08	-24.12	68.20	53.91	36.33	11.15	58.05	---	Peak
10	10663.00	47.17	-26.83	74.00	55.70	39.80	12.92	61.73	---	Peak
11	13523.00	46.85	-21.35	68.20	52.38	40.17	14.98	61.21	100	0 Peak
12	16119.00	45.33	-28.67	74.00	52.19	37.22	16.66	61.20	---	Peak

Annex. B Maximum Power Density

B.1 RF Exposure Limit Introduction

According to NCC LP0002, the criteria listed in Table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §5.20.2.1 and §5.20.2.2.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

B.2 Standalone Power Density Calculation

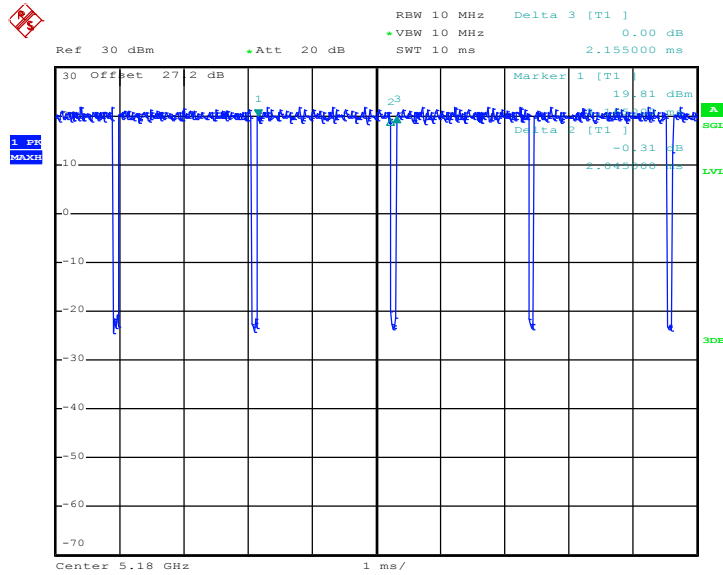
<CDD Mode>				
Maximum Power Density				
Max. Power	Gain	EIRP	20 cm PSD	Limit
22.27	4.2	26.47	0.0883	1
dBm	dBi	dBm	mW/cm ²	mW/cm ²
<TXBF Mode>				
Maximum Power Density				
Max. Power	Gain	EIRP	20 cm PSD	Limit
21.46	7.01	28.47	0.1399	1
dBm	dBi	dBm	mW/cm ²	mW/cm ²

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1	802.11a	94.90	2045	0.49	1kHz	0.23
2	802.11a	95.15	2060	0.49	1kHz	0.22
1+2	802.11a for Ant. 1	94.92	2055	0.49	1kHz	0.23
1+2	802.11a for Ant. 2	95.80	2055	0.49	1kHz	0.19
1	5GHz 802.11n HT20	94.33	1915	0.52	1kHz	0.25
2	5GHz 802.11n HT20	94.57	1915	0.52	1kHz	0.24
1+2	5GHz 802.11n HT20 for Ant. 1	94.58	1920	0.52	1kHz	0.24
1+2	5GHz 802.11n HT20 for Ant. 2	94.57	1915	0.52	1kHz	0.24
1	5GHz 802.11n HT40	92.20	945	1.06	3kHz	0.35
2	5GHz 802.11n HT40	91.83	955	1.05	3kHz	0.37
1+2	5GHz 802.11n HT40 for Ant. 1	91.39	955	1.05	3kHz	0.39
1+2	5GHz 802.11n HT40 for Ant. 2	92.23	950	1.05	3kHz	0.35
1	5GHz 802.11ac VHT20	94.88	1945	0.51	1kHz	0.23
2	5GHz 802.11ac VHT20	95.30	1925	0.52	1kHz	0.21
1+2	5GHz 802.11ac VHT20 for Ant. 1	95.77	1925	0.52	1kHz	0.19
1+2	5GHz 802.11ac VHT20 for Ant. 2	94.36	1925	0.52	1kHz	0.25
1	5GHz 802.11ac VHT40	91.79	950	1.05	3kHz	0.37
2	5GHz 802.11ac VHT40	91.83	955	1.05	3kHz	0.37
1+2	5GHz 802.11ac VHT40 for Ant. 1	90.95	955	1.05	3kHz	0.41
1+2	5GHz 802.11ac VHT40 for Ant. 2	90.91	950	1.05	3kHz	0.41
1	5GHz 802.11ac VHT80	85.19	460	2.17	3kHz	0.70
2	5GHz 802.11ac VHT80	85.32	465	2.15	3kHz	0.69
1+2	5GHz 802.11ac VHT80 for Ant. 1	85.45	470	2.13	3kHz	0.68
1+2	5GHz 802.11ac VHT80 for Ant. 2	86.11	465	2.15	3kHz	0.65

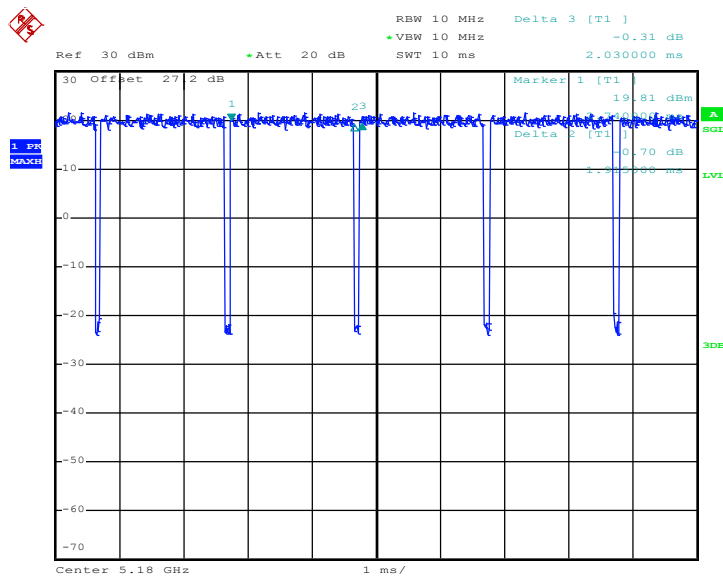
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802.11a



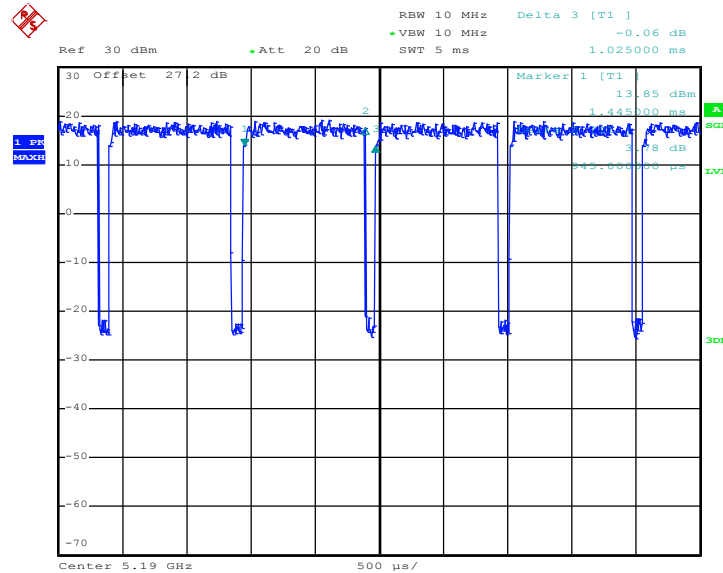
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802.11n HT20



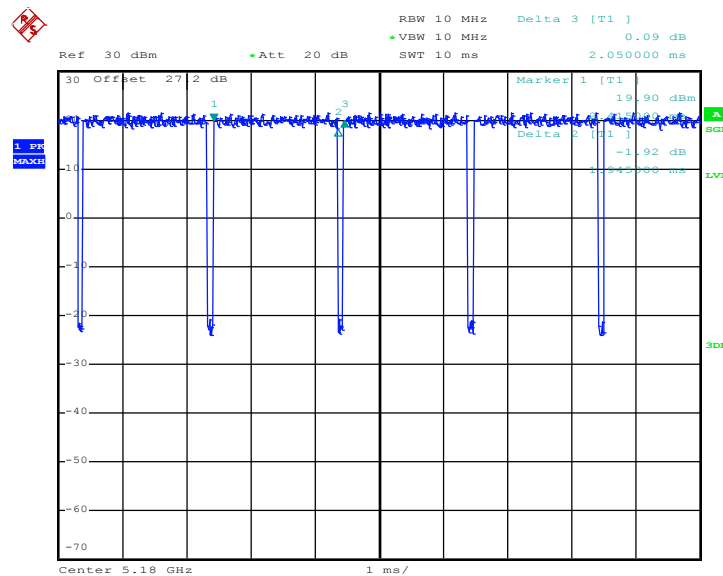
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802.11n HT40



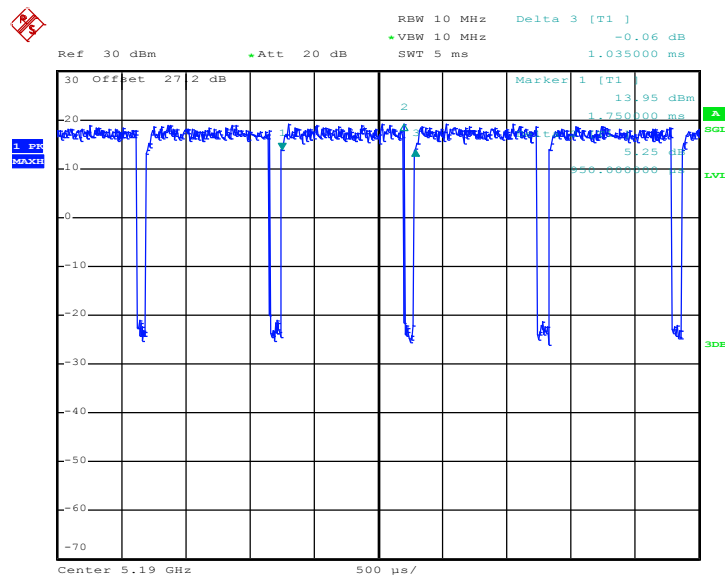
Date: 21.FEB.2019 06:40:51

802.11ac VHT20



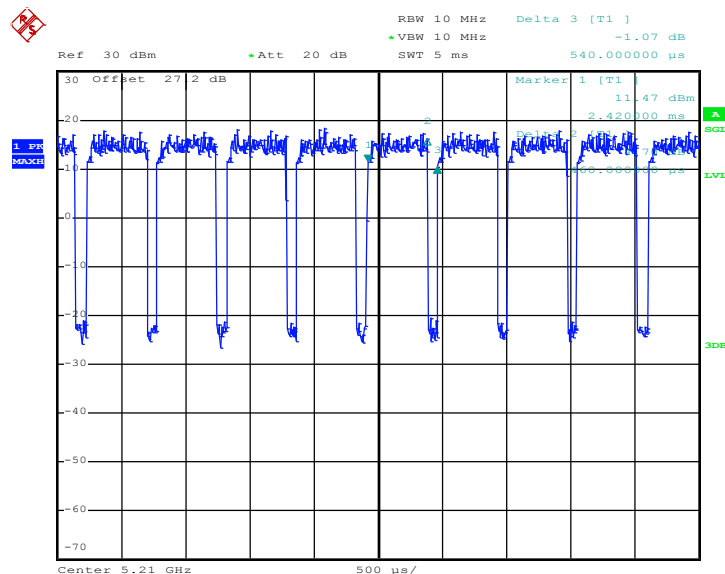
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802.11ac VHT40



Date: 21.FEB.2019 06:41:50

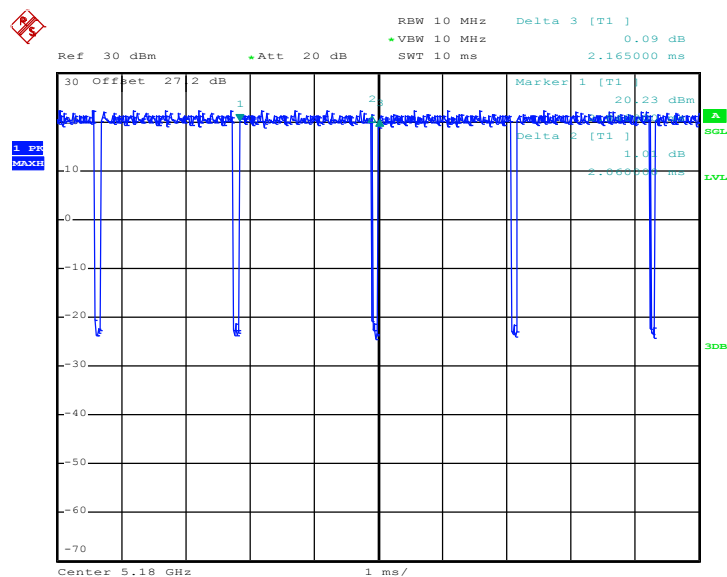
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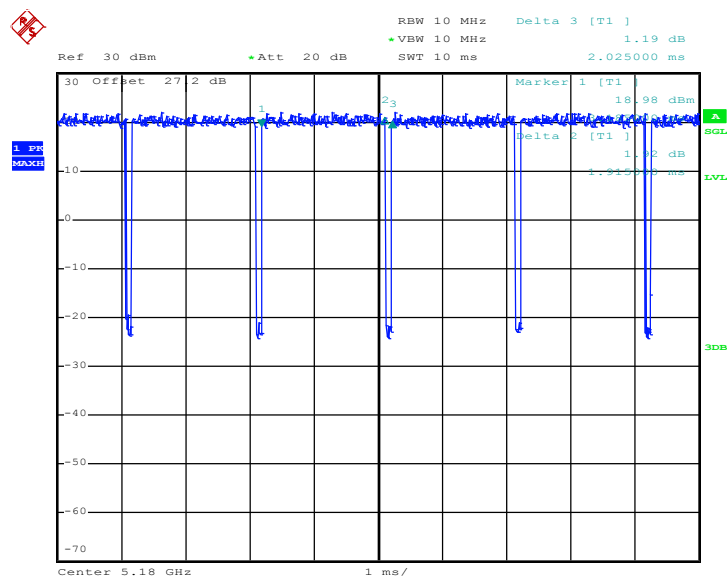
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802.11a



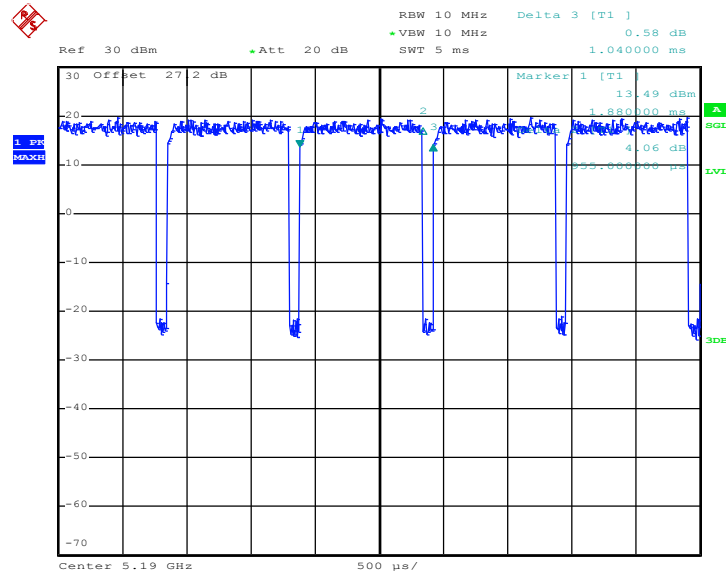
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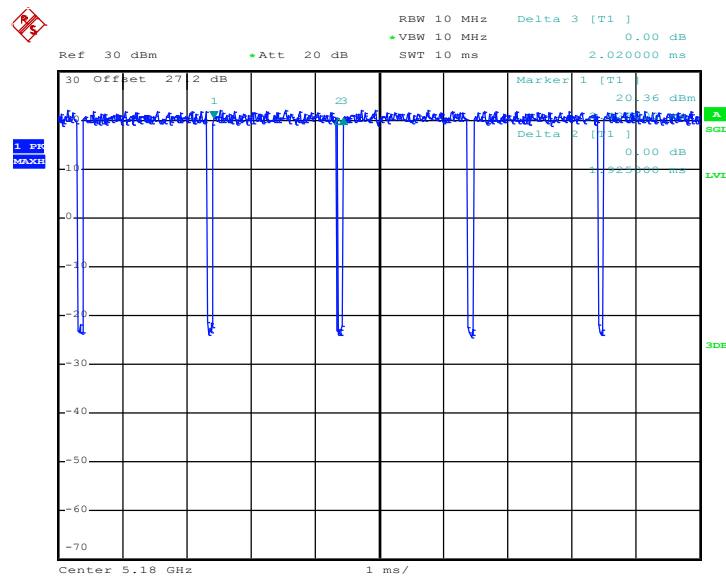
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802.11n HT40



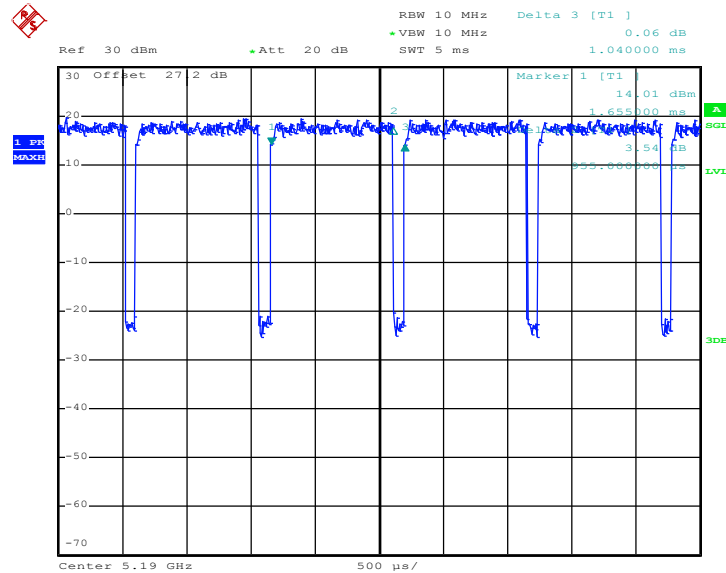
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802.11ac VHT20



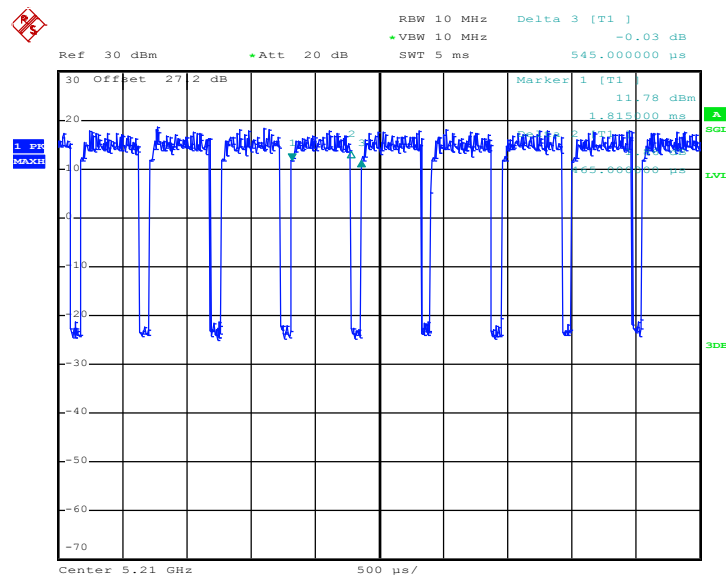
Date: 21.FEB.2019 06:36:16

802.11ac VHT40



Date: 21.FEB.2019 06:42:33

802.11ac VHT80



Date: 21.FEB.2019 06:46:54



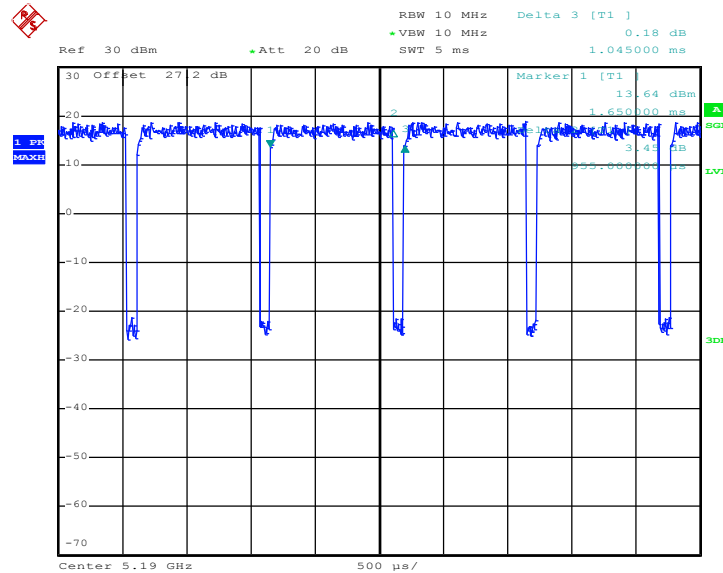
802.11a



802.11n HT20

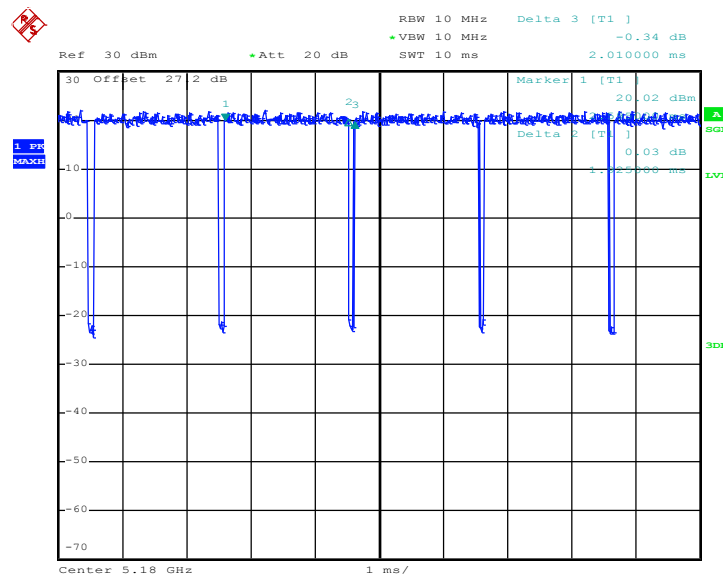


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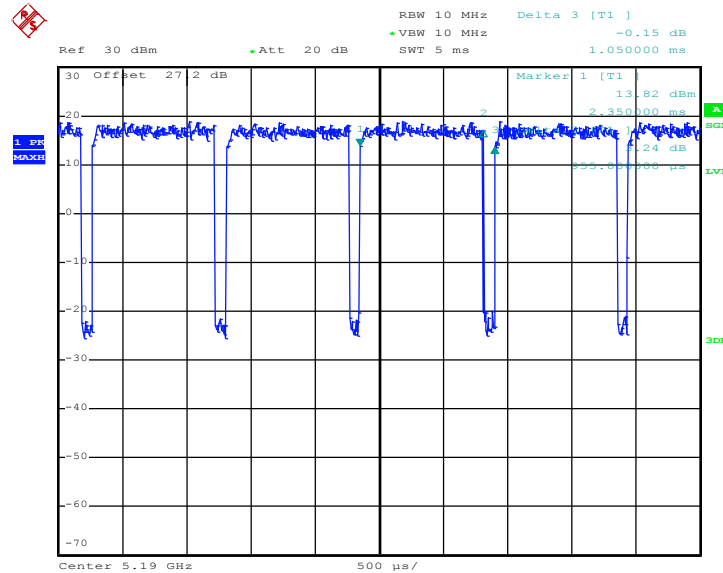
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802.11ac VHT20



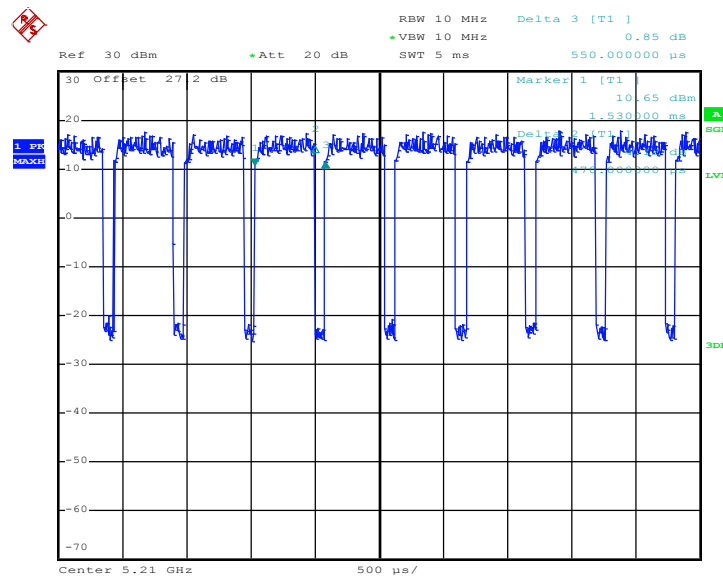
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802.11ac VHT40



Date: 21.FEB.2019 06:43:07

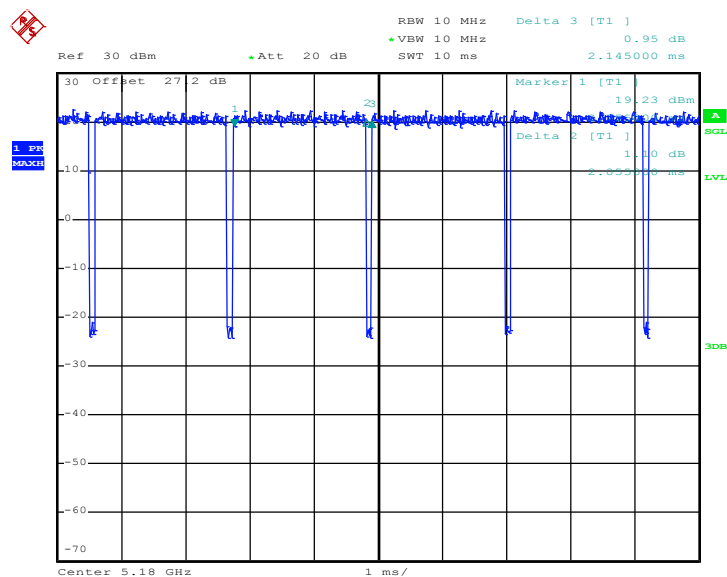
802.11ac VHT80



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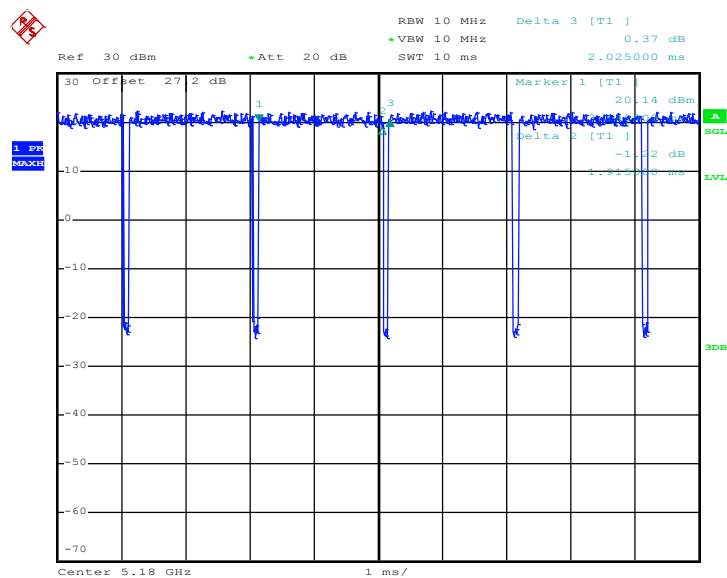
MIMO <Ant. 2>

802.11a



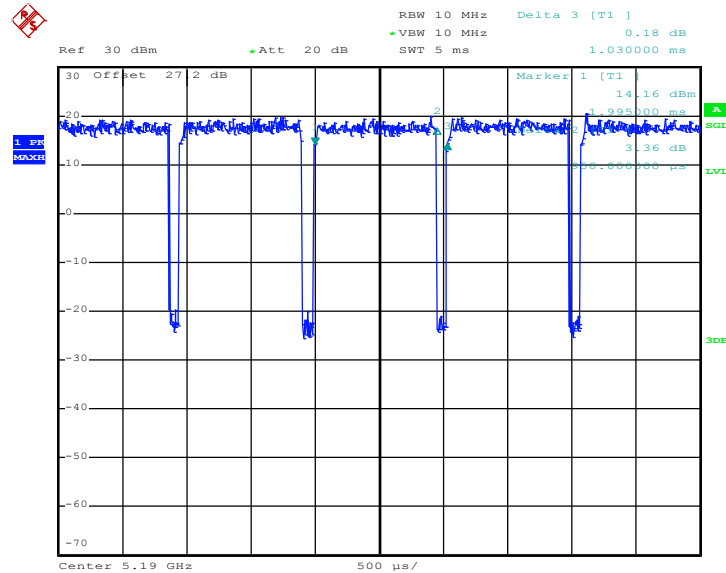
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802.11n HT20



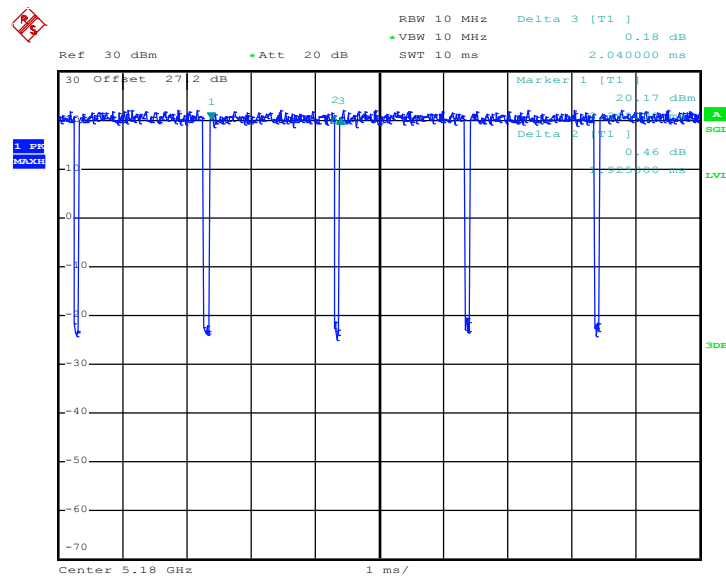
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802.11n HT40



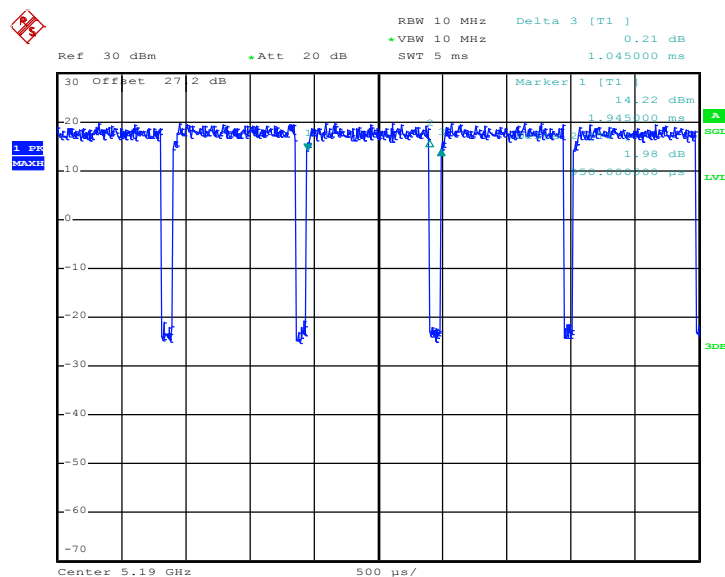
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802.11ac VHT20



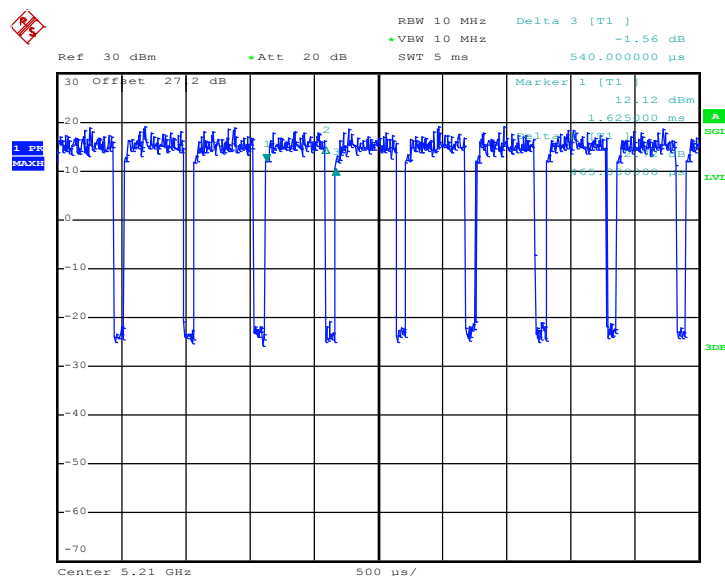
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802.11ac VHT40



Date: 21.FEB.2019 06:43:31

802.11ac VHT80



Date: 21.FEB.2019 06:44:41