



FCC 47 CFR PART 15 SUBPART E 15.407
TEST REPORT
FOR
TREKSTOR PRIMETAB T13B

Model : DFALPWW01464, DFALKWW01464

Issued to
TREKSTOR GmbH
Berliner Ring 7, 64625 Bensheim, Germany

Issued by
WH Technology Corp.



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APPENDIX 1 PHOTOS OF TEST CONFIGURATION
PHOTOS OF EUT



1. General Information

Applicant : TREKSTOR GmbH

Address : Berliner Ring 7, 64625 Bensheim, Germany

Manufacturer : Heyuan Vastking Electronic Co.,Ltd

Address : No.13, Hepu Avenue, Yuancheng District, Heyuan City, Guangdong Province, China.

EUT : TREKSTOR PRIMETAB T13B

Model Name : DFALPWW01464, DFALKWW01464

Model Differences : Only model name different, others are all the same.

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI C63.4-2014. The said equipment in the configuration described in this report shows the maximum emission levels emanating

FCC part 15 subpart E

Receipt Date : 07/02/2018

Final Test Date : 07/18/2018

Tested By:

Reviewed by:

Jul. 23, 2018

Date

Bing Chang/ Engineer

Jul. 23, 2018

Date

Bell Wei / Manager

Designation Number: TW2954



2. Report of Measurements and Examinations

2.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.203	Antenna requirement	Pass
15.207	AC Power Line Conducted Emission	Pass
15.407(a)(1)	Peak Transmit Power	Pass
15.407(a)(1)	Power Spectral Density	Pass
15.407(e)	Channel Bandwidth	Pass
15.407(b)(6), 15.205/15.209	Undesirable Emission	Pass
15.205/15.209	Radiated Emission	Pass
15.205	Band Edge	Pass
15.407(f)	Frequency Stability	Pass



3. Test Configuration of Equipment under Test

3.1 Description of the tested samples

EUT Name	: TREKSTOR PRIMETAB T13B
Model Number	: DFALPWW01464
FCCID	: 2ALTX-DFALPWW01464
Receipt Date	: 07/02/2018
Power From	: ☒ Inside ☒ Outside ☒ Adaptor ☒ Battery ☐ AC Power Source ☐ DC Power Source ☐ Support Unit PC or NB
Adapter	: JHD-AP024U-120200BA-A INPUT: AC100-240V~ 50/60Hz 0.45A, Output: DC12V 2000mA
Battery	: 7.4V
Operate Frequency	: WiFi: 802.11a/802.11n(HT20) /ac(VHT20): 5180MHz ~ 5240MHz;
Modulation Technique	: 802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Number of Channels	: Refer to the channel list as described below
Antenna Type	: FPCB Antenna
Antenna gain	: Antenna A :2.4GWIFI 2.0dBi; 5G WIFI 1.8dBi Antenna B : 2.4GWIFI 1.85dBi; 5G WIFI 1.9dBi



3.2 Carrier Frequency of Channels

1. Channel List for 802.11a/n-HT20/ac-VHT20

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	--	--
40	5200	--	--
44	5220	--	--
48	5240	--	--
149	--		

2. Channel List for 802.11n-HT40/ac-VHT40

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	--	--
46	5230	--	--

3. Channel List for 802.11ac-VHT80

Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	--	--



3.3 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included Notebook and EUT for RF test.
- c. Test Software: Radio Test.exe
- d. Full charge Battery was used for all testing and the worst radiated emission case from X,Y and Z axis evaluation was selected for testing.
- e. Per-test antenna **A** and antenna **B**, find the worst-case is antenna **A**, and record in report.

Note:

Have verified all construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as Test Mode as below:

Transmit (802.11a)

Transmit (802.11n MCS0 20MBW)

Transmit (802.11n MCS0 40MBW)

Transmit (802.11ac MCS0 80MBW)



3.4 TEST Methodology & General Test Procedures

All testing as described bellowed were performed in accordance with ANSI C63.4:2014 and ANSI C63.10:2013.

Conducted Emissions

The EUT is placed on a wood table, which is at 0.8 m above ground plane acceding to clause 15.207 and requirements of ANSI C63.4:2014. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

Radiated Emissions

The EUT is a placed on a turn table, which is 0.8 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

- 1) Putting the EUT on the platform and turning on the EUT (on/off button on the bottom of the EUT).
- 2) Setting test channel described as “Channel setting and operating condition”, and testing channel by channel.
- 3) For the maximum output power measurement, we followed the method of measurement KDB 789033 D02.
- 4) For the spurious emission test based on ANSI(2014), at the frequency where below 1GHz used quasi-peak detector mode; where above 1GHz used the peak and average detector mode. IF the peak value may be under average limit, the average mode will not be performed.



3.5 Measurement Uncertainty

Measurement Item	Uncertainty
Peak Output Power(conducted)	$\pm 1.345\text{dB}$
Power Spectral Density	$\pm 1.347\text{dB}$
Radiated emission(1G-40GHz)	$\pm 5.00\text{dB}$
Radiated emission(30M-1GHz)	$\pm 3.89\text{dB}$
Conducted emission	$\pm 1.81\text{dB}$

3.6 Description of the Support Equipments

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.



4. Test and measurement equipment

4.1 calibration

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

4.2 equipment

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.



TABLELIST OF TEST AND MEASUREMENT EQUIPMENT

Test Site	Instrument	Manufacturer	Model No.	S/N	Next Cal. Date
Conduction	Spectrum (9K--3GHz)	R&S	FSP3	833387/010	2018/09/20
	EMI Receiver	R&S	ESHS10	830223/008	2019/05/22
	LISN	Rolf Heine Hochfrequenztechnik	NNB-2/16z	98062	2019/05/25
	ISN	Schwarzbeck	8-Wire ISN CAT5	CAT5-8158-0094	2018/09/21
	RF Cable	N/A	N/A	EMI-3	2018/10/19
Radiation	Bilog antenna(30M-1G)	ETC	MCTD2786B	BLB16M04004/J B-5-004	2019/05/03
	Double Ridged Guide Horn antenna(1G-18G)	ETC	MCTD 1209	DRH15N0 2009	2018/11/23
	Horn antenna (18G-26G)	com-power	AH-826	81000	2018/08/15
	LOOP Antenna (Below 30M)	com-power	AL-130	17117	2018/10/04
	Pre amplifier (30M-1G)	EMC INSTRUMENT	EMC9135	980334	2019/05/04
	Microwave Preamplifier (1G-18G)	EMC INSTRUMENT	EMC051845	980108&AT -18001	2018/10/23
	Pre amplifier (18G~26G)	MITEQ	JS4-18002600-3 0-5A	808329	2018/08/10
	EMI Test Receiver	R&S	ESVS30 (20M-1000MHz)	826006/002	2018/11/28
	RF Cable	EMCI	N male on end	30m	2018/10/19



	(open site)		of both sides (EMI4)		
	RF CABLE (1~26.5G)	HARBOUT INDUSTRIES	LL142MI(4M+4M)	NA	2019/03/08
	RF CABLE (1~26.5G)	HARBOUR INDUSTRIES	LL142MI(7M)	NA	2018/08/11
	Spectrum (9K--7GHz)	R&S	FSP7	830180/006	2019/03/25
	Spectrum (9K--40GHz)	AGILENT	8564EC	4046A0032	2019/03/01
--	Power Meter	R&S	NRVS	100696	2018/08/10
--	Power Sensor	R&S	URV5-Z4	0395.1619.05	2018/08/10

***CALIBRATION INTERVAL OF INSTRUMENTS LISTED ABOVE IS ONE YEAR**



5. Antenna Requirements

5.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2 Antenna Construction and Directional Gain

Antenna Type: FPCB Antenna

Antenna Gain: Gain:

Antenna A :2.4GWIFI 2.0dBi; 5G WIFI 1.8dBi

Antenna B : 2.4GWIFI 1.85dBi; 5G WIFI 1.9dBi



6. Test of Conducted Emission

6.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 110 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2014 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

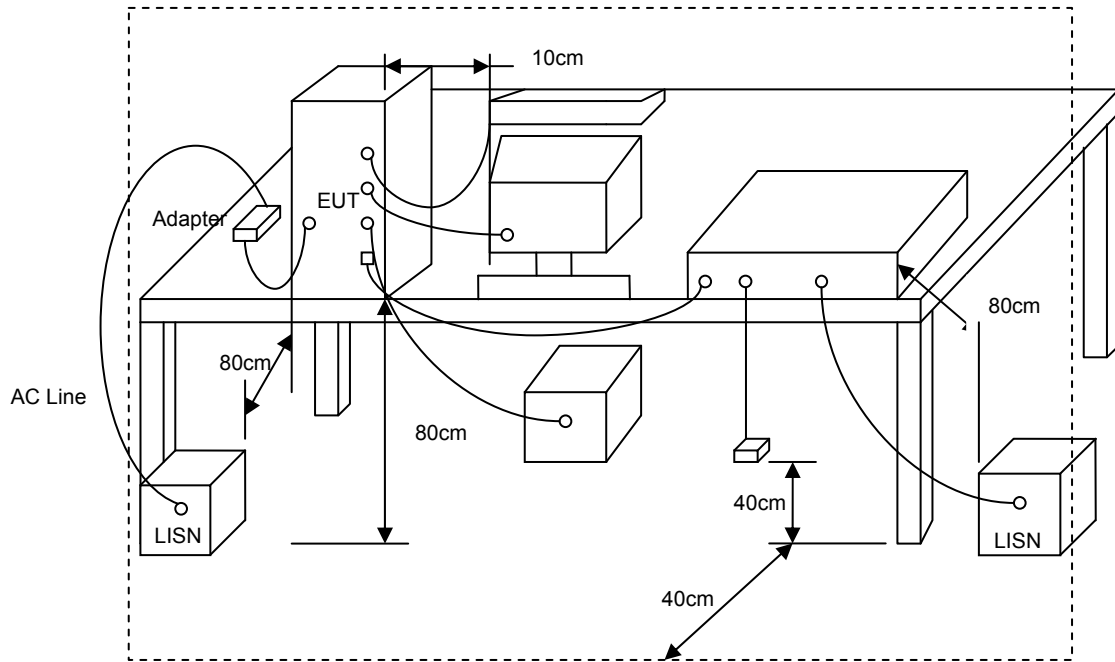
*Decreases with the logarithm of the frequency.

6.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



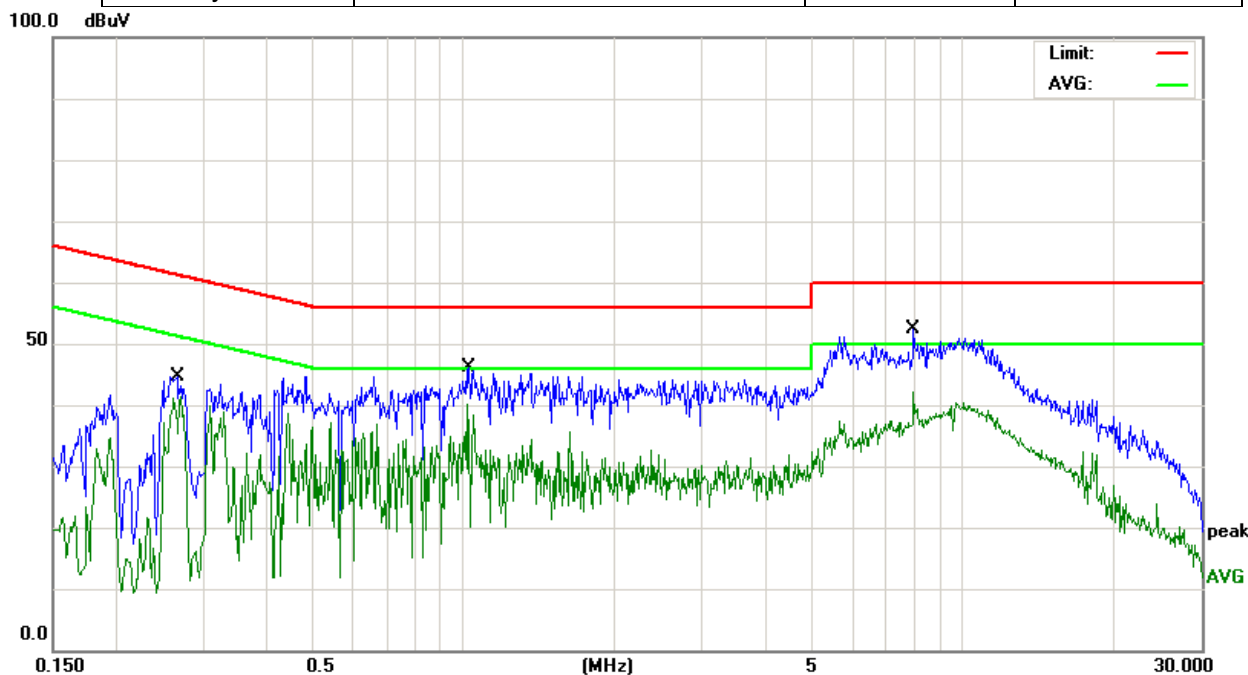
6.3 Typical Test Setup





6.4 Test Result and Data

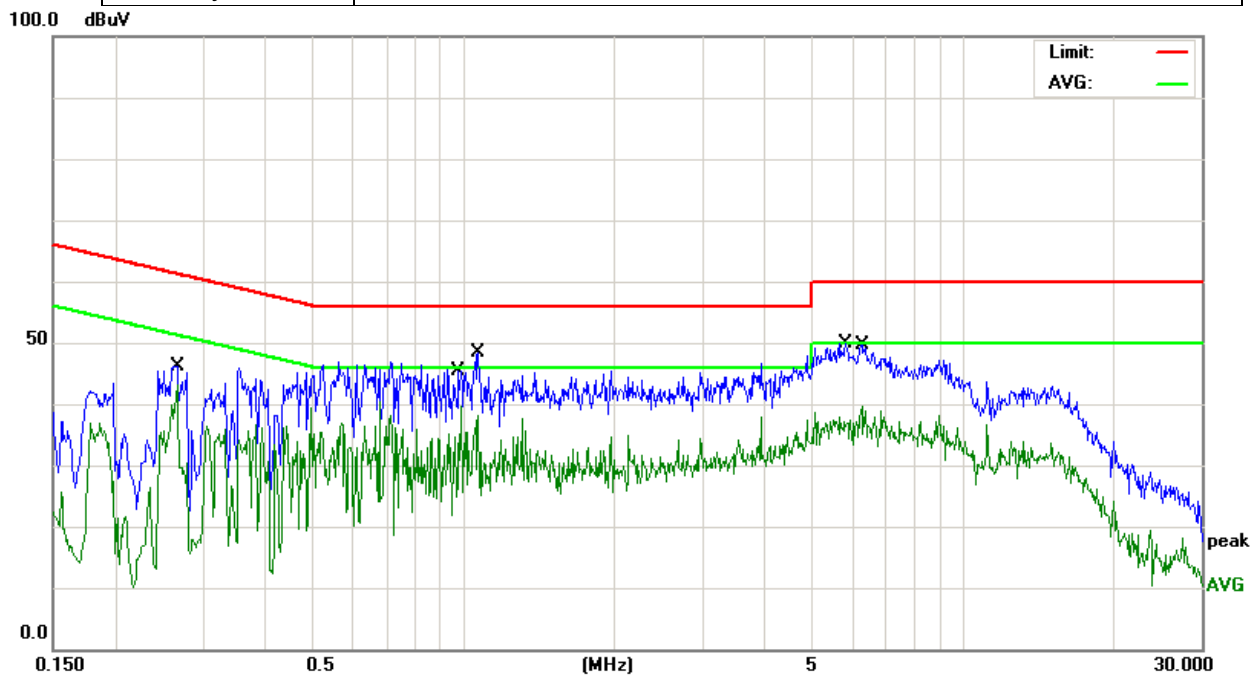
Power	: 120V/60Hz for adapter	Pol/Phase	: LINE
Test Mode 1	: TX CH38 5180MHz(worst-case)	Temperatur	: 28 °C
Humidity	: 43 %		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.2660	42.91	1.81	44.72	61.24	-16.52	QP
2		0.2700	39.65	1.80	41.45	51.12	-9.67	AVG
3	*	1.0140	39.24	0.84	40.08	46.00	-5.92	AVG
4		1.0220	45.26	0.84	46.10	56.00	-9.90	QP
5		7.9698	42.31	10.19	52.50	60.00	-7.50	QP
6		7.9698	31.94	10.19	42.13	50.00	-7.87	AVG



Power	: 120V/60Hz for adapter	Pol/Phase	: NEUTRAL
Test Mode 1	: TX CH38 5180MHz(worst-case)	Temperatur	: 28 °C
Humidity	: 43 %		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2660	44.27	1.81	46.08	61.24	-15.16	QP
2		0.2660	41.41	1.81	43.22	51.24	-8.02	AVG
3	*	0.9858	38.78	0.84	39.62	46.00	-6.38	AVG
4		1.0700	47.51	0.84	48.35	56.00	-7.65	QP
5		5.8219	39.88	10.12	50.00	60.00	-10.00	QP
6		6.2618	29.53	10.13	39.66	50.00	-10.34	AVG



7. Test of Radiated Emission

7.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/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

7.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- 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 turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise,

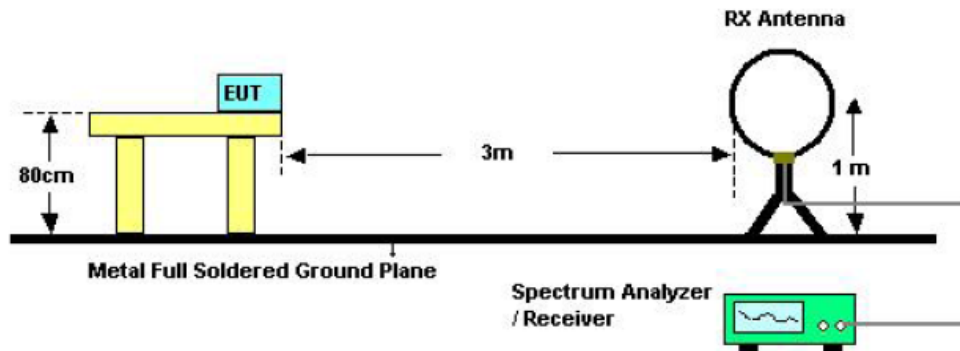


the emissions will be measured in average mode again and reported.

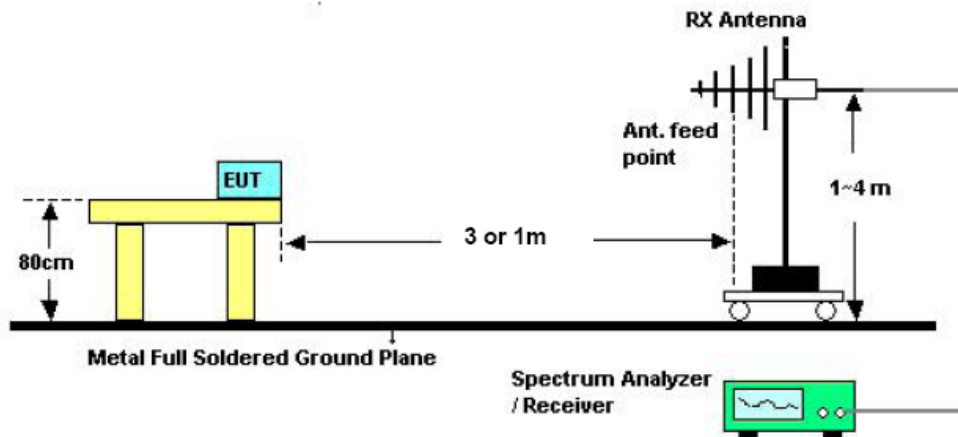
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

7.3 Typical Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].



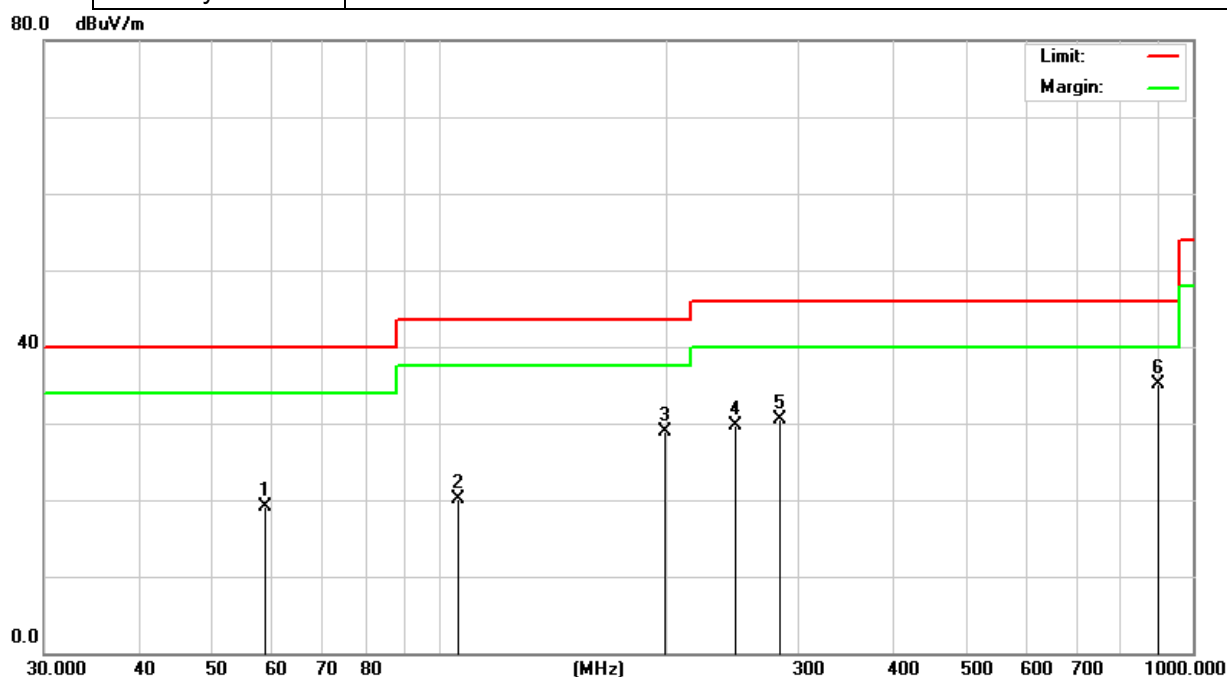
7.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

7.5 Test Result and Data (30MHz ~ 1GHz, worst emissions found)

Antenna A:

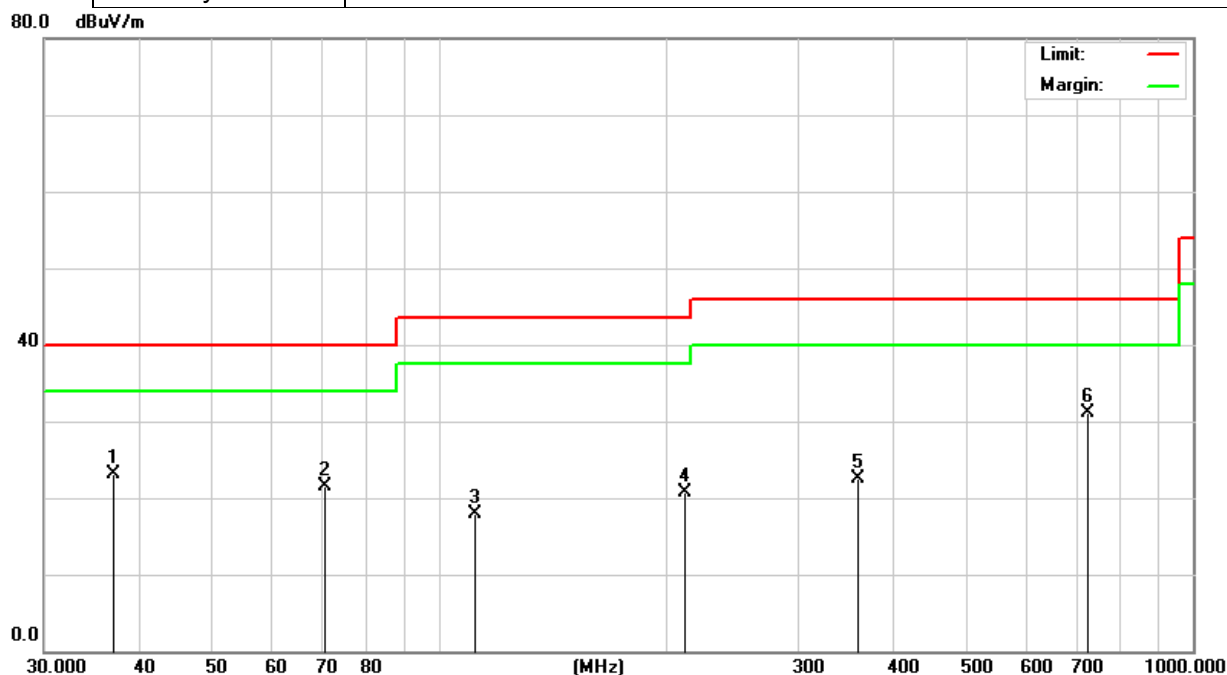
Power	: DC 7.4V from battery	Pol/Phase	: HORIZONTAL
Test Mode 1	: TX 5180MHz(worst-case)	Temperature	: 28 °C
Humidity	: 59%		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		59.0251	31.98	-12.86	19.12	40.00	-20.88	QP
2		106.3850	31.95	-11.93	20.02	43.50	-23.48	QP
3		199.2855	45.58	-16.76	28.82	43.50	-14.68	QP
4		247.6819	43.39	-13.78	29.61	46.00	-16.39	QP
5		282.9852	41.54	-11.02	30.52	46.00	-15.48	QP
6	*	900.1473	32.30	2.80	35.10	46.00	-10.90	QP



Power	: DC 7.4V from battery	Pol/Phase	: VERTICAL
Test Mode 1	: TX 5180MHz(worst-case)	Temperature	: 28 °C
Humidity	: 59%		

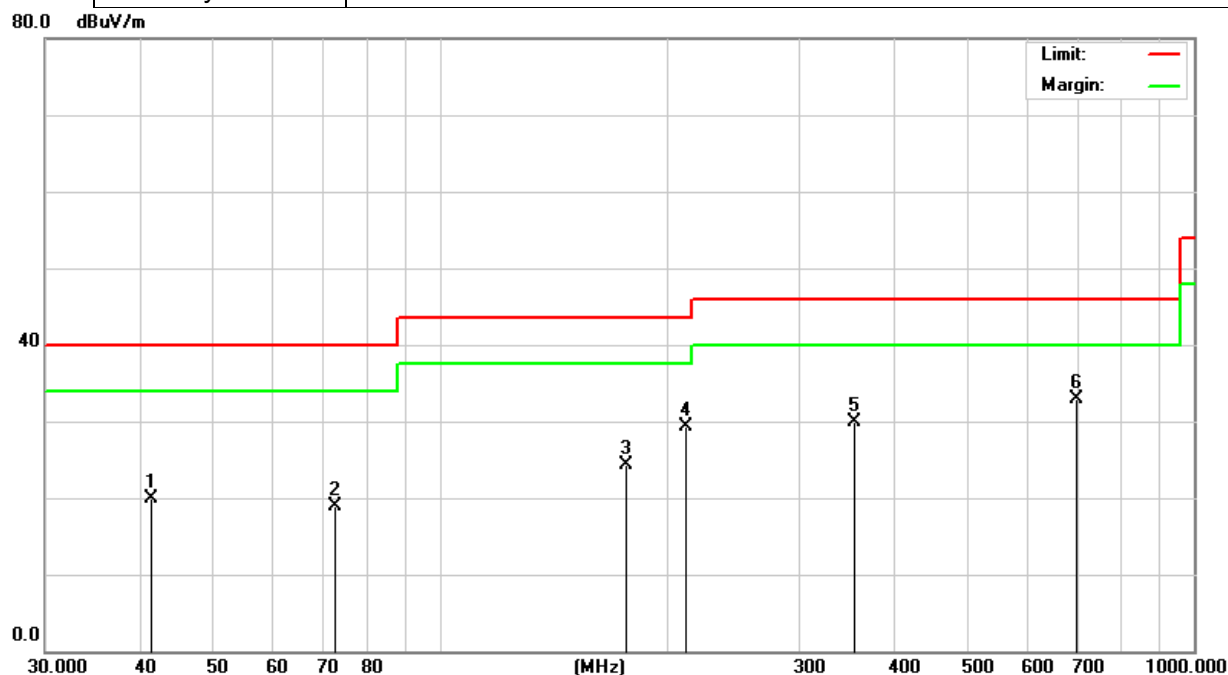


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		37.0248	35.34	-12.30	23.04	40.00	-16.96	QP
2		70.8315	36.51	-15.00	21.51	40.00	-18.49	QP
3		111.7379	31.12	-13.22	17.90	43.50	-25.60	QP
4		212.2694	32.93	-12.30	20.63	43.50	-22.87	QP
5		359.1859	30.14	-7.62	22.52	46.00	-23.48	QP
6	*	724.2611	31.53	-0.46	31.07	46.00	-14.93	QP



Antenna B:

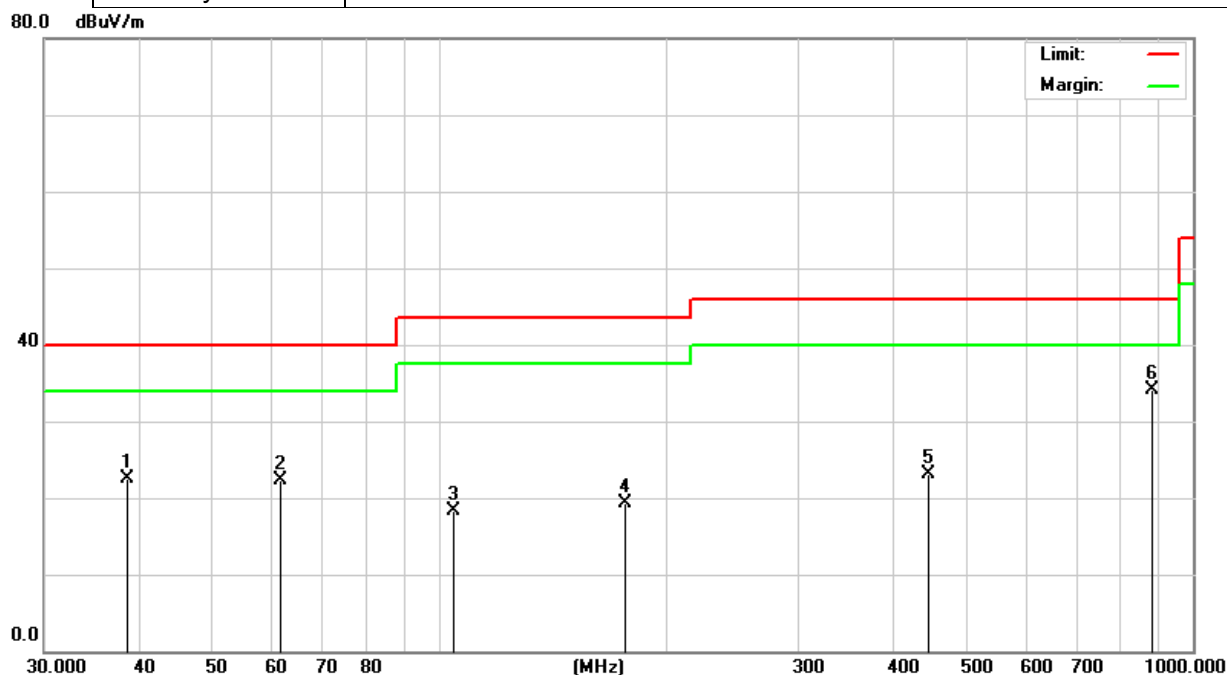
Power	: DC 7.4V from battery	Pol/Phase	: HORIZONTAL
Test Mode 1	: TX 5180MHz(worst-case)	Temperature	: 28 °C
Humidity	: 59%		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		41.4215	30.39	-10.52	19.87	40.00	-20.13	QP
2		72.8465	33.45	-14.62	18.83	40.00	-21.17	QP
3		176.8876	37.09	-12.85	24.24	43.50	-19.26	QP
4		212.2694	45.96	-16.57	29.39	43.50	-14.11	QP
5		354.1831	37.81	-7.83	29.98	46.00	-16.02	QP
6	*	699.3046	32.54	0.44	32.98	46.00	-13.02	QP



Power	: DC 7.4V from battery	Pol/Phase	: VERTICAL
Test Mode 1	: TX 5180MHz(worst-case)	Temperature	: 28 °C
Humidity	: 59%		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		38.6160	34.62	-12.14	22.48	40.00	-17.52	QP
2		61.7781	33.91	-11.60	22.31	40.00	-17.69	QP
3		104.9033	31.60	-13.37	18.23	43.50	-25.27	QP
4		176.8876	33.31	-14.04	19.27	43.50	-24.23	QP
5		446.4141	29.99	-6.82	23.17	46.00	-22.83	QP
6	*	884.5028	31.61	2.57	34.18	46.00	-11.82	QP

Note:

All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.

**7.6 Test Result and Data (Between 1~40 GHz)****Antenna A:****Above 1GHz:**

802.11a-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	33.11	12.56	47.90	74	-26.10	PEAK
	H	15540	35.07	16.45	51.99	74	-22.01	PEAK
	V	10360	35.42	12.56	48.27	74	-25.73	PEAK
	V	15540	35.62	16.45	53.14	74	-20.86	PEAK

802.11a-5200 MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	35.31	12.64	47.95	74	-26.05	PEAK
	H	15600	34.99	16.53	51.52	74	-22.48	PEAK
	V	10400	36.89	12.64	49.53	74	-24.47	PEAK
	V	15600	34.85	16.53	51.38	74	-22.62	PEAK

802.11a-5240 MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	32.68	12.68	45.36	74	-28.64	PEAK
	H	15720	34.86	16.54	51.40	74	-22.60	PEAK
	V	10480	35.93	12.68	48.61	74	-25.39	PEAK
	V	15720	34.02	16.54	50.56	74	-23.44	PEAK

802.11n HT20-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	33.31	12.56	45.87	74	-28.13	PEAK
	H	15540	35.14	16.45	51.59	74	-22.41	PEAK
	V	10360	35.41	12.56	47.97	74	-26.03	PEAK
	V	15540	35.64	16.45	52.09	74	-21.91	PEAK

802.11n HT20-5200MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	35.01	12.64	47.65	74	-26.35	PEAK



	H	15600	33.24	16.53	49.77	74	-24.23	PEAK
	V	10400	35.84	12.64	48.48	74	-25.52	PEAK
	V	15600	35.15	16.53	51.68	74	-22.32	PEAK

802.11n HT20-5240MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	35.14	12.68	47.82	74	-26.18	PEAK
	H	15720	29.71	16.54	46.25	74	-27.75	PEAK
	V	10480	33.54	12.68	46.22	74	-27.78	PEAK
	V	15720	33.42	16.54	49.96	74	-24.04	PEAK

802.11n HT40-5190MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10380	35.54	12.58	48.12	74	-25.88	PEAK
	H	15570	34.19	16.48	50.67	74	-23.33	PEAK
	V	10380	37.99	12.58	50.57	74	-23.43	PEAK
	V	15570	33.14	16.48	49.62	74	-24.38	PEAK

802.11n HT40-5230MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10460	36.11	12.66	48.77	74	-25.23	PEAK
	H	15690	35.62	16.53	52.15	74	-21.85	PEAK
	V	10460	36.15	12.66	48.81	74	-25.19	PEAK
	V	15690	32.52	16.53	49.05	74	-24.95	PEAK

802.11ac HT20-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	35.21	12.56	47.77	74	-26.23	PEAK
	H	15540	33.85	16.45	50.3	74	-23.70	PEAK
	V	10360	33.87	12.56	46.43	74	-27.57	PEAK
	V	15540	35.06	16.45	51.51	74	-22.49	PEAK



802.11ac HT20-5200MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	34.84	12.64	47.48	74	-26.52	PEAK
	H	15600	32.03	16.53	48.56	74	-25.44	PEAK
	V	10400	33.54	12.64	46.18	74	-27.82	PEAK
	V	15600	32.13	16.53	48.66	74	-25.34	PEAK

802.11ac HT20-5240MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	34.51	12.68	47.19	74	-26.81	PEAK
	H	15720	32.11	16.54	48.65	74	-25.35	PEAK
	V	10480	33.36	12.68	46.04	74	-27.96	PEAK
	V	15720	34.23	16.54	50.77	74	-23.23	PEAK

802.11ac HT40-5190MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10380	34.32	12.58	46.9	74	-27.1	PEAK
	H	15570	35.03	16.48	51.51	74	-22.49	PEAK
	V	10380	35.54	12.58	48.12	74	-25.88	PEAK
	V	15570	32.33	16.48	48.81	74	-25.19	PEAK

802.11ac HT40-5230MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10460	35.03	12.66	47.69	74	-26.31	PEAK
	H	15690	33.02	16.53	49.55	74	-24.45	PEAK
	V	10460	35.35	12.66	48.01	74	-25.99	PEAK
	V	15690	33.65	16.53	50.18	74	-23.82	PEAK

802.11ac HT80-5210MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10420	34.32	12.62	46.94	74	-27.06	PEAK
	H	15630	33.22	16.52	49.74	74	-24.26	PEAK
	V	10420	34.36	12.62	46.98	74	-27.02	PEAK
	V	15630	32.51	16.52	49.03	74	-24.97	PEAK



The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor.

Average measurement was not performed if peak level lower than average limit.

No any other emissions level very low which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

**Antenna B:****Above 1GHz:**

802.11a-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	34.32	12.56	46.88	74	-27.12	PEAK
	H	15540	35.65	16.45	52.1	74	-21.9	PEAK
	V	10360	35.18	12.56	47.74	74	-26.26	PEAK
	V	15540	36.47	16.45	52.92	74	-21.08	PEAK
802.11a-5200 MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	35.85	12.64	48.49	74	-25.51	PEAK
	H	15600	35.42	16.53	51.95	74	-22.05	PEAK
	V	10400	37.33	12.64	49.97	74	-24.03	PEAK
	V	15600	35.16	16.53	51.69	74	-22.31	PEAK
802.11a-5240 MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	33.35	12.68	46.03	74	-27.97	PEAK
	H	15720	34.62	16.54	51.16	74	-22.84	PEAK
	V	10480	36.03	12.68	48.71	74	-25.29	PEAK
	V	15720	34.13	16.54	50.67	74	-23.33	PEAK



802.11n HT20-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	33.21	12.56	45.77	74	-28.23	PEAK
	H	15540	35.32	16.45	51.77	74	-22.23	PEAK
	V	10360	35.64	12.56	48.2	74	-25.8	PEAK
	V	15540	36.03	16.45	52.48	74	-21.52	PEAK

802.11n HT20-5200MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	34.58	12.64	47.22	74	-26.78	PEAK
	H	15600	33.32	16.53	49.85	74	-24.15	PEAK
	V	10400	36.03	12.64	48.67	74	-25.33	PEAK
	V	15600	35.48	16.53	52.01	74	-21.99	PEAK

802.11n HT20-5240MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	35.33	12.68	48.01	74	-25.99	PEAK
	H	15720	29.41	16.54	45.95	74	-28.05	PEAK
	V	10480	34.33	12.68	47.01	74	-26.99	PEAK
	V	15720	32.65	16.54	49.19	74	-24.81	PEAK

802.11n HT40-5190MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10380	36.14	12.58	48.72	74	-25.28	PEAK
	H	15570	34.23	16.48	50.71	74	-23.29	PEAK
	V	10380	37.03	12.58	49.61	74	-24.39	PEAK
	V	15570	33.41	16.48	49.89	74	-24.11	PEAK

802.11n HT40-5230MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10460	37.32	12.66	49.98	74	-24.02	PEAK
	H	15690	35.33	16.53	51.86	74	-22.14	PEAK
	V	10460	36.12	12.66	48.78	74	-25.22	PEAK
	V	15690	32.36	16.53	48.89	74	-25.11	PEAK



802.11ac HT20-5180MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10360	34.85	12.56	47.41	74	-26.59	PEAK
	H	15540	34.52	16.45	50.97	74	-23.03	PEAK
	V	10360	34.33	12.56	46.89	74	-27.11	PEAK
	V	15540	35.64	16.45	52.09	74	-21.91	PEAK
802.11ac HT20-5200MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10400	34.28	12.64	46.92	74	-27.08	PEAK
	H	15600	31.65	16.53	48.18	74	-25.82	PEAK
	V	10400	33.51	12.64	46.15	74	-27.85	PEAK
	V	15600	32.34	16.53	48.87	74	-25.13	PEAK
802.11ac HT20-5240MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10480	34.51	12.68	47.19	74	-26.81	PEAK
	H	15720	32.75	16.54	49.29	74	-24.71	PEAK
	V	10480	33.33	12.68	46.01	74	-27.99	PEAK
	V	15720	34.52	16.54	51.06	74	-22.94	PEAK
802.11ac HT40-5190MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10380	34.28	12.58	46.86	74	-27.14	PEAK
	H	15570	35.36	16.48	51.84	74	-22.16	PEAK
	V	10380	35.74	12.58	48.32	74	-25.68	PEAK
	V	15570	32.71	16.48	49.19	74	-24.81	PEAK
802.11ac HT40-5230MHz	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	H	10460	35.21	12.66	47.87	74	-26.13	PEAK
	H	15690	32.52	16.53	49.05	74	-24.95	PEAK
	V	10460	32.31	12.66	44.97	74	-29.03	PEAK



	V	15690	33.43	16.53	49.96	74	-24.04	PEAK
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	Pol. (H/V)	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Emission (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
802.11ac HT80-5210MHz	H	10420	34.41	12.62	47.03	74	-26.97	PEAK
	H	15630	33.85	16.52	50.37	74	-23.63	PEAK
	V	10420	34.52	12.62	47.14	74	-26.86	PEAK
	V	15630	32.56	16.52	49.08	74	-24.92	PEAK

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

Average measurement was not performed if peak level lower than average limit.

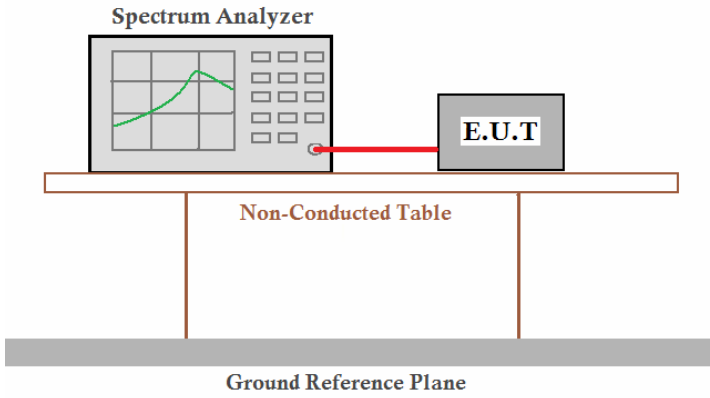
No any other emissions level very low which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.



8. Bandwidth Measurement Data

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	N/A (Band I)
	>500KHz(Band IV)
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, showing a frequency spectrum on its screen, is connected to an Equipment Under Test (E.U.T.) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table. This table is supported by a Ground Reference Plane, which is represented by a thick grey bar at the bottom of the setup.
Test procedure:	According to KDB 789033 D02 General UNII Test Procedures New Rules v01.
Test Instruments:	Refer to section 5.10 f & section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

**8.1 Test Result and Data**

Antenna A:

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11a	802.11n (HT20)	802.11ac (VHT20)
36	5180.00	26.58	24.45	25.32	16.49	17.75	17.65
40	5200.00	26.51	26.21	24.01	16.50	17.64	17.64
48	5240.00	23.43	26.63	24.54	16.50	17.63	17.65

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(VHT40)	802.11n(HT40)	802.11ac(VHT40)
38	5190.00	42.89	44.56	36.07	36.24
46	5230.00	43.34	43.79	36.24	36.17

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
		802.11ac(VHT80)	802.11ac(VHT80)
42	5210	80.99	75.44



Antenna B:

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11a	802.11n (HT20)	802.11ac (VHT20)
36	5180.00	26.43	24.41	25.31	16.50	17.73	17.65
40	5200.00	26.30	26.13	24.00	16.49	17.62	17.64
48	5240.00	23.23	26.60	24.47	16.50	17.60	17.65

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(VHT40)	802.11n(HT40)	802.11ac(VHT40)
38	5190.00	42.78	44.48	36.00	36.18
46	5230.00	43.26	43.74	36.13	36.09

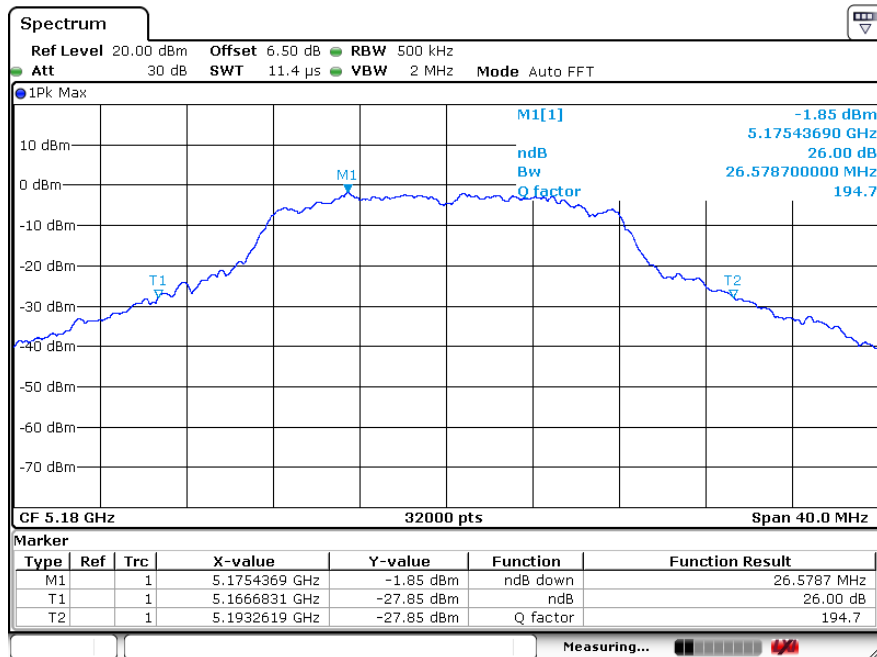
CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
		802.11ac(VHT80)	802.11ac(VHT80)
42	5210	80.96	75.40

Note: The worst data is Antenna A, only shown Antenna A Plot.

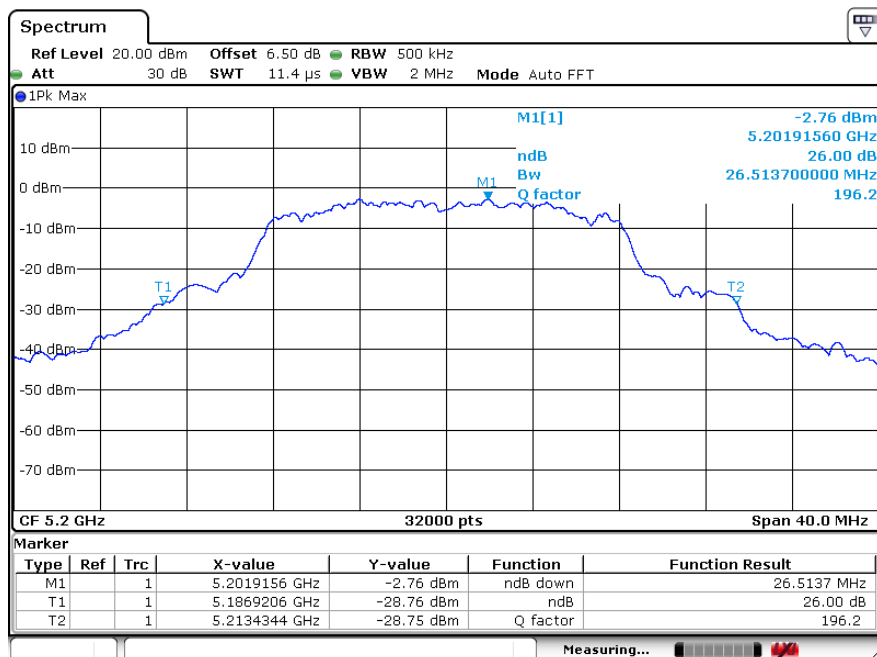


26dB BW 802.11a

Channel: 36

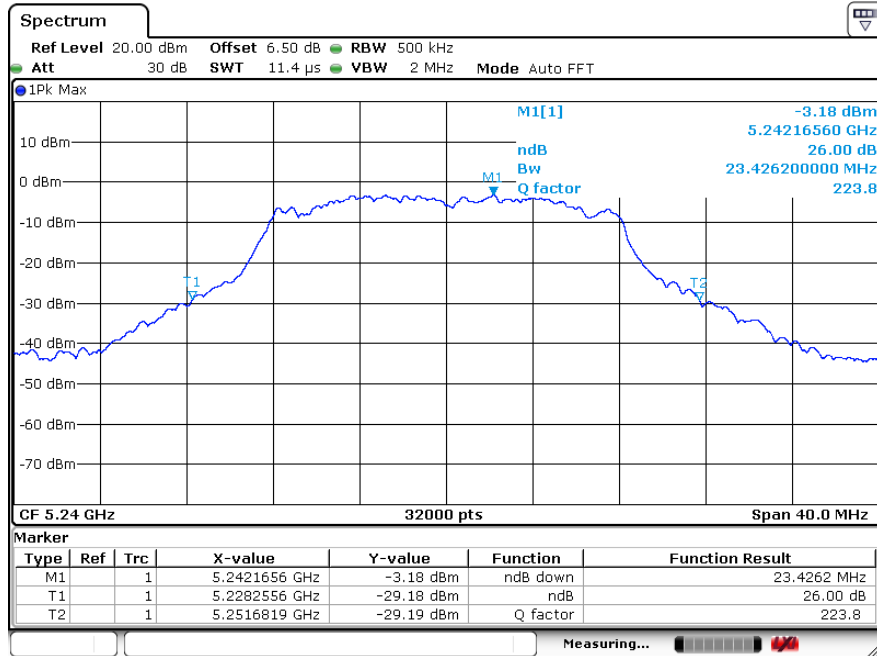


Channel: 40





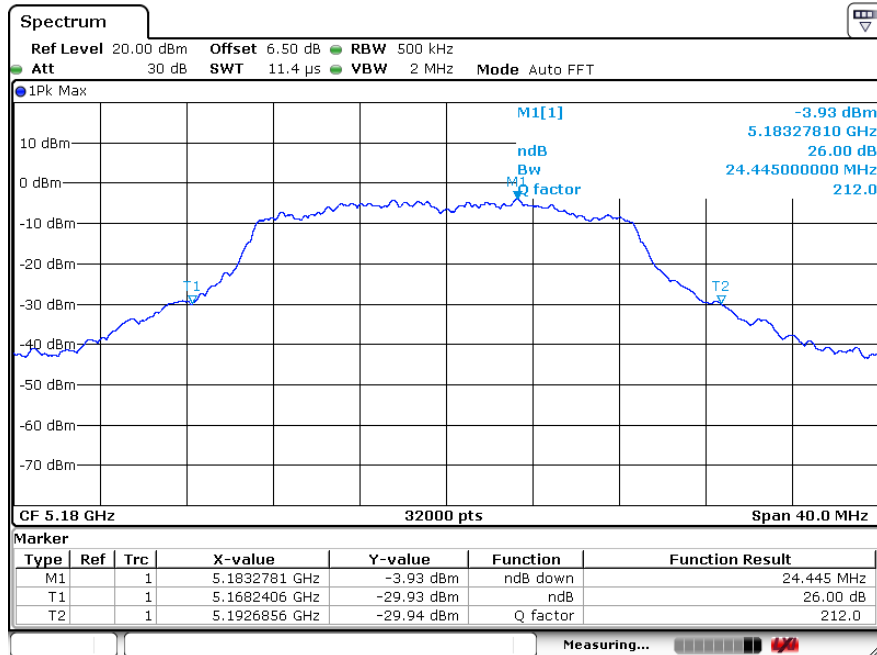
Channel: 48



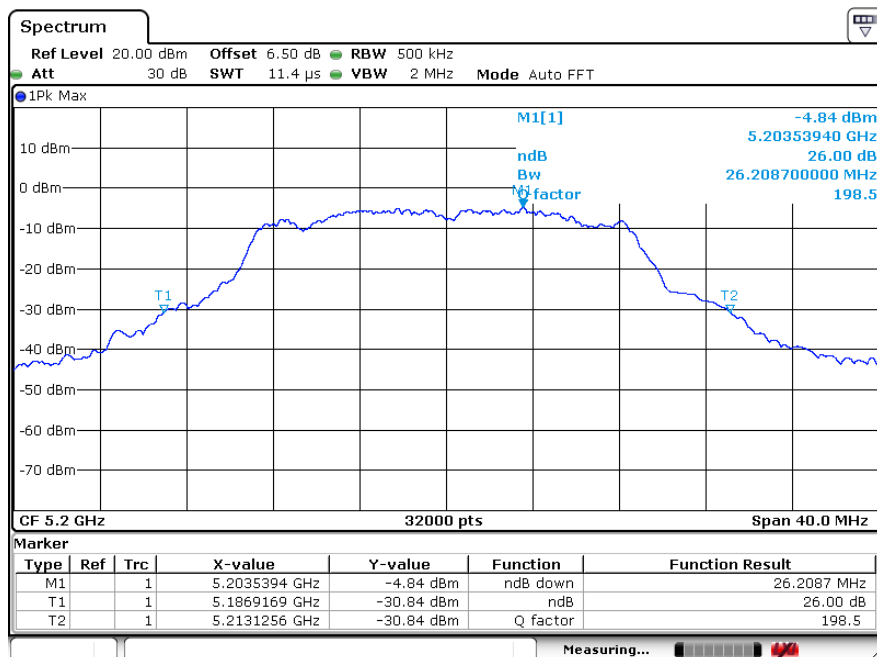


26dB BW 802.11n20

Channel: 36

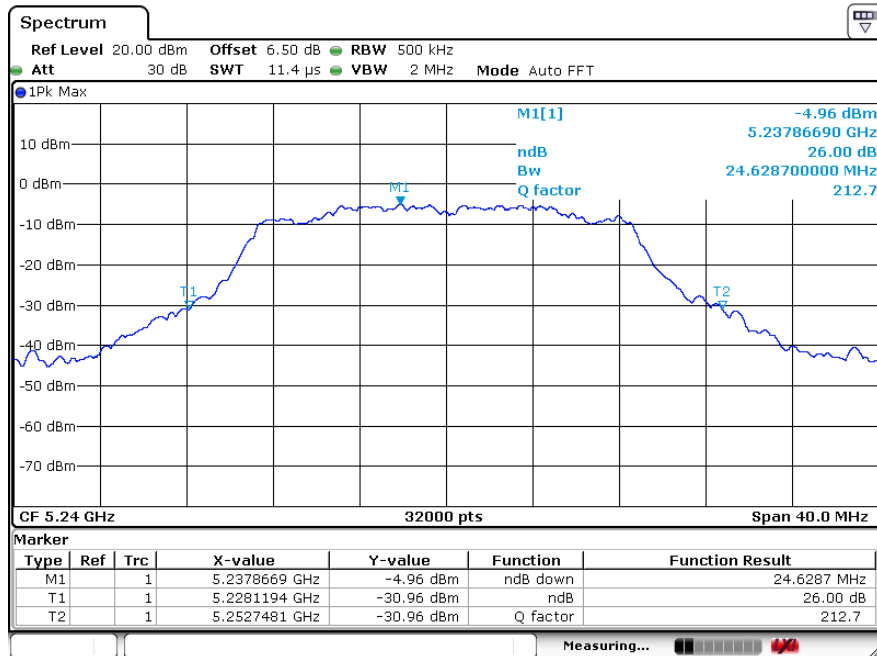


Channel: 40



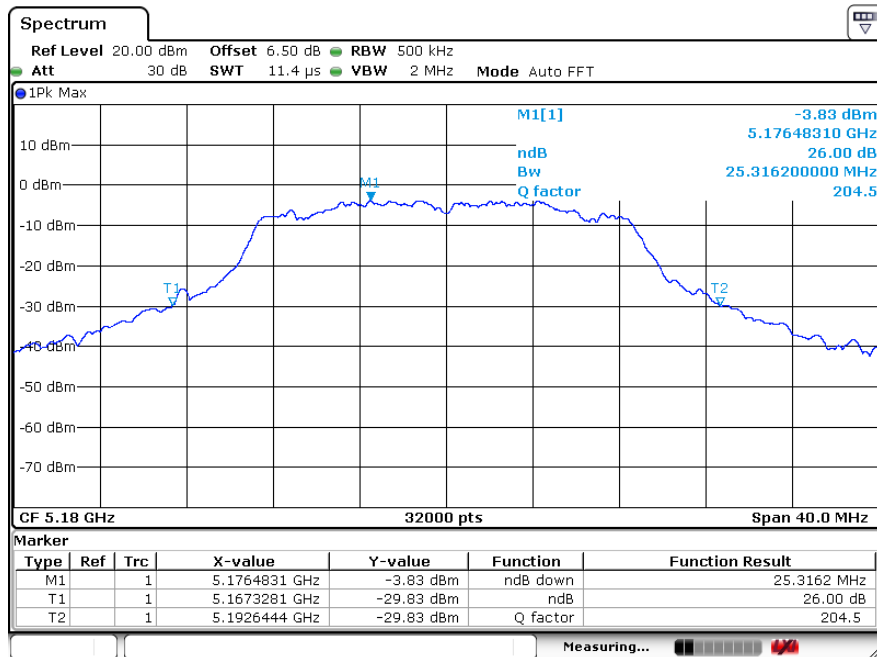


Channel: 48

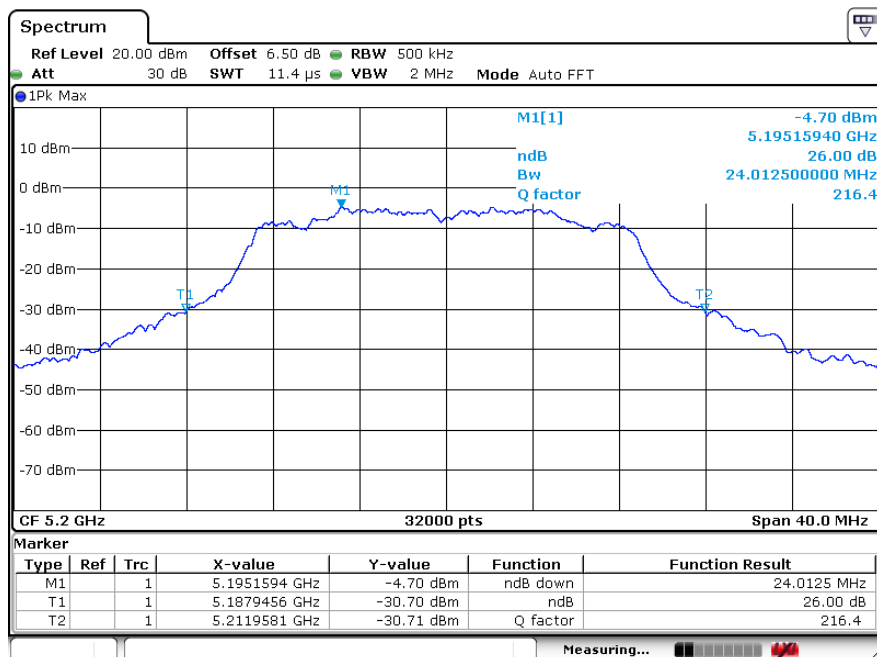




802.11ac20 Channel: 36

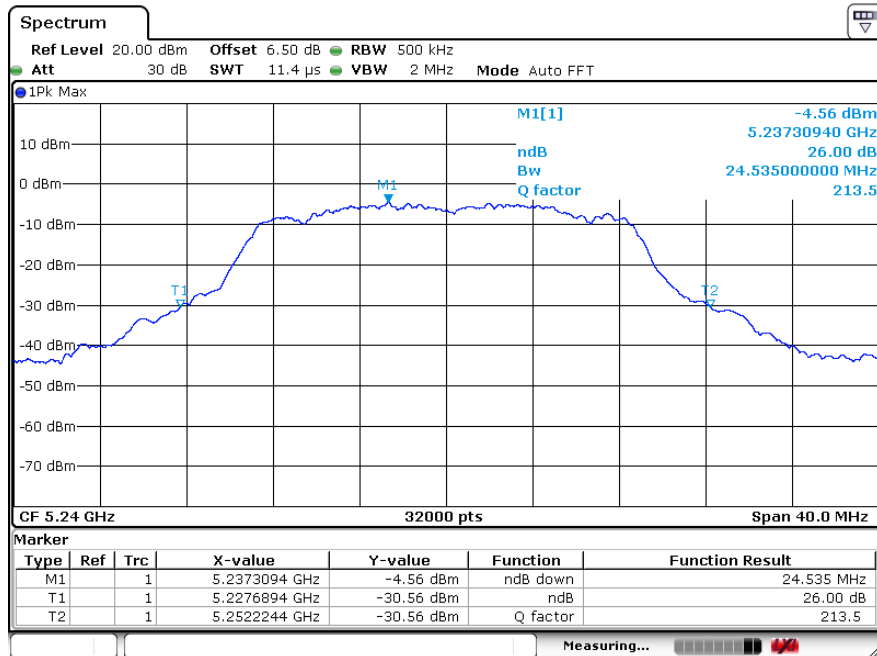


Channel: 40



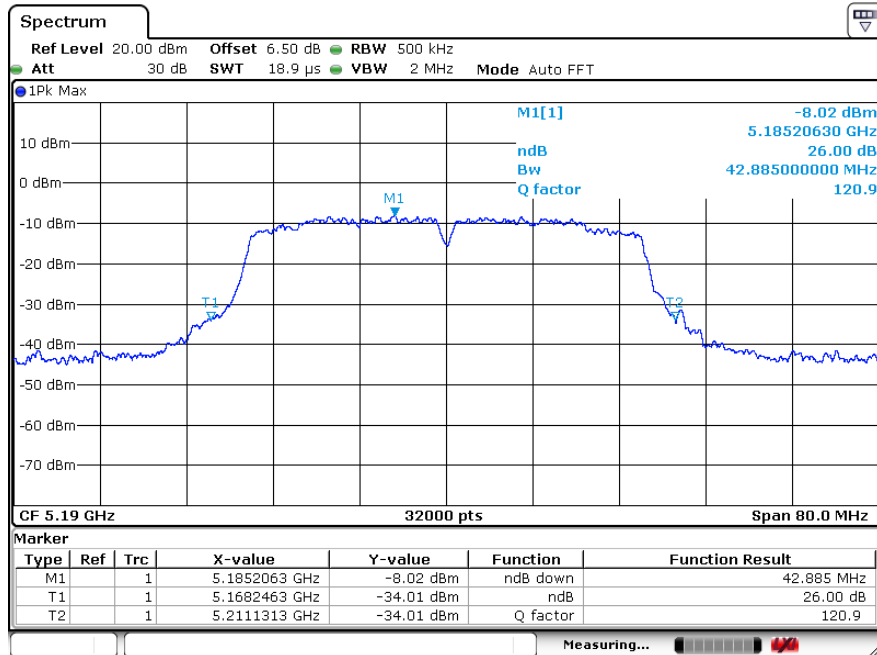


Channel: 48

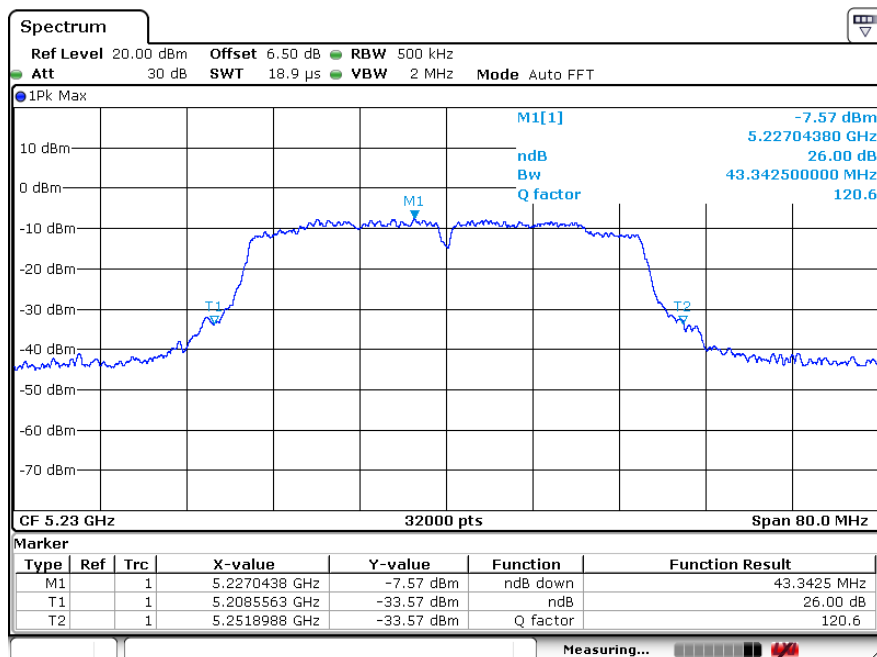




26dB BW 802.11n40 Channel: 38



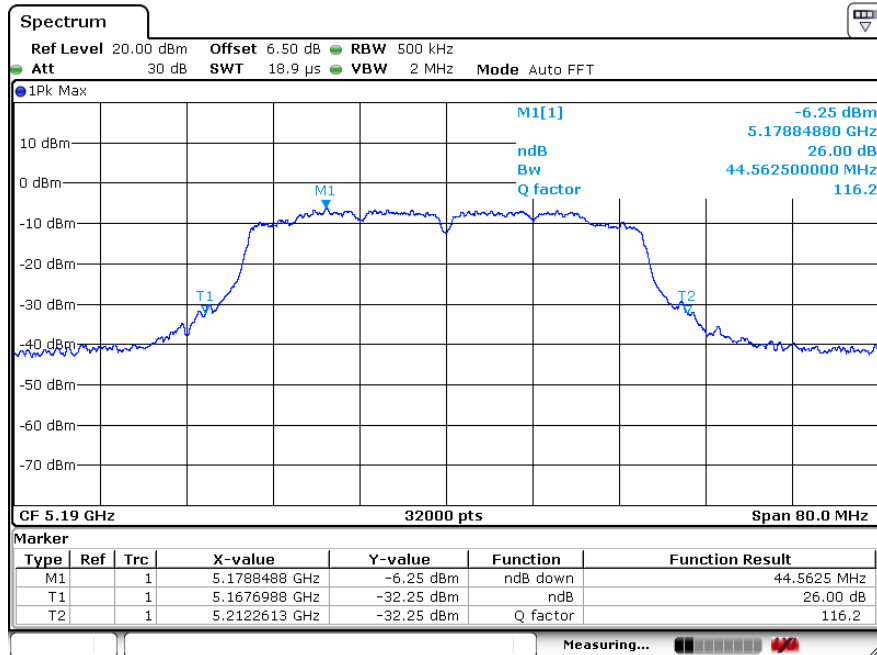
Channel: 46



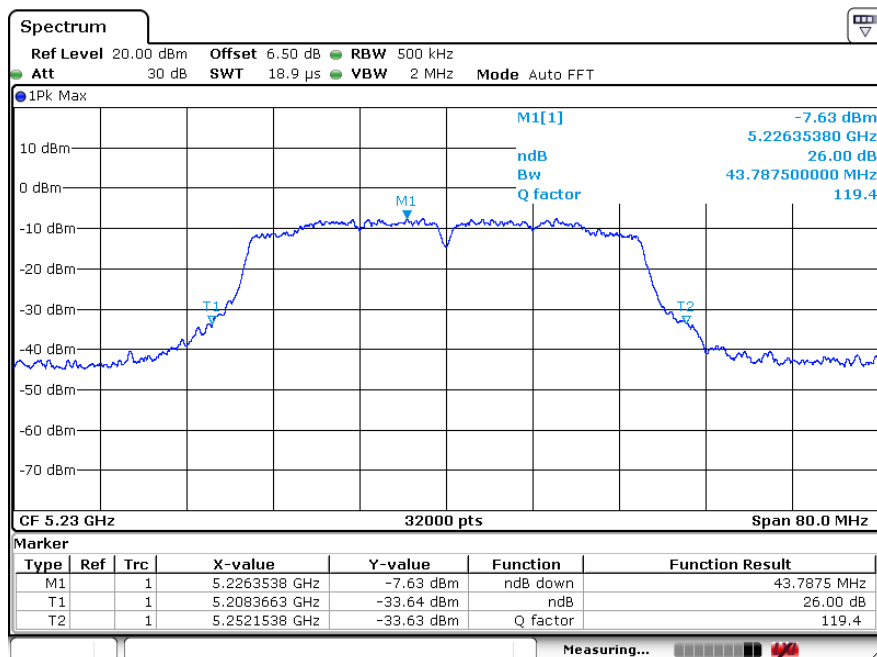


26dB BW 802.11ac40

Channel: 38

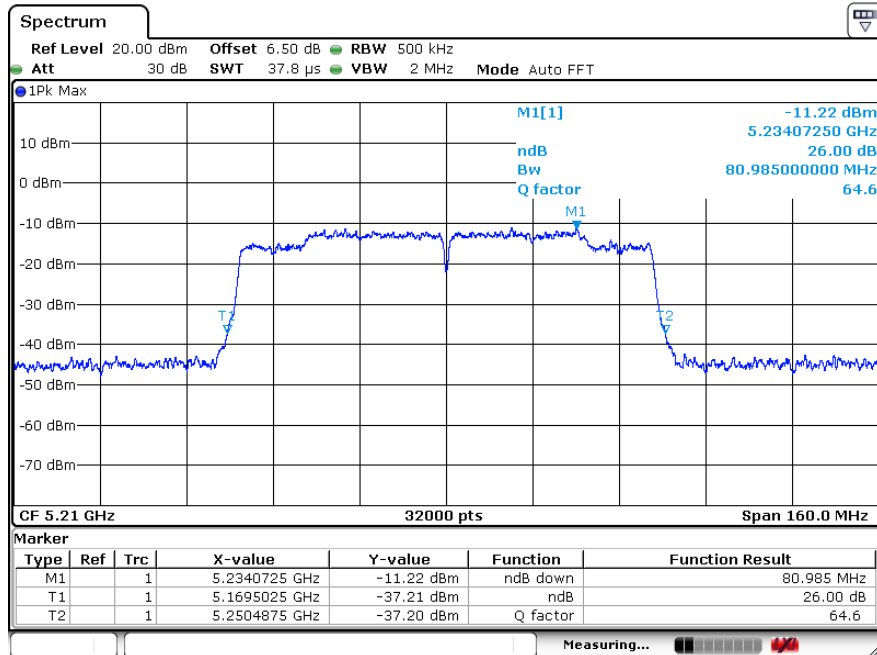


Channel: 46



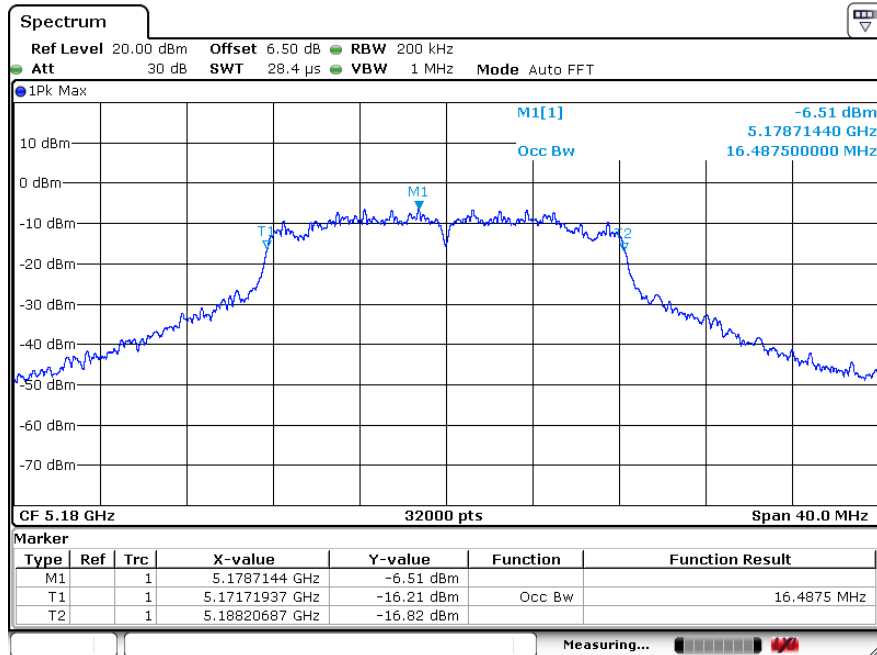


26dB BW 802.11ac80 Channel:42

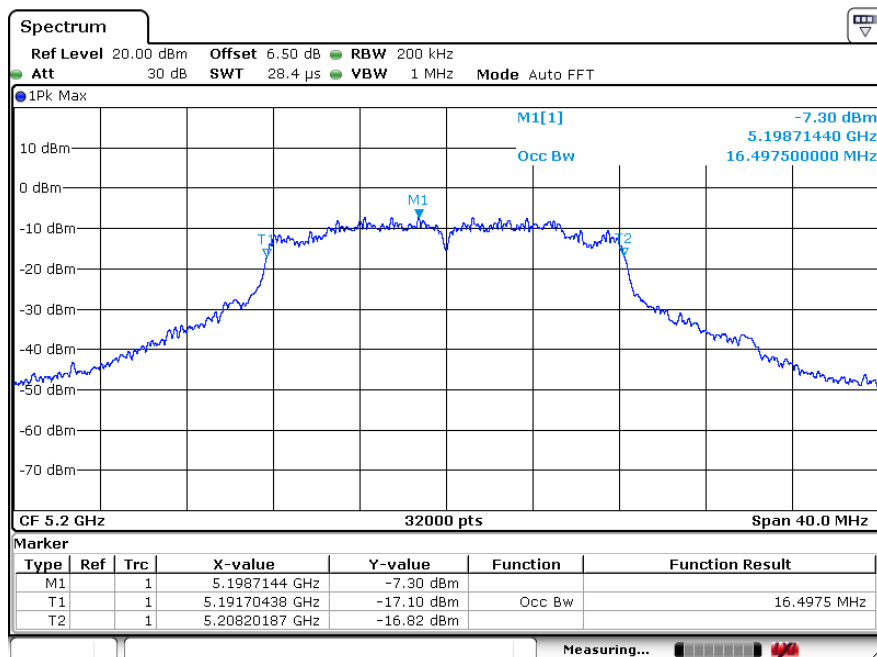




99% OBW 802.11a Channel: 36

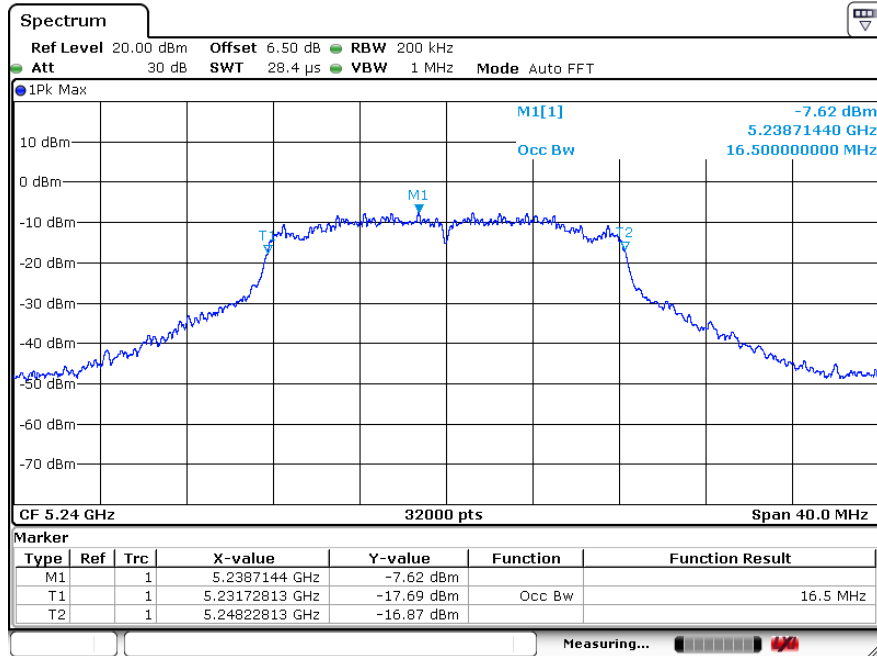


Channel: 40



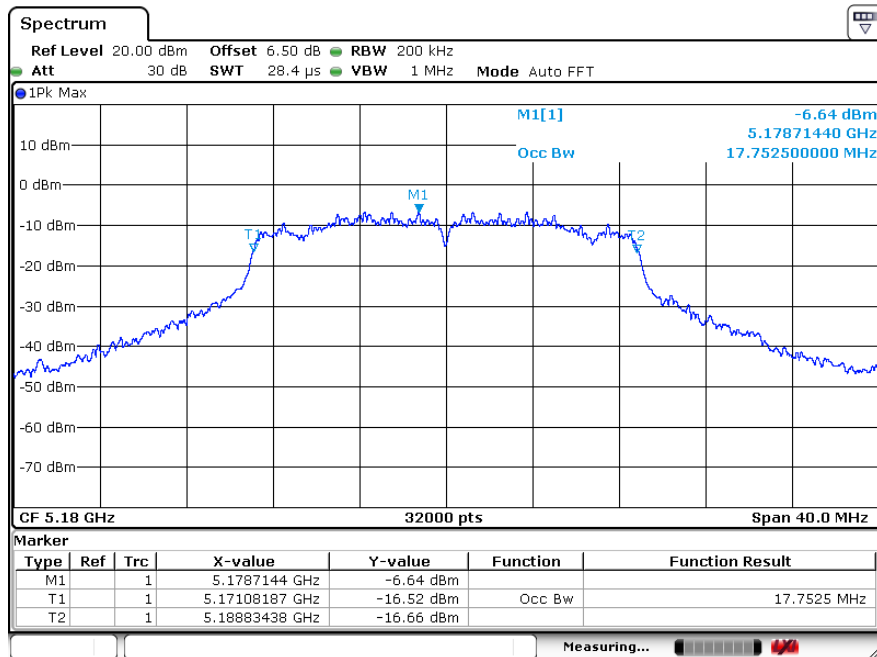


Channel: 48

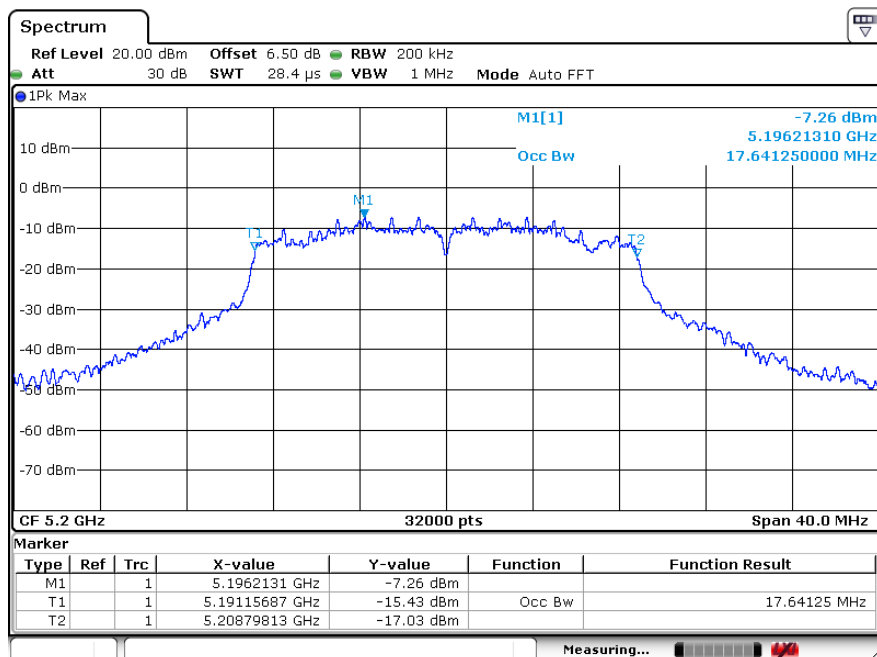




99% OBW 802.11n20 Channel: 36

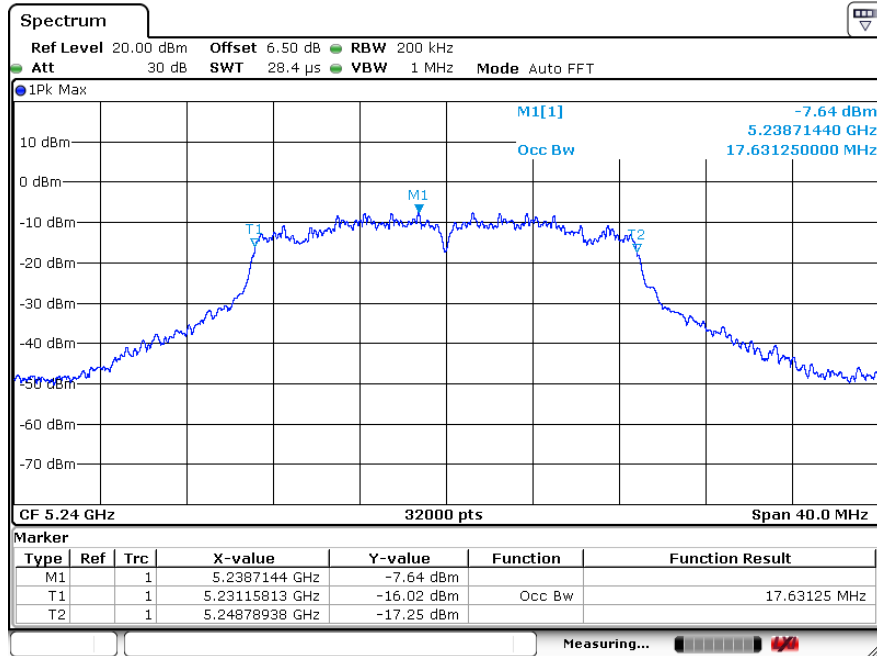


Channel: 40



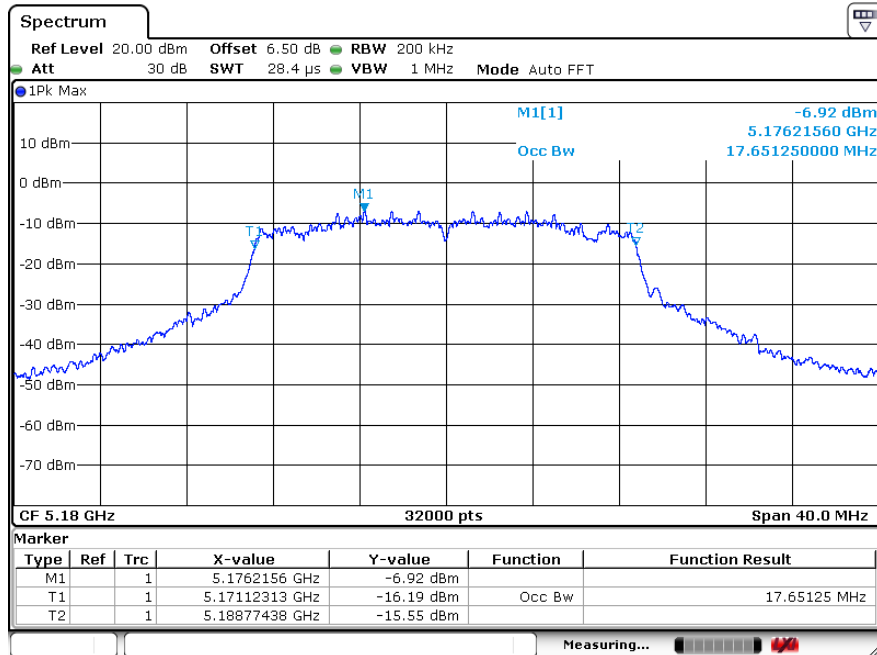


Channel: 48

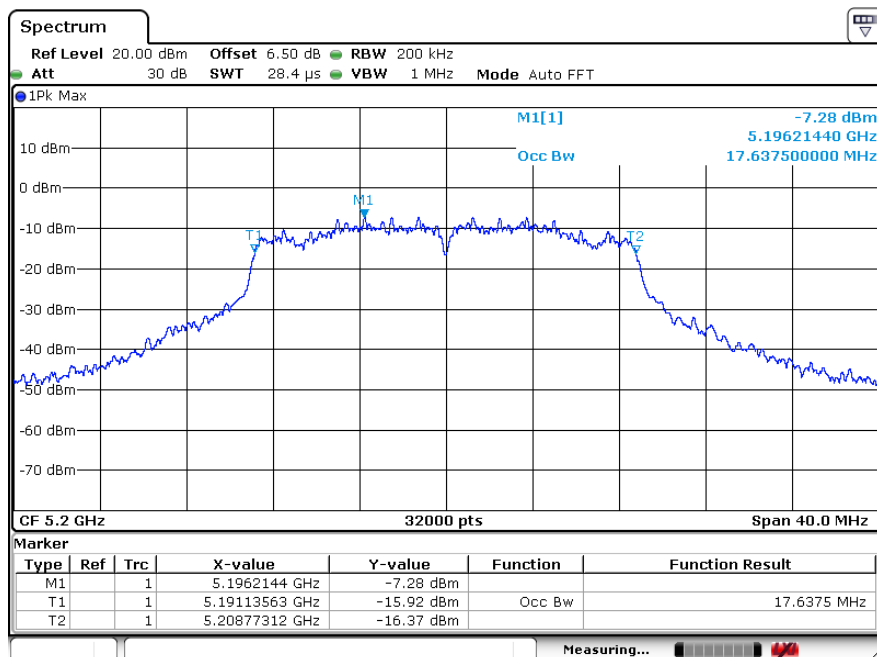




99% OBW 802.11ac20 Channel: 36

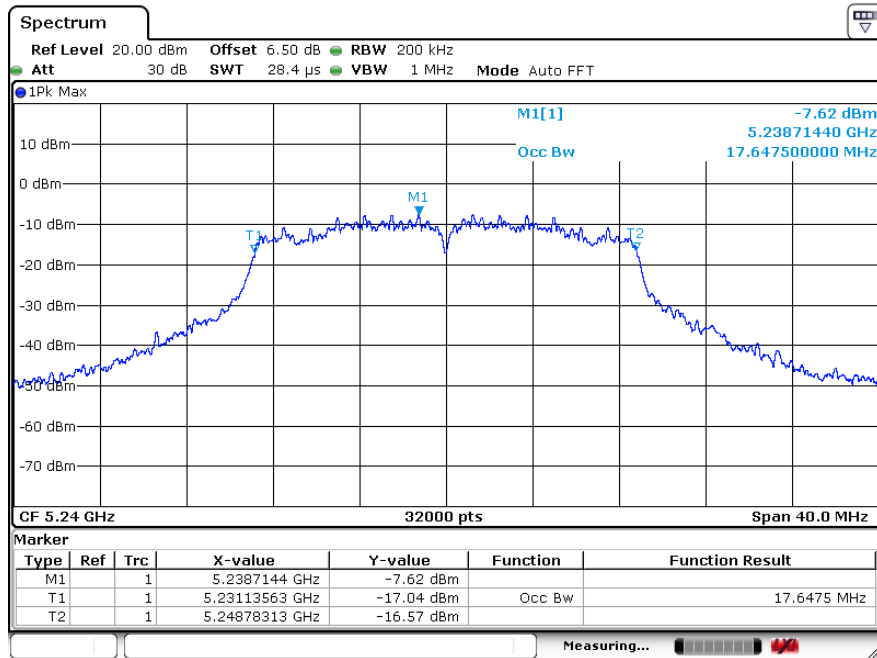


Channel: 40



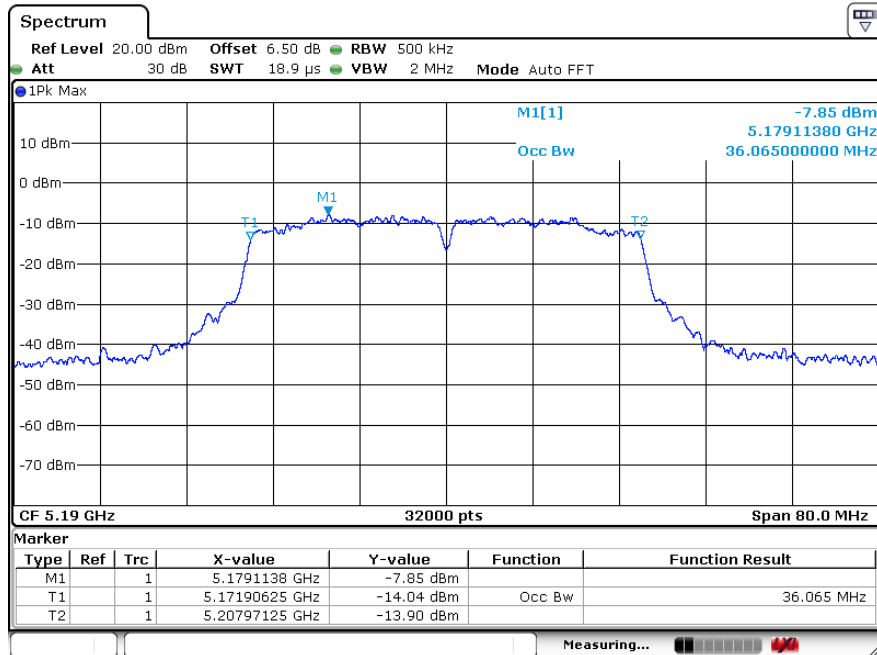


Channel: 48

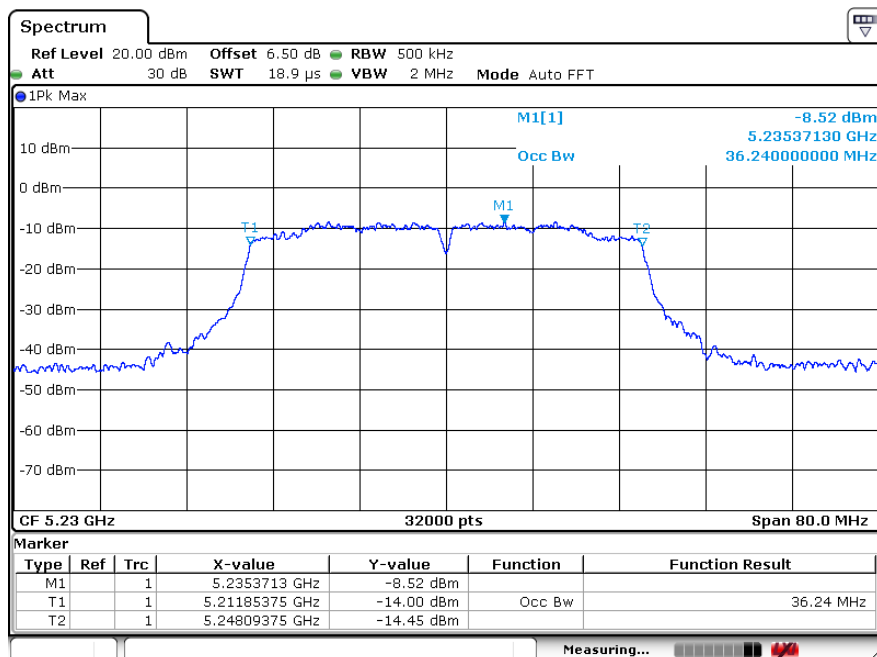




99% OBW 802.11n40 Channel: 38



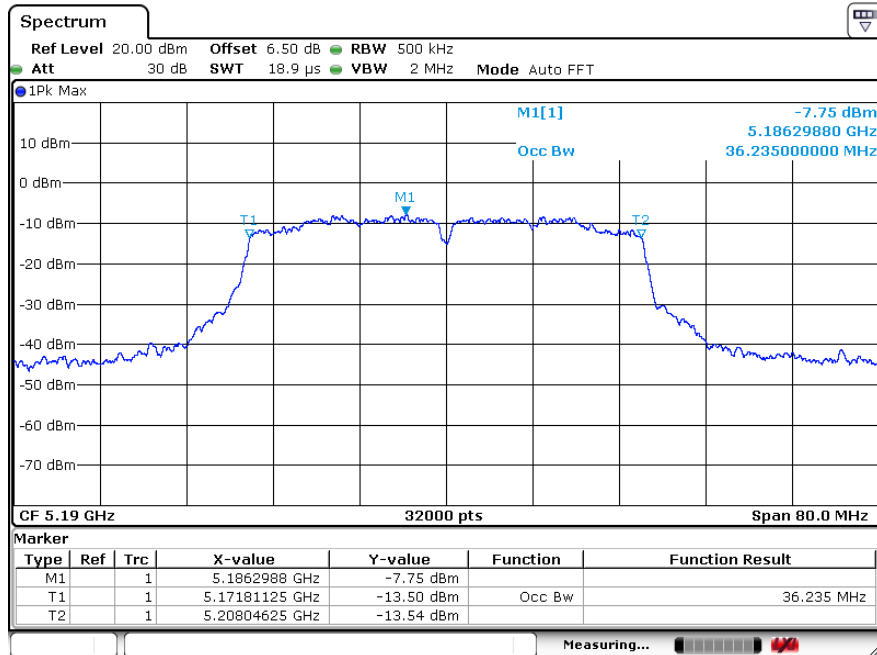
Channel: 46



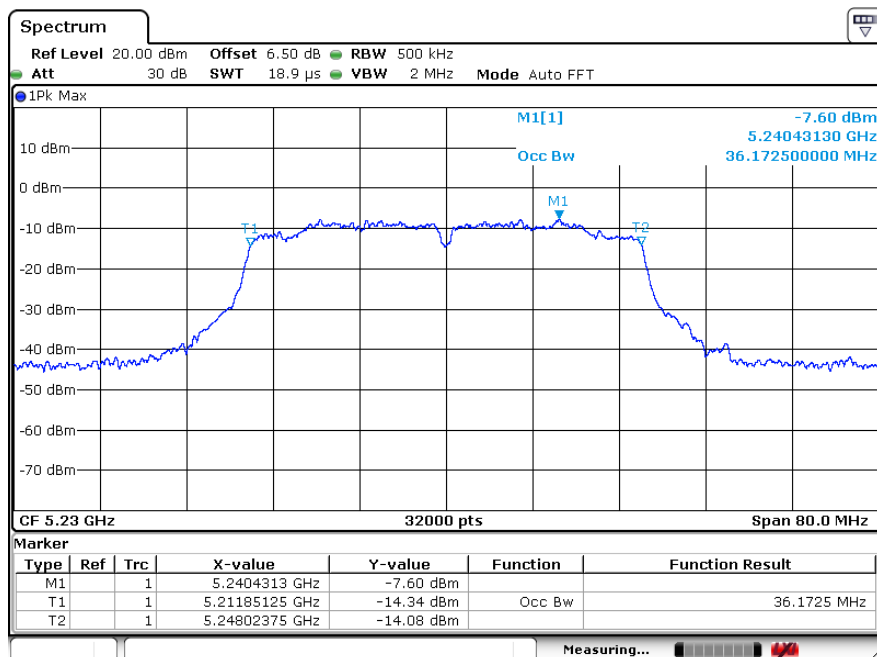


99% OBW 802.11ac40

Channel: 38

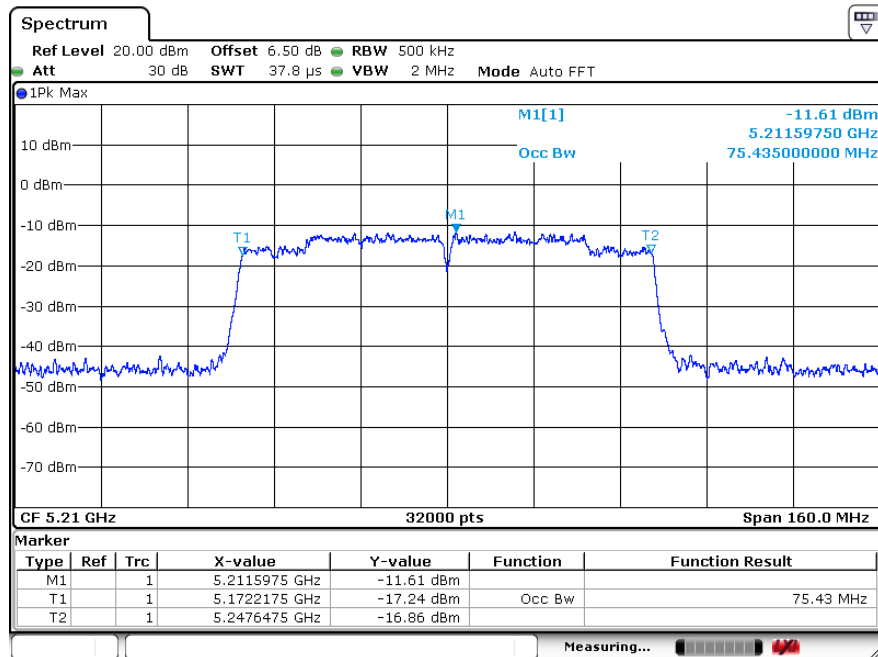


Channel: 46



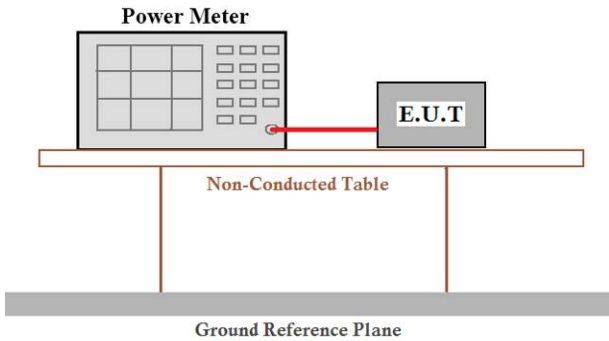


99% OBW 802.11ac80 Channel:42





9. Output Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW. For the band 5.745-5.850 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 30dBm
Test setup:	 The diagram illustrates the test setup. A 'Power Meter' is connected to an 'E.U.T.' (Equipment Under Test) by a red cable. Both components are placed on a 'Non-Conducted Table'. This table is supported by a 'Ground Reference Plane'.
Test procedure:	Measurement using an RF average power meter (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding $10 \log(1/x)$ where x is the duty cycle (e.g., $10 \log(1/0.25)$ if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details

**9.1 Test Result and Data**

Antenna A:

CH. No.	Frequency (MHz)	Output Power (dBm)			Limit(dBm)	Result
		802.11a	802.11n (HT20)	802.11ac (VHT20)		
36	5180.00	5.69	5.37	5.76	24	Pass
40	5200.00	5.64	5.70	5.46	24	Pass
48	5240.00	5.67	5.56	5.51	24	Pass

CH. No.	Frequency (MHz)	Output Power (dBm)		Limit(dBm)	Result
		802.11n(HT40)	802.11ac(VHT40)		
38	5190.00	4.22	4.30	24	Pass
46	5230.00	4.21	4.27	24	Pass

CH. No.	Frequency (MHz)	Output Power (dBm)	Limit(dBm)	Result
		802.11ac(VHT80)		
42	5210	5.01	24	Pass



Antenna B:

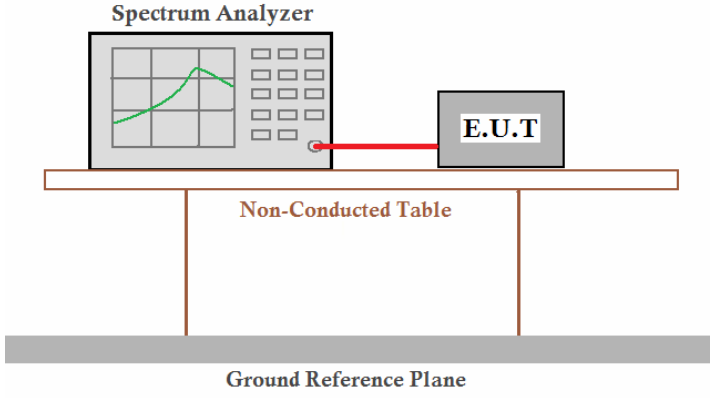
CH. No.	Frequency (MHz)	Output Power (dBm)			Limit(dBm)	Result
		802.11a	802.11n (HT20)	802.11ac (VHT20)		
36	5180.00	5.15	5.00	5.12	24	Pass
40	5200.00	4.95	5.03	5.11	24	Pass
48	5240.00	4.99	4.99	5.01	24	Pass

CH. No.	Frequency (MHz)	Output Power (dBm)		Limit(dBm)	Result
		802.11n(HT40)	802.11ac(VHT40)		
38	5190.00	3.87	3.89	24	Pass
46	5230.00	3.98	4.01	24	Pass

CH. No.	Frequency (MHz)	Output Power (dBm)	Limit(dBm)	Result
		802.11ac(VHT80)		
42	5210	4.91	24	Pass



10. Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	11dBm/MHz(Band I), 30 dBm(Band IV)
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PPSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

**10.1 Test Result and Data**

CH. No.	Frequency	Power Density ANT A (dBm/MHz)	Power Density ANT B (dBm/MHz)	total power density (dBm/MHz)	Limit (dBm/MHz)	Result
TX 802.11a Mode						
CH36	5180	0.09	-0.13	--	11	Pass
CH40	5200	-1.27	-1.68	--	11	Pass
CH48	5240	-0.73	-1.33	--	11	Pass
TX 802.11n20 Mode						
CH36	5180	-0.23	-1.01	--	11	Pass
CH40	5200	-1.43	-1.92	--	11	Pass
CH48	5240	-1.08	-1.85	--	11	Pass
TX 802.11n40 Mode						
CH38	5190	-4.80	-5.31	--	11	Pass
CH46	5230	-4.63	-4.96	--	11	Pass



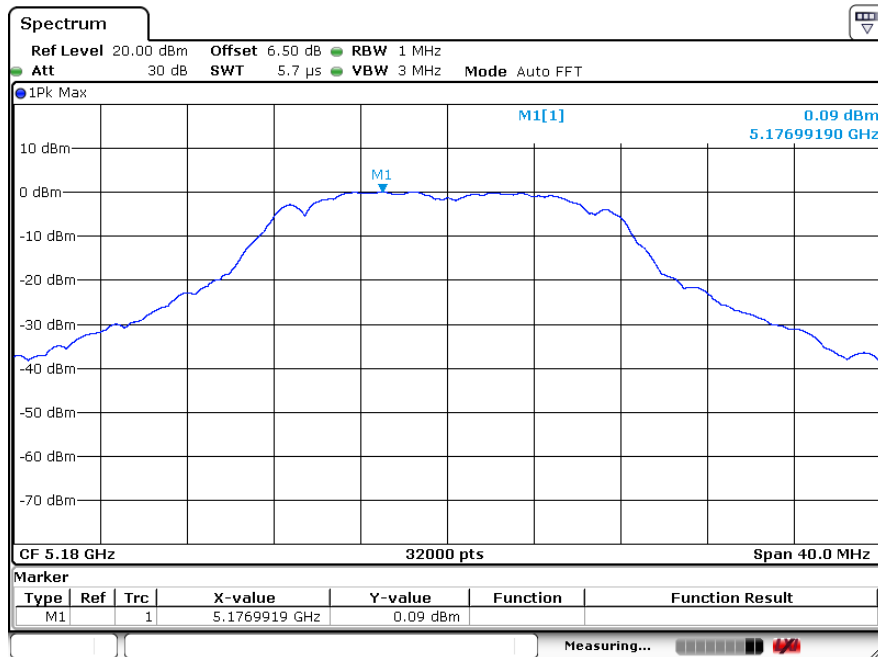
CH. No.	Frequency	Power Density ANT A (dBm/MHz)	Power Density ANT B (dBm/MHz)	total power density (dBm/MHz)	Limit (dBm/MHz)	Result
TX 802.11 ac(VHT20) Mode						
CH36	5180	-1.05	-1.75	--	11	Pass
CH40	5200	-0.82	-1.65	--	11	Pass
CH48	5240	-1.40	-2.01	--	11	Pass
TX 802.11 ac(VHT40) Mode						
CH38	5190	-4.41	-4.92	--	11	Pass
CH46	5230	-4.24	-4.85	--	11	Pass
TX 802.11 ac(VHT80) Mode						
CH42	5210	-8.28	-8.69	--	11	Pass

Note: The worst data is Antenna A, only shown Antenna A Plot.

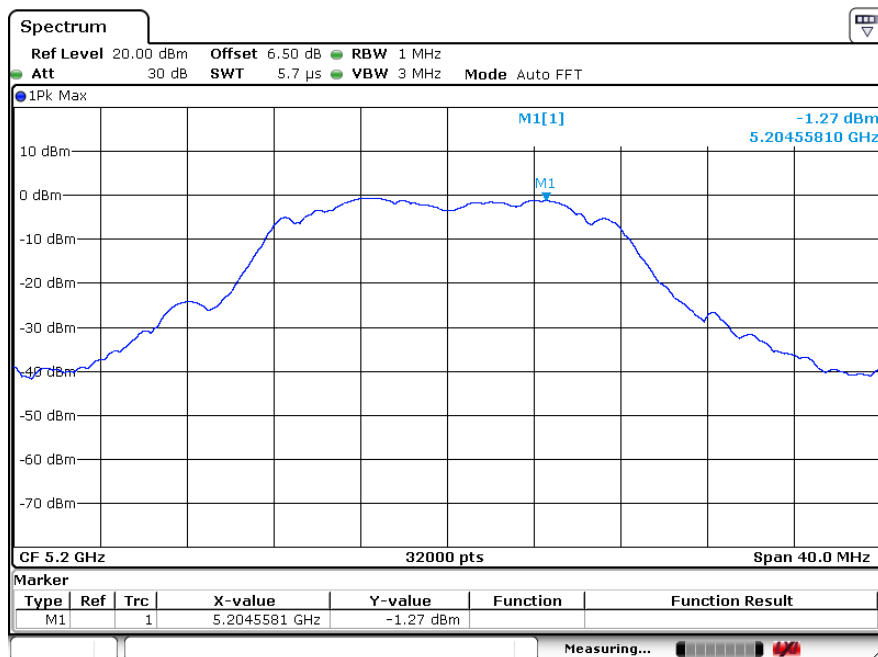


Test plots as followed: Antenna A

802.11a Channel: 36

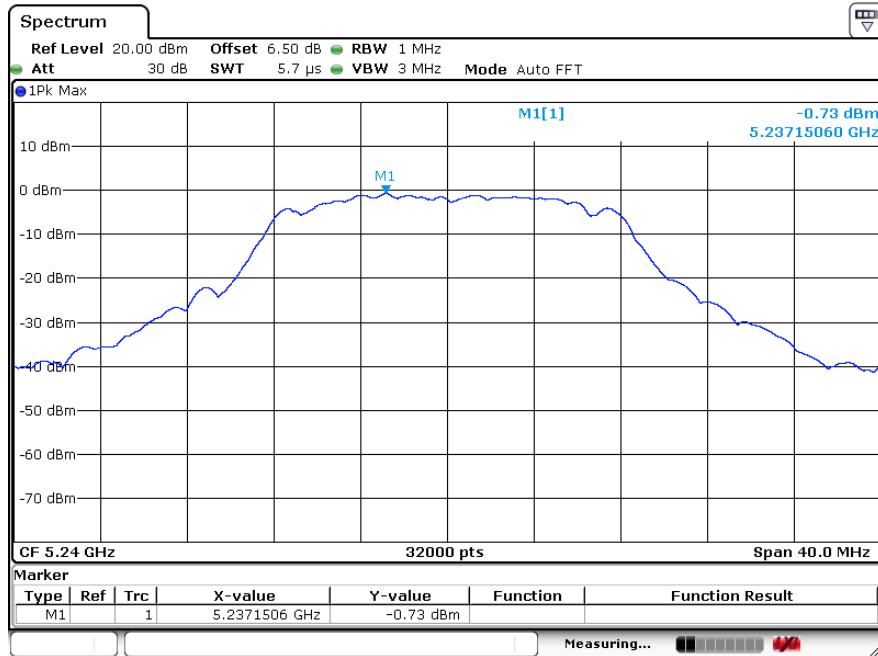


Channel: 40



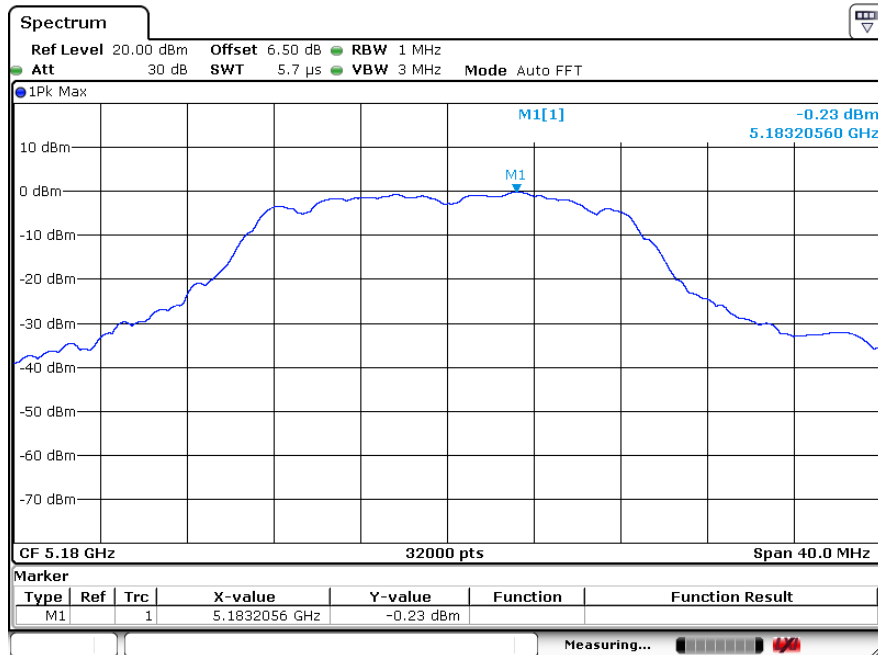


Channel: 48

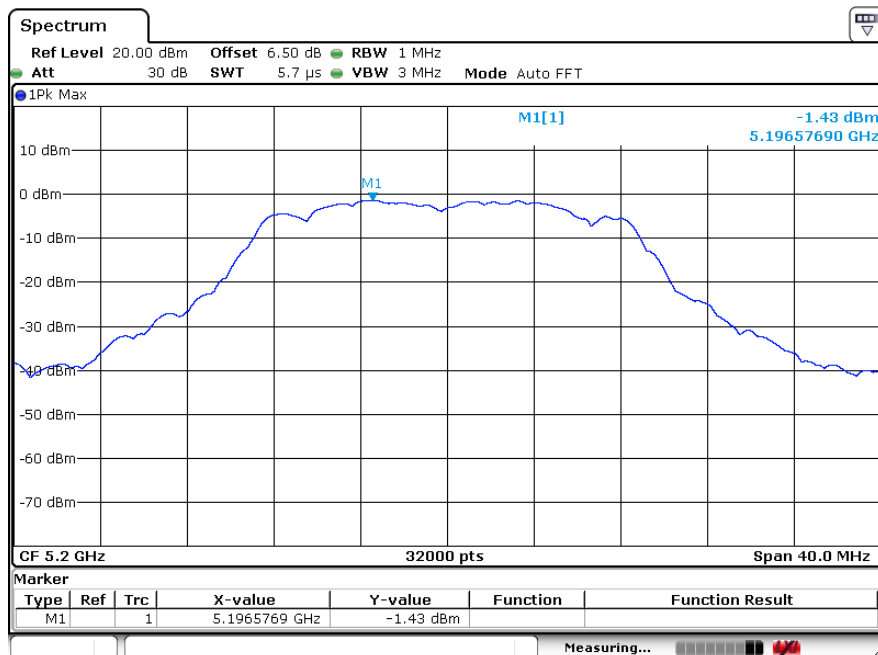




802.11n20 Channel: 36

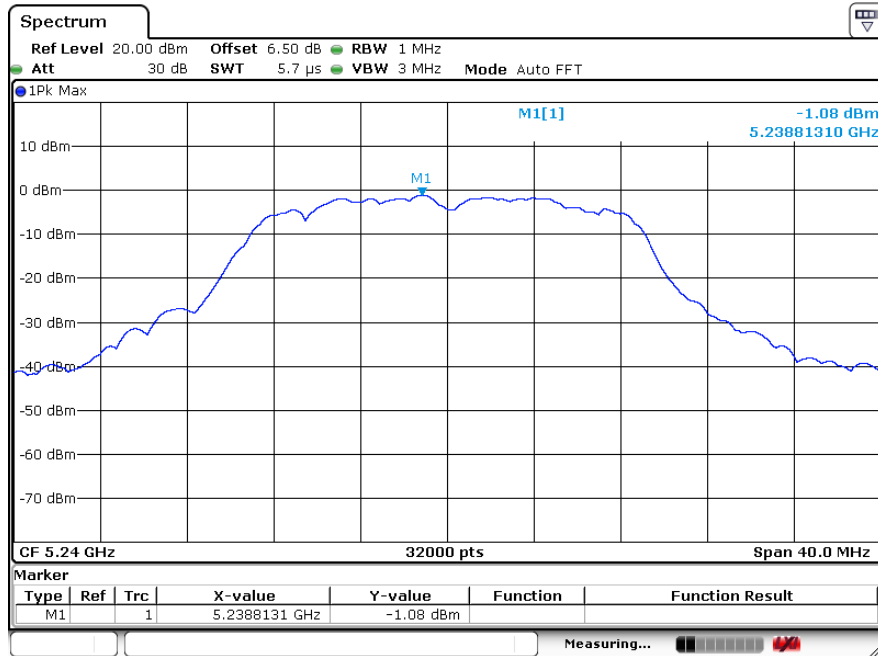


Channel: 40



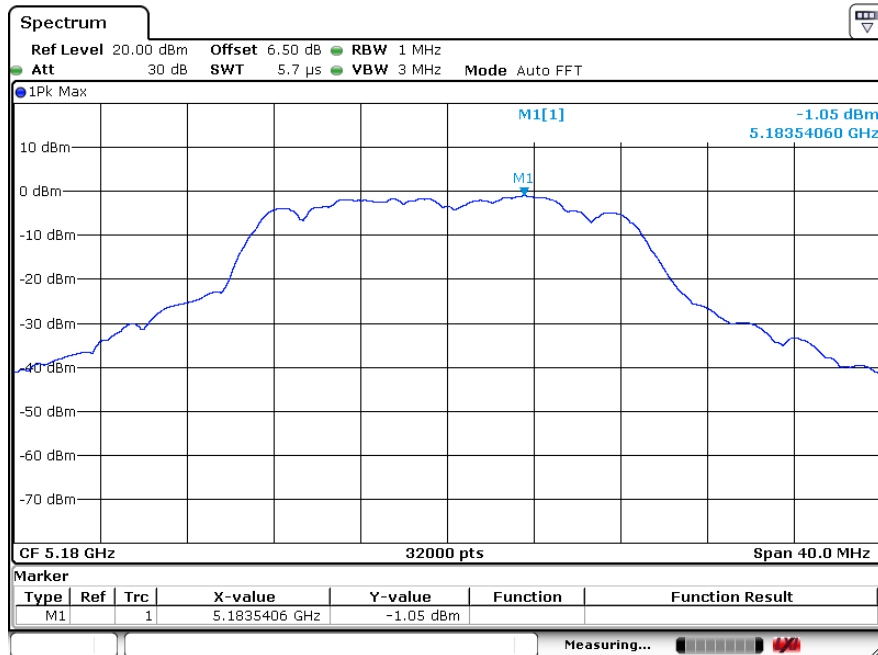


Channel: 48

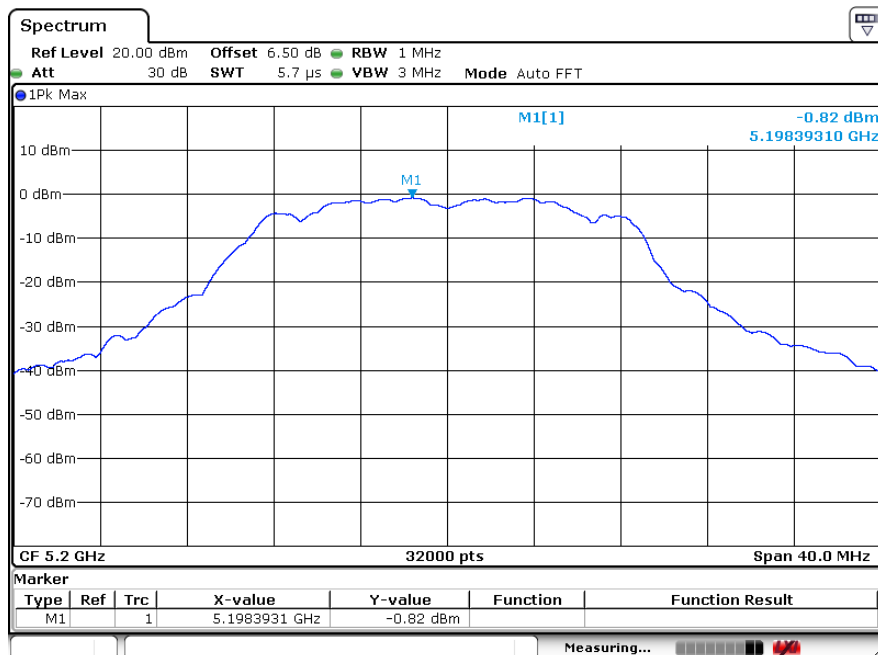




802.11ac20 Channel: 36

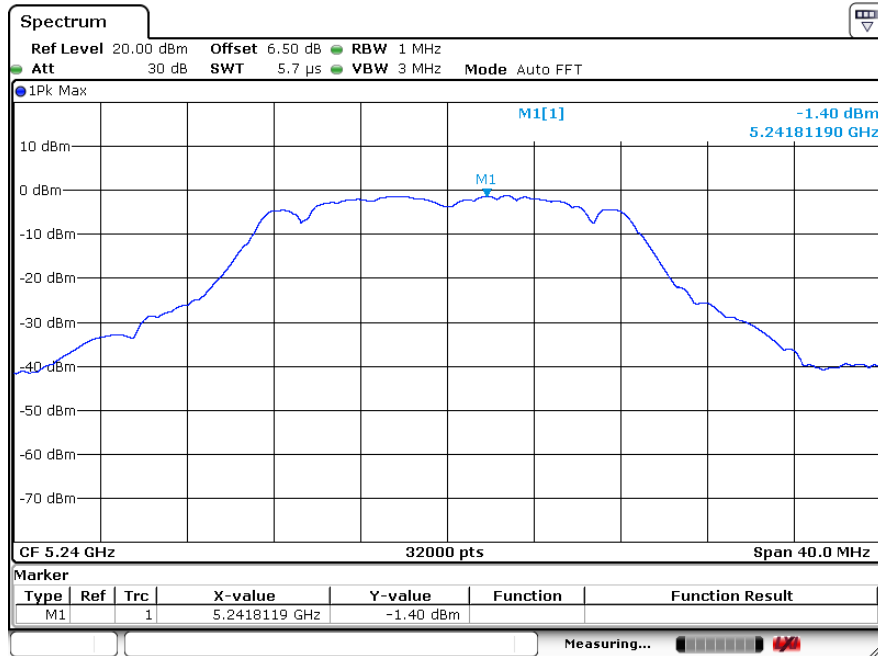


Channel: 40



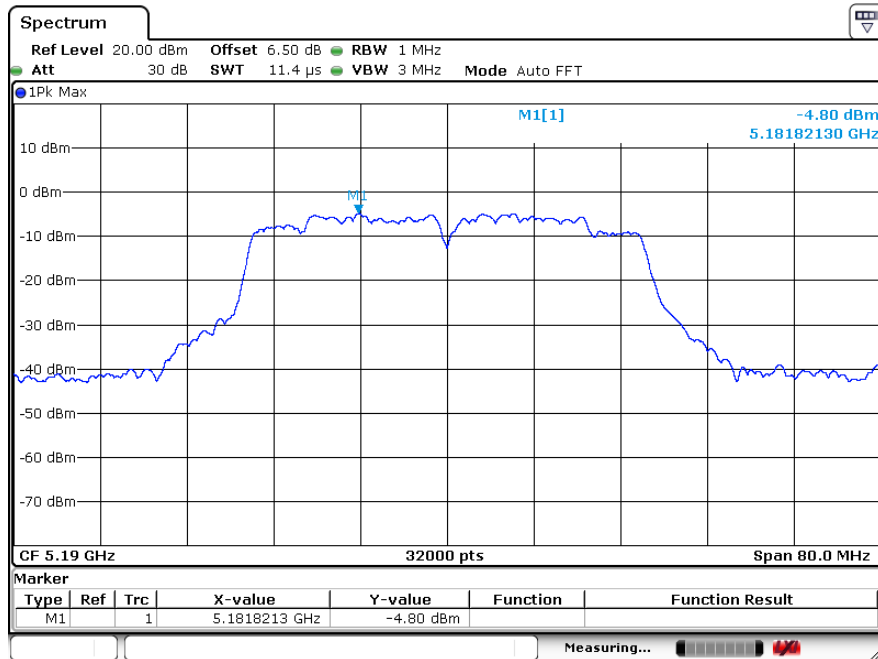


Channel: 48

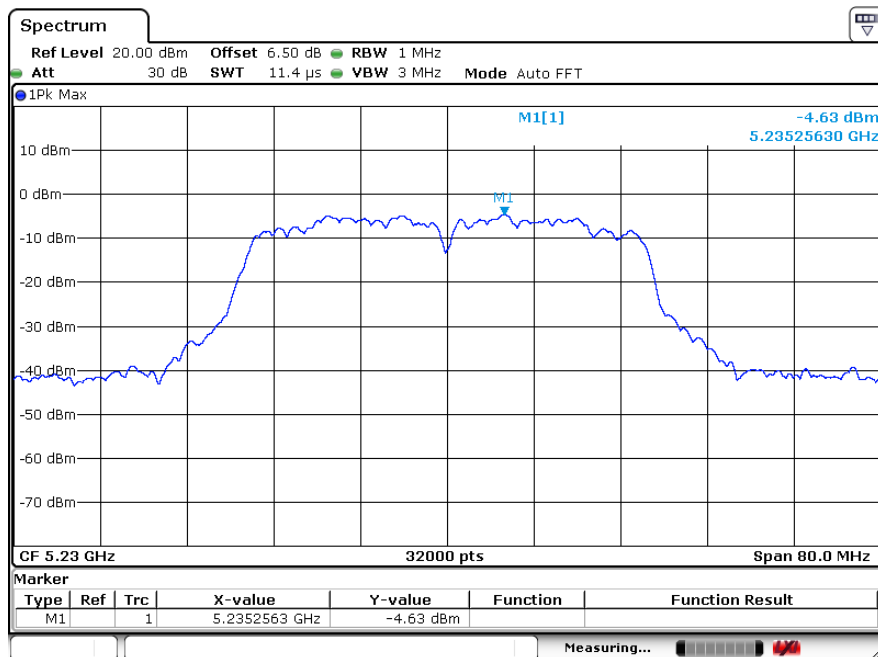




802.11n40 Channel: 38

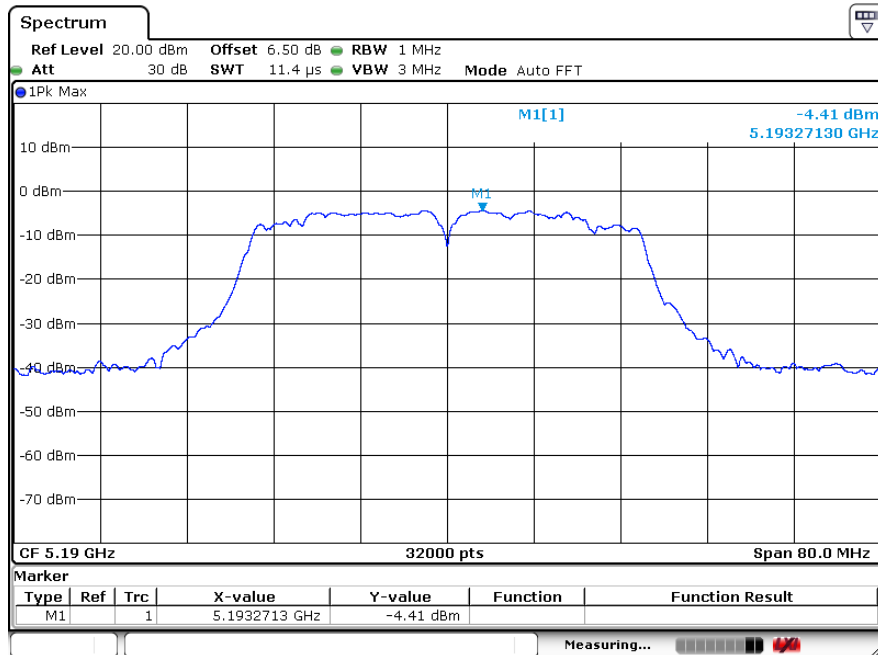


Channel: 46

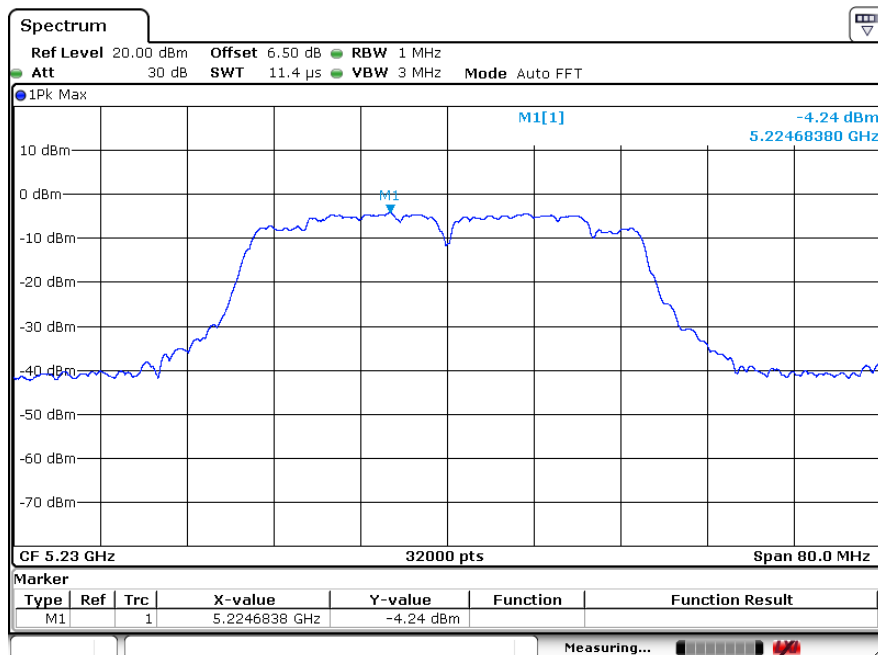




802.11ac40 Channel: 38

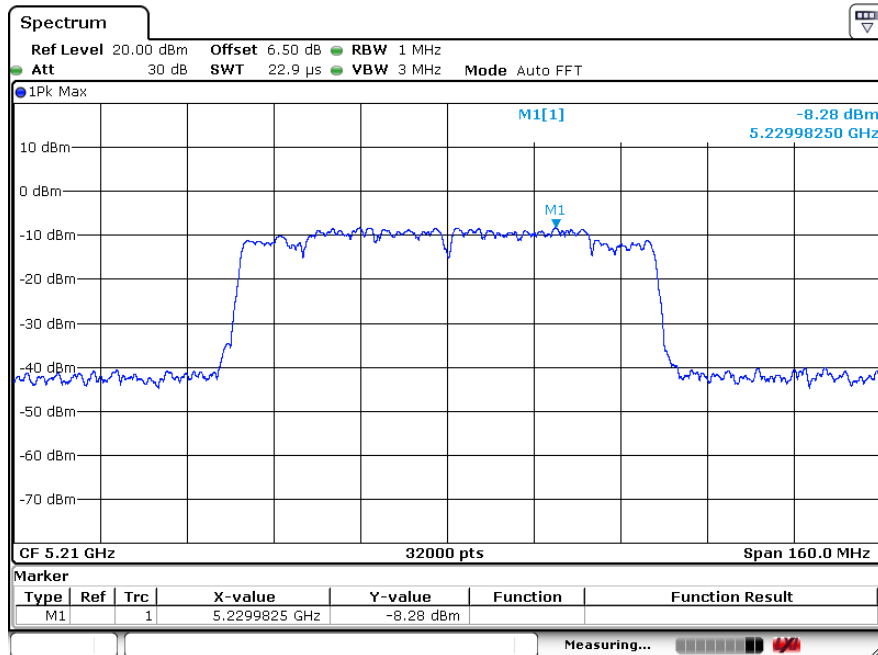


Channel: 46





802.11ac80
Channel:42

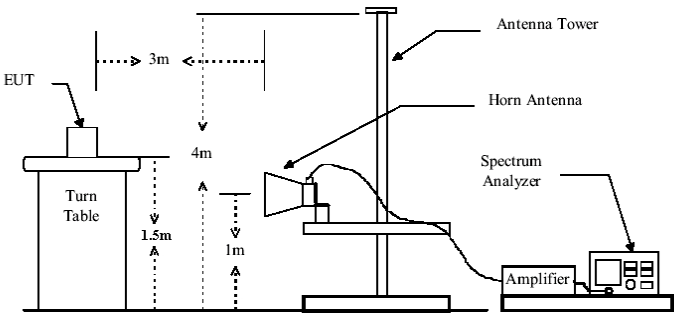




11. Band Edges Measurement

Test Requirement:	FCC Part15 E Section 15.407 and 5.205				
Test Method:	ANSI C63.10:2013				
Test site:	Measurement Distance: 3m				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
AV		1MHz	3MHz	Average Value	
Limit:					
	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
			74.0		Peak Value
	Undesirable emission limits:				
	(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.				
	(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.				
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.					
Test Procedure:	a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to				



	determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



Remark:

According to KDB 789033 D02V01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$$

For example, if EIRP = -27dBm

$$E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$$

**11.1 Test Result and Data**

Antenna A:

Peak value:

Test mode:		802.11a		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	44.32	7.18	51.50	68.2	-16.70	PK	H
5150	43.41	7.18	50.59	68.2	-17.61	PK	V
Test mode:		802.11a		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	43.51	7.2	50.71	68.2	-17.49	PK	H
5350	49.06	7.2	56.26	68.2	-11.94	PK	V

Average:

Test mode:		802.11a		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	31.25	7.18	38.43	48.2	-9.77	AV	H
5150	30.16	7.18	37.34	48.2	-10.86	AV	V
Test mode:		802.11a		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	30.33	7.2	37.53	48.2	-10.67	AV	H
5350	35.97	7.2	43.17	48.2	-5.03	AV	V

**Peak value:**

Test mode:		802.11n(HT20)		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	47.51	7.18	54.69	68.2	-13.51	PK	H
5150	54.36	7.18	61.54	68.2	-6.66	PK	V
Test mode:		802.11n(HT20)		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	43.21	7.2	50.41	68.2	-17.79	PK	H
5350	50.12	7.2	57.32	68.2	-10.88	PK	V

Average:

Test mode:		802.11n(HT20)		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	32.96	7.18	40.14	48.2	-8.06	AV	H
5150	38.01	7.18	45.19	48.2	-3.01	AV	V
Test mode:		802.11n(HT20)		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	30.13	7.2	37.33	48.2	-10.87	AV	H
5350	35.98	7.2	43.18	48.2	-5.02	AV	V

**Peak value:**

Test mode:		802.11n(HT40)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	43.02	7.18	50.2	68.2	-18.00	PK	H
5150	43.26	7.18	50.44	68.2	-17.76	PK	V
Test mode:		802.11n(HT40)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	43.96	7.2	51.16	68.2	-17.04	PK	H
5350	47.19	7.2	54.39	68.2	-13.81	PK	V

Average:

Test mode:		802.11n(HT40)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	30.23	7.18	37.41	48.2	-10.79	AV	H
5150	29.16	7.18	36.34	48.2	-11.86	AV	V
Test mode:		802.11n(HT40)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	29.96	7.2	37.16	48.2	-11.04	AV	H
5350	32.03	7.2	39.23	48.2	-8.97	AV	V

**Peak value:**

Test mode:		802.11ac(VHT80)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	45.19	7.18	52.37	68.2	-15.83	PK	H
5150	48.65	7.18	55.83	68.2	-12.37	PK	V
Test mode:		802.11ac(VHT80)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	46.12	7.2	53.32	68.2	-14.88	PK	H
5350	48.35	7.2	55.55	68.2	-12.65	PK	V

Average:

Test mode:		802.11ac(VHT80)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	31.02	7.18	38.2	48.2	-10	AV	H
5150	34.52	7.18	41.7	48.2	-6.5	AV	V
Test mode:		802.11ac(VHT80)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	34.43	7.2	41.63	48.2	-6.57	AV	H
5350	35.56	7.2	42.76	48.2	-5.44	AV	V



Antenna B:

Peak value:

Test mode:		802.11a		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	44.21	7.18	51.39	68.2	-16.81	PK	H
5150	43.19	7.18	50.37	68.2	-17.83	PK	V
Test mode:		802.11a		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	43.31	7.2	50.51	68.2	-17.69	PK	H
5350	48.78	7.2	55.98	68.2	-12.22	PK	V

Average:

Test mode:		802.11a		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	31.02	7.18	38.2	48.2	-10.00	AV	H
5150	30.08	7.18	37.26	48.2	-10.94	AV	V
Test mode:		802.11a		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	30.25	7.2	37.45	48.2	-10.75	AV	H
5350	35.73	7.2	42.93	48.2	-5.27	AV	V

**Peak value:**

Test mode:		802.11n(HT20)		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	47.25	7.18	54.43	68.2	-13.77	PK	H
5150	54.19	7.18	61.37	68.2	-6.83	PK	V
Test mode:		802.11n(HT20)		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	43.12	7.2	50.32	68.2	-17.88	PK	H
5350	49.97	7.2	57.17	68.2	-11.03	PK	V

Average:

Test mode:		802.11n(HT20)		Test channel:		Lowest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5150	32.05	7.18	39.23	48.2	-8.97	AV	H
5150	37.74	7.18	44.92	48.2	-3.28	AV	V
Test mode:		802.11n(HT20)		Test channel:		Highest	
Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector	Antenna Pol.
5350	30.03	7.2	37.23	48.2	-10.97	AV	H
5350	35.67	7.2	42.87	48.2	-5.33	AV	V

**Peak value:**

Test mode:		802.11n(HT40)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	42.97	7.18	50.15	68.2	-18.05	PK	H
5150	43.02	7.18	50.2	68.2	-18.00	PK	V
Test mode:		802.11n(HT40)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	43.25	7.2	50.45	68.2	-17.75	PK	H
5350	46.41	7.2	53.61	68.2	-14.59	PK	V

Average:

Test mode:		802.11n(HT40)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	30.05	7.18	37.23	48.2	-10.97	AV	H
5150	28.93	7.18	36.11	48.2	-12.09	AV	V
Test mode:		802.11n(HT40)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	29.48	7.2	36.68	48.2	-11.52	AV	H
5350	31.97	7.2	39.17	48.2	-9.03	AV	V

**Peak value:**

Test mode:		802.11ac(VHT80)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	45.03	7.18	52.21	68.2	-15.99	PK	H
5150	48.25	7.18	55.43	68.2	-12.77	PK	V
Test mode:		802.11ac(VHT80)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	45.01	7.2	52.21	68.2	-15.99	PK	H
5350	47.93	7.2	55.13	68.2	-13.07	PK	V

Average:

Test mode:		802.11ac(VHT80)		Test channel:		Lowest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5150	30.68	7.18	37.86	48.2	-10.34	AV	H
5150	34.22	7.18	41.4	48.2	-6.80	AV	V
Test mode:		802.11ac(VHT80)		Test channel:		Highest	
Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pol.
5350	34.09	7.2	41.29	48.2	-6.91	AV	H
5350	35.14	7.2	42.34	48.2	-5.86	AV	V



12. Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2014; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	Temperature Chamber <pre>graph LR; SA[Spectrum analyzer] --- Att[Att.]; Att --- EUT[EUT]; EUT --- VPS[Variable Power Supply]; subgraph TC [Temperature Chamber]; EUT; end</pre> Variable Power Supply Note : Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



Frequency stability versus Temp.					
Power Supply: DC 7.4V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5180	5176.1530	5182.9160	5181.2366	5177.7656
	5200	5198.4862	5202.7572	5202.1566	5199.3360
	5220	5219.8388	5220.2407	5221.2145	5219.7952
	5240	5240.0246	5240.6465	5240.1089	5239.5773
-20	5180	5179.6240	5180.3928	5180.7688	5180.0094
	5200	5199.6009	5200.3051	5199.9405	5199.8086
	5220	5219.2612	5220.5552	5220.0365	5219.6675
	5240	5239.3614	5240.1103	5240.4602	5239.1825
-10	5180	5178.9415	5180.2471	5180.0809	5179.1899
	5200	5199.8087	5200.7045	5200.9939	5199.1198
	5220	5219.8363	5220.5900	5220.2388	5219.4622
	5240	5239.3173	5240.5634	5240.9832	5239.3819
0	5180	5179.8948	5180.5569	5180.3728	5179.2963
	5200	5199.2278	5200.6612	5200.7317	5199.8933
	5220	5218.9069	5219.9760	5219.9829	5219.9976
	5240	5239.5732	5240.7336	5240.2391	5239.5681

10	5180	5179.2560	5180.0233	5180.8395	5179.3813
	5200	5199.2993	5200.1676	5200.5921	5199.7393
	5220	5219.0376	5220.3027	5220.0949	5219.9318
	5240	5239.0617	5240.5569	5240.6768	5239.5243
20	5180	5179.7525	5180.2415	5180.4188	5179.3355
	5200	5199.7051	5200.4881	5200.7624	5199.3744
	5220	5219.2651	5220.6157	5220.2781	5219.6687
	5240	5239.1152	5240.9421	5240.2786	5239.2804
30	5180	5179.8190	5180.7567	5180.1448	5179.6410
	5200	5199.3005	5200.1963	5200.2894	5199.5546
	5220	5219.2618	5220.4286	5220.9589	5219.6171
	5240	5239.5602	5240.2502	5240.6624	5239.9492



40	5180	5179.9014	5180.7265	5180.2244	5180.0123
	5200	5199.5642	5200.7204	5200.8330	5199.7874
	5220	5219.4641	5220.5004	5220.5917	5219.5885
	5240	5239.3020	5240.8121	5240.6858	5240.0723
50	5180	5179.4052	5180.5340	5180.4562	5179.1584
	5200	5199.2126	5200.7758	5200.2875	5199.3308
	5220	5219.7824	5220.8513	5220.5839	5219.3244
	5240	5239.5341	5240.2266	5240.0032	5239.2863



Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
6.9	5180	5183.9390	5182.0209	5176.2932	5178.4926
	5200	5203.8519	5200.2353	5196.7523	5198.0427
	5220	5220.8296	5220.2494	5217.3959	5219.8411
	5240	5240.7341	5240.7616	5238.4900	5239.2793
7.4	5180	5180.9642	5180.2824	5179.2917	5179.3373
	5200	5200.2600	5200.5335	5199.9052	5199.2982
	5220	5220.8970	5220.2945	5219.5889	5219.5904
	5240	5240.0594	5240.7283	5239.3516	5239.7611
8.4	5180	5180.2097	5180.4744	5179.1614	5179.3201
	5200	5200.4797	5200.5601	5199.2227	5199.2997
	5220	5219.9236	5220.8194	5219.1492	5219.3488
	5240	5240.6690	5240.4577	5239.5883	5239.1324



13. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.150
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**.: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

13.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.