



FCC Part 15E Test Report

FCC ID: 2BSO7-SPAMW21XXM

Applicant: SUNPLUS TECHNOLOGY CO., LTD.

Address: 19, Innovation First Road Hsinchu Science Park, Taiwan 30076

Manufacturer: SUNPLUS TECHNOLOGY CO., LTD.

Address: 19, Innovation First Road Hsinchu Science Park, Taiwan 30076

Product Name: Wireless Audio Module

Trade Mark: N/A

Model Number: SPA-MW21xx-M, SPA-MW21F3-M, SPA-MW21P2-M

Date of Receipt: Oct. 10, 2025

Test Date: Oct. 10, 2025 - Oct. 27, 2025

Date of Report: Oct. 27, 2025

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

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China

Applicable Standards: FCC PART 15 E 15.407
ANSI C63.10-2020+Cor 1-2023
KDB 662911 D01 Multiple Transmitter Output v02r01

Test Result: Pass

Report Number: DLE-251010071R

Prepared (Test Engineer): Alisa Song

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



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1.. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.407(b), 15.209	Radiated Spurious Emission	PASS	
15.407 (b)	Band Edge Emission	PASS	
15.407 (a)	Peak Output Power	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.407(a) (e)	26dB bandwidth and 99%dB Bandwidth 6dB bandwidth and 99%dB Bandwidth	PASS	
15.407(g)	Frequency Stability	PASS	
15.407(c)	Transmission in case of Absence of Information	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

Test lab: Shenzhen DL Testing Technology Co., Ltd.

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Address: Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB ID.: CN0118

1.1. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$ providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.56\text{dB}$
2	RF power,conducted	$\pm 0.42\text{dB}$
3	Spurious emissions,conducted	$\pm 2.76\text{dB}$
4	All emissions,radiated(<30MHz)	$\pm 3.54\text{dB}$
5	All emissions,radiated(<1G)	$\pm 3.65\text{dB}$
6	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
7	Occupied bandwidth	$\pm 1.28\text{MHz}$
8	PSD	$\pm 0.69\text{dB}$
9	Temperature	$\pm 0.5^{\circ}\text{C}$
10	Humidity	$\pm 2\%$



2.. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Product Name:	Wireless Audio Module
Trade Mark:	N/A
Model Number:	SPA-MW21xx-M, SPA-MW21F3-M, SPA-MW21P2-M
Test Model:	SPA-MW21xx-M
Sample number:	251010069-01
Model Difference	All models are same as the samples except model name and appearance color, they have the same structure and circuit.
Operation Frequency:	5180-5240, 5745-5825MHz(802.11a/n(HT20)) 5190-5230, 5755-5795MHz(802.11n(HT40))
Channel numbers:	See channel list
Channel separation:	5MHz
Modulation technology:	64QAM, 16QAM, QPSK, BPSK for OFDM
Rate of Transmitter	802.11a: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps 802.11n: Up to 300Mbps
Antenna Type:	PCB Antenna
Antenna gain:	WIFI 5.2G: Antenna 1:3.26dBi Antenna 2:2.03dBi WIFI 5.8G: Antenna 1:3.29dBi Antenna 2:1.87dBi
Power Supply:	DC 3.3V
Note:	WIFI 5.2G: The MIMO mode only support PCB Antenna1 and PCB Antenna2 the 802.11n mode, antenna 1 the Directional Gain=3.26dBi+10log(2)=6.27dBi. WIFI 5.8G: The MIMO mode only support PCB Antenna1 and PCB Antenna2 the 802.11n mode, antenna 1 the Directional Gain=3.29dBi+10log(2)=6.30dBi.

Note:

- 1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.The EUT's all information provided by client.



2. Channel List

Channel List for 802.11a/n(HT20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

Channel List for 802.11n(HT40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

Channel List for 802.11a/n(HT20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

Channel List for 802.11n(HT40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795



2.2. DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was e-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Band 1:

Pretest Mode	Modulation	Channel
Mode 1	802.11a	CH36
Mode 2		CH44
Mode 3		CH48
Mode 4	802.11n HT20	CH36
Mode 5		CH44
Mode 6		CH48
Mode 7	802.11n HT40	CH38
Mode 8		CH46

Mode 9	802.11n HT20(MIMO)	CH36
Mode 10		CH44
Mode 11		CH48
Mode 12	802.11n HT40(MIMO)	CH38
Mode 13		CH46

Band 4:

Pretest Mode	Modulation	Channel
Mode 14	802.11a	CH149
Mode 15		CH157
Mode 16		CH165
Mode 16	802.11n HT20	CH149
Mode 17		CH157
Mode 18		CH165
Mode 19	802.11n HT40	CH151
Mode 20		CH159

Mode 21	802.11n HT20(MIMO)	CH149
Mode 22		CH157
Mode 23		CH165
Mode 24	802.11n HT40(MIMO)	CH151
Mode 25		CH159

Note: (1) The measurements are performed at the highest, middle, lowest available channels.

(2) During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

(3) For the two items of conducted disturbance at the power supply end and space radiation below 1GHz, all modes have undergone pre-tests. The report only shows the worst test results of mode 24.



2.3. BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



2.4. DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	Notebook	310S-14AST	N/A	LENOVO

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5. TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the end product.

Max output power Setting			
Test software Version	Test program: sscom5.13.1		
Mode	802.11a	802.11n HT20	802.11n HT40
Data Rate	6Mbps	MSC0	MSC0
Power Setting of Software	60	60	66

**2.6. EQUIPMENTS LIST FOR ALL TEST ITEMS**

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 01, 2024	Oct. 31, 2025
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 01, 2024	Oct. 31, 2025
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 01, 2024	Oct. 31, 2025
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 01, 2024	Oct. 31, 2025
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 01, 2024	Oct. 31, 2025
6	Amplifier (9kHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 01, 2024	Oct. 31, 2025
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 01, 2024	Oct. 31, 2025
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 01, 2024	Oct. 31, 2025
9	Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 01, 2024	Oct. 31, 2025
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 01, 2024	Oct. 31, 2025
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 01, 2024	Oct. 31, 2025
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 01, 2024	Oct. 31, 2025
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 01, 2024	Oct. 31, 2025
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 01, 2024	Oct. 31, 2025
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 01, 2024	Oct. 31, 2025
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 01, 2024	Oct. 31, 2025

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	YIHENG	843 Room	843	Nov. 05, 2023	Nov. 04, 2026
2	EMI Receiver	R&S	ESR	101421	Nov. 01, 2024	Oct. 31, 2025
3	LISN	R&S	ENV216	102417	Nov. 01, 2024	Oct. 31, 2025
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 01, 2024	Oct. 31, 2025

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0



3.. EMC EMISSION TEST

3.1. CONDUCTED EMISSION MEASUREMENT

3.1.1. POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.5 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2. TEST PROCEDURE

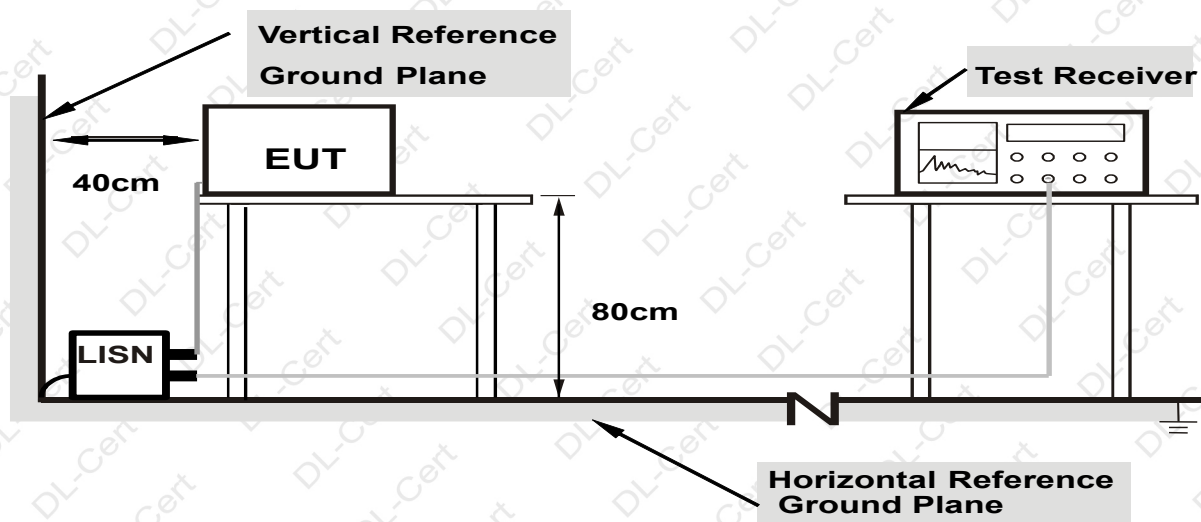
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3. DEVIATION FROM TEST STANDARD

No deviation



3.1.4. TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5. EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

3.1.6. TEST RESULTS

The EUT is powered by DC, no requirements for this item.



3.2. RADIATED EMISSION MEASUREMENT

3.2.1. RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

15.407(b) Undesirable emission limits. Except as shown in paragraph (b) (10) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. 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 e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating solely in the 5.725-5.850GHz band:
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micromvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average



Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2. TEST PROCEDURE

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.

Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre.
- Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

The horizontal and vertical polarities of the antenna were tested, and a pre-test was conducted on the EUT placement as three orthogonal axes X,Y,Z. The worst display of the test results was the Y-axis. The worst case emissions were reported.

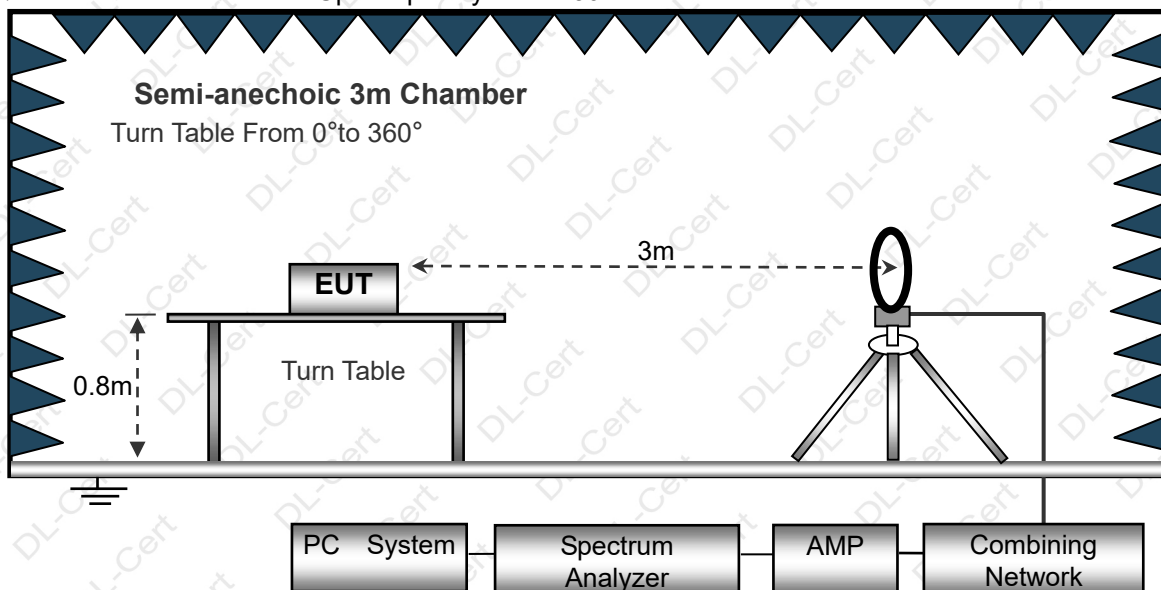
3.2.3. DEVIATION FROM TEST STANDARD

No deviation

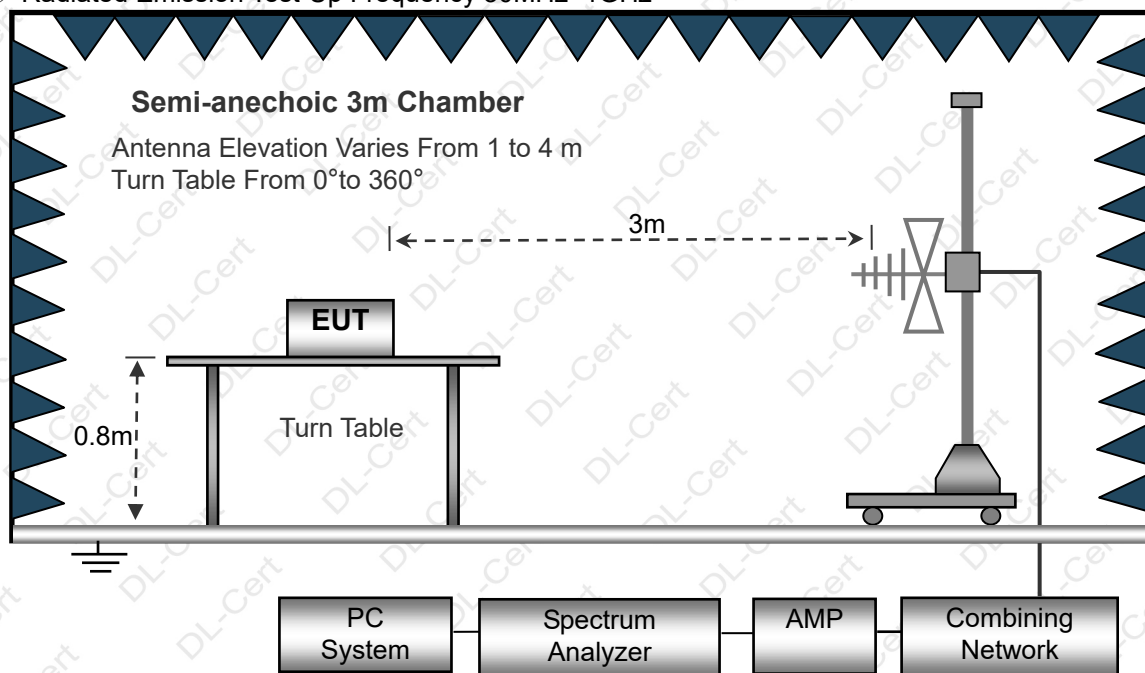


3.2.4. TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz

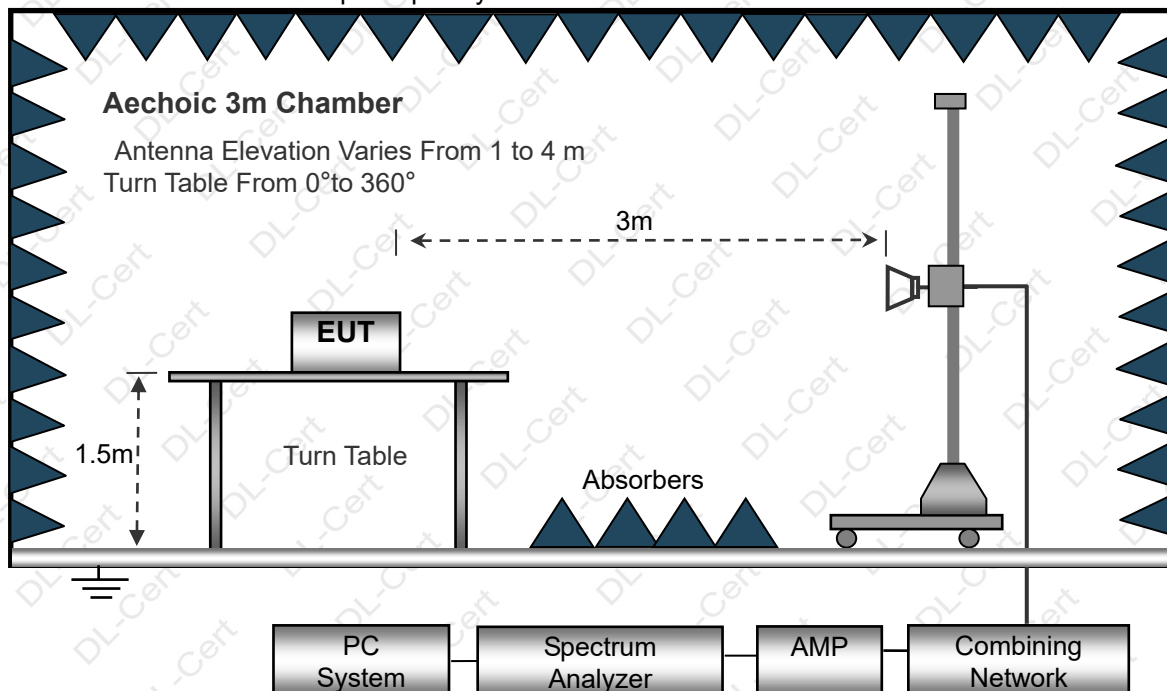


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





(C) Radiated Emission Test-Up Frequency Above 1GHz

**3.2.5. EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

**3.2.6. TEST RESULTS (Between 9KHz – 30 MHz)**

Temperature:	20°C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Mode 24	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

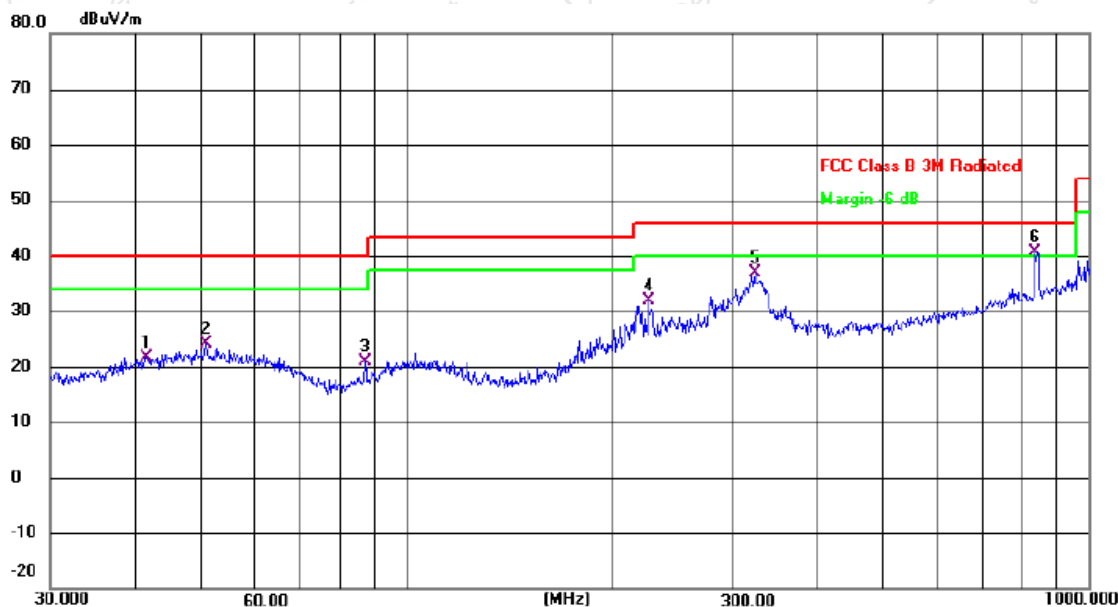
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.

**3.2.7. TEST RESULTS (Between 30MHz – 1GHz)**

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.3V		
Test Mode :	Mode 24		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		41.4215	29.37	-7.65	21.72	40.00	-18.28	QP	
2		50.7635	30.82	-6.75	24.07	40.00	-15.93	QP	
3		86.8067	32.62	-11.70	20.92	40.00	-19.08	QP	
4		226.0994	39.93	-7.97	31.96	46.00	-14.04	QP	
5		324.4560	42.77	-5.83	36.94	46.00	-9.06	QP	
6	*	836.2441	36.53	4.12	40.65	46.00	-5.35	QP	

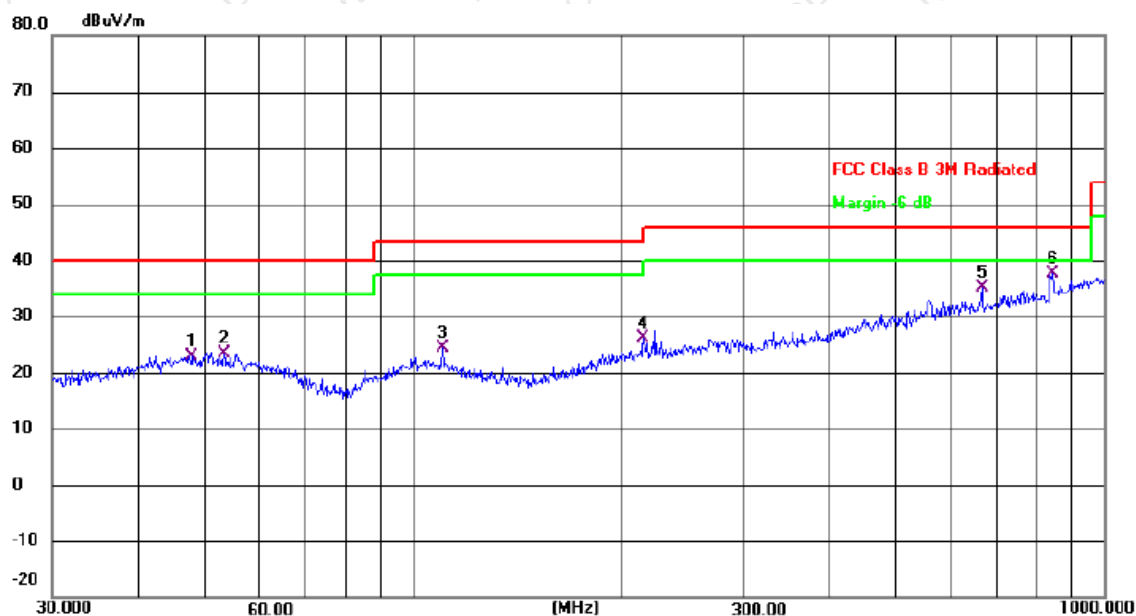
Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;



Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
test voltage :	DC 3.3V		
Test Mode :	Mode 24		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		47.8260	29.93	-6.97	22.96	40.00	-17.04	QP	
2		53.1313	30.30	-6.99	23.31	40.00	-16.69	QP	
3		110.1816	32.91	-8.55	24.36	43.50	-19.14	QP	
4		215.2677	34.31	-8.20	26.11	43.50	-17.39	QP	
5		665.8034	33.36	1.76	35.12	46.00	-10.88	QP	
6	*	842.1295	33.30	4.44	37.74	46.00	-8.26	QP	

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Level - Limit;

**3.2.8. TEST RESULTS (1ghz~40ghZ)**

802.11a band 1

We test all antenna's data, the data only show the antenna1 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5180									
V	10360	56.25	49.05	15.3	37.39	59.89	68.2	-8.31	PK
V	10360	41.85	49.05	15.3	37.39	45.49	54	-8.51	AV
V	15540	52.46	49.16	15.27	40.45	59.02	74	-14.98	PK
V	15540	39.84	49.16	15.27	40.45	46.4	54	-7.60	AV
H	10360	56.74	49.05	15.3	37.39	60.38	68.2	-7.82	PK
H	10360	40.43	49.05	15.3	37.39	44.07	54	-9.93	AV
H	15540	51.52	49.16	15.27	40.45	58.08	74	-15.92	PK
H	15540	38.83	49.16	15.27	40.45	45.39	54	-8.61	AV
operation frequency:5200									
V	10400	57.52	49.09	15.34	37.42	61.19	68.2	-7.01	PK
V	10400	39.86	49.09	15.34	37.42	43.53	54	-10.47	AV
V	15600	52.41	49.18	15.29	40.47	58.99	74	-15.01	PK
V	15600	38.26	49.18	15.29	40.47	44.84	54	-9.16	AV
H	10400	56.74	49.09	15.34	37.42	60.41	68.2	-7.79	PK
H	10400	39.52	49.09	15.34	37.42	43.19	54	-10.81	AV
H	15600	53.53	49.18	15.29	40.47	60.11	74	-13.89	PK
H	15600	38.54	49.18	15.29	40.47	45.12	54	-8.88	AV
operation frequency:5240									
V	10480	58.52	49.11	15.37	37.46	62.24	68.2	-5.96	PK
V	10480	39.56	49.11	15.37	37.46	43.28	54	-10.72	AV
V	15720	53.48	49.21	15.34	40.51	60.12	74	-13.88	PK
V	15720	38.41	49.21	15.34	40.51	45.05	54	-8.95	AV
H	10480	57.76	49.11	15.37	31.31	55.33	68.2	-12.87	PK
H	10480	45.55	49.11	15.37	31.31	43.12	54	-10.88	AV
H	15720	54.58	49.21	15.34	40.51	61.22	74	-12.78	PK
H	15720	37.14	49.21	15.34	40.51	43.78	54	-10.22	AV
Remark:									
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit									
2. If peak below the average limit, the average emission was no test.									
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



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Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5180									
V	10360	56.63	49.05	15.3	37.39	60.27	68.2	-7.93	PK
V	10360	38.41	49.05	15.3	37.39	42.05	54	-11.95	AV
V	15540	52.46	49.16	15.27	40.45	59.02	74	-14.98	PK
V	15540	38.74	49.16	15.27	40.45	45.3	54	-8.70	AV
H	10360	56.83	49.05	15.3	37.39	60.47	68.2	-7.73	PK
H	10360	39.41	49.05	15.3	37.39	43.05	54	-10.95	AV
H	15540	51.66	49.16	15.27	40.45	58.22	74	-15.78	PK
H	15540	38.67	49.16	15.27	40.45	45.23	54	-8.77	AV
operation frequency:5200									
V	10400	56.52	49.09	15.34	37.42	60.19	68.2	-8.01	PK
V	10400	39.66	49.09	15.34	37.42	43.33	54	-10.67	AV
V	15600	52.55	49.18	15.29	40.47	59.13	74	-14.87	PK
V	15600	38.41	49.18	15.29	40.47	44.99	54	-9.01	AV
H	10400	55.56	49.09	15.34	37.42	59.23	68.2	-8.97	PK
H	10400	40.52	49.09	15.34	37.42	44.19	54	-9.81	AV
H	15600	53.25	49.18	15.29	40.47	59.83	74	-14.17	PK
H	15600	39.63	49.18	15.29	40.47	46.21	54	-7.79	AV
operation frequency:5240									
V	10480	57.54	49.11	15.37	37.46	61.26	68.2	-6.94	PK
V	10480	40.51	49.11	15.37	37.46	44.23	54	-9.77	AV
V	15720	52.85	49.21	15.34	40.51	59.49	74	-14.51	PK
V	15720	38.66	49.21	15.34	40.51	45.3	54	-8.70	AV
H	10480	57.52	49.11	15.37	31.31	55.09	68.2	-13.11	PK
H	10480	44.81	49.11	15.37	31.31	42.38	54	-11.62	AV
H	15720	51.36	49.21	15.34	40.51	58	74	-16.00	PK
H	15720	39.74	49.21	15.34	40.51	46.38	54	-7.62	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



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Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5190									
V	10380	56.52	49.07	15.33	37.41	60.19	68.2	-8.01	PK
V	10380	39.33	49.07	15.33	37.41	43	54	-11.00	AV
V	15570	52.41	49.17	15.28	40.46	58.98	74	-15.02	PK
V	15570	38.83	49.17	15.28	40.46	45.4	54	-8.60	AV
H	10380	56.85	49.07	15.33	37.41	60.52	68.2	-7.68	PK
H	10380	40.56	49.07	15.33	37.41	44.23	54	-9.77	AV
H	15570	52.61	49.17	15.28	40.46	59.18	74	-14.82	PK
H	15570	38.62	49.17	15.28	40.46	45.19	54	-8.81	AV
operation frequency:5230									
V	10460	57.25	49.11	15.37	37.46	60.97	68.2	-7.23	PK
V	10460	39.54	49.11	15.37	37.46	43.26	54	-10.74	AV
V	15690	52.74	49.21	15.34	40.51	59.38	74	-14.62	PK
V	15690	38.66	49.21	15.34	40.51	45.3	54	-8.70	AV
H	10460	57.52	49.11	15.37	31.31	55.09	68.2	-13.11	PK
H	10460	44.36	49.11	15.37	31.31	41.93	54	-12.07	AV
H	15690	52.85	49.21	15.34	40.51	59.49	74	-14.51	PK
H	15690	39.63	49.21	15.34	40.51	46.27	54	-7.73	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



802.11a band 4

We test all antenna's data, the data only show the antenna1 worst mode.

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5745									
V	11490	54.45	49.05	15.3	37.39	58.09	74	-15.91	PK
V	11490	41.46	49.05	15.3	37.39	45.1	54	-8.90	AV
V	17235	55.21	49.16	15.27	40.45	61.77	68.2	-6.43	PK
V	17235	40.74	49.16	15.27	40.45	47.3	54	-6.70	AV
H	11490	52.33	49.05	15.3	37.39	55.97	74	-18.03	PK
H	11490	42.55	49.05	15.3	37.39	46.19	54	-7.81	AV
H	17235	51.36	49.16	15.27	40.45	57.92	68.2	-10.28	PK
H	17235	40.21	49.16	15.27	40.45	46.77	54	-7.23	AV
operation frequency:5785									
V	11570	51.56	49.09	15.34	37.42	55.23	74	-18.77	PK
V	11570	41.38	49.09	15.34	37.42	45.05	54	-8.95	AV
V	17355	50.75	49.18	15.29	40.47	57.33	68.2	-10.87	PK
V	17355	40.63	49.18	15.29	40.47	47.21	54	-6.79	AV
H	11570	50.34	49.09	15.34	37.42	54.01	74	-19.99	PK
H	11570	42.52	49.09	15.34	37.42	46.19	54	-7.81	AV
H	17355	48.68	49.18	15.29	40.47	55.26	68.2	-12.94	PK
H	17355	40.63	49.18	15.29	40.47	47.21	54	-6.79	AV
operation frequency:5825									
V	11650	52.21	49.11	15.37	37.46	55.93	74	-18.07	PK
V	11650	41.36	49.11	15.37	37.46	45.08	54	-8.92	AV
V	17475	49.25	49.21	15.34	40.51	55.89	68.2	-12.31	PK
V	17475	40.74	49.21	15.34	40.51	47.38	54	-6.62	AV
H	11650	57.53	49.11	15.37	31.31	55.1	74	-18.90	PK
H	11650	48.24	49.11	15.37	31.31	45.81	54	-8.19	AV
H	17475	49.46	49.21	15.34	40.51	56.1	68.2	-12.10	PK
H	17475	40.57	49.21	15.34	40.51	47.21	54	-6.79	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



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Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5745									
V	11490	49.52	49.05	15.3	37.39	53.16	74	-20.84	PK
V	11490	42.86	49.05	15.3	37.39	46.5	54	-7.50	AV
V	17235	48.41	49.16	15.27	40.45	54.97	68.2	-13.23	PK
V	17235	40.46	49.16	15.27	40.45	47.02	54	-6.98	AV
H	11490	49.58	49.05	15.3	37.39	53.22	74	-20.78	PK
H	11490	41.84	49.05	15.3	37.39	45.48	54	-8.52	AV
H	17235	48.51	49.16	15.27	40.45	55.07	68.2	-13.13	PK
H	17235	40.69	49.16	15.27	40.45	47.25	54	-6.75	AV
operation frequency:5785									
V	11570	52.52	49.09	15.34	37.42	56.19	74	-17.81	PK
V	11570	42.43	49.09	15.34	37.42	46.1	54	-7.90	AV
V	17355	49.25	49.18	15.29	40.47	55.83	68.2	-12.37	PK
V	17355	40.81	49.18	15.29	40.47	47.39	54	-6.61	AV
H	11570	49.63	49.09	15.34	37.42	53.3	74	-20.70	PK
H	11570	43.36	49.09	15.34	37.42	47.03	54	-6.97	AV
H	17355	49.58	49.18	15.29	40.47	56.16	68.2	-12.04	PK
H	17355	40.26	49.18	15.29	40.47	46.84	54	-7.16	AV
operation frequency:5825									
V	11650	51.64	49.11	15.37	37.46	55.36	74	-18.64	PK
V	11650	41.38	49.11	15.37	37.46	45.1	54	-8.90	AV
V	17475	48.46	49.21	15.34	40.51	55.1	68.2	-13.10	PK
V	17475	40.65	49.21	15.34	40.51	47.29	54	-6.71	AV
H	11650	57.41	49.11	15.37	31.31	54.98	74	-19.02	PK
H	11650	44.44	49.11	15.37	31.31	42.01	54	-11.99	AV
H	17475	49.74	49.21	15.34	40.51	56.38	68.2	-11.82	PK
H	17475	40.21	49.21	15.34	40.51	46.85	54	-7.15	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



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Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5755									
V	11510	49.43	49.07	15.33	37.41	53.1	74	-20.90	PK
V	11510	41.41	49.07	15.33	37.41	45.08	54	-8.92	AV
V	17265	49.56	49.17	15.28	40.46	56.13	68.2	-12.07	PK
V	17265	40.52	49.17	15.28	40.46	47.09	54	-6.91	AV
H	11510	48.85	49.07	15.33	37.41	52.52	74	-21.48	PK
H	11510	41.36	49.07	15.33	37.41	45.03	54	-8.97	AV
H	17265	49.24	49.17	15.28	40.46	55.81	68.2	-12.39	PK
H	17265	40.21	49.17	15.28	40.46	46.78	54	-7.22	AV
operation frequency:5795									
V	11590	49.52	49.11	15.37	37.46	53.24	74	-20.76	PK
V	11590	41.53	49.11	15.37	37.46	45.25	54	-8.75	AV
V	17385	48.34	49.21	15.34	40.51	54.98	68.2	-13.22	PK
V	17385	40.17	49.21	15.34	40.51	46.81	54	-7.19	AV
H	11590	57.51	49.11	15.37	31.31	55.08	74	-18.92	PK
H	11590	44.33	49.11	15.37	31.31	41.9	54	-12.10	AV
H	17385	48.45	49.21	15.34	40.51	55.09	68.2	-13.11	PK
H	17385	40.57	49.21	15.34	40.51	47.21	54	-6.79	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

15.407 (b)

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	5000MHz
Stop Frequency	5420MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 1.5 meters 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 rota 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.
- g. Test the EUT in the lowest channel,the Highest channel

Note:

The horizontal and vertical polarities of the antenna were tested, and a pre-test was conducted on the EUT placement as three orthogonal axes X,Y,Z. The worst display of the test results was the Y-axis. The worst case emissions were reported.

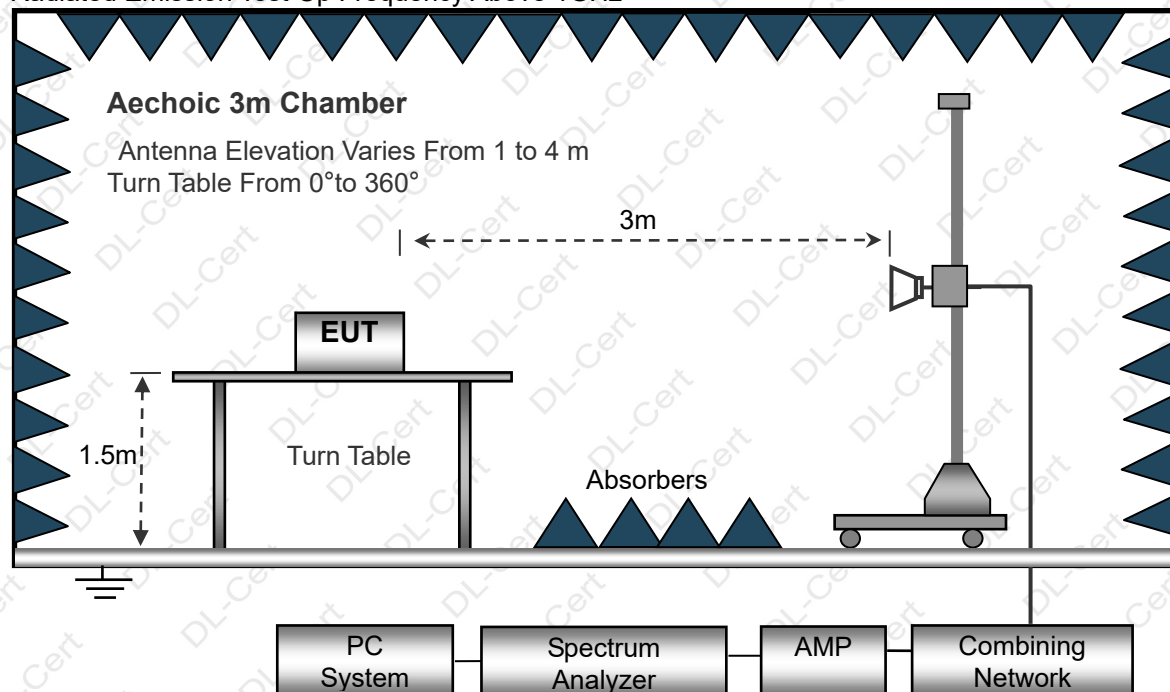
3.3.3 DEVIATION FROM TEST STANDARD

No deviation



3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



3.3.6 TEST RESULT

802.11a

We test all antenna's data, the data only show the antenna1 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5180									
V	5150	53.24	49.12	15.6	37.34	57.06	74	-16.94	PK
V	5150	39.83	49.12	15.6	37.34	43.65	54	-10.35	AV
V	5145	54.48	49.19	15.24	40.43	60.96	74	-13.04	PK
V	5145	36.41	49.19	15.24	40.43	42.89	54	-11.11	AV
H	5150	52.36	49.12	15.6	37.34	56.18	74	-17.82	PK
H	5150	37.15	49.12	15.6	37.34	40.97	54	-13.03	AV
H	5145	54.23	49.19	15.24	40.43	60.71	74	-13.29	PK
H	5145	33.44	49.19	15.24	40.43	39.92	54	-14.08	AV
operation frequency:5240									
V	5350	53.74	49.13	15.32	37.46	57.39	74	-16.61	PK
V	5350	35.43	49.13	15.32	37.46	39.08	54	-14.92	AV
V	5370	53.45	49.24	15.36	40.51	60.08	74	-13.92	PK
V	5370	32.66	49.24	15.36	40.51	39.29	54	-14.71	AV
H	5350	52.74	49.13	15.32	31.31	50.24	74	-23.76	PK
H	5350	40.63	49.13	15.32	31.31	38.13	54	-15.87	AV
H	5370	52.41	49.24	15.36	40.51	59.04	74	-14.96	PK
H	5370	32.46	49.24	15.36	40.51	39.09	54	-14.91	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



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Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5180									
V	5150	51.55	49.12	15.6	37.34	55.37	74	-18.63	PK
V	5150	33.21	49.12	15.6	37.34	37.03	54	-16.97	AV
V	5145	51.46	49.19	15.24	40.43	57.94	74	-16.06	PK
V	5145	33.67	49.19	15.24	40.43	40.15	54	-13.85	AV
H	5150	51.54	49.12	15.6	37.34	55.36	74	-18.64	PK
H	5150	33.43	49.12	15.6	37.34	37.25	54	-16.75	AV
H	5145	50.61	49.19	15.24	40.43	57.09	74	-16.91	PK
H	5145	32.96	49.19	15.24	40.43	39.44	54	-14.56	AV
operation frequency:5240									
V	5350	53.52	49.13	15.32	37.46	57.17	74	-16.83	PK
V	5350	34.36	49.13	15.32	37.46	38.01	54	-15.99	AV
V	5370	50.52	49.24	15.36	40.51	57.15	74	-16.85	PK
V	5370	33.44	49.24	15.36	40.51	40.07	54	-13.93	AV
H	5350	54.25	49.13	15.32	31.31	51.75	74	-22.25	PK
H	5350	36.69	49.13	15.32	31.31	34.19	54	-19.81	AV
H	5370	51.52	49.24	15.36	40.51	58.15	74	-15.85	PK
H	5370	33.63	49.24	15.36	40.51	40.26	54	-13.74	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



802.11n HT40

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:5190									
V	5150	52.41	49.12	15.33	37.41	56.03	74	-17.97	PK
V	5150	34.31	49.12	15.33	37.41	37.93	54	-16.07	AV
V	5145	51.58	49.19	15.28	40.46	58.13	74	-15.87	PK
V	5145	33.46	49.19	15.28	40.46	40.01	54	-13.99	AV
H	5150	52.65	49.12	15.33	37.41	56.27	74	-17.73	PK
H	5150	34.73	49.12	15.33	37.41	38.35	54	-15.65	AV
H	5145	50.88	49.19	15.28	40.46	57.43	74	-16.57	PK
H	5145	33.52	49.19	15.28	40.46	40.07	54	-13.93	AV
operation frequency:5230									
V	5350	52.21	49.12	15.33	37.41	55.83	74	-18.17	PK
V	5350	34.43	49.12	15.33	37.41	38.05	54	-15.95	AV
V	5370	51.58	49.19	15.28	40.46	58.13	74	-15.87	PK
V	5370	33.64	49.19	15.28	40.46	40.19	54	-13.81	AV
H	5350	52.46	49.12	15.33	37.41	56.08	74	-17.92	PK
H	5350	34.87	49.12	15.33	37.41	38.49	54	-15.51	AV
H	5370	50.35	49.19	15.28	40.46	56.9	74	-17.1	PK
H	5370	33.63	49.19	15.28	40.46	40.18	54	-13.82	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



802.11a

We test all antenna's data, the data only show the antenna1 worst mode.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5745									
V	5725	51.36	46.38	12.43	35.65	53.06	68.2	-15.14	PK
V	5725	40.64	46.38	12.43	35.65	42.34	54	-11.66	AV
V	5720	51.85	46.56	12.47	35.76	53.52	68.2	-14.68	PK
V	5720	40.63	46.56	12.47	35.76	42.3	54	-11.7	AV
H	5725	51.81	46.38	12.43	35.65	53.51	68.2	-14.69	PK
H	5725	40.18	46.38	12.43	35.65	41.88	54	-12.12	AV
H	5720	51.62	46.56	12.47	35.76	53.29	68.2	-14.91	PK
H	5720	40.56	46.56	12.47	35.76	42.23	54	-11.77	AV
operation frequency:5825									
V	5850	56.55	46.55	12.65	35.87	58.52	68.2	-9.68	PK
V	5850	42.32	46.55	12.65	35.87	44.29	54	-9.71	AV
V	5870	56.67	46.58	12.67	35.93	58.69	68.2	-9.51	PK
V	5870	42.15	46.58	12.67	35.93	44.17	54	-9.83	AV
H	5850	56.26	46.55	12.65	35.87	58.23	68.2	-9.97	PK
H	5850	42.23	46.55	12.65	35.87	44.2	54	-9.8	AV
H	5870	55.52	46.58	12.67	35.93	57.54	68.2	-10.66	PK
H	5870	42.46	46.58	12.67	35.93	44.48	54	-9.52	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5745									
V	5725	50.21	47.36	13.18	36.26	52.29	68.2	-15.91	PK
V	5725	40.83	47.36	13.18	36.26	42.91	54	-11.09	AV
V	5720	51.84	47.38	13.2	36.29	53.95	68.2	-14.25	PK
V	5720	41.85	47.38	13.2	36.29	43.96	54	-10.04	AV
H	5725	51.66	47.36	13.18	36.26	53.74	68.2	-14.46	PK
H	5725	41.25	47.36	13.18	36.26	43.33	54	-10.67	AV
H	5720	51.81	47.38	13.2	36.29	53.92	68.2	-14.28	PK
H	5720	40.66	47.38	13.2	36.29	42.77	54	-11.23	AV
operation frequency:5825									
V	5850	51.52	48.32	15.24	37.37	55.81	68.2	-12.39	PK
V	5850	40.66	48.32	15.24	37.37	44.95	54	-9.05	AV
V	5870	51.74	48.36	15.27	37.39	56.04	68.2	-12.16	PK
V	5870	41.41	48.36	15.27	37.39	45.71	54	-8.29	AV
H	5850	51.63	48.32	15.24	37.37	55.92	68.2	-12.28	PK
H	5850	40.52	48.32	15.24	37.37	44.81	54	-9.19	AV
H	5870	50.23	48.36	15.27	37.39	54.53	68.2	-13.67	PK
H	5870	40.67	48.36	15.27	37.39	44.97	54	-9.03	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5755									
V	5725	51.52	46.38	12.43	35.65	53.22	68.2	-14.98	PK
V	5725	40.56	46.38	12.43	35.65	42.26	54	-11.74	AV
V	5720	51.54	46.56	12.47	35.76	53.21	68.2	-14.99	PK
V	5720	40.85	46.56	12.47	35.76	42.52	54	-11.48	AV
H	5725	51.63	46.38	12.43	35.65	53.33	68.2	-14.87	PK
H	5725	40.21	46.38	12.43	35.65	41.91	54	-12.09	AV
H	5720	51.25	46.56	12.47	35.76	52.92	68.2	-15.28	PK
H	5720	40.41	46.56	12.47	35.76	42.08	54	-11.92	AV
operation frequency:5795									
V	5850	55.25	46.55	12.65	35.87	57.22	68.2	-10.98	PK
V	5850	43.66	46.55	12.65	35.87	45.63	54	-8.37	AV
V	5870	55.84	46.58	12.67	35.93	57.86	68.2	-10.34	PK
V	5870	43.74	46.58	12.67	35.93	45.76	54	-8.24	AV
H	5850	56.26	46.55	12.65	35.87	58.23	68.2	-9.97	PK
H	5850	43.45	46.55	12.65	35.87	45.42	54	-8.58	AV
H	5870	56.62	46.58	12.67	35.93	58.64	68.2	-9.56	PK
H	5870	43.63	46.58	12.67	35.93	45.65	54	-8.35	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Note:1. The antenna gain is compensated in the test data.



3.3 CONDUCTED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.407

(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 e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	5150MHz	5725MHz
Stop Frequency	5250MHz	5850MHz
RB / VB (emission in restricted band)	1 MHz / 3 MHz for Peak, 1 MHz / 10Hz for Average	

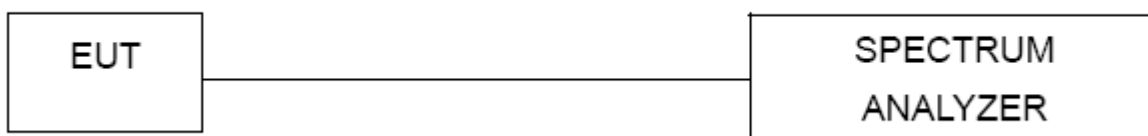
3.3.2 TEST PROCEDURE

Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

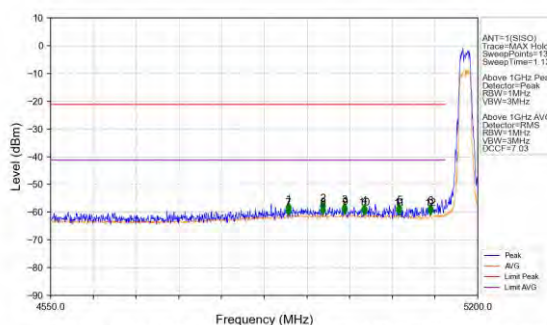


3.3.6 TEST RESULT

The antenna gain is compensated in the test data.

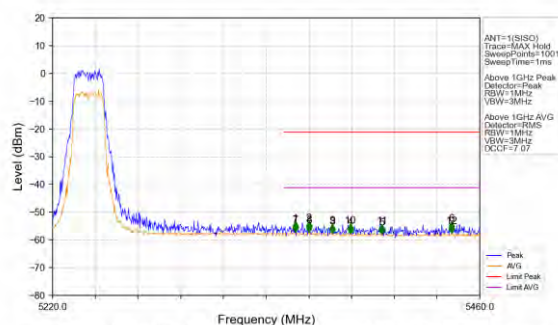
The ANT 1&ANT 2 both has 3dB margin below the limit, so the MIMO mode is passed.

802.11a ANT1



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4912.000	-59.69	-21.20	38.49	Pass	Peak	7	4912.000	-60.99	-21.20	39.79	Pass	AVG
2	4964.000	-59.36	-21.20	38.16	Pass	Peak	8	4964.000	-60.82	-21.20	39.62	Pass	AVG
3	4997.500	-59.94	-21.20	38.74	Pass	Peak	9	4997.500	-60.70	-21.20	39.50	Pass	AVG
4	5027.500	-60.25	-21.20	39.05	Pass	Peak	10	5027.500	-60.90	-21.20	39.70	Pass	AVG
5	5080.500	-60.11	-21.20	38.91	Pass	Peak	11	5080.500	-60.94	-21.20	39.74	Pass	AVG
6	5128.000	-60.25	-21.20	39.05	Pass	Peak	12	5128.000	-61.02	-21.20	39.82	Pass	AVG

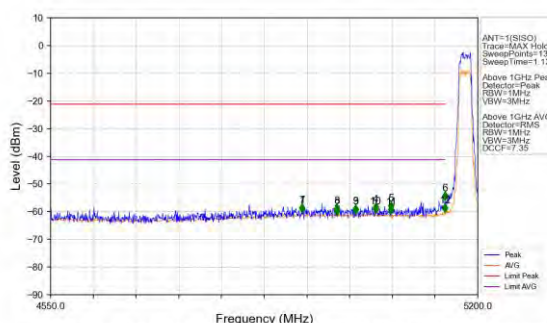
5180MHz



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5356.320	-56.60	-21.20	35.40	Pass	Peak	7	5356.320	-57.19	-21.20	35.99	Pass	AVG
2	5364.000	-56.42	-21.20	35.22	Pass	Peak	8	5364.000	-57.13	-21.20	35.87	Pass	AVG
3	5377.200	-57.68	-21.20	36.48	Pass	Peak	9	5377.200	-57.45	-21.20	36.25	Pass	AVG
4	5387.280	-57.82	-21.20	36.62	Pass	Peak	10	5387.280	-57.43	-21.20	36.23	Pass	AVG
5	5405.040	-58.12	-21.20	36.92	Pass	Peak	11	5405.040	-57.52	-21.20	36.32	Pass	AVG
6	5444.160	-56.59	-21.20	35.39	Pass	Peak	12	5444.160	-57.56	-21.20	36.36	Pass	AVG

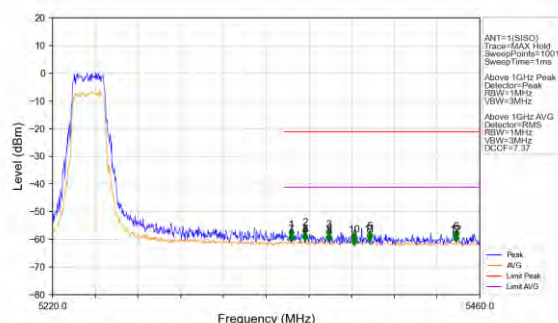
5240MHz

802.11n HT20 ANT1



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4933.000	-60.17	-21.20	38.97	Pass	Peak	7	4933.000	-60.32	-21.20	39.12	Pass	AVG
2	4985.500	-61.34	-21.20	40.14	Pass	Peak	8	4985.500	-60.51	-21.20	39.31	Pass	AVG
3	5014.000	-60.67	-21.20	39.47	Pass	Peak	9	5014.000	-60.71	-21.20	39.51	Pass	AVG
4	5044.500	-59.88	-21.20	38.68	Pass	Peak	10	5044.500	-60.57	-21.20	39.37	Pass	AVG
5	5068.000	-59.53	-21.20	38.33	Pass	Peak	11	5068.000	-60.75	-21.20	39.55	Pass	AVG
6	5150.000	-55.85	-21.20	34.65	Pass	Peak	12	5150.000	-60.31	-21.20	39.11	Pass	AVG

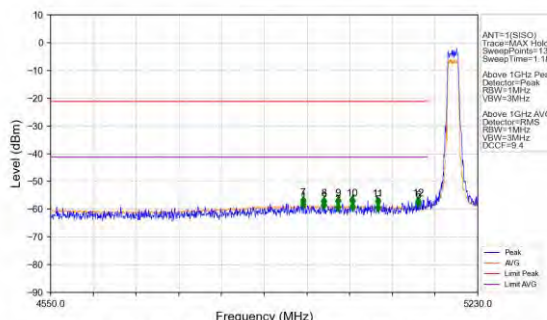
5180MHz



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5354.160	-59.03	-21.20	37.83	Pass	Peak	7	5354.160	-60.85	-21.20	39.65	Pass	AVG
2	5361.840	-58.27	-21.20	37.07	Pass	Peak	8	5361.840	-60.58	-21.20	39.38	Pass	AVG
3	5375.280	-58.97	-21.20	37.77	Pass	Peak	9	5375.280	-60.58	-21.20	39.38	Pass	AVG
4	5389.440	-62.19	-21.20	40.99	Pass	Peak	10	5389.440	-60.75	-21.20	39.55	Pass	AVG
5	5398.080	-59.81	-21.20	38.61	Pass	Peak	11	5398.080	-60.66	-21.20	39.46	Pass	AVG
6	5446.560	-59.80	-21.20	38.60	Pass	Peak	12	5446.560	-60.87	-21.20	39.67	Pass	AVG

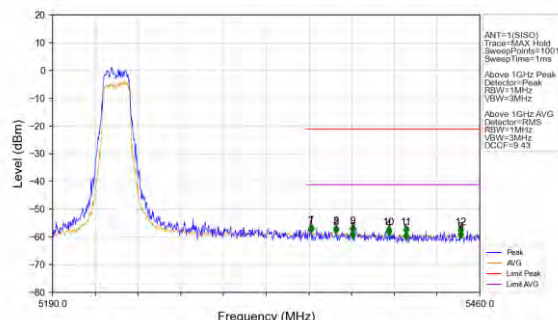
5240MHz

802.11n HT40 ANT1



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4952.000	-59.63	-21.20	38.43	Pass	Peak	7	4952.000	-58.44	-21.20	37.24	Pass	AVG
2	4985.000	-60.02	-21.20	38.82	Pass	Peak	8	4985.000	-58.56	-21.20	37.36	Pass	AVG
3	5007.000	-60.80	-21.20	39.60	Pass	Peak	9	5007.000	-58.68	-21.20	37.48	Pass	AVG
4	5030.500	-60.59	-21.20	39.39	Pass	Peak	10	5030.500	-58.70	-21.20	37.50	Pass	AVG
5	5071.000	-61.06	-21.20	39.86	Pass	Peak	11	5071.000	-58.78	-21.20	37.58	Pass	AVG
6	5135.500	-59.40	-21.20	38.20	Pass	Peak	12	5135.500	-58.53	-21.20	37.33	Pass	AVG

5190MHz

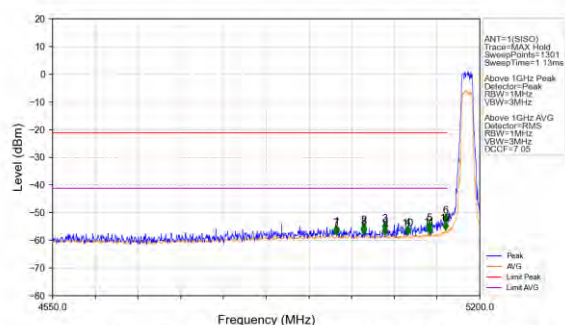


No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5353.350	-58.28	-21.20	37.08	Pass	Peak	7	5353.350	-58.63	-21.20	37.43	Pass	AVG
2	5369.010	-58.90	-21.20	37.70	Pass	Peak	8	5369.010	-58.65	-21.20	37.45	Pass	AVG
3	5379.540	-60.56	-21.20	39.36	Pass	Peak	9	5379.540	-58.71	-21.20	37.51	Pass	AVG
4	5402.490	-59.62	-21.20	38.42	Pass	Peak	10	5402.490	-58.94	-21.20	37.74	Pass	AVG
5	5413.290	-61.24	-21.20	40.04	Pass	Peak	11	5413.290	-58.99	-21.20	37.79	Pass	AVG
6	5447.850	-60.61	-21.20	39.41	Pass	Peak	12	5447.850	-58.96	-21.20	37.76	Pass	AVG

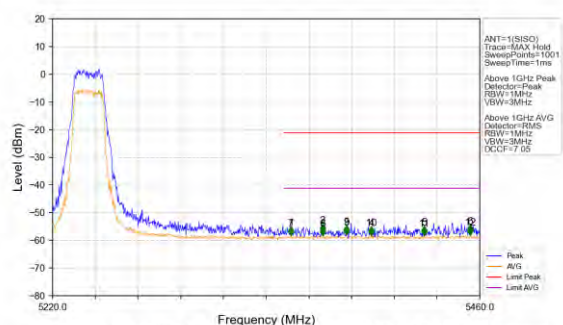
5230MHz



802.11a ANT2



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4962.000	-57.48	-21.20	36.28	Pass	Peak
2	5023.500	-56.97	-21.20	35.77	Pass	Peak
3	5055.500	-56.53	-21.20	35.33	Pass	Peak
4	5090.500	-57.90	-21.20	36.70	Pass	Peak
5	5123.000	-56.24	-21.20	35.04	Pass	Peak
6	5148.000	-53.50	-21.20	32.30	Pass	Peak

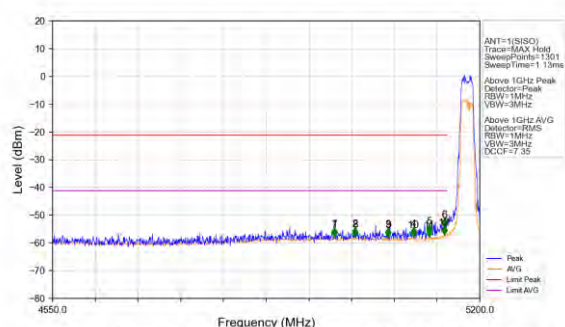


No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5353.920	-58.11	-21.20	36.91	Pass	Peak
2	5371.680	-57.16	-21.20	35.96	Pass	Peak
3	5385.120	-57.66	-21.20	36.46	Pass	Peak
4	5399.040	-58.14	-21.20	36.94	Pass	Peak
5	5428.800	-57.92	-21.20	36.72	Pass	Peak
6	5454.720	-57.55	-21.20	36.35	Pass	Peak

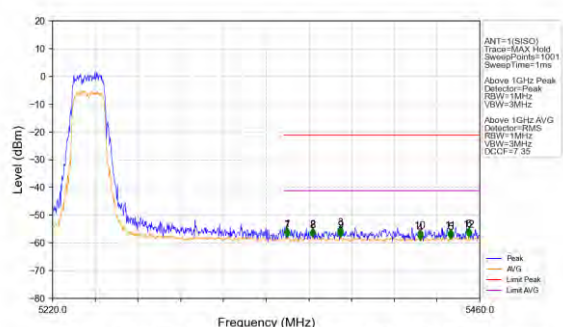
5180MHz

5240MHz

802.11n HT20 ANT2



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4979.000	-57.64	-21.20	36.44	Pass	Peak
2	5010.000	-57.58	-21.20	36.38	Pass	Peak
3	5060.500	-57.71	-21.20	36.51	Pass	Peak
4	5099.000	-57.53	-21.20	36.33	Pass	Peak
5	5123.000	-56.64	-21.20	35.44	Pass	Peak
6	5146.000	-54.20	-21.20	33.00	Pass	Peak

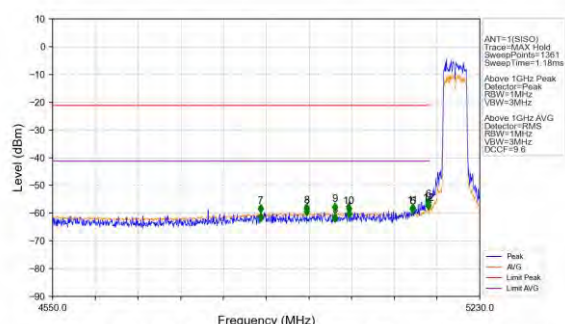


No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5351.760	-57.53	-21.20	36.33	Pass	Peak
2	5366.160	-57.69	-21.20	36.49	Pass	Peak
3	5381.760	-57.07	-21.20	35.87	Pass	Peak
4	5426.400	-59.00	-21.20	37.80	Pass	Peak
5	5443.440	-58.86	-21.20	37.66	Pass	Peak
6	5453.760	-57.51	-21.20	36.31	Pass	Peak

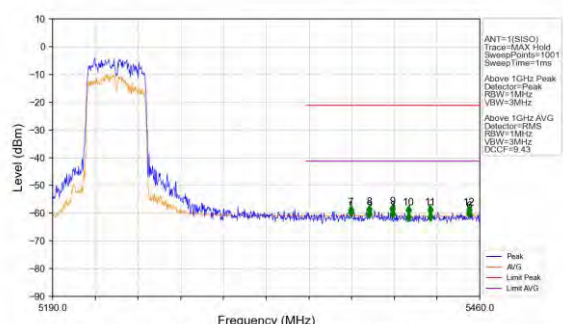
5180MHz

5240MHz

802.11n HT40 ANT2



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	4961.000	-62.97	-21.20	41.77	Pass	Peak
2	4964.500	-60.95	-21.20	39.75	Pass	Peak
3	4999.500	-63.13	-21.20	41.93	Pass	Peak
4	5021.500	-61.66	-21.20	40.46	Pass	Peak
5	5123.000	-60.13	-21.20	38.93	Pass	Peak
6	5148.000	-57.52	-21.20	36.32	Pass	Peak



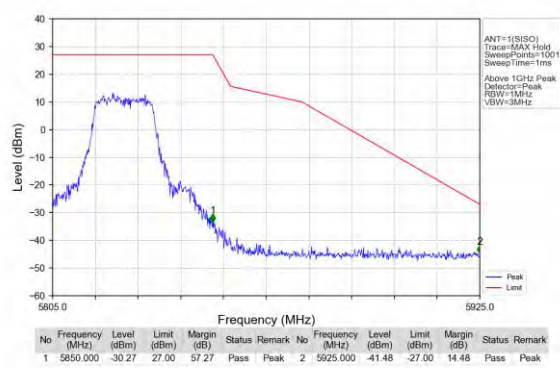
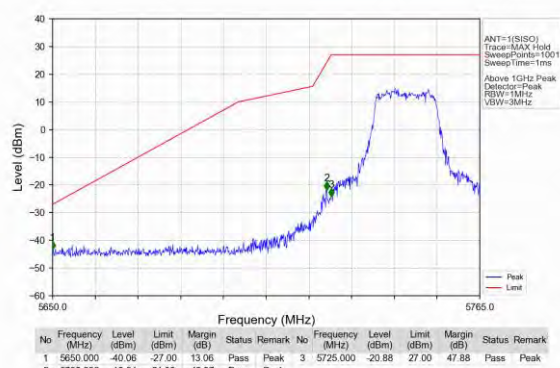
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	5376.460	-61.26	-21.20	40.06	Pass	Peak
2	5390.070	-61.96	-21.20	40.76	Pass	Peak
3	5404.650	-61.77	-21.20	40.57	Pass	Peak
4	5414.910	-62.97	-21.20	41.77	Pass	Peak
5	5426.680	-62.86	-21.20	41.66	Pass	Peak
6	5453.250	-61.74	-21.20	40.54	Pass	Peak

5190MHz

5230MHz



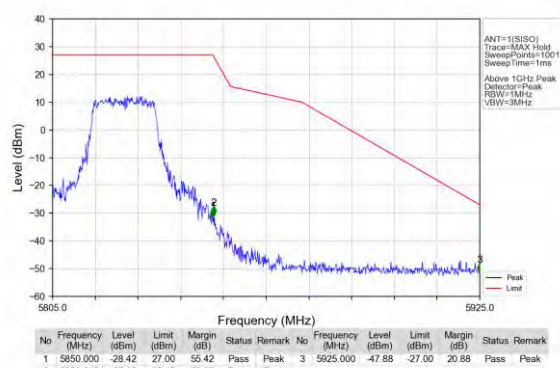
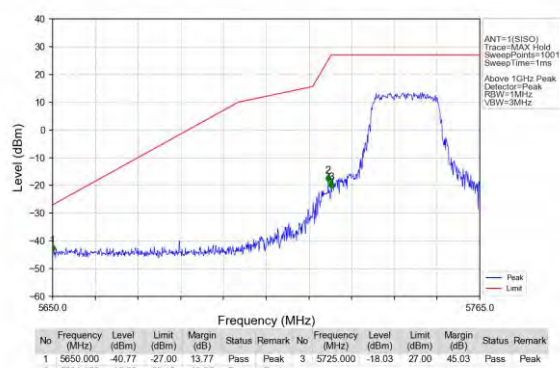
802.11a ANT1



5745MHz

5825MHz

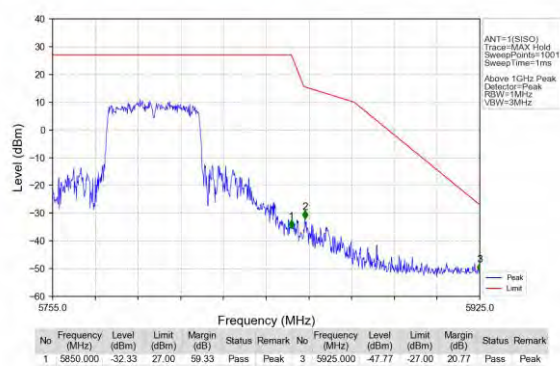
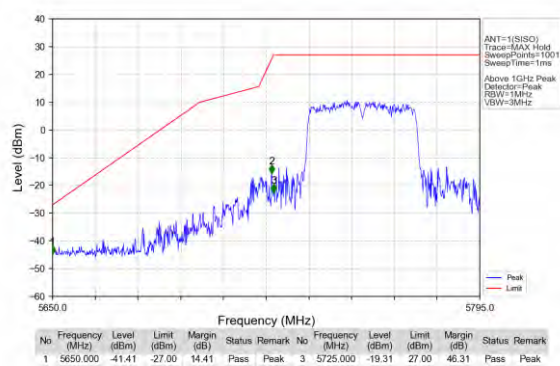
802.11n HT20 ANT1



5745MHz

5825MHz

802.11n HT40 ANT1

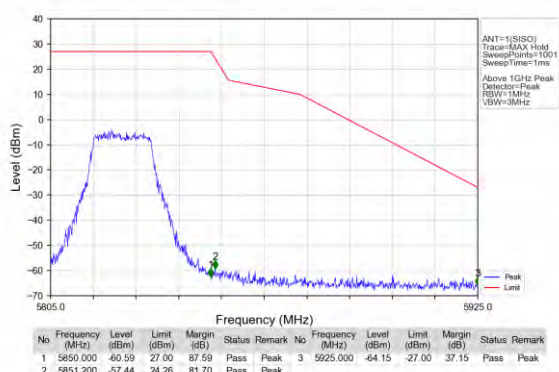
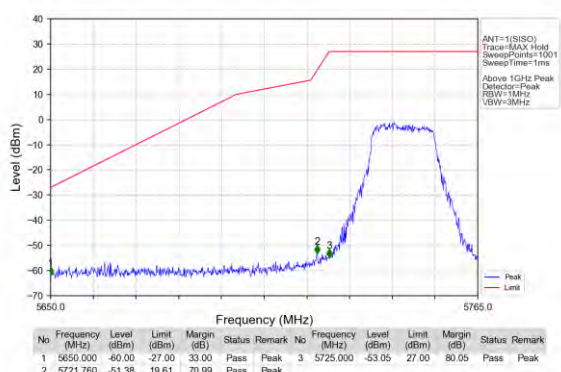


5755MHz

5795MHz



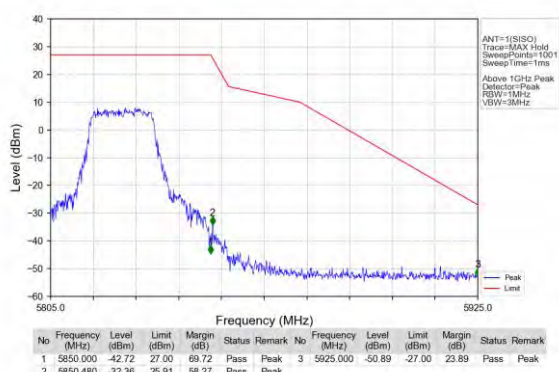
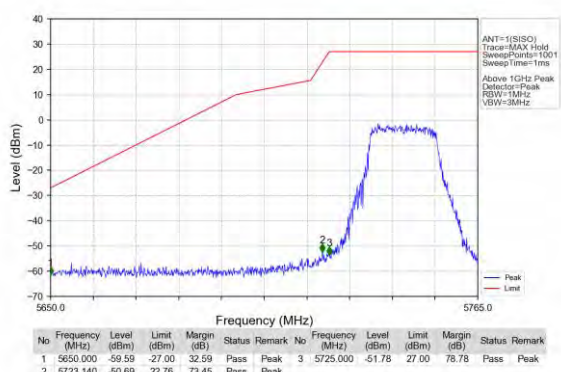
802.11a ANT2



5745MHz

5825MHz

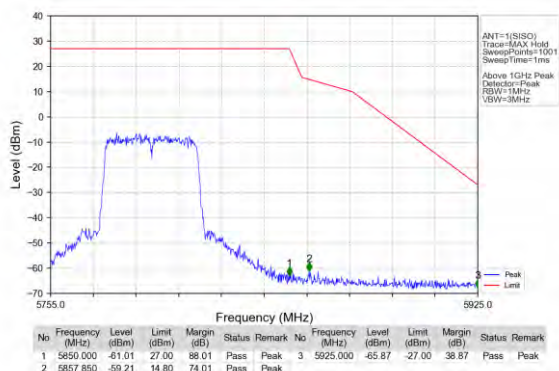
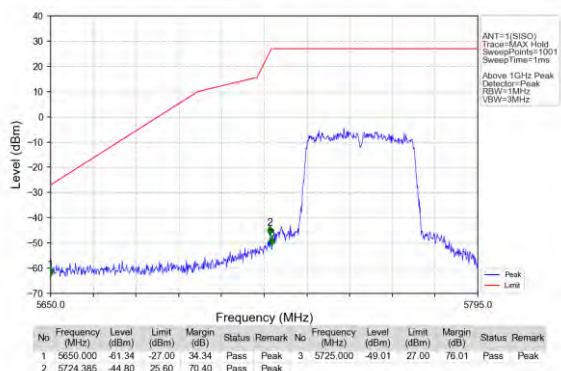
802.11n HT20 ANT2



5745MHz

5825MHz

802.11n HT40 ANT2



5755MHz

5795MHz



4.. AVERAGING OUTPUT POWER

4.1. APPLIED PROCEDURES / LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

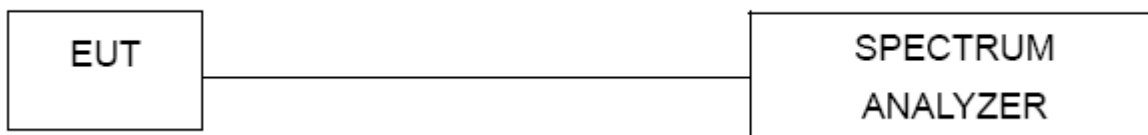
4.1.1. TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW = 1MHz
Span $\geq 99\%$ OBW(30MHz/60MHz/120MHz etc.)
VBW $\geq 3 \times$ RBW
Sweep = auto
Detector function = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
Trace = max hold

4.1.2. DEVIATION FROM STANDARD

No deviation.

4.1.3. TEST SETUP



4.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**4.1.5. TEST RESULTS**

Temperature:	25 °C	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3.3V

ANT1:

Band	Mode	Test Channel	Average Output Power (dBm)	Duty factor (dB)	Total Output Power(dBm)	LIMIT (dBm)
Band 1	802.11a	Low	14.76	1.75	16.51	23.98
		Middle	15.51	1.75	17.26	23.98
		High	16.01	1.75	17.76	23.98
	802.11n HT20	Low	13.57	1.84	15.41	23.98
		Middle	15.95	1.85	17.80	23.98
		High	16.72	1.85	18.57	23.98
	802.11n HT40	Low	14.89	3.33	18.22	23.98
		High	15.43	3.17	18.60	23.98

ANT2:

Band	Mode	Test Channel	Average Output Power (dBm)	Duty factor (dB)	Total Output Power(dBm)	LIMIT (dBm)
Band 1	802.11a	Low	16.00	1.75	17.75	23.98
		Middle	15.97	1.75	17.72	23.98
		High	15.01	1.74	16.75	23.98
	802.11n HT20	Low	16.57	1.85	18.42	23.98
		Middle	16.57	1.85	18.42	23.98
		High	14.82	1.85	16.67	23.98
	802.11n HT40	Low	15.96	3.34	19.30	23.98
		High	14.52	3.18	17.70	23.98

Band	Mode	Frequency (MHz)	Total Output Power(dBm)		ANT1&ANT2 MIMO Conducted Output Power(dBm)	Limit (dBm)
			ANT1	ANT2		
Band 1	802.11n(HT20)	Low	15.41	18.42	20.18	23.71
		Middle	17.80	18.42	21.13	23.71
		High	18.57	16.67	20.73	23.71
	802.11n(HT40)	Low	18.22	19.30	21.80	23.71
		High	18.60	17.70	21.18	23.71



ANT1:

Band	Mode	Test Channel	Average Output Power (dBm)	Duty factor (dB)	Total Output Power(dBm)	LIMIT (dBm)
Band 4	802.11a	Low	17.81	1.74	19.55	30
		Middle	17.35	1.74	19.09	30
		High	15.99	1.74	17.73	30
	802.11n HT20	Low	17.77	1.84	19.61	30
		Middle	17.00	1.85	18.85	30
		High	15.60	1.85	17.45	30
	802.11n HT40	Low	17.46	3.17	20.63	30
		High	16.70	3.17	19.87	30

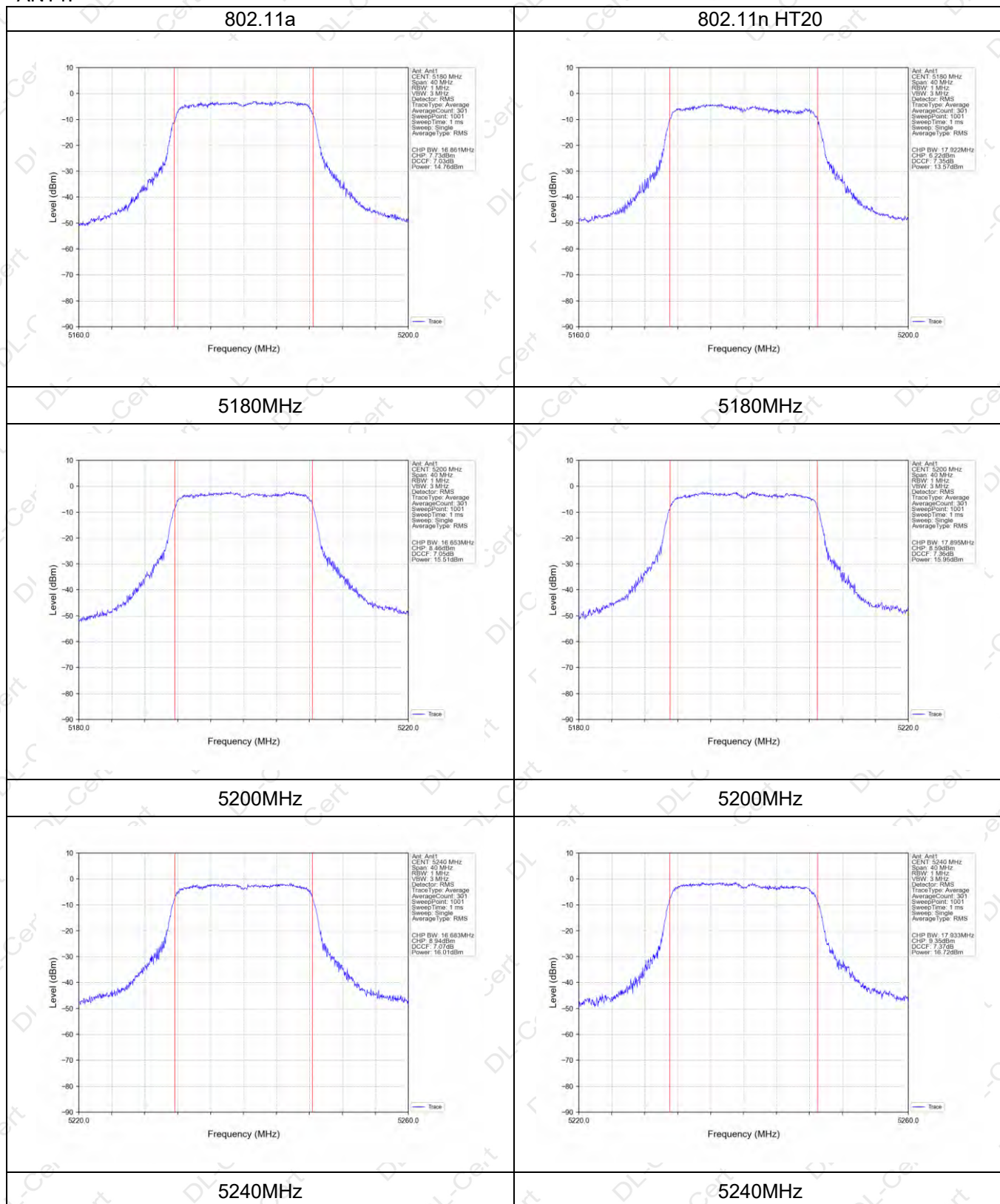
ANT2:

Band	Mode	Test Channel	Average Output Power (dBm)	Duty factor (dB)	Total Output Power(dBm)	LIMIT (dBm)
Band 4	802.11a	Low	14.46	1.74	16.20	30
		Middle	13.10	1.74	14.84	30
		High	11.46	1.74	13.20	30
	802.11n HT20	Low	14.59	1.85	16.44	30
		Middle	12.67	1.85	14.52	30
		High	11.50	1.85	13.35	30
	802.11n HT40	Low	14.10	3.17	17.27	30
		High	12.57	3.17	15.74	30

Band	Mode	Frequency (MHz)	Total Output Power(dBm)		ANT1&ANT2 MIMO Conducted Output Power(dBm)	Limit (dBm)
			ANT1	ANT2		
Band 4	802.11n(HT20)	Low	19.61	16.44	21.32	29.70
		Middle	18.85	14.52	20.21	29.70
		High	17.45	13.35	18.88	29.70
	802.11n(HT40)	Low	20.63	17.27	22.28	29.70
		High	19.87	15.74	21.29	29.70

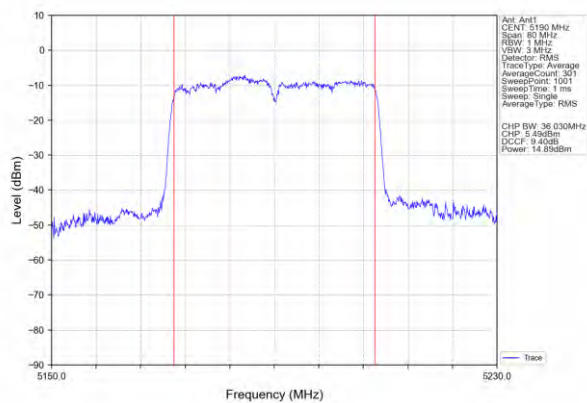


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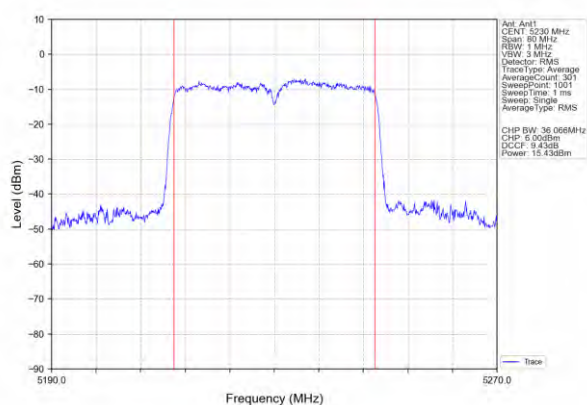




802.11n HT40



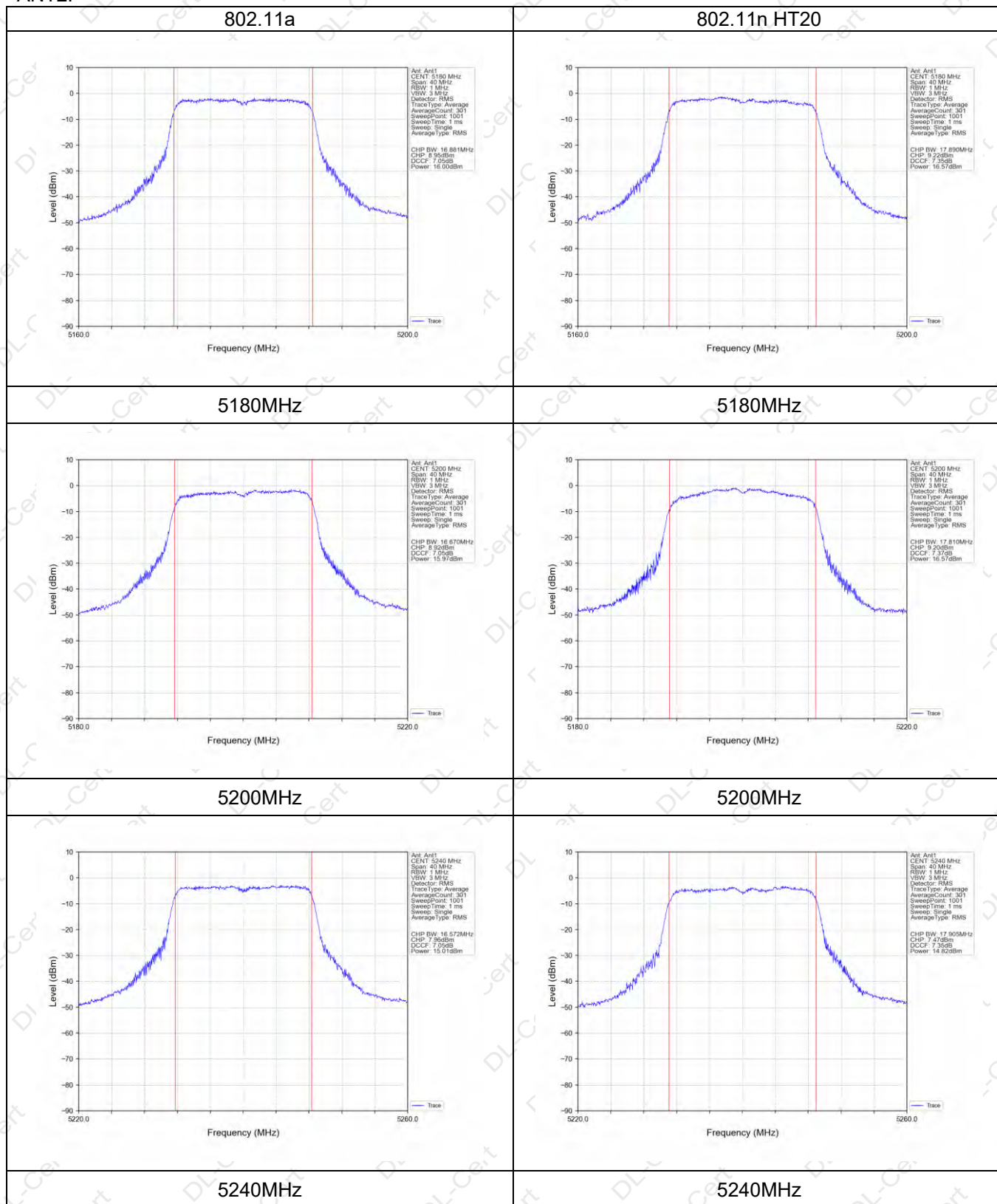
5190MHz



5230MHz

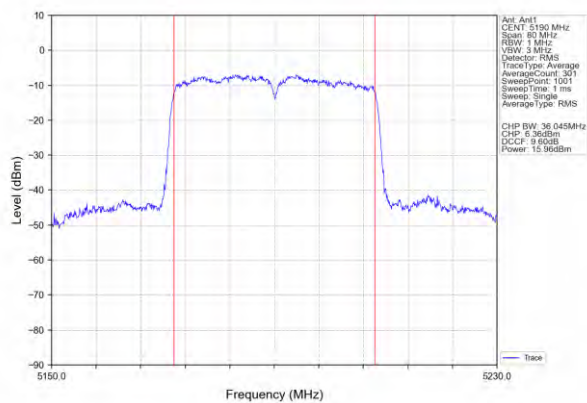


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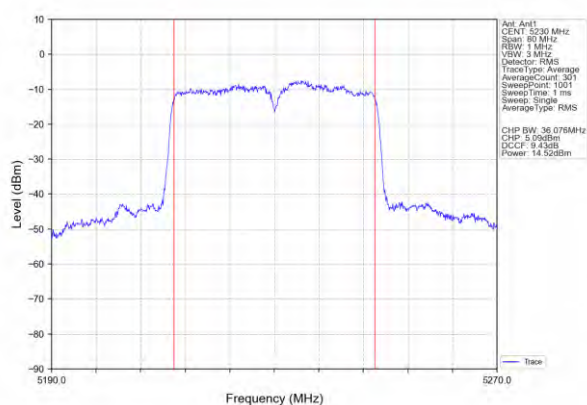




802.11n HT40



5190MHz

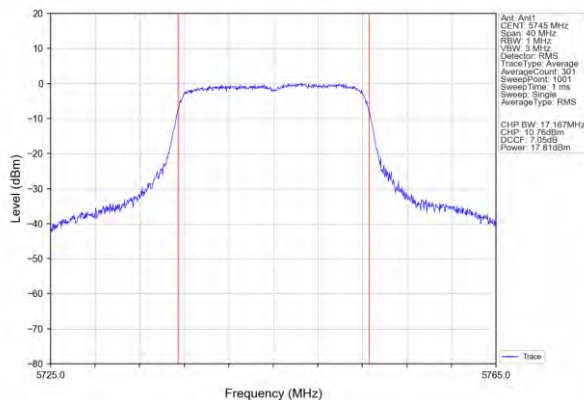


5230MHz

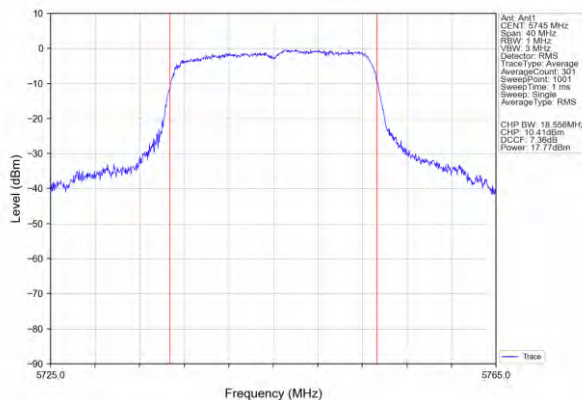


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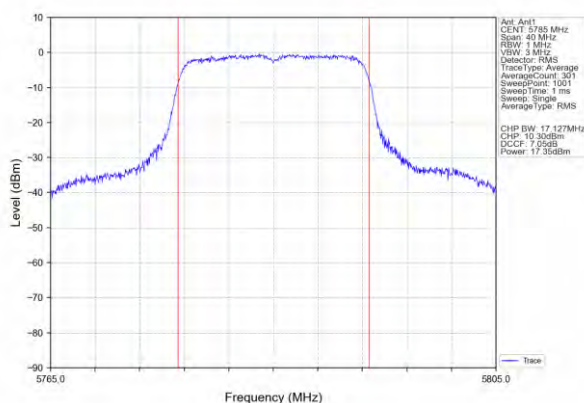
802.11a



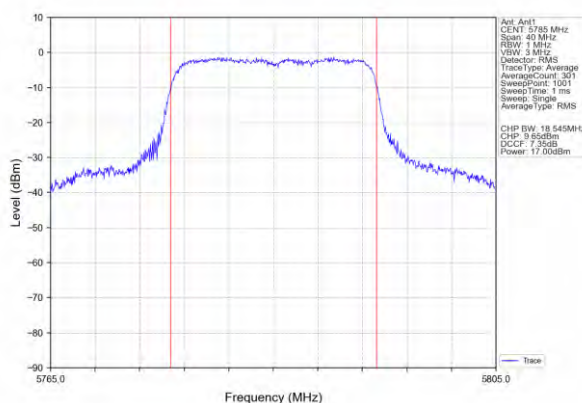
802.11n HT20



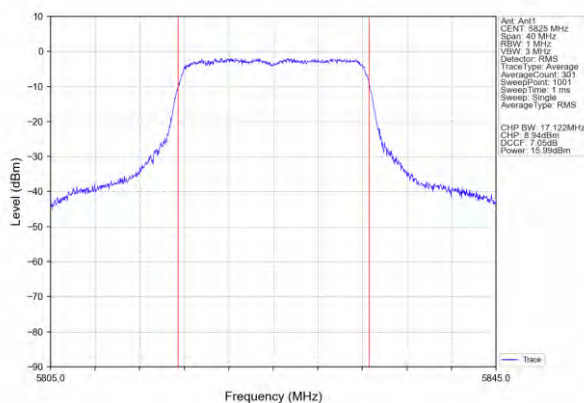
5745MHz



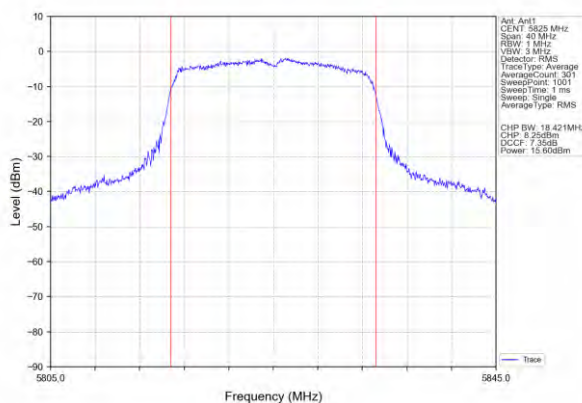
5745MHz



5785MHz



5785MHz

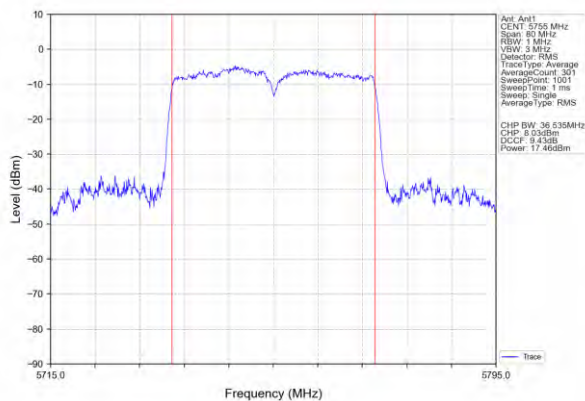


5825MHz

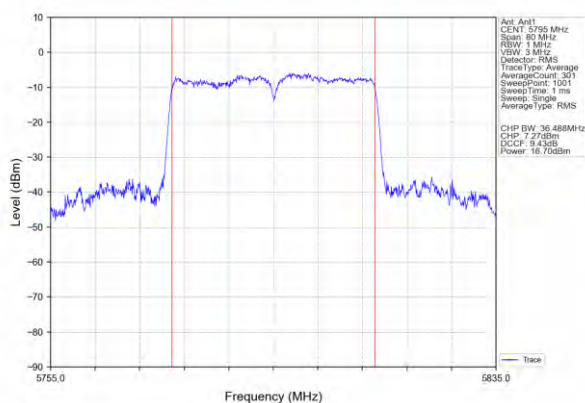
5825MHz



802.11n HT40



5755MHz

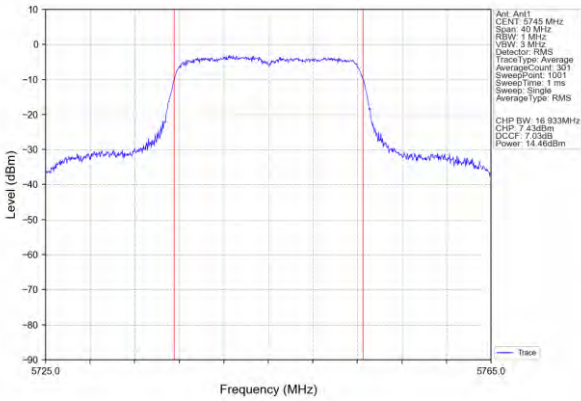


5795MHz

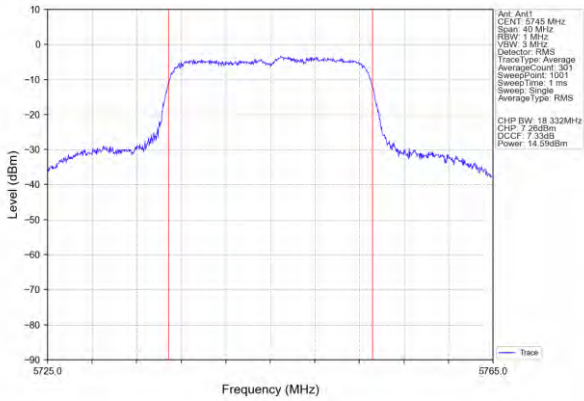


ANT2:

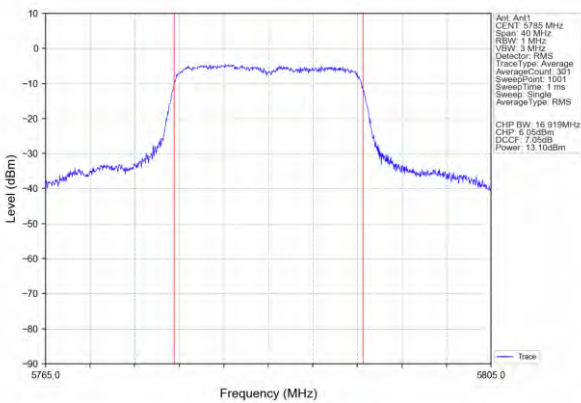
802.11a



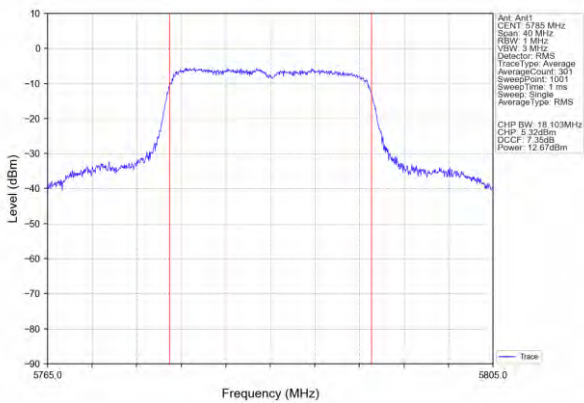
802.11n HT20



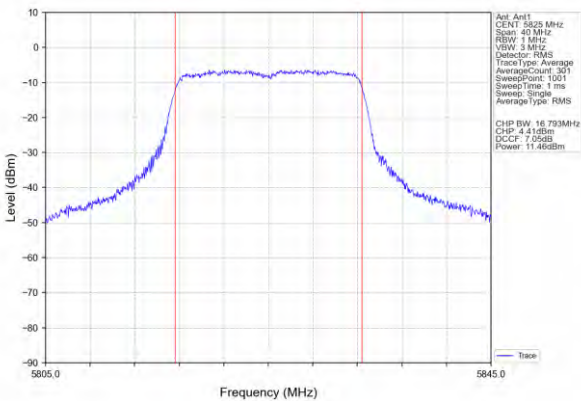
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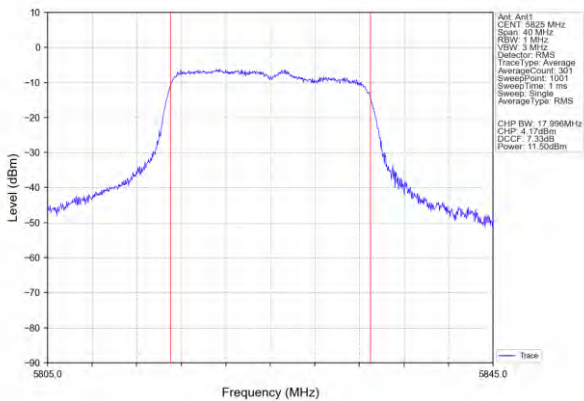
5745MHz



5785MHz



5785MHz

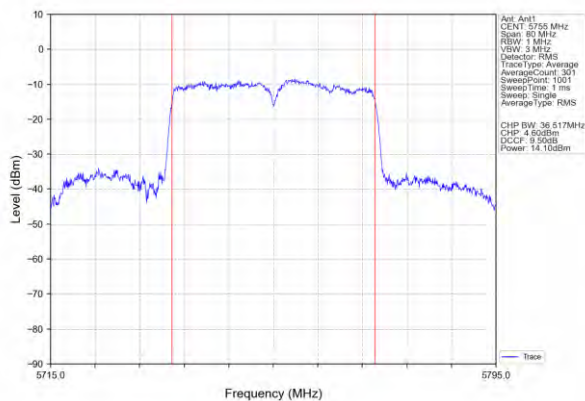


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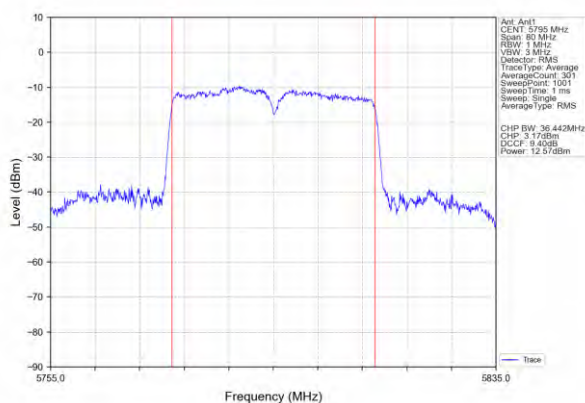
5825MHz



802.11n HT40



5755MHz



5795MHz



5.. POWER SPECTRAL DENSITY TEST

5.1. APPLIED PROCEDURES / LIMIT

In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW $\geq$ 1MHz for band 1 RBW $\geq$ 510KHz for band 4
VB	VBW $\geq$ 3RBW
Detector	RMS (i.e., power averaging).
Trace	Max Hold
Sweep Time	Auto

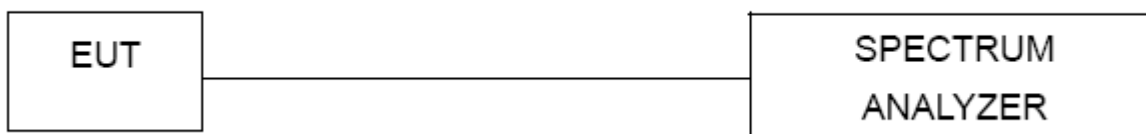
5.1.1. TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. For U-NII1, U-NII-2A, U-NII-2C Band:
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:
Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
we test all antennas, the antenna 1 was worst mode and the data recording in the report.
7. Duty factor Reference is made to the test results in Section 7.1.5.

5.1.2. DEVIATION FROM STANDARD

No deviation.

5.1.3. TEST SETUP



5.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**5.1.5. TEST RESULTS**

ANT1:

Band	Mode	Test Channel	Reading Level (dBm/MHz)	Duty factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Result
Band1	802.11a	Low	4.29	1.75	6.04	11	PASS
		Middle	4.68	1.75	6.43	11	PASS
		High	5.93	1.75	7.68	11	PASS
	802.11n20	Low	4.17	1.84	6.01	11	PASS
		Middle	4.37	1.85	6.22	11	PASS
		High	5.79	1.85	7.64	11	PASS
	802.11n40	Low	1.33	3.33	4.66	11	PASS
		High	2.32	3.17	5.49	11	PASS

ANT2:

Band	Mode	Test Channel	Reading Level (dBm/MHz)	Duty factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Result
Band1	802.11a	Low	5.82	1.75	7.57	11	PASS
		Middle	5.35	1.75	7.10	11	PASS
		High	4.72	1.74	6.46	11	PASS
	802.11n20	Low	5.34	1.85	7.19	11	PASS
		Middle	5.35	1.85	7.20	11	PASS
		High	4.46	1.85	6.31	11	PASS
	802.11n40	Low	3.05	3.34	6.39	11	PASS
		High	1.47	3.18	4.65	11	PASS

Band	Mode	Frequency (MHz)	Power Spectral Density (dBm)		ANT1&ANT2 MIMO Power Spectral Density (dBm)	Limit (dBm)
			ANT1	ANT2		
Band1	802.11n(HT20)	Low	6.01	7.19	9.65	10.73
		Middle	6.22	7.20	9.75	10.73
		High	7.64	6.31	10.04	10.73
	802.11n(HT40)	Low	4.66	6.39	8.62	10.73
		High	5.49	4.65	8.10	10.73



ANT1:

Band	Mode	Test Channel	Reading Level (dBm/510kHz)	Duty factor (dB)	RB factor (dB)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Band4	802.11a	Low	4.78	1.74	-0.09	6.61	30	PASS
		Middle	5.08	1.74	-0.09	6.91	30	PASS
		High	2.98	1.74	-0.09	4.81	30	PASS
	802.11n20	Low	4.29	1.84	-0.09	6.22	30	PASS
		Middle	4.73	1.85	-0.09	6.67	30	PASS
		High	2.34	1.85	-0.09	4.28	30	PASS
	802.11n40	Low	3.01	3.17	-0.09	6.27	30	PASS
		High	2.02	3.17	-0.09	5.28	30	PASS

Note: RB factor=10log(510/500k)

ANT2:

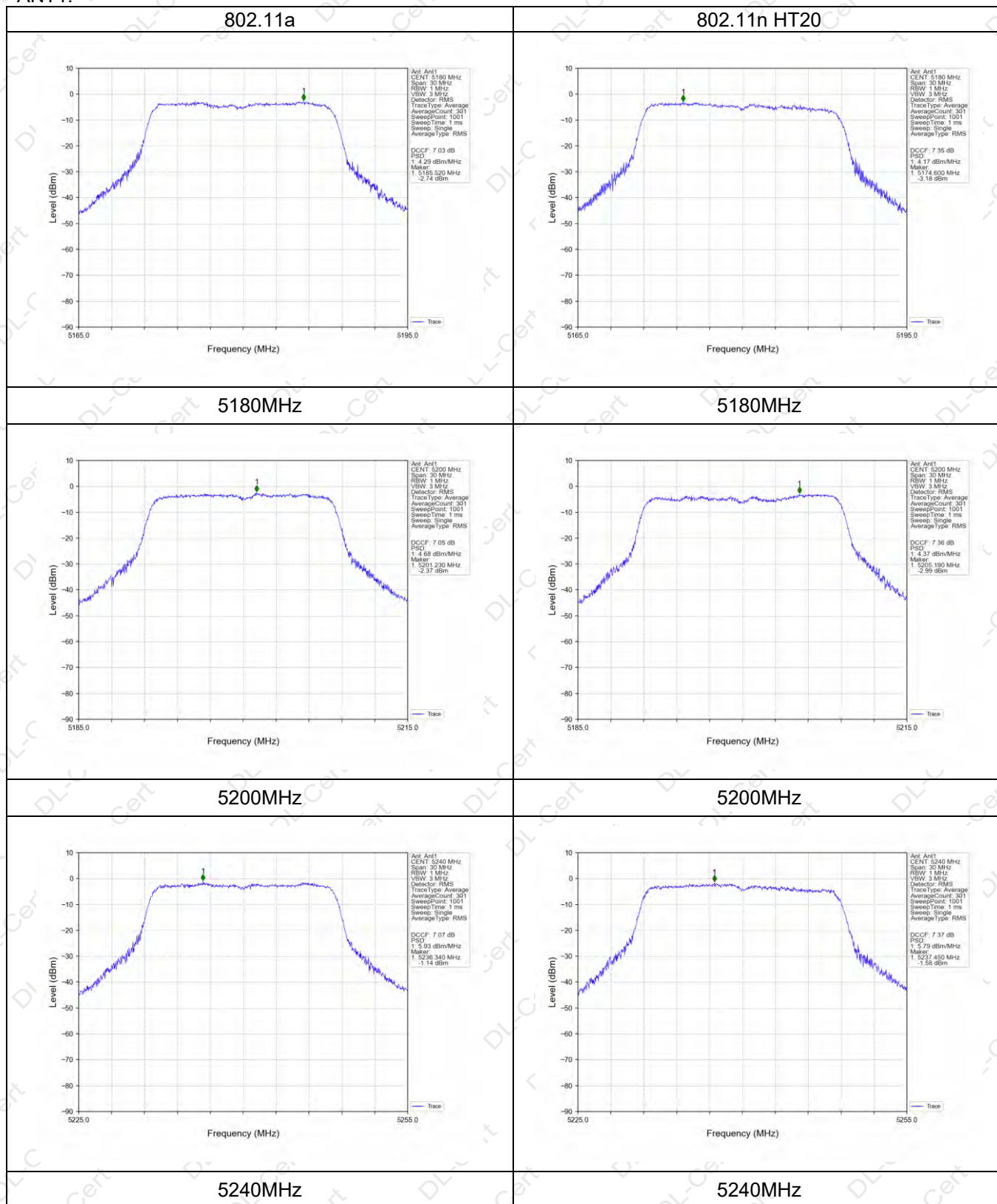
Band	Mode	Test Channel	Reading Level (dBm/510kHz)	Duty factor (dB)	RB factor (dB)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Band4	802.11a	Low	1.42	1.74	-0.09	3.25	30	PASS
		Middle	0.47	1.74	-0.09	2.3	30	PASS
		High	-1.61	1.74	-0.09	0.22	30	PASS
	802.11n20	Low	0.92	1.85	-0.09	2.86	30	PASS
		Middle	-0.88	1.85	-0.09	1.06	30	PASS
		High	-1.65	1.85	-0.09	0.29	30	PASS
	802.11n40	Low	-1.35	3.17	-0.09	1.91	30	PASS
		High	-2.87	3.17	-0.09	0.39	30	PASS

Note: RB factor=10log(510/500k)

Band	Mode	Frequency (MHz)	Power Spectral Density (dBm)		ANT1&ANT2 MIMO Power Spectral Density (dBm)	Limit (dBm)
			ANT1	ANT2		
Band4	802.11n(HT20)	Low	6.22	2.86	7.87	29.70
		Middle	6.67	1.06	7.72	29.70
		High	4.28	0.29	5.74	29.70
	802.11n(HT40)	Low	6.27	1.91	7.63	29.70
		High	5.28	0.39	6.50	29.70

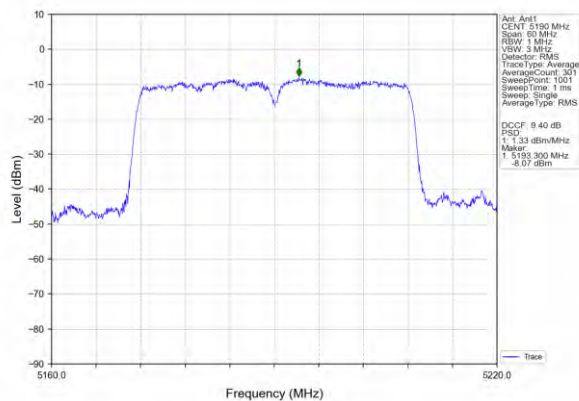


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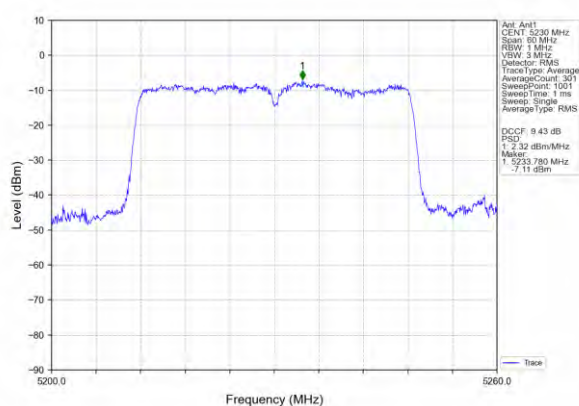




802.11n HT40



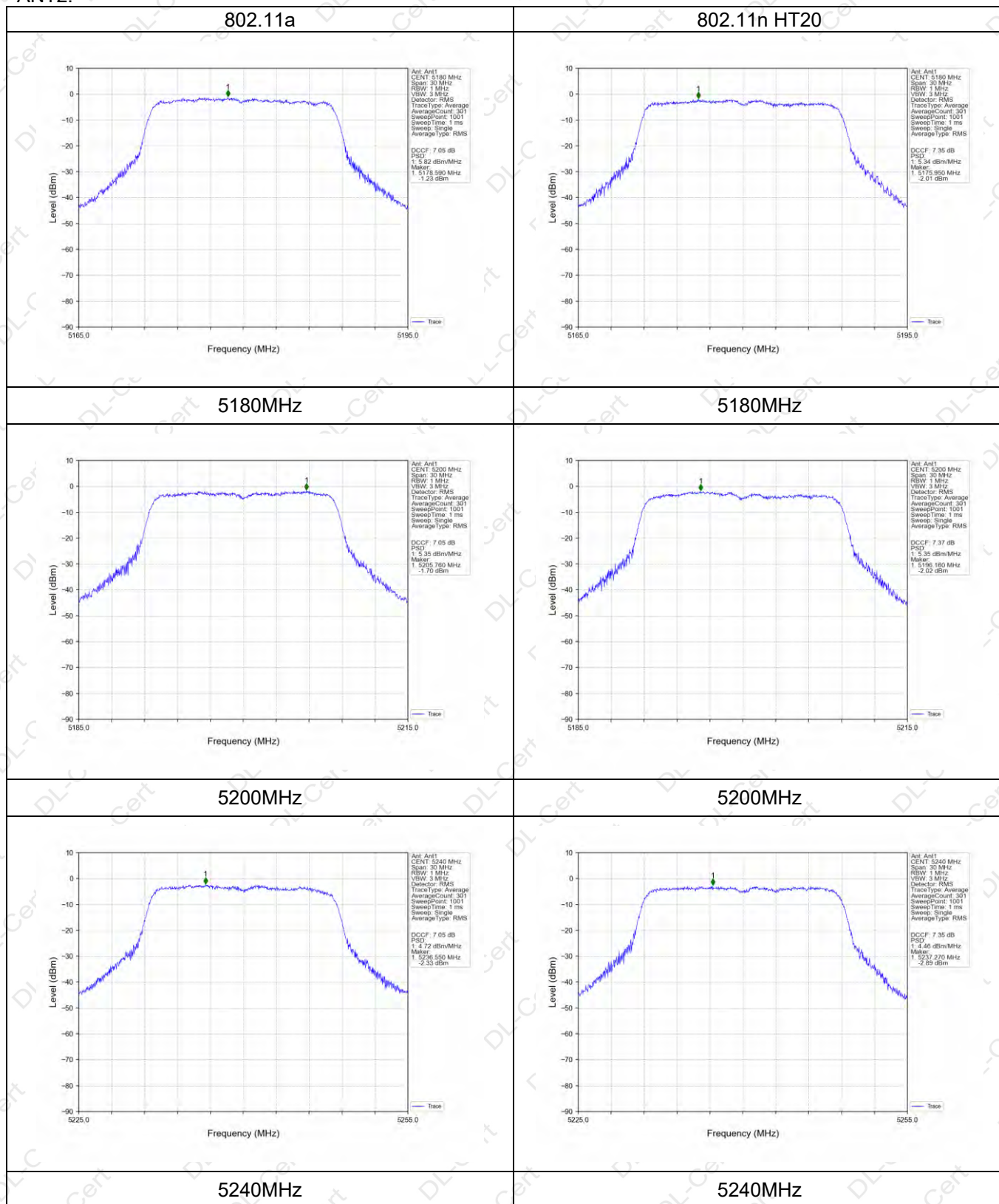
5190MHz



5230MHz

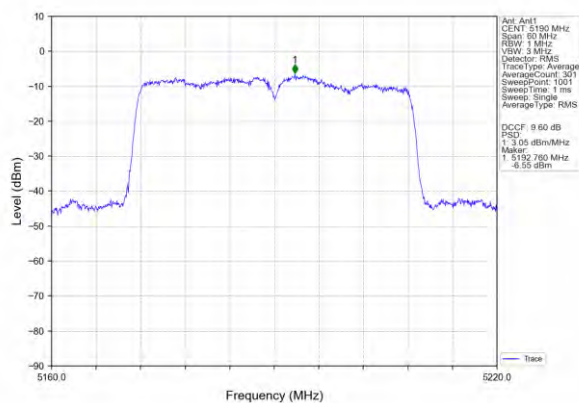


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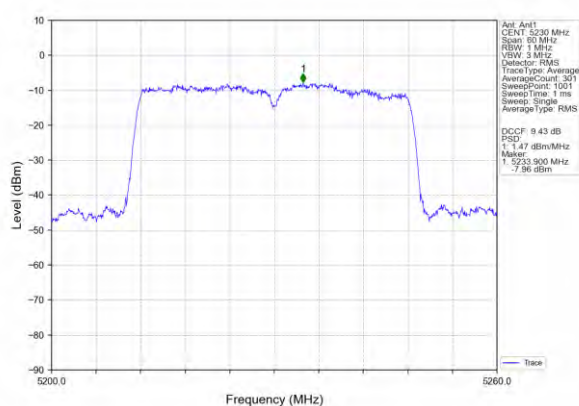




802.11n HT40



5190MHz

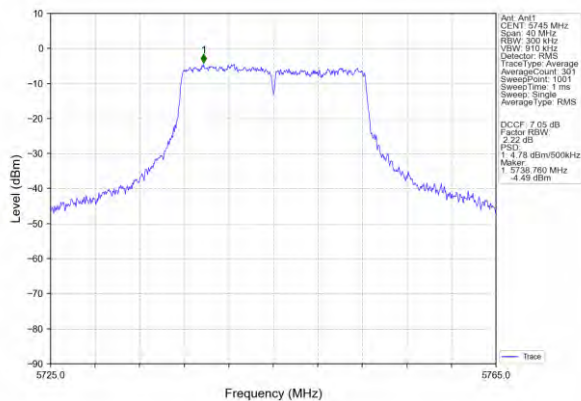


5230MHz

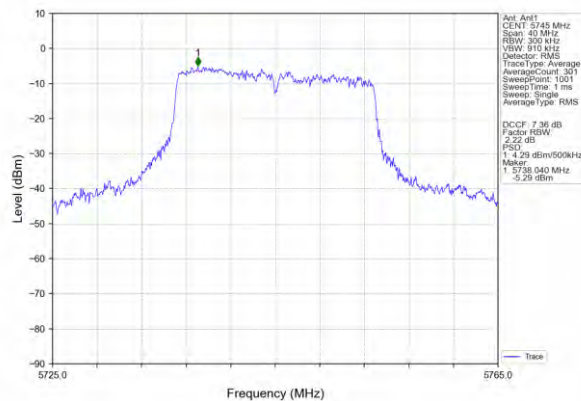


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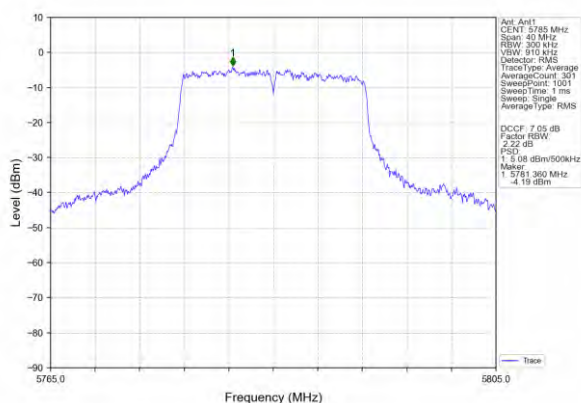
802.11a



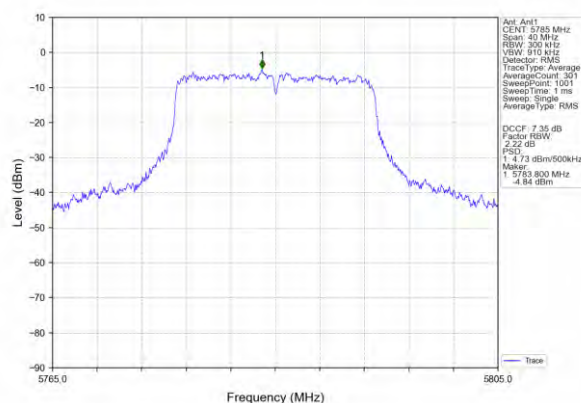
802.11n HT20



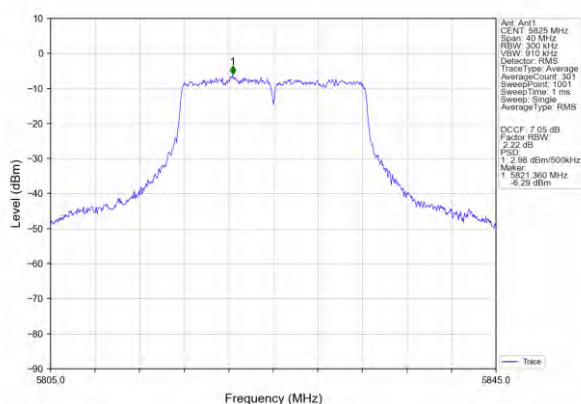
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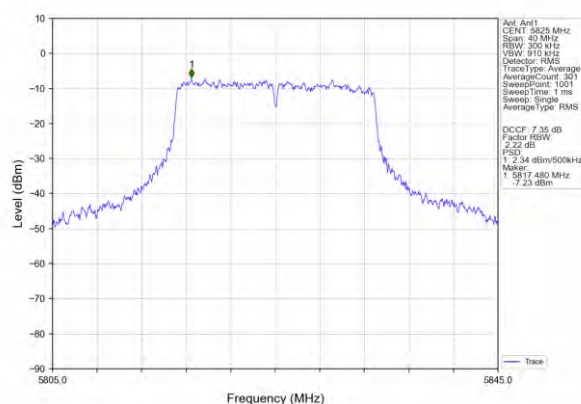
5745MHz



5785MHz



5785MHz

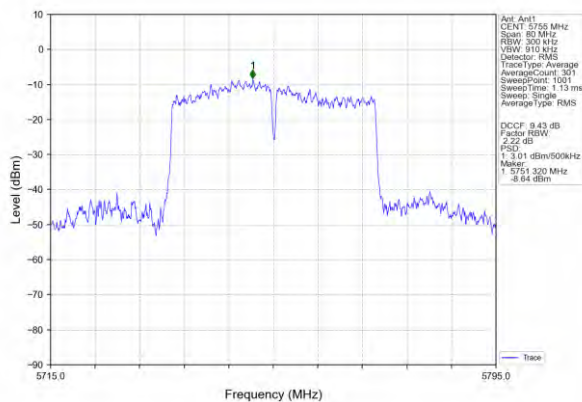


5825MHz

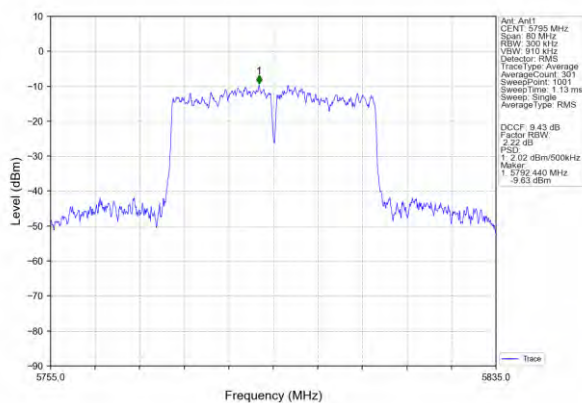
5825MHz



802.11n HT40



5755MHz

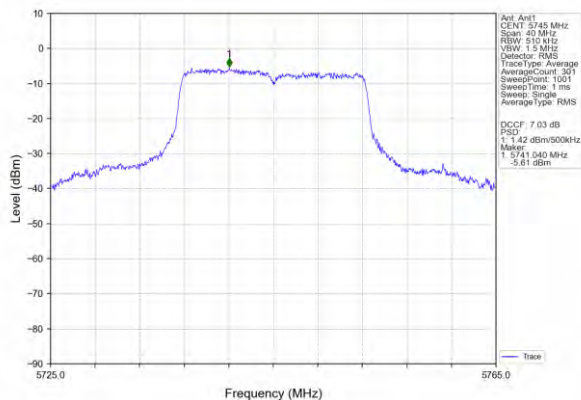


5795MHz

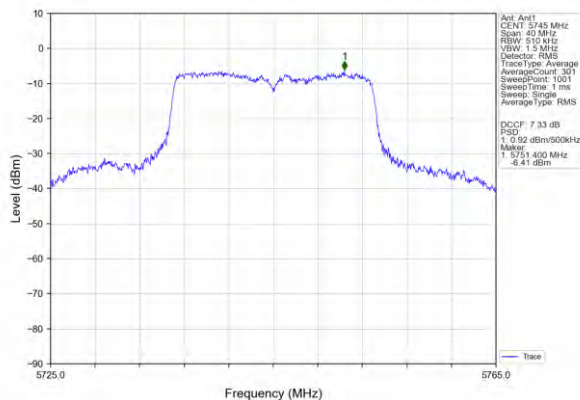


ANT2:

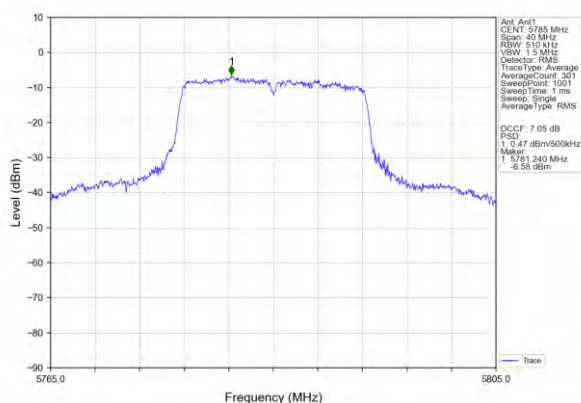
802.11a



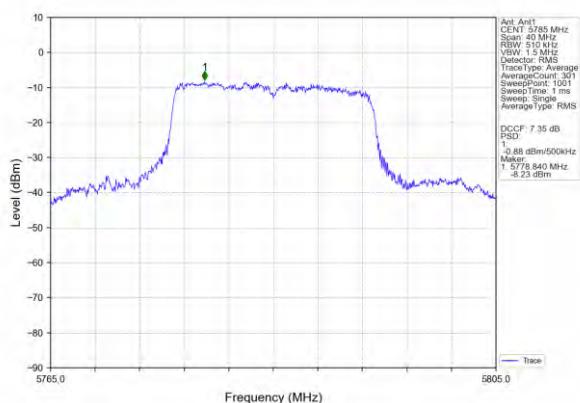
802.11n HT20



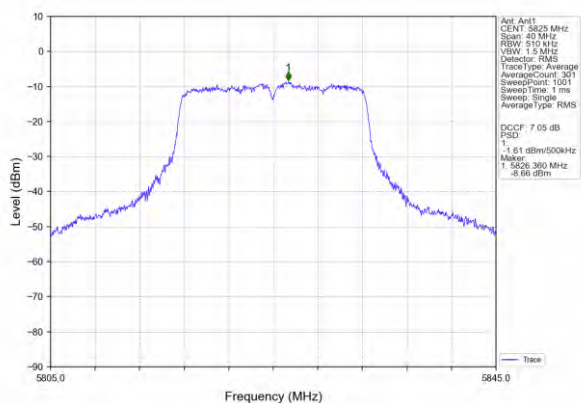
5745MHz



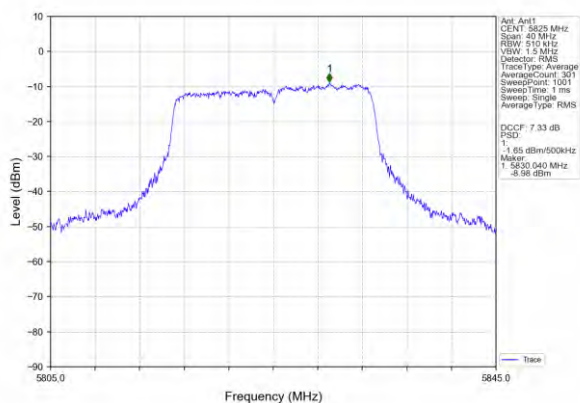
5745MHz



5785MHz



5785MHz

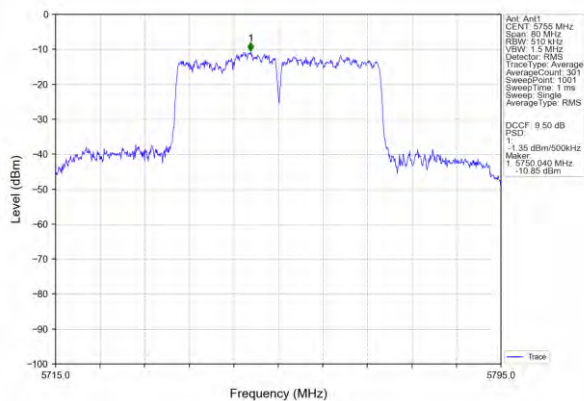


5825MHz

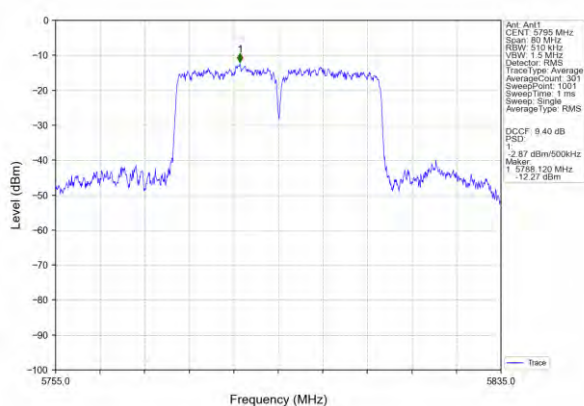
5825MHz



802.11n HT40



5755MHz



5795MHz

**6.. 6DB&26DB&99% BANDWIDTH TEST****6.1. APPLIED PROCEDURES / LIMIT**

The 26 dB bandwidth is used to determine the conducted power limits.

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.1.1. TEST PROCEDURE

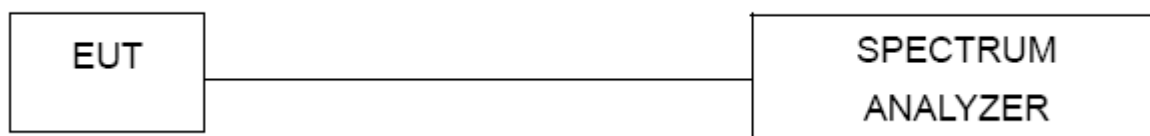
6dB Bandwidth	
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	Approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2. DEVIATION FROM STANDARD

No deviation.

6.1.3. TEST SETUP



6.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

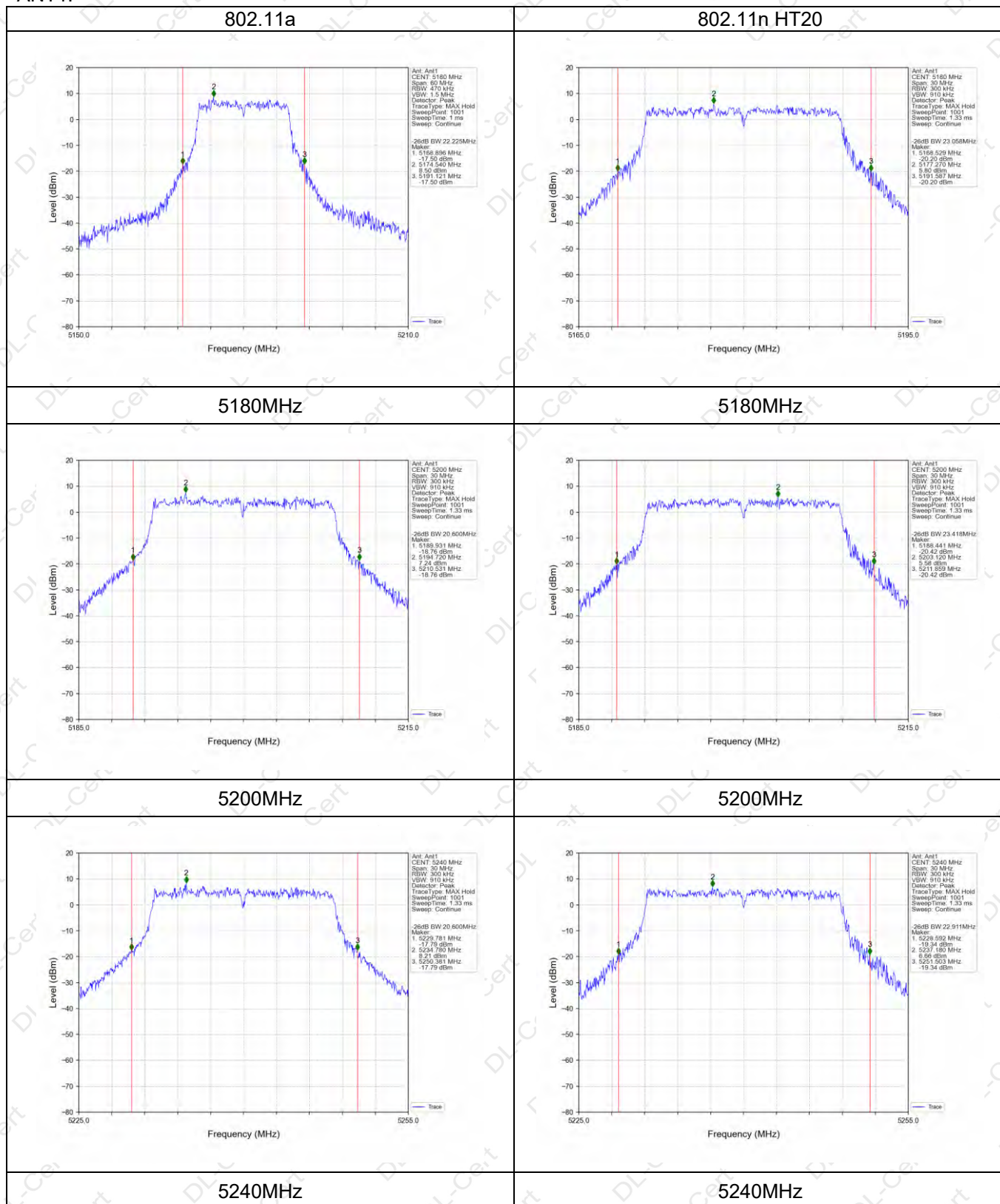
6.1.5. TEST RESULTS

		Test Channel	26dB Bandwidth (MHz)		Result
			ANT1	ANT2	
Band 1	802.11a	Low	22.225	22.014	Pass
		Middle	20.600	20.483	Pass
		High	20.600	20.639	Pass
	802.11n HT20	Low	23.058	23.204	Pass
		Middle	23.418	23.300	Pass
		High	22.911	22.949	Pass
	802.11n HT40	Low	38.753	38.618	Pass
		High	38.748	39.050	Pass

		Test Channel	6dB Bandwidth (MHz)		6dB Bandwidth Limit (MHz)	Result
			ANT1	ANT2		
Band 4	802.11a	Low	16.491	16.293	>0.5	Pass
		Middle	16.435	16.413	>0.5	Pass
		High	16.490	16.404	>0.5	Pass
	802.11n HT20	Low	17.577	17.651	>0.5	Pass
		Middle	17.387	17.718	>0.5	Pass
		High	17.446	17.679	>0.5	Pass
	802.11n HT40	Low	35.921	36.429	>0.5	Pass
		High	35.683	35.997	>0.5	Pass

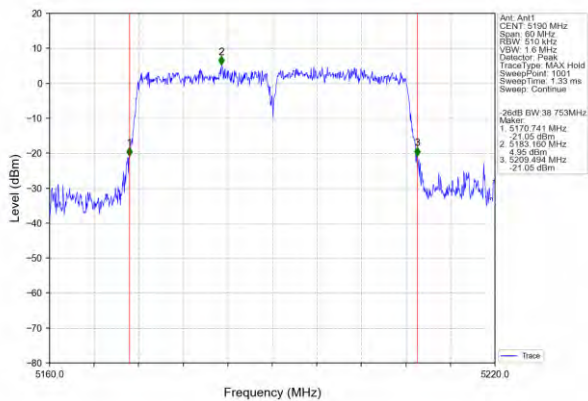


ANT1:

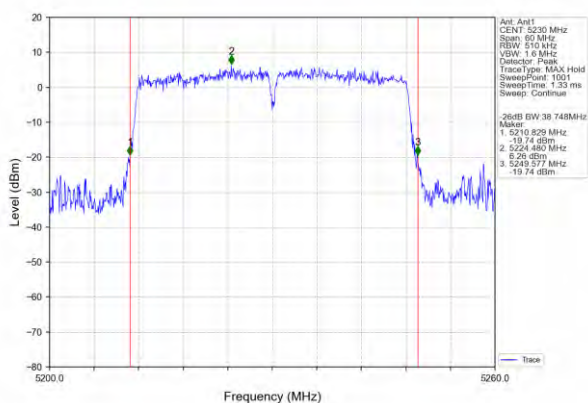




802.11n HT40



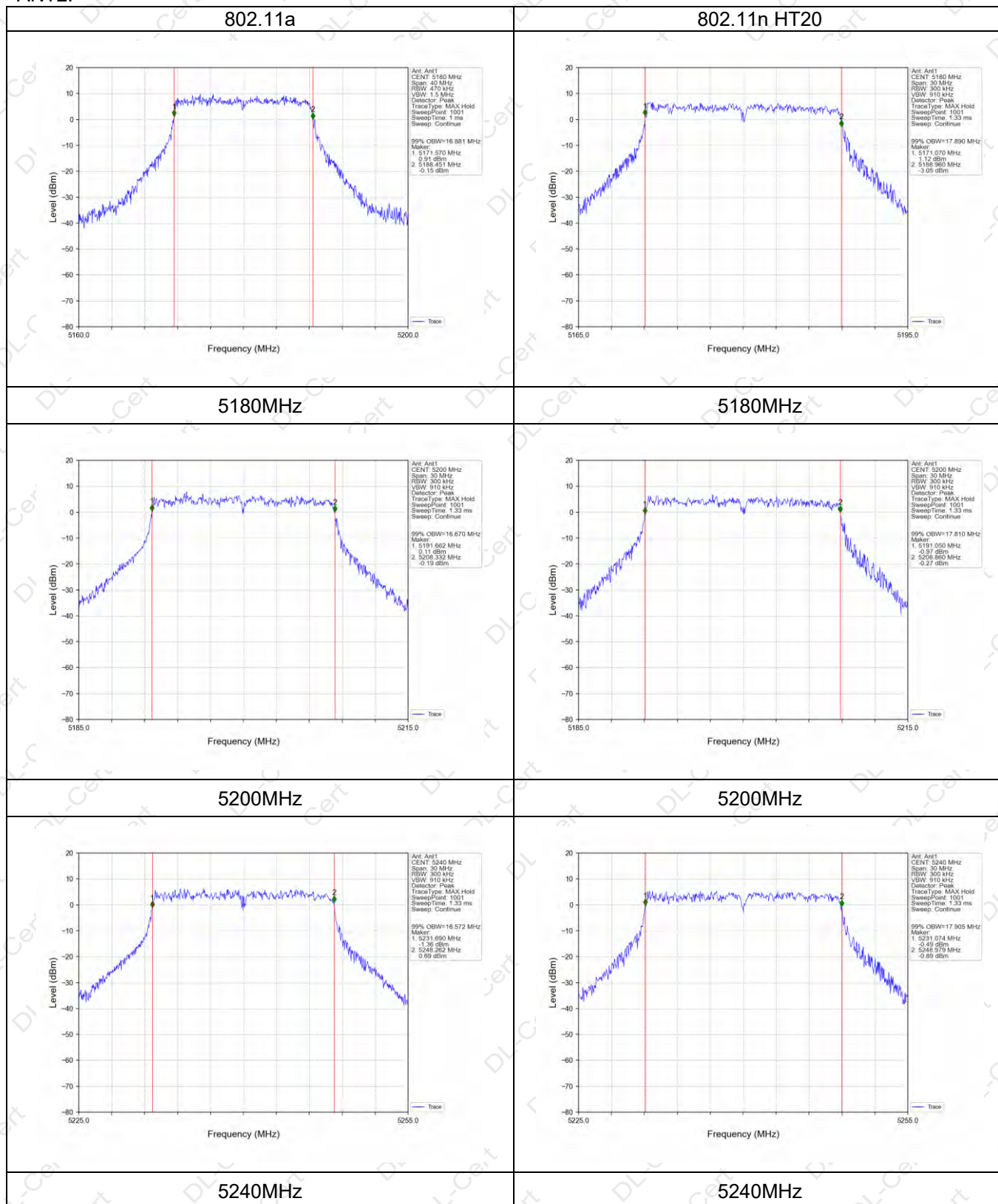
5190MHz



5230MHz

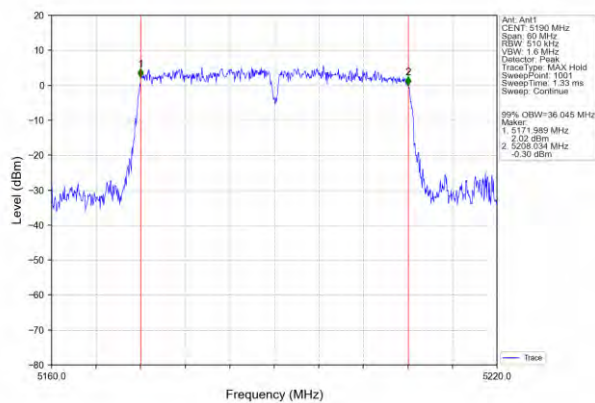


ANT2:

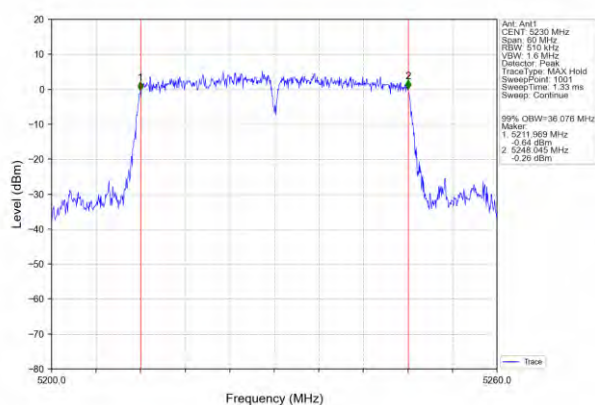




802.11n HT40



5190MHz

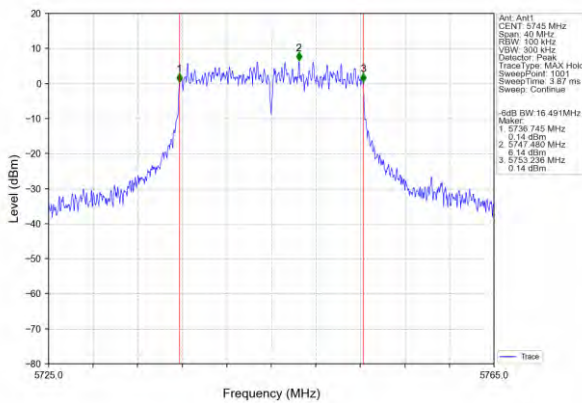


5230MHz

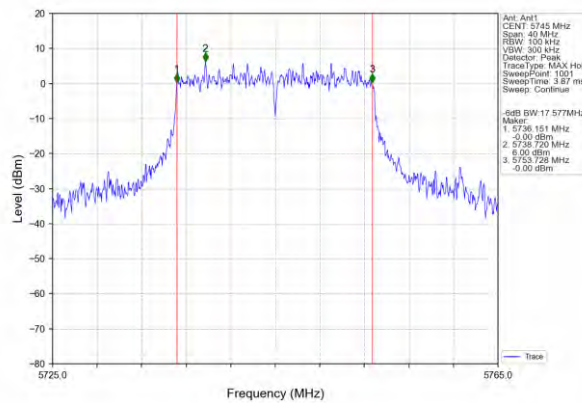


ANT1:

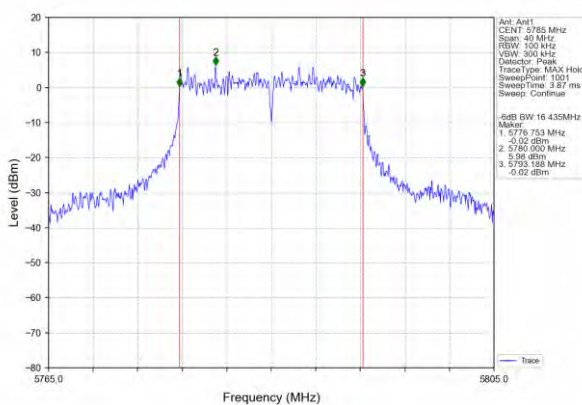
802.11a



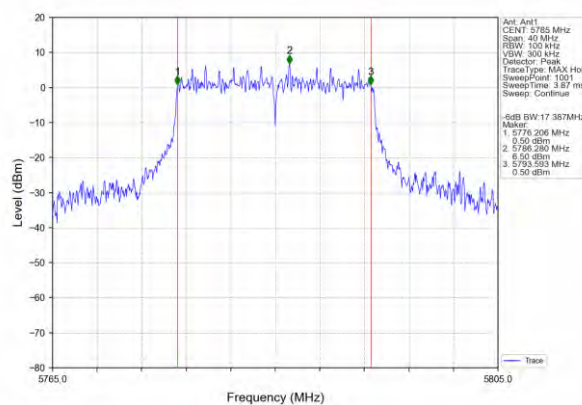
802.11n HT20



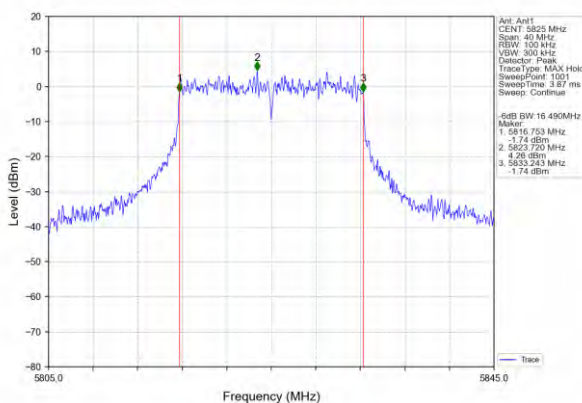
5745MHz



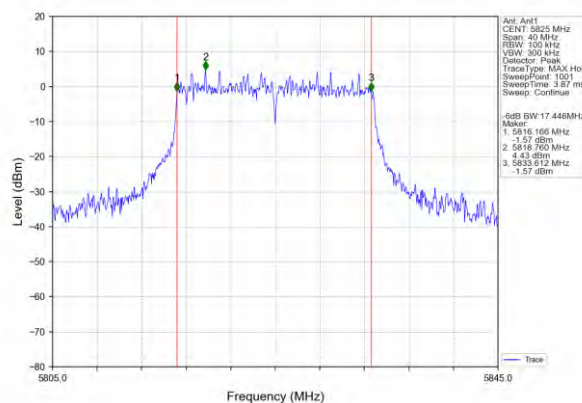
5745MHz



5785MHz



5785MHz

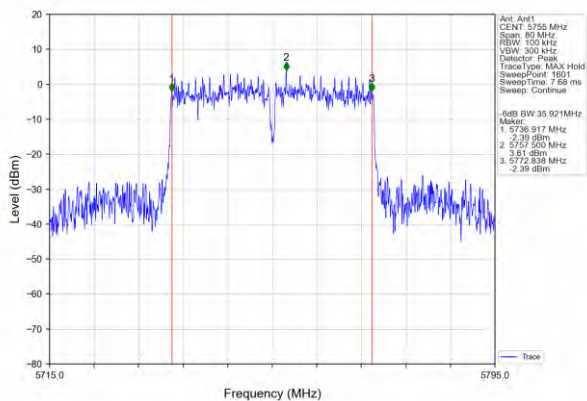


5825MHz

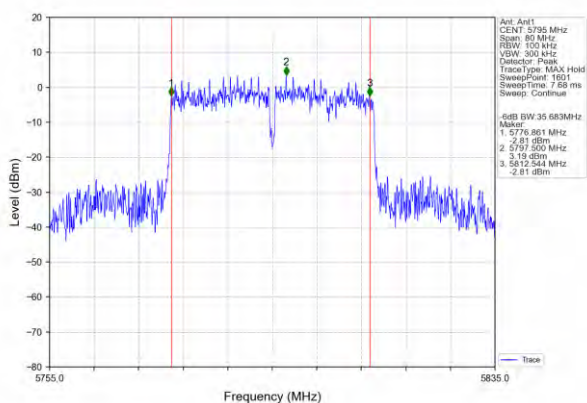
5825MHz



802.11n HT40



5755MHz

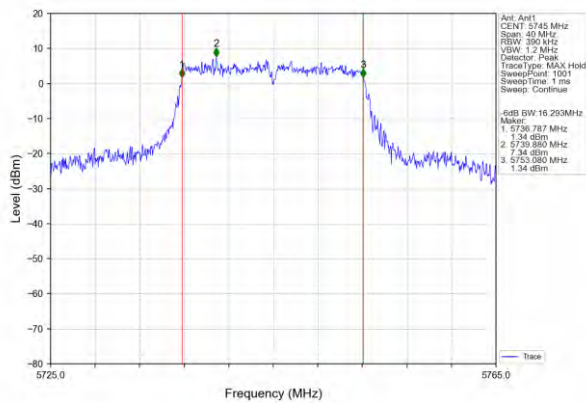


5795MHz

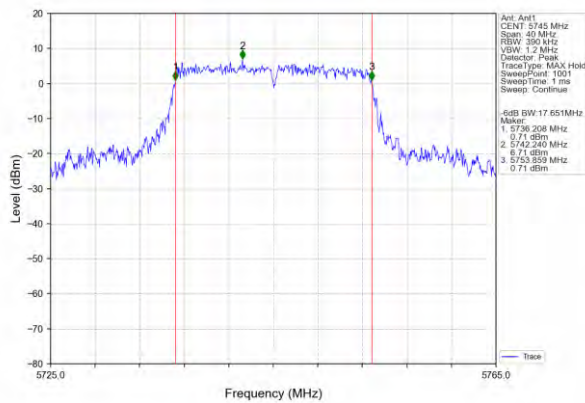


ANT2:

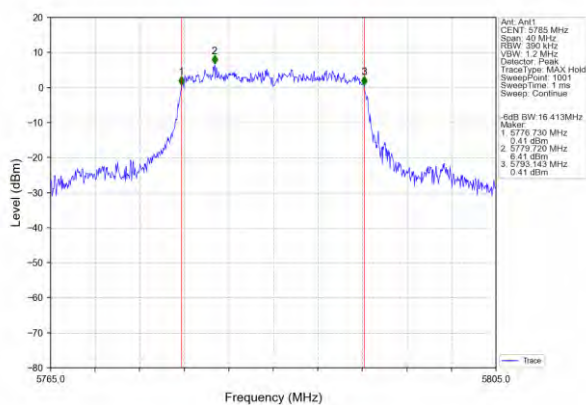
802.11a



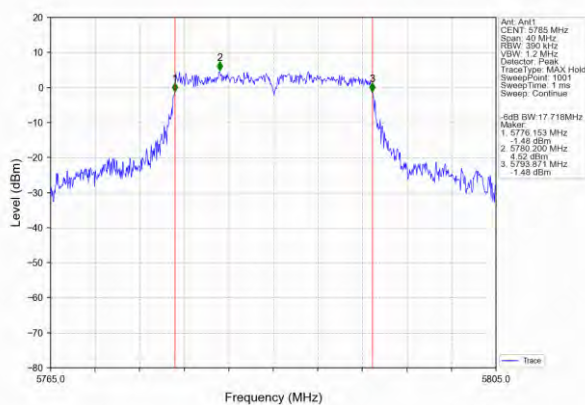
802.11n HT20



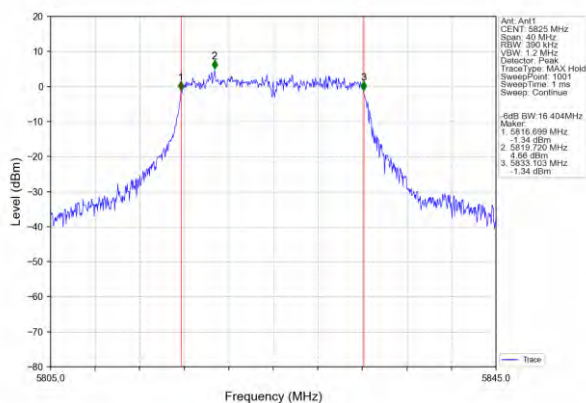
5745MHz



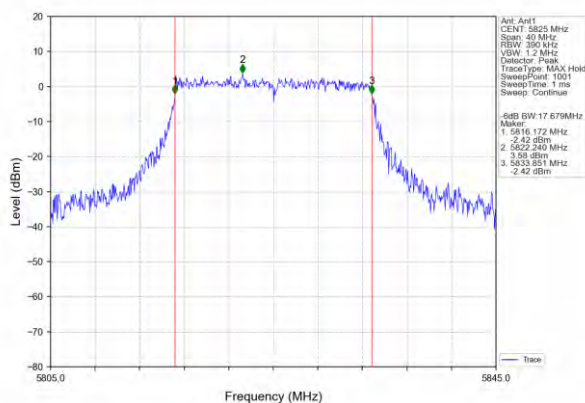
5745MHz



5785MHz



5785MHz

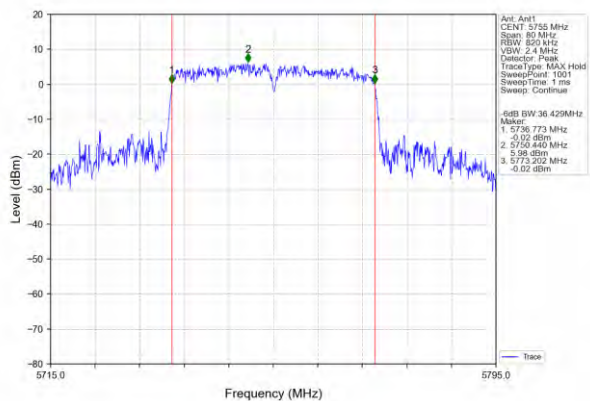


5825MHz

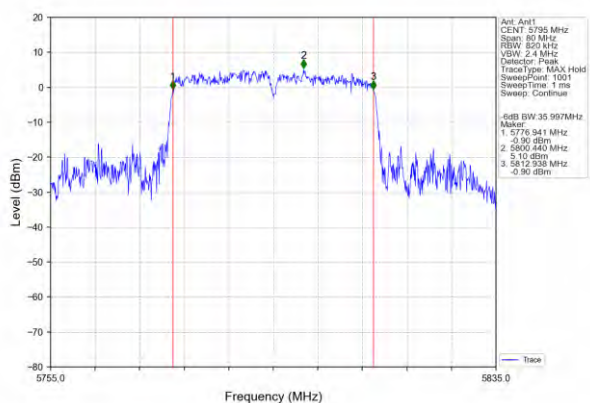
5825MHz



802.11n HT40



5755MHz



5795MHz



7.. DUTY CYCLE TEST SIGNAL

7.1. APPLIED PROCEDURES / LIMIT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1.1. TEST PROCEDURE

1. Set RBW = 1 MHz.
2. Set the video bandwidth (VBW) $\geq$ RBW.
3. Detector = Peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize.
6. Span=0

7.1.2. DEVIATION FROM STANDARD

No deviation.

7.1.3. TEST SETUP



7.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

**7.1.5. TEST RESULTS**

ANT1:

		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	Low	66.90	1.75
		Middle	66.90	1.75
		High	66.90	1.75
	802.11n HT20	Low	65.41	1.84
		Middle	65.34	1.85
		High	65.38	1.85
	802.11n HT40	Low	46.45	3.33
		High	48.16	3.17

ANT2:

		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	Low	66.91	1.75
		Middle	66.89	1.75
		High	66.93	1.74
	802.11n HT20	Low	65.35	1.85
		Middle	65.34	1.85
		High	65.34	1.85
	802.11n HT40	Low	46.35	3.34
		High	48.13	3.18



ANT1:

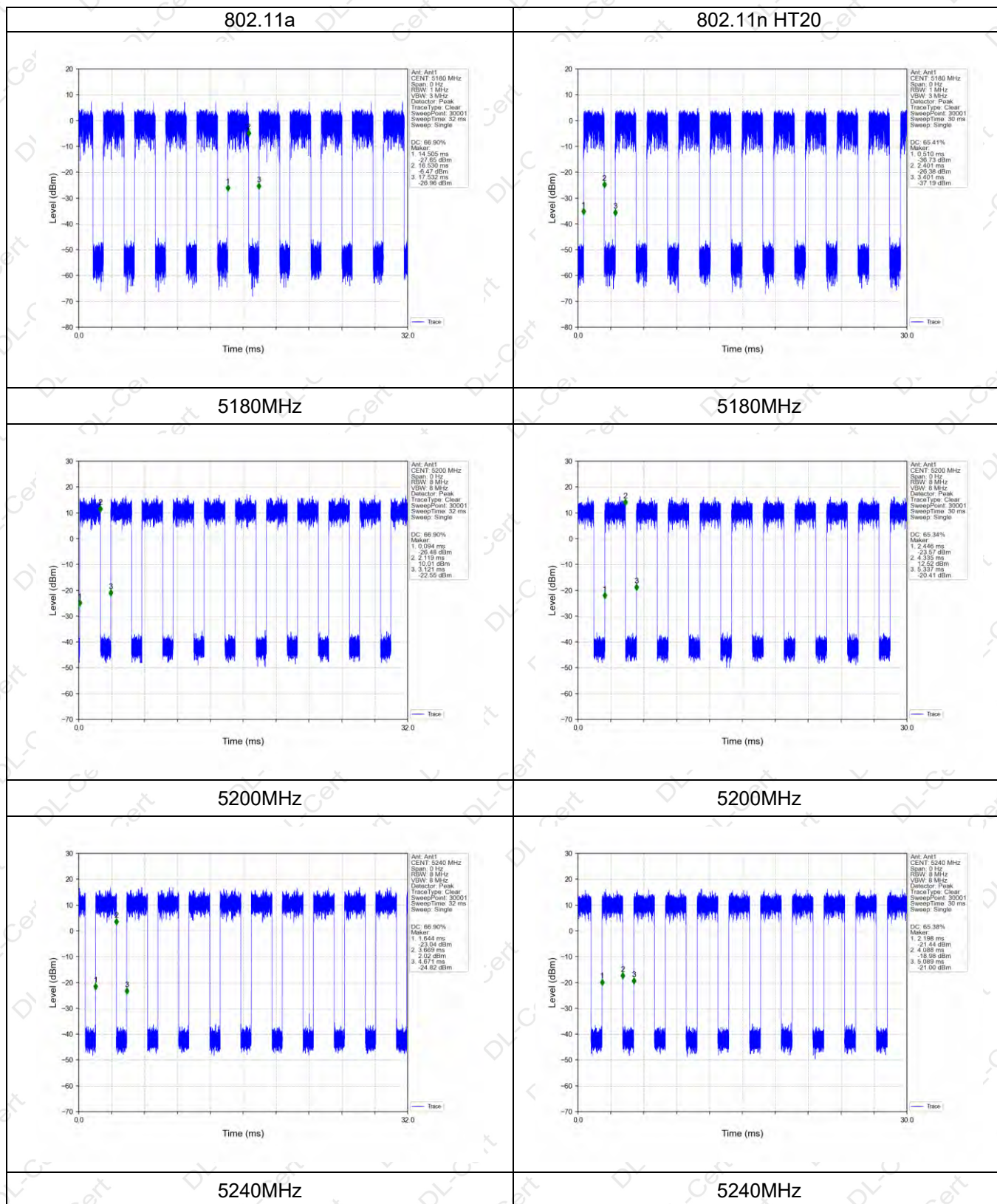
		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 4	802.11a	Low	66.92	1.74
		Middle	66.93	1.74
		High	66.95	1.74
	802.11n HT20	Low	65.41	1.84
		Middle	65.38	1.85
		High	65.38	1.85
	802.11n HT40	Low	48.16	3.17
		High	48.19	3.17

ANT2:

		Test Channel	Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 4	802.11a	Low	66.95	1.74
		Middle	66.93	1.74
		High	66.95	1.74
	802.11n HT20	Low	65.38	1.85
		Middle	65.38	1.85
		High	65.39	1.85
	802.11n HT40	Low	48.16	3.17
		High	48.16	3.17

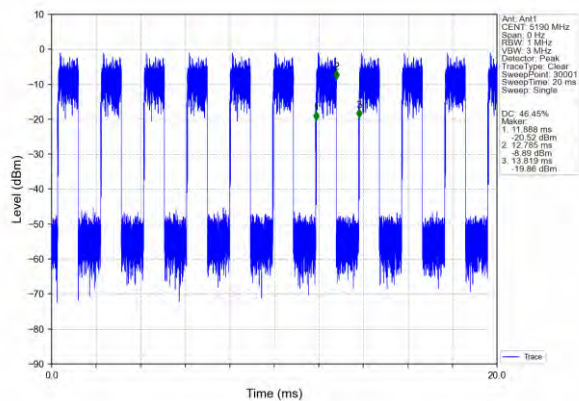


ANT1:

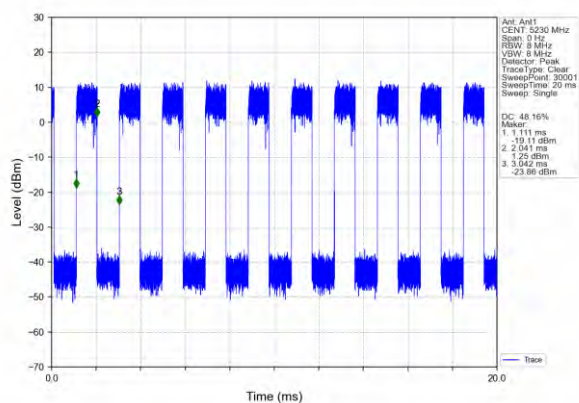




802.11n HT40



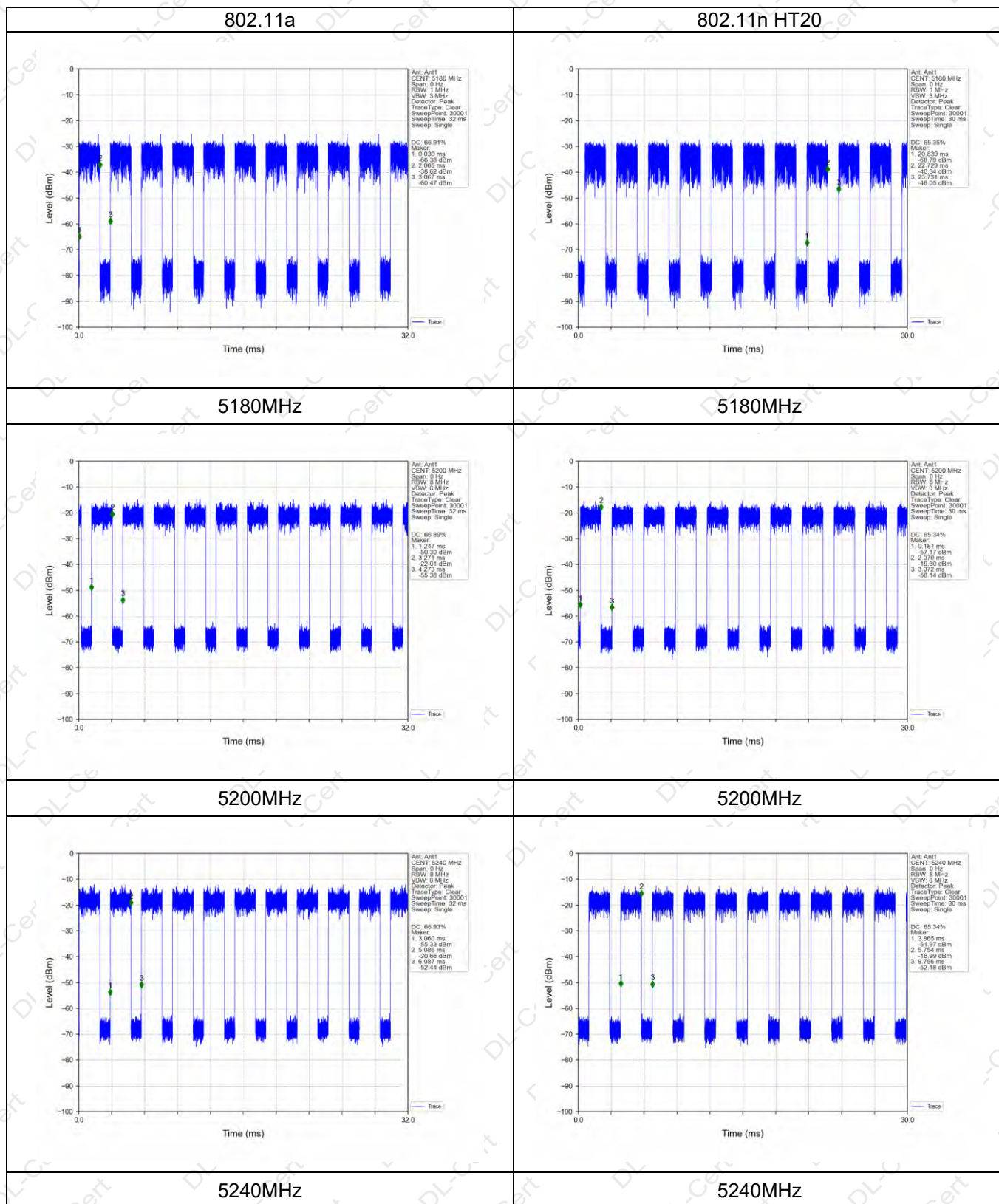
5190MHz



5230MHz

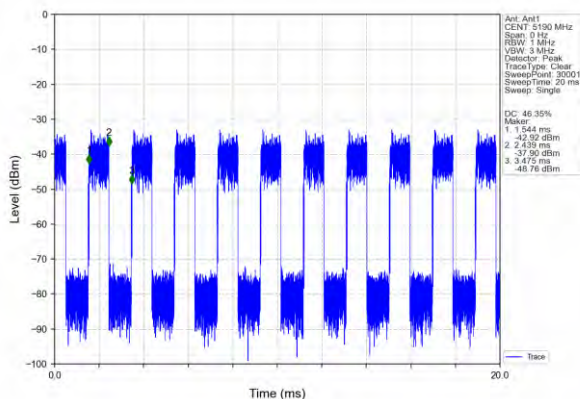


ANT2:

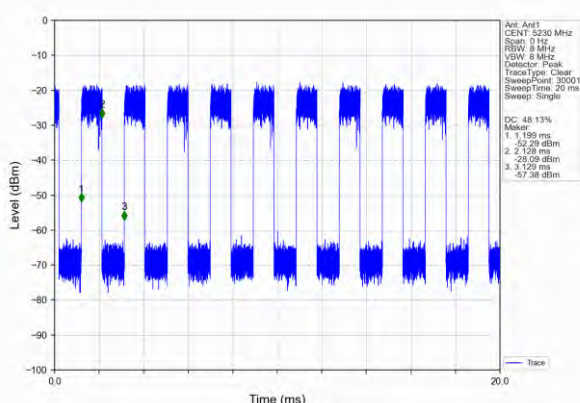




802.11n HT40



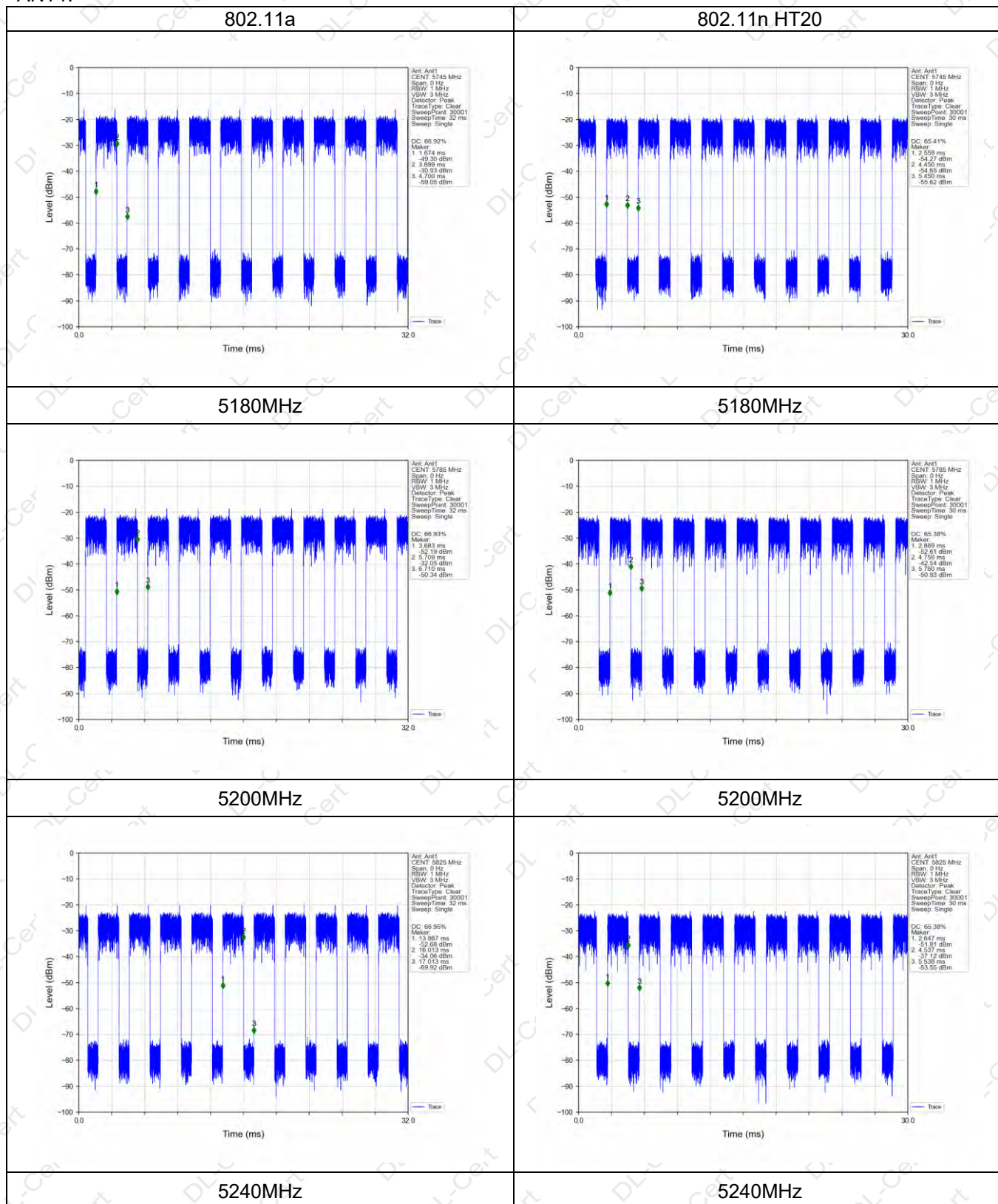
5190MHz



5230MHz

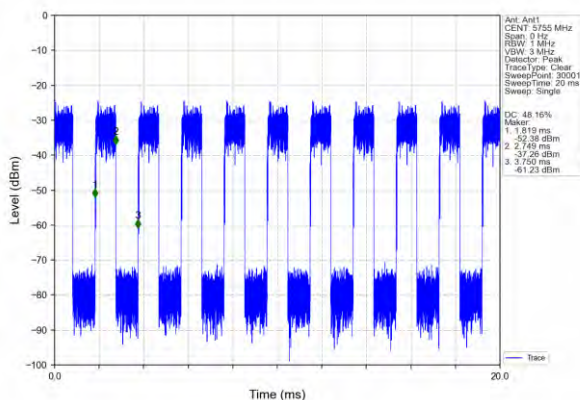


ANT1:

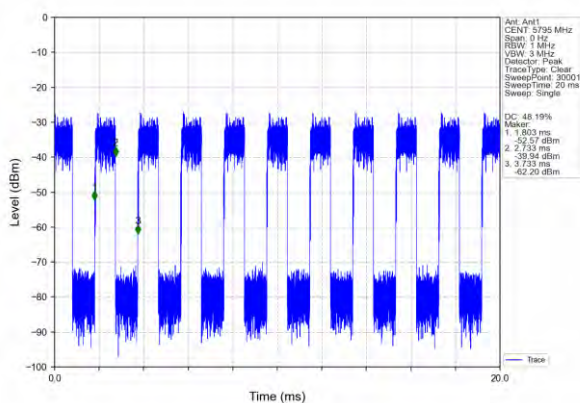




802.11n HT40



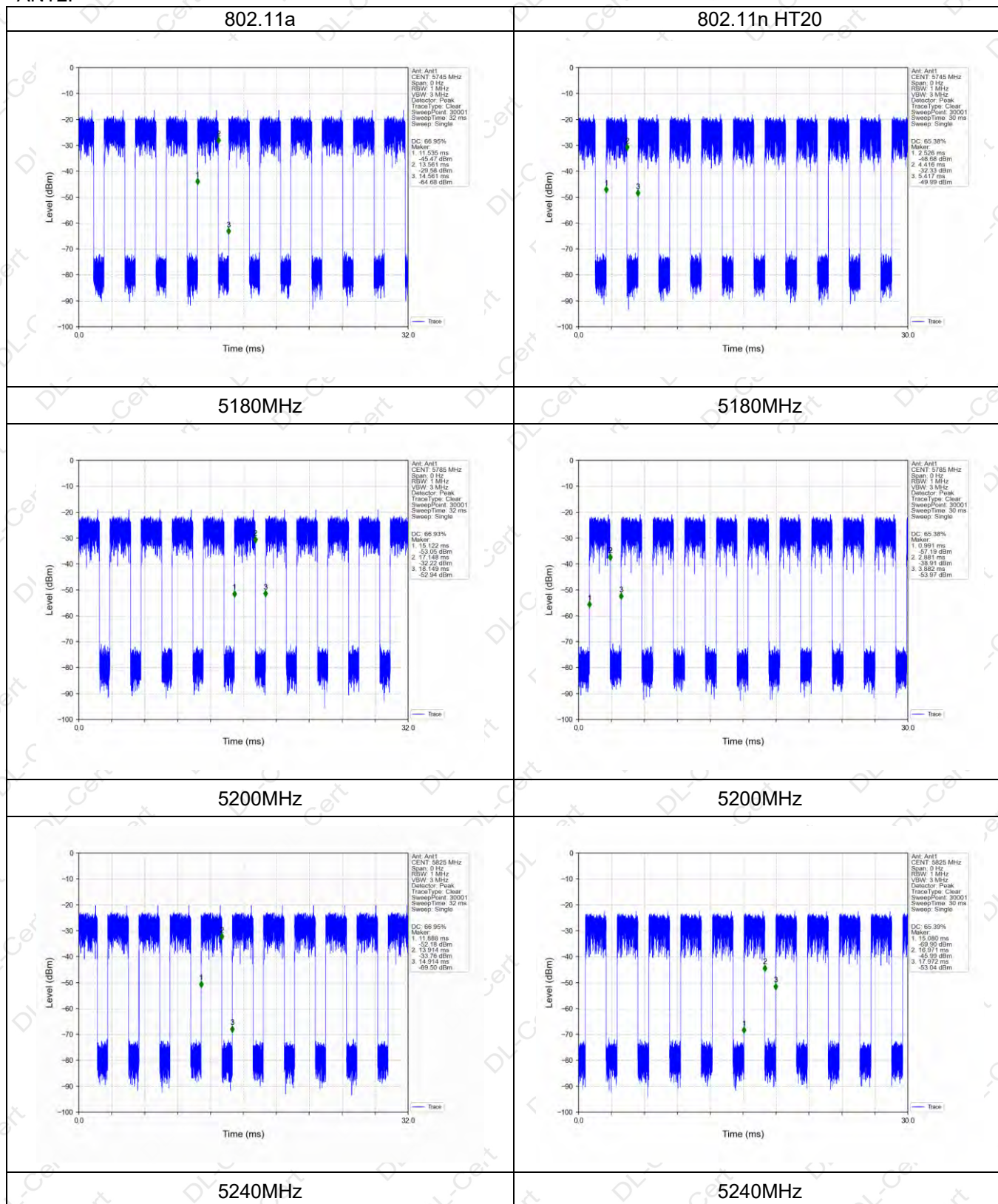
5190MHz



5230MHz

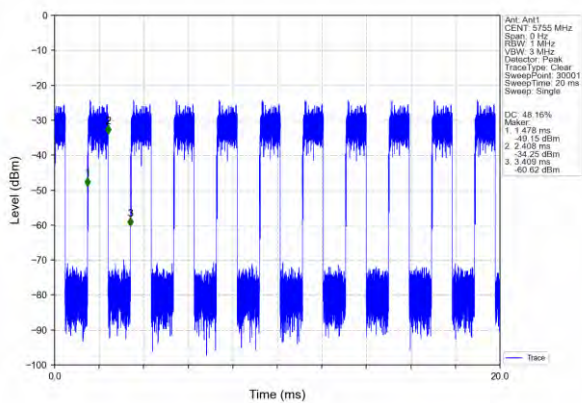


ANT2:

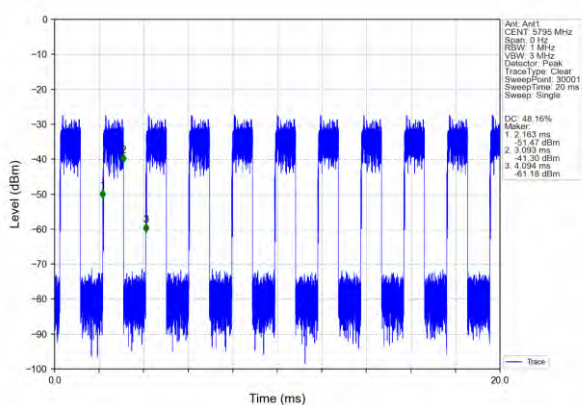




802.11n HT40



5190MHz



5230MHz



8.. FREQUENCY STABILITY

8.1. APPLIED PROCEDURES / LIMIT

Manufacturers 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 in the user's manual.

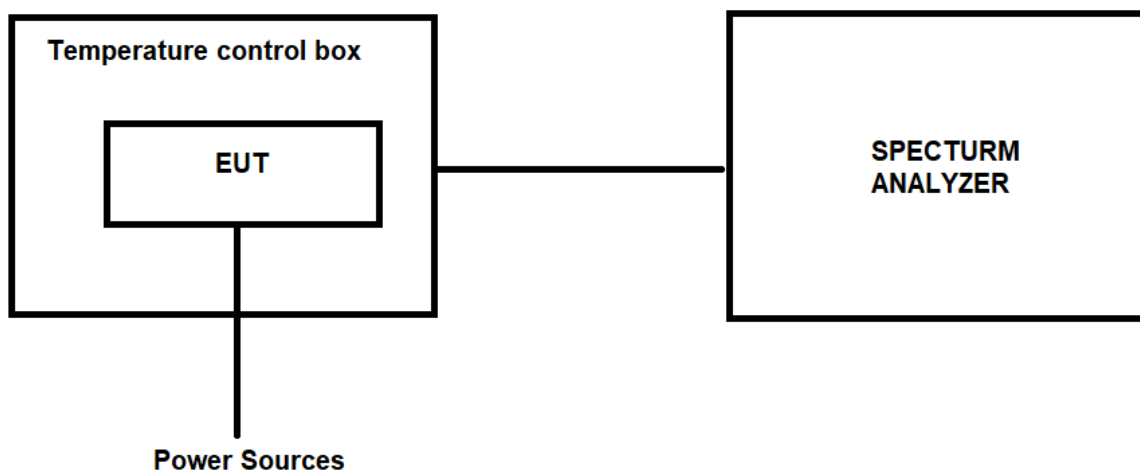
8.1.1. TEST PROCEDURE

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

8.1.2. DEVIATION FROM STANDARD

No deviation.

8.1.3. TEST SETUP



8.1.4. EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



8.1.5. TEST RESULTS

We test all antenna's data, the data only show the antenna1 worst mode.

Test Voltage	Test Temp.	Spectrum Frequency (MHz)			Δ Frequency (PPM)	
		(MHz)	802.11a	802.11n HT20	802.11a	802.11n HT20
3.63V	-20℃	5180	5180.0035	5180.0052	0.6757	1.0039
		5220	5220.0022	5220.0021	0.4215	0.4023
		5240	5240.0041	5240.0041	0.7824	0.7824
		5745	5745.0036	5745.0016	0.6266	0.2785
		5785	5785.0041	5785.0052	0.7087	0.8989
		5825	5825.0021	5825.0063	0.3605	1.0815
2.97V	-20℃	5180	5180.0041	5180.0041	0.7915	0.7915
		5220	5220.0055	5220.0052	1.0536	0.9962
		5240	5240.0014	5240.0041	0.2672	0.7824
		5745	5745.0041	5745.0063	0.7137	1.0966
		5785	5785.0052	5785.0015	0.8989	0.2593
		5825	5825.0016	5825.0054	0.2747	0.9270
3.3V	25℃	5180	5180.0052	5180.0012	1.0039	0.2317
		5220	5220.0014	5220.0037	0.2682	0.7088
		5240	5240.0057	5240.0016	1.0878	0.3053
		5745	5745.0055	5745.0025	0.9574	0.4352
		5785	5785.0063	5785.0016	1.0890	0.2766
		5825	5825.0012	5825.0015	0.2060	0.2575
3.63V	50℃	5180	5180.0033	5180.0037	0.6371	0.7143
		5220	5220.0034	5220.0046	0.6513	0.8812
		5240	5240.0015	5240.0025	0.2863	0.4771
		5745	5745.0063	5745.0056	1.0966	0.9748
		5785	5785.0052	5785.0064	0.8989	1.1063
		5825	5825.0021	5825.0055	0.3605	0.9442
2.97V	50℃	5180	5180.0041	5180.0024	0.7915	0.4633
		5220	5220.0053	5220.0051	1.0153	0.9770
		5240	5240.0052	5240.0023	0.9924	0.4389
		5745	5745.0015	5745.0024	0.2611	0.4178
		5785	5785.0054	5785.0024	0.9334	0.4149
		5825	5825.0028	5825.0037	0.4807	0.6352



Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (PPM)
			802.11n HT40	802.11n HT40
3.63V	-20°C	5190	5190.0024	0.4624
		5230	5230.0036	0.6883
		5755	5755.0021	0.3649
		5795	5795.0054	0.9318
2.97V	-20°C	5190	5190.0015	0.2890
		5230	5230.0013	0.2486
		5755	5755.0052	0.9036
		5795	5795.0021	0.3624
3.3V	25°C	5190	5190.0048	0.9249
		5230	5230.0045	0.8604
		5755	5755.0041	0.7124
		5795	5795.0023	0.3969
3.63V	50°C	5190	5190.0015	0.2890
		5230	5230.0014	0.2677
		5755	5755.0031	0.5387
		5795	5795.0053	0.9146
2.97V	50°C	5190	5190.0063	1.2139
		5230	5230.0052	0.9943
		5755	5755.0025	0.4344
		5795	5795.0014	0.2416



9.. TRANSMISSION IN THE ABSENCE OF DATA

9.1. STANDARD REQUIREMENT

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

9.2. TEST RESULT

No non-compliance noted:
Refer to the theory of operation.

10.. ANTENNA REQUIREMENT

10.1. STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

10.2. EUT ANTENNA

The EUT antenna is PCB Antenna, It comply with the standard requirement.

11.. TEST SEUUP PHOTO

Reference to the appendix I for details.

12.. EUT PHOTO

Reference to the appendix II for details.

***** END OF REPORT *****