

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT AND INDUSTRY CANADA RSS 247 CLASS II & IV PC REPORT

OF

Acer Incorporated

**Applicant:** 8F, 88, Sec 1, Hsin Tai Wu Rd Hsichih, Taipei Hsien, 221  
Taiwan

**Product Name:** WLAN and BT, 2x2 PCIe M.2 2230 adapter card



**Model No.:** 9560NGW

**Model Difference:** N/A

**FCC ID:** HLZ9560NG

**IC:** 1754F-9560NG

**Report Number:** E2/2018/80077

**FCC Rule Part:** §15.407, Cat: NII

**IC Rule Part:** RSS-247 issue 2 Feb 2017

**Issue Date:** Sep. 26, 2018

**Date of Test:** Jul. 16, 2018 ~ Sep. 21, 2018

**Date of EUT Received:** Jul. 16, 2018

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.



**Tested By:**

*Aken Huang / Engineer*



**Approved By:**

*Blue Yang / Supervisor*



Testing Laboratory  
0513

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## Revision History

Report Number	Revision	Description	Effectuated Page	Issue Date	Revised By
E2/2018/80077	Rev.00	Initial creation of document	All	Sep. 26, 2018	Yuri Tsai

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## Contents

1. GENERAL INFORMATION .....	4
2. SYSTEM TEST CONFIGURATION .....	8
3. SUMMARY OF TEST RESULT .....	10
4. DESCRIPTION OF TEST MODES .....	10
5. MEASUREMENT UNCERTAINTY .....	15
6. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT .....	16
7. UNDESIRABLE EMISSION - RADIATED MEASUREMENT .....	24
8. ANTENNA REQUIREMENT .....	92

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## 1. GENERAL INFORMATION

### 1.1. Product Description

General:

Product Name of Host:	Notebook / Tablet Computer	
Brand Name:		
Marketing Name of Host:	SF514-53T	
Model No. of Host:	N17W3	
Model Difference:	N/A	
Hardware Version:	version 1-1	
Software Version:	Win 10	
Model No. of BT/WLAN Module:	9560NGW	
Module FCC ID:	HLZ9560NG	
Module IC:	1754F-9560NG	
Scope:	The test report covers the radiated emissions requirements of the standards referenced in the report to allow system level approval of the module in this specific host.	
Class II & Class IV Permissive change:	WLAN and BT, 2x2 PCIe M.2 2230 adapter card INSTALLED IN Notebook / Tablet Computer	
Power Supply:	7.7Vdc from Rechargeable Li-ion Battery Pack or 19V by AC/DC Power Adapter	
	Battery:	Model No.: AP16L5J, Supplier: acer
	Adapter:	Model No.: A13-045N2A, Supplier: acer

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## WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.) / Average Rated Power(EIRP)	Modulation Technology	Type of Emission
11a	5150~5250	4	Avg. Power: 17.48dBm EIRP: 15.76dBm	OFDM	16M8D7W
	5250~5350	4	Avg. Power: 17.49dBm EIRP: 15.77dBm		28M6D7W
	5470~5725	12	Avg. Power: 14.48dBm EIRP: 11.34dBm		21M8D7W
	5725~5850	5	Avg. Power: 17.49dBm EIRP: 14.10dBm		21M8D7W
11n_20M	HT20 5150~5250	4	Avg. Power: 20.48dBm EIRP: 21.77dBm (Worst Case)	OFDM	18M0D7W
	HT20 5250~5350	4	Avg. Power: 20.46dBm EIRP: 21.75dBm (Worst Case)		29M6D7W
	HT20 5470~5725	12	Avg. Power: 17.48dBm EIRP: 17.35dBm (Worst Case)		22M2D7W
	HT20 5725~5850	5	Avg. Power: 20.48dBm EIRP: 20.10dBm (Worst Case)		22M2D7W
11n_40M	HT40 5150-5250	2	Avg. Power: 20.48dBm EIRP: 21.77dBm (Worst Case)	OFDM	36M7D7W
	HT40 5250-5350	2	Avg. Power: 20.45dBm EIRP: 21.74dBm (Worst Case)		36M6D7W
	HT40 5470-5725	6	Avg. Power: 17.49dBm EIRP: 17.36dBm (Worst Case)		45M9D7W
	HT40 5725-5850	2	Avg. Power: 20.48dBm EIRP: 20.10dBm (Worst Case)		36M7D7W
11ac_80M	VHT80 5150~5250	1	Avg. Power: 16.96dBm EIRP: 18.25dBm	OFDM	75M2D7W
	VHT80 5250~5350	1	Avg. Power: 15.96dBm EIRP: 17.25dBm		75M2D7W
	VHT80 5470~5725	3	Avg. Power: 17.47dBm EIRP: 17.34dBm		76M1D7W
	VHT80 5725-5850	1	Avg. Power: 20.47dBm EIRP: 20.09dBm		75M2D7W

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Wi-Fi	Frequency Range	Channels	Rated Power (Avg.) / Average Rated Power (EIRP)	Modulation Technology	Type of Emission
11ac_160M	VHT160 5150~5250	1	Avg. Power: 14.49dBm EIRP: 15.78dBm	OFDM	153M8D7W
	VHT160 5470~5725	3	Avg. Power: 16.40dBm EIRP: 16.27dBm		153M2D7W

Antenna Designation	PIFA Antenna, Supplier: WNC 1. P/N: 025.901F1.0001 (81EAAL15.GK8) (Main) Gain:-1.72dBi (5150~5250MHz) Gain:-1.72dBi (5250~5350MHz) Gain:-3.14dBi (5470~5725MHz) Gain:-3.39dBi (5725~5850MHz)  2. P/N: 025.901F2.0001 (81EAAL15.GK9) (Aux) Gain:-3.37dBi (5150~5250MHz) Gain:-2.13dBi (5250~5350MHz) Gain:-1.94dBi (5470~5725MHz) Gain:-4.99dBi (5725~5850MHz)
Modulation type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, 256QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps 802.11 ac_20MHz: 6.5 – 173.3Mbps 802.11 ac_40MHz: 13.5 – 400.0Mbps 802.11 ac_80MHz: 29.3 – 866.7Mbps 802.11 ac_160MHz: 58.5 – 1733.3Mbps

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## 1.2. Related Submittal(s) / Grant (s)

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules

FCC KDB 662911 D01 Multiple Transmitter Output

FCC KDB 644545 D03 Guidance for IEEE 802.11ac v01

ANSI C63.10:2013

Canada RSS-247 issue 2 Feb. 2017

Canada RSS-Gen issue 5 Apr. 2018

Note: All test items have been performed and record as per the above standards.

## 1.3. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333. (TAF code 0513)

FCC Registration Number and Designation number are: 735305 / TW0002

Canada Registration Number: 4620E-1

## 1.4. Special Accessories

There are no special accessories used while test was conducted.

## 1.5. Equipment Modifications

There was no modification incorporated into the EUT.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

### 2.3. Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4. Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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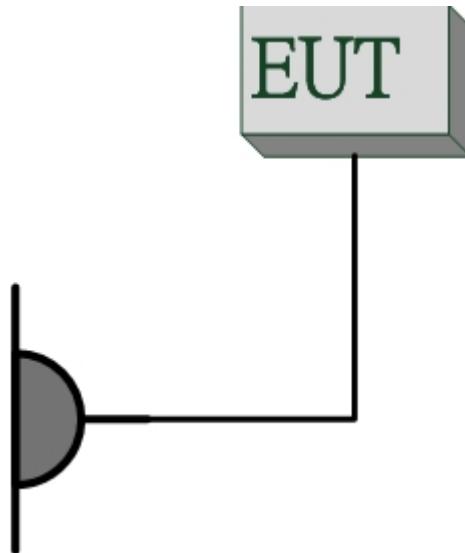
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## 2.5. Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A

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### 3. SUMMARY OF TEST RESULT

FCC / IC Rules	Description Of Test	Result
§15.407(a) (1) (2) RSS-247 §6.2.1~ 4 (1)	The Maximum Output Power Measurement	Compliant
§15.407(b) (1) (2) (3)(6) (7) RSS-247 §6.2.1~ 4 (2)	Undesirable Emission – Radiated Measurement	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

### 4. DESCRIPTION OF TEST MODES

#### 4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

4 channels are provided for 802.11a, 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
42	5210 MHz

1 channel is provided for 802.11ac\_VHT160

CHANNEL	FREQUENCY
50	5250 MHz

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Operated band in 5250 MHz ~5350 MHz:

4 channels are provided for 802.11a, 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n\_HT40, 802.11ac\_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
58	5290 MHz

Operated band in 5470 MHz ~5725 MHz:

12 channels are provided for 802.11a, 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720

6 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710

3 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
106	5530 MHz
122	5610 MHz
138	5690 MHz

1 channel is provided for 802.11ac\_VHT160

CHANNEL	FREQUENCY
114	5570 MHz

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Operated band in 5725 MHz ~5850 MHz:

5 channels are provided for 802.11a, 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
155	5775 MHz

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**RADIATED EMISSION TEST:****RADIATED EMISSION TEST (ABOVE 1 GHz)**

MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	40	OFDM	6	MAIN
802.11a	5260~5320	52 to 64	56	OFDM	6	MAIN
802.11a	5500~5700	100 to 140	120	OFDM	6	MAIN
802.11a	5745~5825	149 to 165	157	OFDM	6	MAIN

**BANDEdge EMISSION TEST**

802.11a	5180~5240	36 to 48	36	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	VHT0	MIMO
802.11ac_VHT160	5250	50	50	OFDM	VHT0	MIMO
802.11a	5260~5320	52 to 64	64	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	VHT0	MIMO
802.11a	5500~5720	100 to 144	100, 140	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102, 134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5690	106 to 138	106	OFDM	VHT0	MIMO
802.11ac_VHT160	5570	114	114	OFDM	VHT0	MIMO
802.11a	5745~5825	149 to 165	149, 165	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151, 159	OFDM	MCS8	MIMO
802.11ac_VHT80	5755	155	155	OFDM	VHT0	MIMO

**Note:**

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

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Pre-scanned was done on Antenna Main and Antenna Aux, and Antenna MIMO results higher emission at 5GHz. Therefore, the completed set of measurement was done on Antenna MIMO (5GHz) to be presented on this test report.

**Remark: The device will not operate in 5600~5650MHz band for IC.**

#### ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,40,48	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	VHT0	MIMO
802.11ac_VHT160	5250	50	50	OFDM	VHT0	MIMO
802.11a	5260~5320	52 to 64	52,56,64	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	VHT0	MIMO
802.11a	5500~5720	100 to 144	100,120,140	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102,118,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5690	106 to 138	106	OFDM	VHT0	MIMO
802.11ac_VHT160	5570	114	114	OFDM	VHT0	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5755	155	155	OFDM	VHT0	MIMO

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## 5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26 dB and 99% Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 1.42 dB
Peak Power Spectral Density Measurement	+/- 1.55 dB
Peak Excursion Measurement	+/- 1.55 dB
Undesirable Emission – Conducted Measurement	+/- 1.55 dB
Transmission in case of Absence of Information	+/- 1.55 dB
Frequency Stability	+/- 123.36 Hz
TPC and DFS Measurement	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

### Radiated Spurious Emission:

Measurement uncertainty (Polarization : <b>Vertical</b> )	9kHz-30MHz: +/- 2.87dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : <b>Horizontal</b> )	9kHz-30MHz: +/- 2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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## 6. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

### 6.1 Standard Applicable:

OPERATION Band	EUT CATEGORY		LIMIT
U-NII-1	Access Point (Master device)		1 Watt(30dBm)
	Fixed point-to-point Access Point		1 Watt(30dBm)
	✓ Mobile and portable client device		250mW(23.98dBm)
U-NII-2A	✓		250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C	✓		250mW(23.98dBm) or 11dBm+10 log B
U-NII-3	✓		1 Watt(30dBm)

According to RSS-247 §6.2.1~4 (1)

OPERATION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP shall not exceed 200 mW or $10 + 10 \log_{10} B$
5250~5350 MHz	Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$ EIRP shall not exceed 1.0 W or $17 + 10 \log_{10} B$ , dBm
5470~5600 MHz and 5650~5725 MHz	Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$ EIRP shall not exceed 1.0 W or $17 + 10 \log_{10} B$ , dBm
5725~5850 MHz	Conducted output power shall not exceed 1 W

Note: B is the 99% emission bandwidth in MHz.

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

*Note: Directional gain = gain of antenna element + 10 log (# of TX antenna elements)*

*Effective Legacy Gain = -1.72+3.01=1.29dBi (5150MHz-5250MHz)*

*Effective Legacy Gain = -1.72+3.01=1.29dBi (5250MHz-5350MHz)*

*Effective Legacy Gain = -3.14+3.01=-0.13dBi (5470MHz-5725MHz)*

*Effective Legacy Gain = -3.39+3.01=-0.38dBi (5725MHz-5850MHz)*

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## 6.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Set the offset  $10 \cdot \log(1/x)$ ,  $n_{HT20}=0.10$ ,  $n_{HT40}=0.12$
4. Record the max. reading.
5. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.
6. Employing step 1 to 4 obtaining per-chain basis in MIMO operation, and sum the power in linear to result the output of MIMO operation at frequency of interest (, where MIMO is applicable).

**Note:** For EIRP/ERP measurement complying with RSS-247 §6.2.1~ 4 (1), the formula as deduced in 1.3.2 of KDB 412172 D01 is used to calculate.  $ERP/EIRP = Pt + Gt - Lc$ , where  $Pt$ = transmitter output power measured directly at antenna port, expressing in dBm, and  $Gt$  = gain of the transmitting antenna in dBi that can be referred in antenna spec provided by the manufacturer in section 1.1,  $Lc$  = signal attenuation in the cable between the transmitting port and antenna.

## 6.3 Measurement Equipment Used:

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY51440113	2018/06/20	2019/06/19
Power Meter	Anritsu	ML2496A	1326001	2017/07/25	2018/07/24
Power Meter	Anritsu	ML2496A	1326001	2018/07/25	2019/07/24
Power Sensor	Anritsu	MA2411B	1315048	2017/07/25	2018/07/24
Power Sensor	Anritsu	MA2411B	1315048	2018/07/25	2019/07/24
Power Sensor	Anritsu	MA2411B	1315049	2017/07/25	2018/07/24
Power Sensor	Anritsu	MA2411B	1315049	2018/07/25	2019/07/24
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
Attenuator	Marvelous	MVE2213-10	RF31	2017/12/26	2018/12/25
DC Block	PASTER-NACK	PE8210	RF29	2017/12/26	2018/12/25

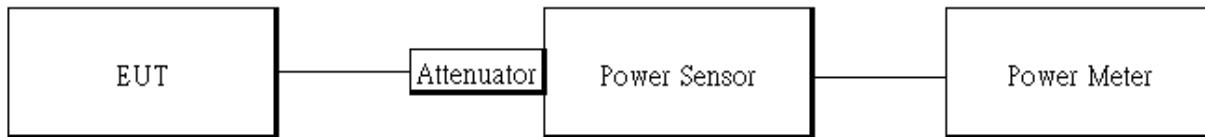
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## 6.4 Test Set-up:



## 6.5 Measurement Result

802.11a

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	<b>17.48</b>	55.976	23.98	PASS
40	5200	17.46	55.719	23.98	PASS
48	5240	17.45	55.590	23.98	PASS
52	5260	<b>17.49</b>	56.105	23.98 or 11+10log(B) =27.59	PASS
56	5280	17.44	55.463	23.98 or 11+10log(B) =25.38	PASS
64	5320	16.85	48.417	23.98 or 11+10log(B) =24.78	PASS
100	5500	<b>14.48</b>	28.054	23.98 or 11+10log(B) =24.81	PASS
120	5600	14.45	27.861	23.98 or 11+10log(B) =27.09	PASS
140	5700	14.46	27.925	23.98 or 11+10log(B) =24.92	PASS
149	5745	<b>17.49</b>	56.105	30	PASS
157	5785	17.46	55.719	30	PASS
165	5825	17.47	55.847	30	PASS

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## 802.11n\_HT20 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
36	5180	15.6	15.84	18.91	74.679	23.98	PASS
40	5200	17.16	17.43	<b>20.48</b>	107.335	23.98	PASS
48	5240	17.13	17.39	20.45	106.469	23.98	PASS
52	5260	17.14	17.41	<b>20.46</b>	106.841	23.98 or $11+10\log(B) = 27.90$	PASS
56	5280	17.11	17.37	20.43	105.980	23.98 or $11+10\log(B) = 25.51$	PASS
64	5320	15.93	15.6	18.95	75.482	23.98 or $11+10\log(B) = 24.91$	PASS
100	5500	14.16	14.42	<b>17.48</b>	53.731	23.98 or $11+10\log(B) = 24.82$	PASS
120	5600	14.14	14.41	17.46	53.548	23.98 or $11+10\log(B) = 27.24$	PASS
140	5700	14.42	14.15	17.47	53.671	23.98 or $11+10\log(B) = 24.93$	PASS
144	5720 (band 3)	14.42	14.11	<b>17.45</b>	53.433	23.98 or $11+10\log(B) = 24.38$	PASS
144	5720 (band 4)	13.05	13.21	16.32	41.125	23.98 or $11+10\log(B) = 24.38$	PASS
149	5745	17.21	17.35	20.47	106.927	30	PASS
157	5785	17.22	17.36	<b>20.48</b>	107.173	30	PASS
165	5825	17.19	17.33	20.45	106.435	30	PASS

## 802.11n\_HT40 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
38	5190	15.38	15.4	18.74	69.188	23.98	PASS
46	5230	17.1	17.15	<b>20.48</b>	103.166	23.98	PASS
54	5270	17.08	17.11	<b>20.45</b>	102.455	23.98 or $11+10\log(B) = 27.35$	PASS
62	5310	14.49	14.03	17.46	53.412	23.98 or $11+10\log(B) = 27.32$	PASS
102	5510	14.21	14.06	<b>17.49</b>	51.832	23.98 or $11+10\log(B) = 27.46$	PASS
118	5590	14.17	13.98	17.43	51.125	23.98 or $11+10\log(B) = 27.53$	PASS
134	5670	14.25	14.01	17.48	51.784	23.98 or $11+10\log(B) = 27.48$	PASS
142	5710 (band 3)	14.21	14.07	<b>17.49</b>	51.890	23.98 or $11+10\log(B) = 27.20$	PASS
142	5710 (band 4)	9.88	9.51	13.05	18.661	23.98 or $11+10\log(B) = 27.20$	PASS
151	5755	17.08	17.15	20.47	102.931	30	PASS
159	5795	17.05	17.21	<b>20.48</b>	103.301	30	PASS

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## 802.11ac\_VHT80 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
42	5210	13.15	13.54	<b>16.96</b>	43.248	23.98	PASS
58	5290	12.18	12.51	<b>15.96</b>	34.343	23.98 or 11+10log(B) =30.41	PASS
106	5530	13.69	14.01	17.47	48.565	23.98 or 11+10log(B) =30.40	PASS
122	5610	13.67	13.98	<b>17.44</b>	48.284	23.98 or 11+10log(B) =32.07	PASS
138	5690 (band 3)	13.66	14.06	<b>17.48</b>	48.696	23.98 or 11+10log(B) =30.63	PASS
138	5690 (band 4)	3.74	1.00	7.24	3.625	23.98 or 11+10log(B) =30.63	PASS
155	5775	16.69	17.01	<b>20.47</b>	96.900	30	PASS

## 802.11ac\_VHT160 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
50	5250	10.42	10.59	<b>14.49</b>	22.471	23.98	PASS
114	5570	12.42	12.40	<b>16.40</b>	34.836	23.98 or 11+10log(B) =33.19	PASS

**\* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.**

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**ERP/EIRP Measurement:**

802.11a

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
36	5180	<b>17.48</b>	55.976	-1.72	15.76	23.01 or $10+10\log(B) = 22.26$	PASS
40	5200	17.46	55.719		15.74	23.01 or $10+10\log(B) = 22.26$	PASS
48	5240	17.45	55.590		15.73	23.01 or $10+10\log(B) = 22.26$	PASS
52	5260	<b>17.49</b>	56.105	-1.72	15.77	30 or $17+10\log(B) = 31.57$	PASS
56	5280	17.44	55.463		15.72	30 or $17+10\log(B) = 29.41$	PASS
64	5320	16.85	48.417		15.13	30 or $17+10\log(B) = 29.26$	PASS
100	5500	<b>14.48</b>	28.054	-3.14	11.34	30 or $17+10\log(B) = 29.26$	PASS
120	5600	14.45	27.861		11.31	30 or $17+10\log(B) = 30.38$	PASS
140	5700	14.46	27.925		11.32	30 or $17+10\log(B) = 29.28$	PASS
149	5745	<b>17.49</b>	56.105	-3.39	14.10	30	PASS
157	5785	17.46	55.719		14.07	30	PASS
165	5825	17.47	55.847		14.08	30	PASS

\* Note: EIRP = Average Power + Gain

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## 802.11n\_HT20 (MIMO)

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
36	5180	18.91	77.804	1.29	20.20	23.01 or $10+10\log(B) = 22.53$	PASS
40	5200	<b>20.48</b>	111.686		21.77	23.01 or $10+10\log(B) = 22.65$	PASS
48	5240	20.45	110.917		21.74	23.01 or $10+10\log(B) = 24.59$	PASS
52	5260	<b>20.46</b>	111.173	1.29	21.75	30 or $17+10\log(B) = 31.63$	PASS
56	5280	20.43	110.408		21.72	30 or $17+10\log(B) = 29.60$	PASS
64	5320	18.95	78.524		20.24	30 or $17+10\log(B) = 29.53$	PASS
100	5500	<b>17.48</b>	55.976	-0.13	17.35	30 or $17+10\log(B) = 29.54$	PASS
120	5600	17.46	55.719		17.33	30 or $17+10\log(B) = 30.46$	PASS
140	5700	17.47	55.847		17.34	30 or $17+10\log(B) = 29.53$	PASS
149	5745	20.47	111.429	-0.38	20.09	30	PASS
157	5785	<b>20.48</b>	111.686		20.10	30	PASS
165	5825	20.45	110.917		20.07	30	PASS

\* Note: EIRP = Average Power + Gain

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## 802.11n\_HT40 (MIMO)

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
38	5190	18.74	74.817	1.29	20.03	23.01 or $10+10\log(B) = 25.65$	PASS
46	5230	<b>20.48</b>	111.686		21.77	23.01 or $10+10\log(B) = 25.63$	PASS
54	5270	<b>20.45</b>	110.917	1.29	21.74	30 or $17+10\log(B) = 32.63$	PASS
62	5310	17.46	55.719		18.75	30 or $17+10\log(B) = 32.63$	PASS
102	5510	<b>17.49</b>	56.105	-0.13	17.36	30 or $17+10\log(B) = 32.64$	PASS
118	5590	17.43	55.335		17.30	30 or $17+10\log(B) = 33.62$	PASS
134	5670	17.48	55.976		17.35	30 or $17+10\log(B) = 32.65$	PASS
151	5755	20.47	111.429	-0.38	20.09	30	PASS
159	5795	<b>20.48</b>	111.686		20.10	30	PASS

\* Note: EIRP = Average Power + Gain

## 802.11ac\_VHT80 (MIMO)

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
42	5210	<b>16.96</b>	49.659	1.29	18.25	23.01 or $10+10\log(B) = 28.76$	PASS
58	5290	<b>15.96</b>	39.446	1.29	17.25	30 or $17+10\log(B) = 35.76$	PASS
106	5530	<b>17.47</b>	55.847	-0.13	17.34	30 or $17+10\log(B) = 35.76$	PASS
122	5610	17.44	55.463		17.31	30 or $17+10\log(B) = 35.59$	PASS
155	5775	<b>20.47</b>	111.429	-0.38	20.09	30	PASS

\* Note: EIRP = Average Power + Gain

## 802.11ac\_VHT160 (MIMO)

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
50	5250	<b>14.49</b>	28.119	1.29	15.78	23.01 or $10+10\log(B) = 31.87$	PASS
114	5570	<b>16.40</b>	43.652	-0.13	16.27	30 or $17+10\log(B) = 38.85$	PASS

\* Note: EIRP = Average Power + Gain

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## 7. UNDESIRABLE EMISSION - RADIATED MEASUREMENT

### 7.1 Standard Applicable

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 5.15-5.25 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.
2. 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 10 dBm/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.

APPLICABLE TO	LIMIT	
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRENGTH AT 3m	
	PK: 74 (dB $\mu$ V/m)	AV 54 (dB $\mu$ V/m)
APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.3 (dB $\mu$ V/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dB $\mu$ V/m) *1 PK:105.2 (dB $\mu$ V/m) *2 PK: 110.8(dB $\mu$ V/m) *3 PK:122.2 (dB $\mu$ V/m) *4

\*1 beyond 75 MHz or more above of the bandedge.

\*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

\*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

\*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

EIRP = ( (E\*d)^2) / 30, where E is the field in V/m, d is the measurement distance (3m), EIRP is the equivalent isotropically radiated power in Watts..

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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB $\mu$ V/m) = 20 log Emission level (dB $\mu$ V/m)

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## 7.2 Measurement Equipment Used:

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Horn Antenna	Schwarzbeck	BBHA9120D	1187	2018/01/04	2019/01/03
EMI Test Receiver	R&S	ESU 40	100363	2018/04/11	2019/04/10
Pre-Amplifier	EMC Instruments	EMC0011830	980199	2017/12/26	2018/12/25
Attenuator	Marvelous	WATT-218FS-10	RF246	2017/12/26	2018/12/25
Highpass Filter	Micro Tronics	BRM50701-01	G008	2017/12/26	2018/12/25
Band Rejection Filter	Micro-Tronics	G015	RF100	2017/12/26	2018/12/25
Band Rejection Filter	Micro-Tronics	G016	RF101	2017/12/26	2018/12/25
Band Rejection Filter	Micro-Tronics	G021	RF102	2017/12/26	2018/12/25
Coaxial Cable	Huber Suhner	SUCOFLEX 104	MY17388/4	2017/12/26	2018/12/25

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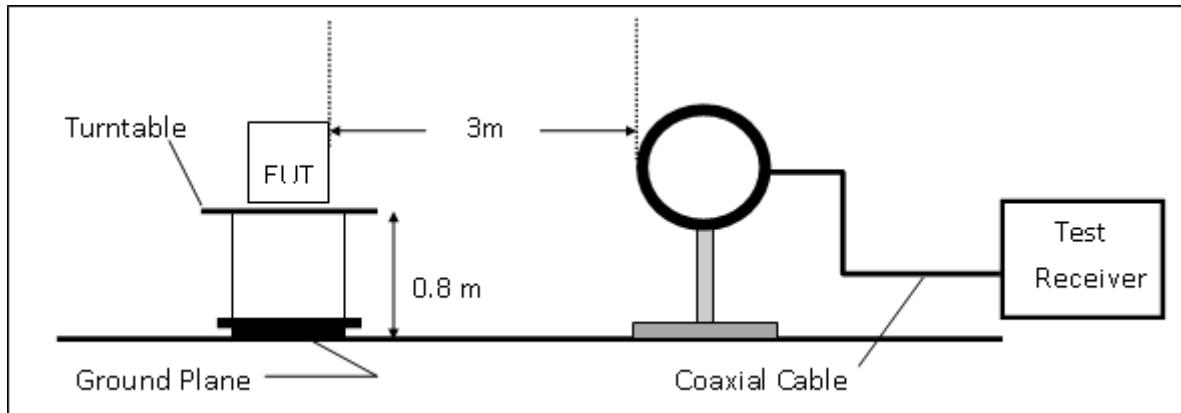
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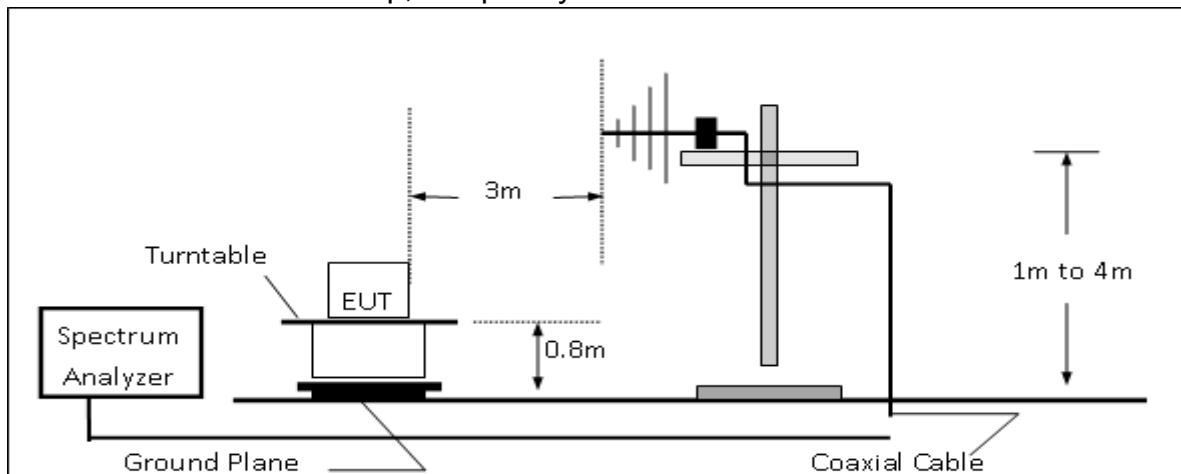
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### 7.3 Test SET-UP

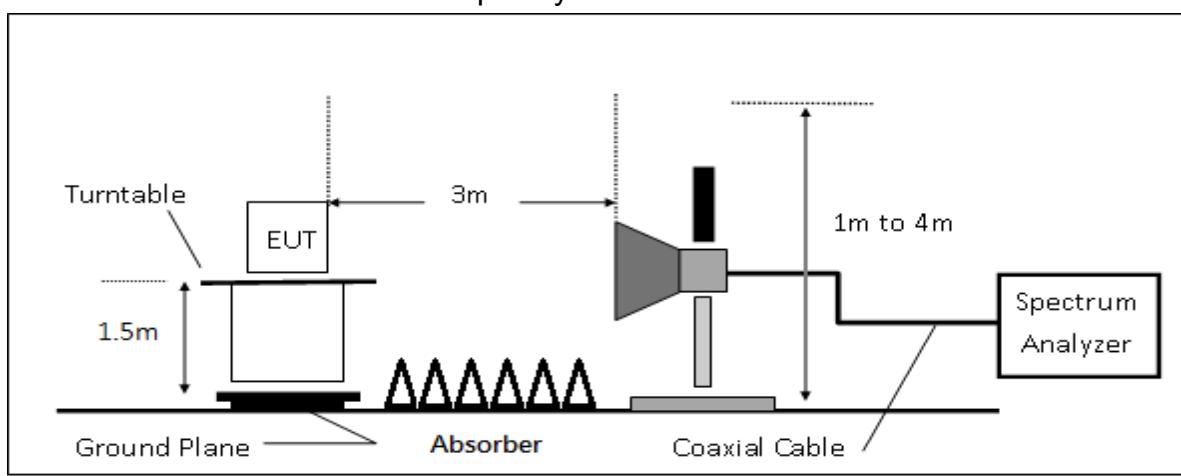
#### (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



#### (B) Radiated Emission Test Set-UP, Frequency from 30MHz to 1000MHz



#### (C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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## 7.4 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
3. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plane.
4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW  $\geq$  1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
11. Repeat above procedures until all frequency measured were complete.

## 7.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

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## 7.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

## 7.7 Measurement Result

Note: Refer to attach tabular data sheets.

Note: There is a comparison data of both open-field test site and semi-Anechoic, and test result came out very similar.

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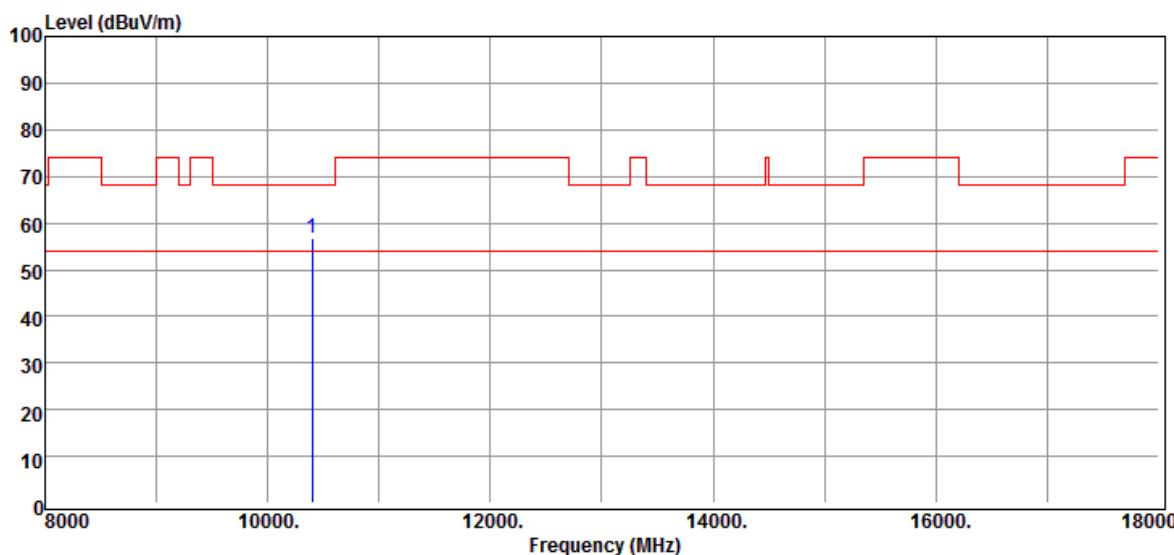
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**Radiated Spurious Emission Measurement Result****Above 1GHz Worst-Case Data:****802.11a, 5150~5250 MHz**

Operation Mode	:802.11a / Band 1	Test Date	:2018-07-18
Test Mode	:TX CH MID	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5200 MHz	Engineer	:Enzo



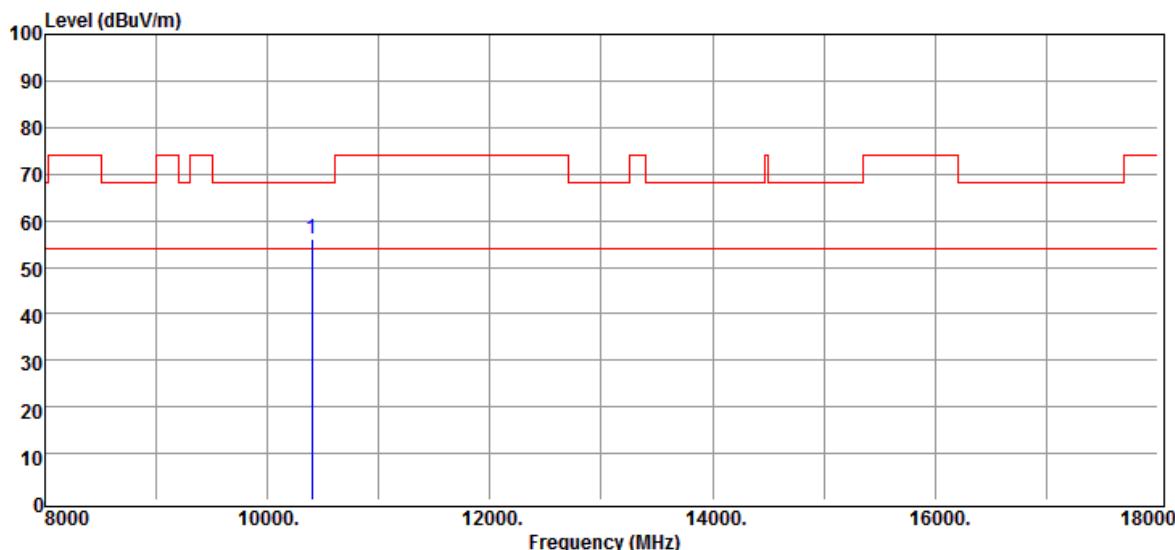
Freq. MHz	Detector Mode	Spectrum Reading Level dB <sub>μ</sub> V	Factor dB	Actual FS dB <sub>μ</sub> V/m	Limit @3m dB <sub>μ</sub> V/m	Margin dB
10400.00	Peak	29.98	26.79	56.77	68.20	-11.43

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Operation Mode :802.11a / Band 1  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :5200 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					68.20	-12.11
10400.00	Peak	29.30	26.79	56.09	68.20	-12.11

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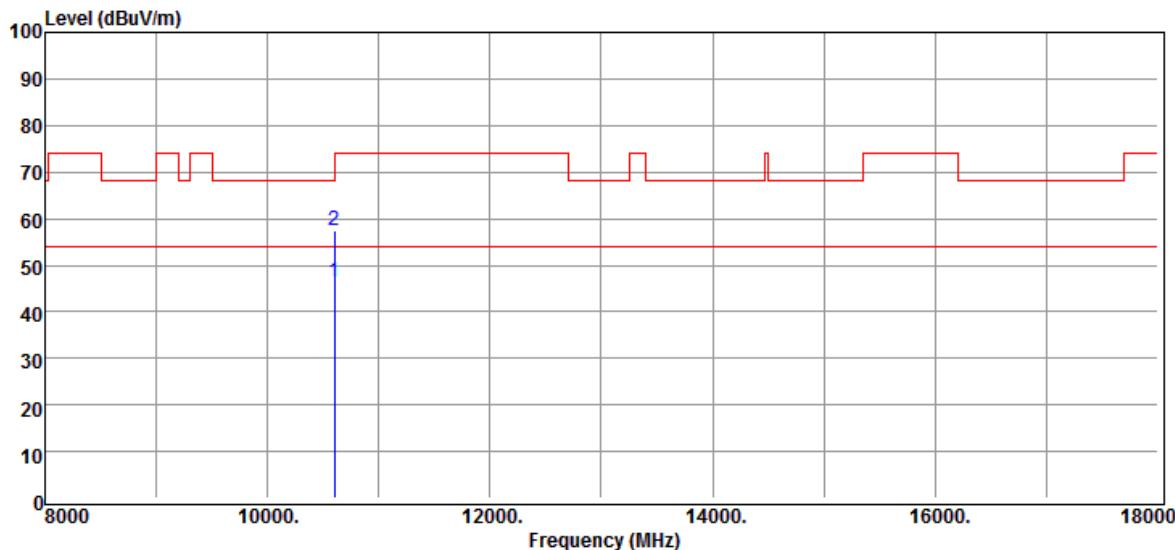
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**Radiated Spurious Emission Measurement Result****802.11a, 5250~5350MHz**

Operation Mode	:802.11a / Band 2	Test Date	:2018-07-18
Test Mode	:TX CH MID	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5300 MHz	Engineer	:Enzo



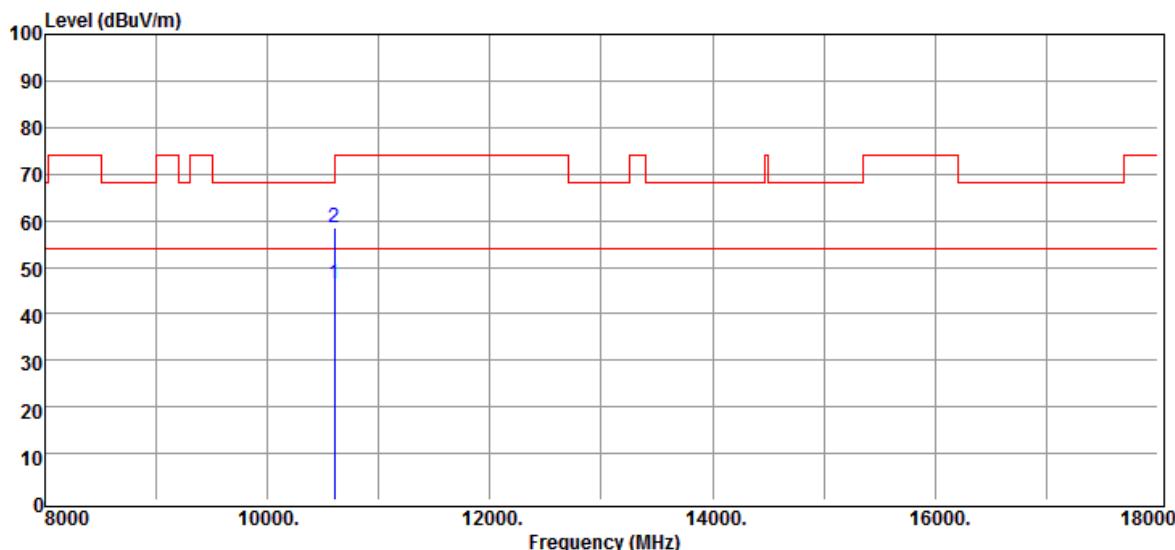
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual	Limit	Margin
				FS dB $\mu$ V/m	@3m dB $\mu$ V/m	dB
10600.00	Average	19.24	27.21	46.45	54.00	-7.55
10600.00	Peak	30.14	27.21	57.35	68.20	-10.85

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Operation Mode :802.11a / Band 2  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :5300 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
10600.00	Average	19.21	27.21	46.42	54.00	-7.58
10600.00	Peak	31.22	27.21	58.43	68.20	-9.77

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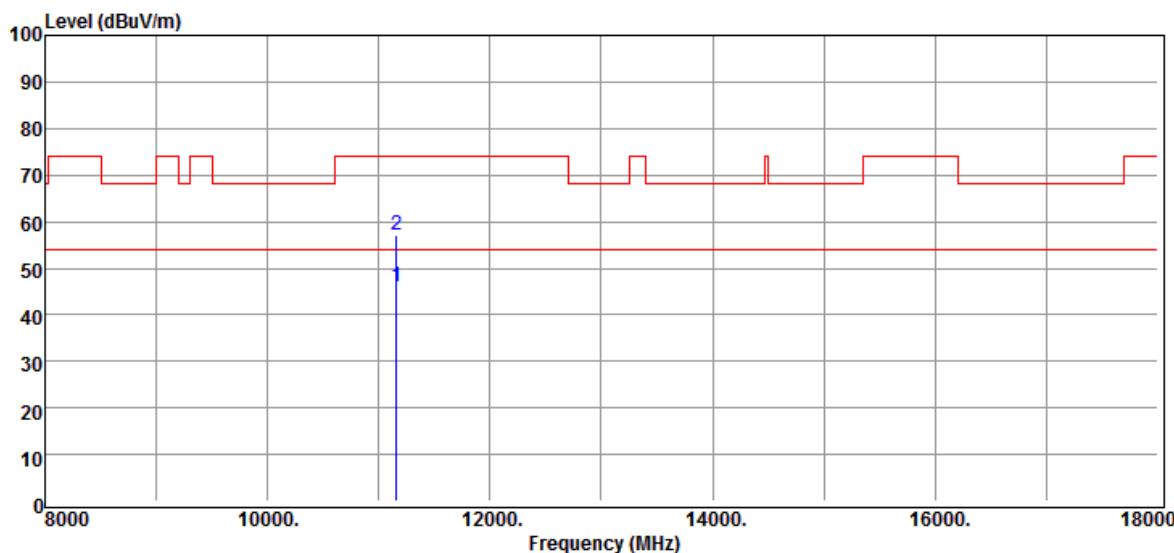
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**Radiated Spurious Emission Measurement Result****802.11a, 5470~5725 MHz**

Operation Mode	:802.11a / Band 3	Test Date	:2018-07-18
Test Mode	:TX CH MID	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5580 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual	Limit	Margin
				FS dB $\mu$ V/m	@3m dB $\mu$ V/m	dB
11160.00	Average	19.31	26.67	45.98	54.00	-8.02
11160.00	Peak	30.30	26.67	56.97	74.00	-17.03

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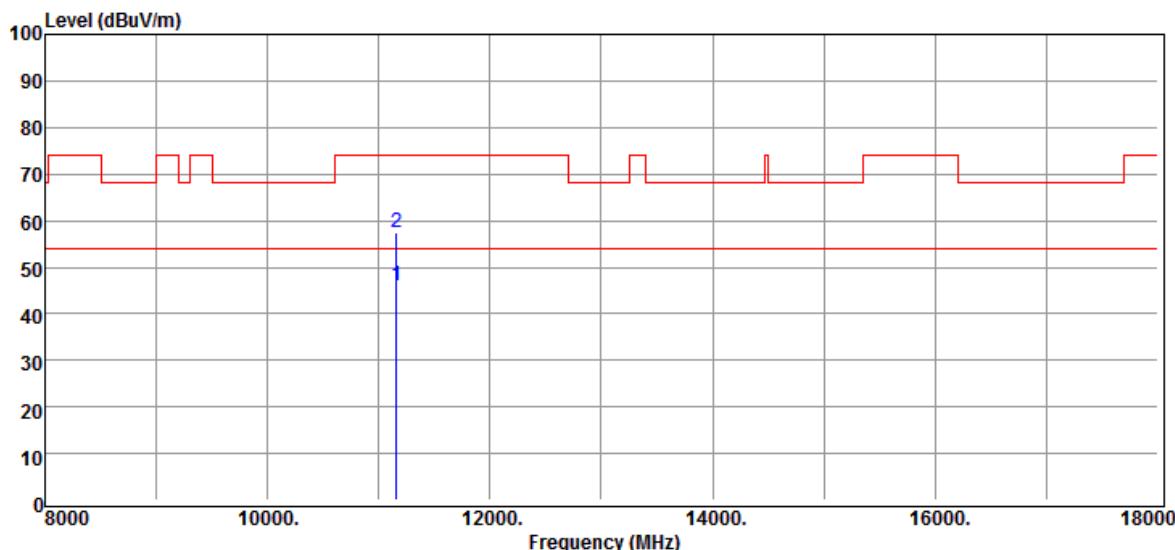
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Operation Mode :802.11a / Band 3  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :5580 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	dB
11160.00	Average	19.29	26.67	45.96	54.00	-8.04
11160.00	Peak	30.87	26.67	57.54	74.00	-16.46

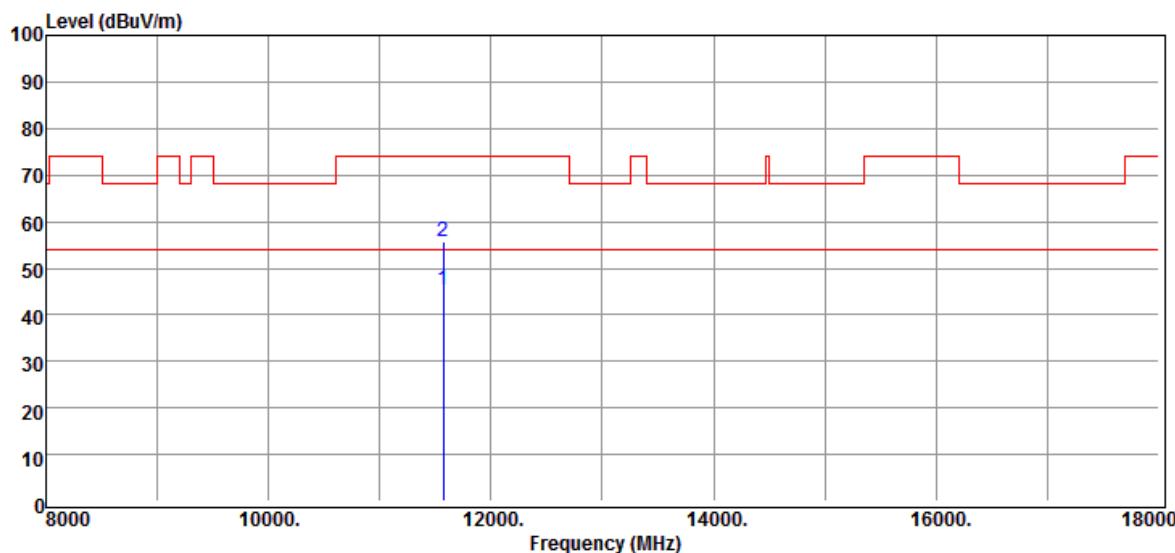
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**Radiated Spurious Emission Measurement Result****802.11a, 5725~5850 MHz**

Operation Mode	:802.11a / Band 4	Test Date	:2018-07-18
Test Mode	:TX CH MID	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5785 MHz	Engineer	:Enzo



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual	Limit	Margin
				FS dB $\mu$ V/m	@3m dB $\mu$ V/m	dB
11570.00	Average	19.50	25.87	45.37	54.00	-8.63
11570.00	Peak	29.80	25.87	55.67	74.00	-18.33

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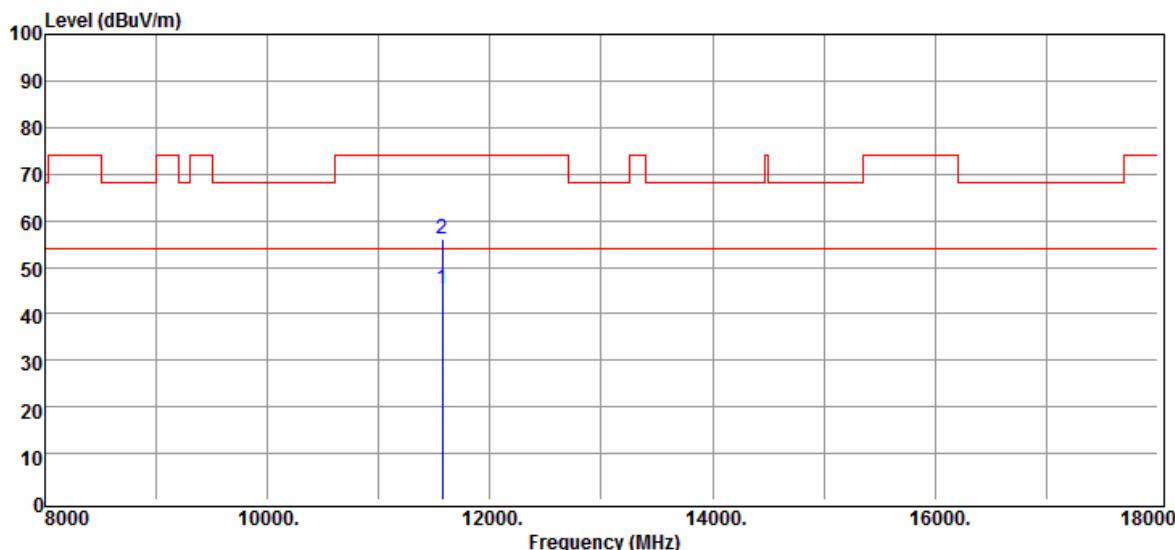
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Operation Mode :802.11a / Band 4  
Test Mode :TX CH MID  
EUT Pol :H Plan  
Test Channel :5785 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	dB $\mu$ V/m
11570.00	Average	19.55	25.87	45.42	54.00	-8.58
11570.00	Peak	30.10	25.87	55.97	74.00	-18.03

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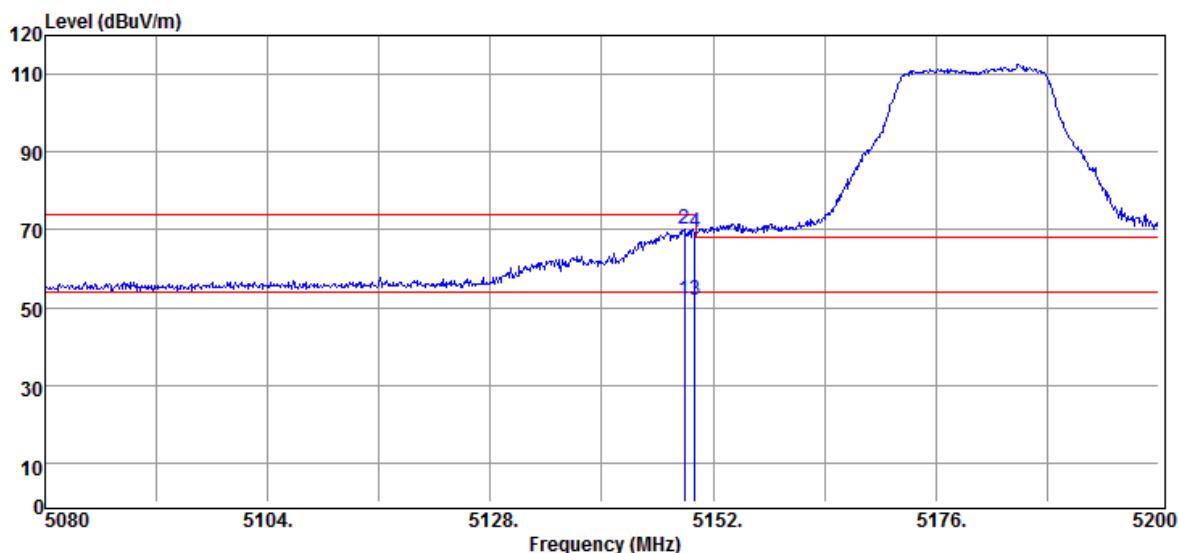
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**Band edge falling to restricted band****802.11a mode**

Operation Mode	:802.11a/Band 1	Test Date	:2018-07-17
Test Mode	:BE CH LOW	Temp./Humi.	:23/61
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Ashton



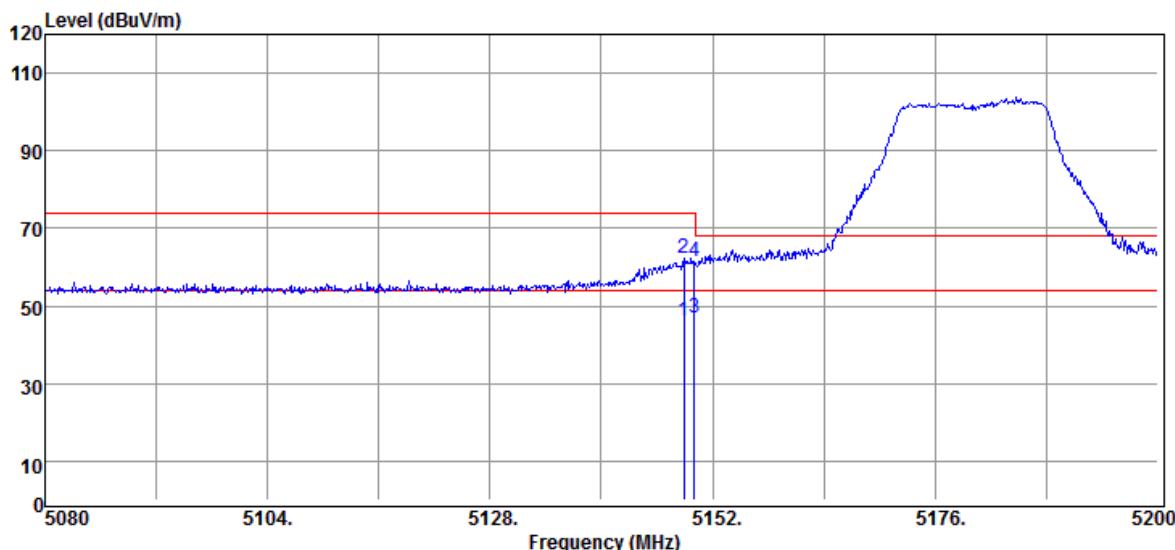
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5148.88	Average	38.09	13.63	51.72	54.00	-2.28
5148.88	Peak	56.58	13.63	70.21	74.00	-3.79
5150.00	Average	38.34	13.65	51.99	54.00	-2.01
5150.00	Peak	55.72	13.65	69.37	74.00	-4.63

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Operation Mode :802.11a/Band 1  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5180 MHz  
Test Date :2018-07-17  
Temp./Humi. :23/61  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
5148.88	Average	32.56	13.63	46.19	54.00	-7.81
5148.88	Peak	48.51	13.63	62.14	74.00	-11.86
5150.00	Average	33.06	13.65	46.71	54.00	-7.29
5150.00	Peak	47.94	13.65	61.59	74.00	-12.41

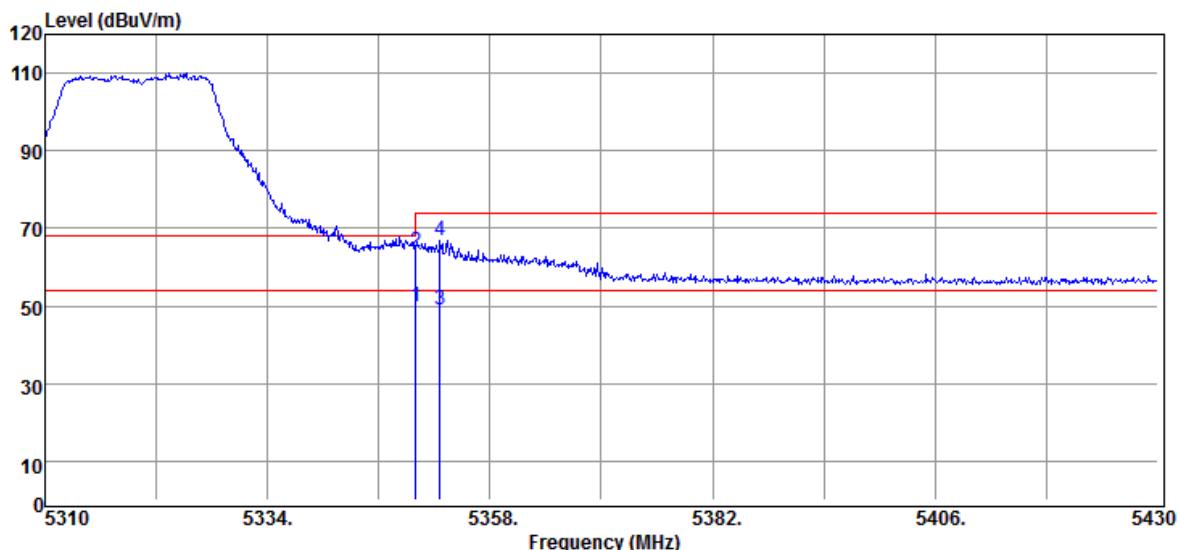
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Operation Mode :802.11a/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5320 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



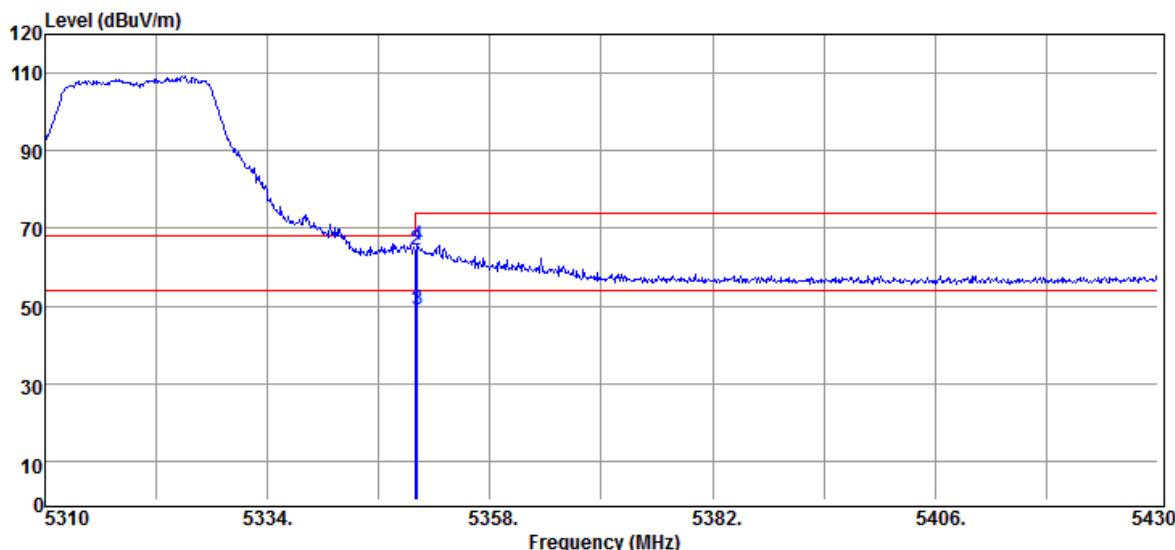
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	dB
5350.00	Average	35.85	14.16	50.01	54.00	-3.99
5350.00	Peak	49.91	14.16	64.07	74.00	-9.93
5352.60	Average	35.02	14.17	49.19	54.00	-4.81
5352.60	Peak	52.71	14.17	66.88	74.00	-7.12

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Operation Mode :802.11a/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5320 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	34.91	14.16	49.07	54.00	-4.93
5350.00	Peak	50.20	14.16	64.36	74.00	-9.64
5350.20	Average	34.87	14.17	49.04	54.00	-4.96
5350.20	Peak	51.53	14.17	65.70	74.00	-8.30

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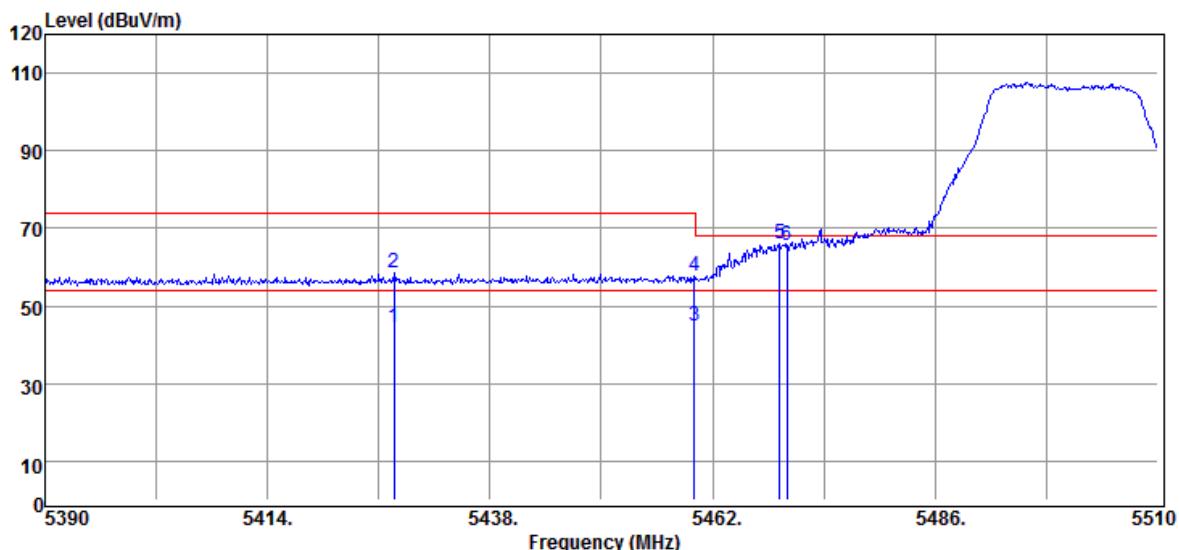
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Operation Mode :802.11a/Band 3  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5500 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Factor dB	Actual FS dB $\mu$ V/m
5427.68	Average	30.12	14.29	44.41	54.00	-9.59
5427.68	Peak	44.06	14.29	58.35	74.00	-15.65
5460.00	Average	30.47	14.31	44.78	54.00	-9.22
5460.00	Peak	43.42	14.31	57.73	74.00	-16.27
5469.20	Peak	51.84	14.31	66.15	68.20	-2.05
5470.00	Peak	51.42	14.31	65.73	68.20	-2.47

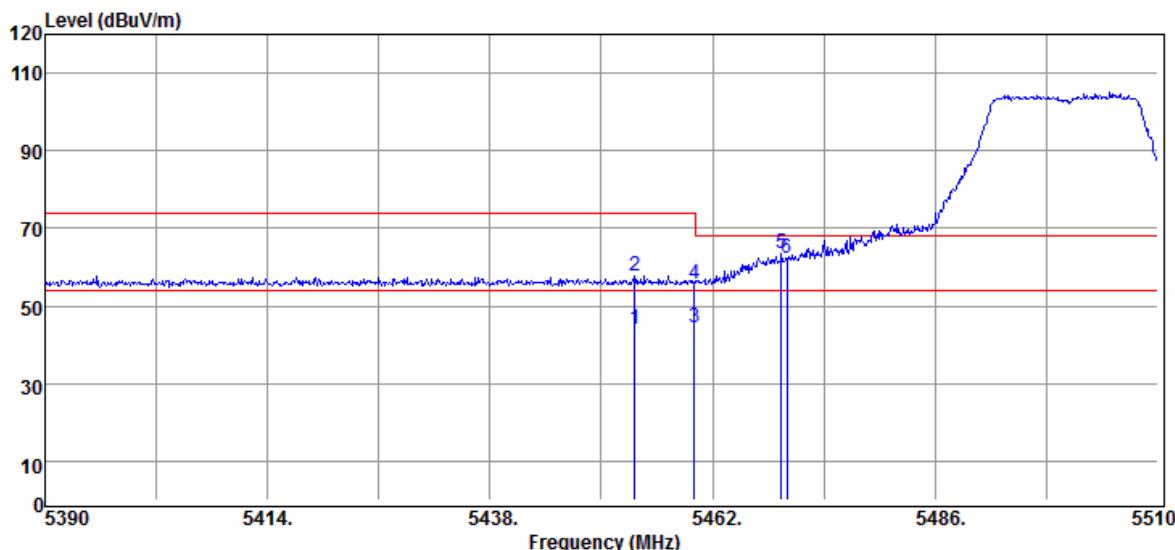
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Operation Mode :802.11a/Band 3  
 Test Mode :BE CH LOW  
 EUT Pol :H Plan  
 Test Channel :5500 MHz

Test Date :2018-07-17  
 Temp./Humi. :24/63  
 Antenna Pol. :HORIZONTAL  
 Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Factor dB	Actual FS dB $\mu$ V/m
5453.60	Average	29.71	14.31	44.02	54.00	-9.98
5453.60	Peak	43.40	14.31	57.71	74.00	-16.29
5460.00	Average	30.01	14.31	44.32	54.00	-9.68
5460.00	Peak	41.48	14.31	55.79	74.00	-18.21
5469.44	Peak	49.18	14.31	63.49	68.20	-4.71
5470.00	Peak	48.11	14.31	62.42	68.20	-5.78

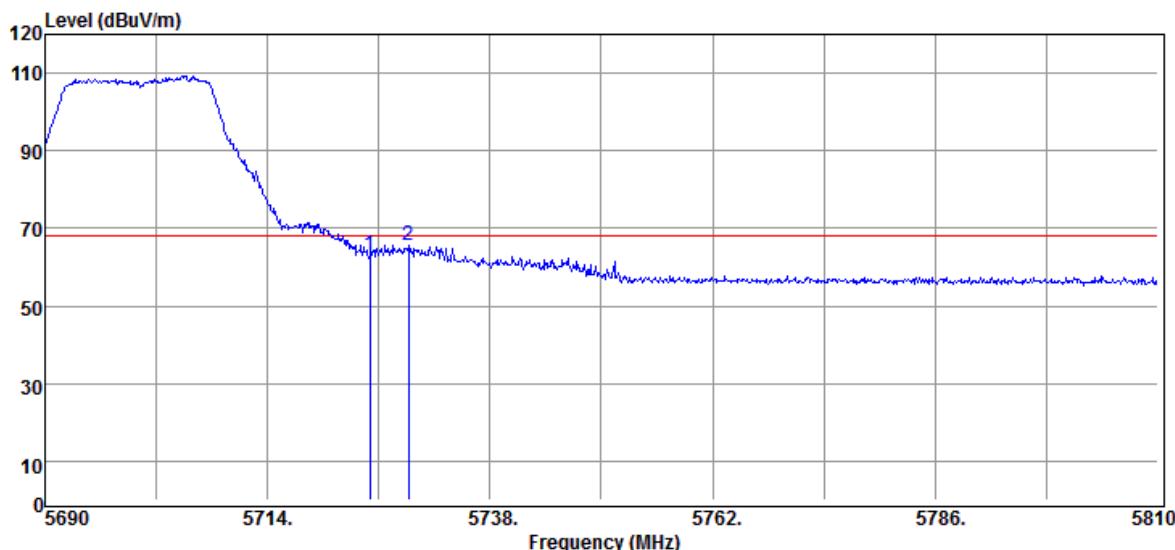
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Operation Mode :802.11a/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5700 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



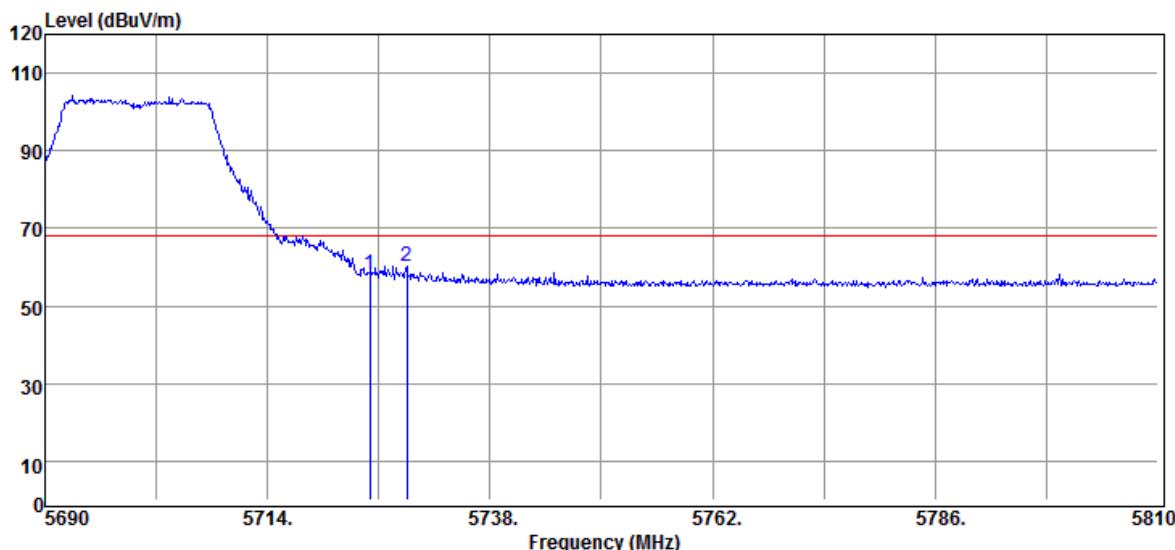
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.42	14.50	62.92	68.20	-5.28
5729.24	Peak	51.27	14.50	65.77	68.20	-2.43

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Operation Mode :802.11a/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5700 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	dB
5725.00	Peak	43.70	14.50	58.20	68.20	-10.00
5729.00	Peak	45.81	14.50	60.31	68.20	-7.89

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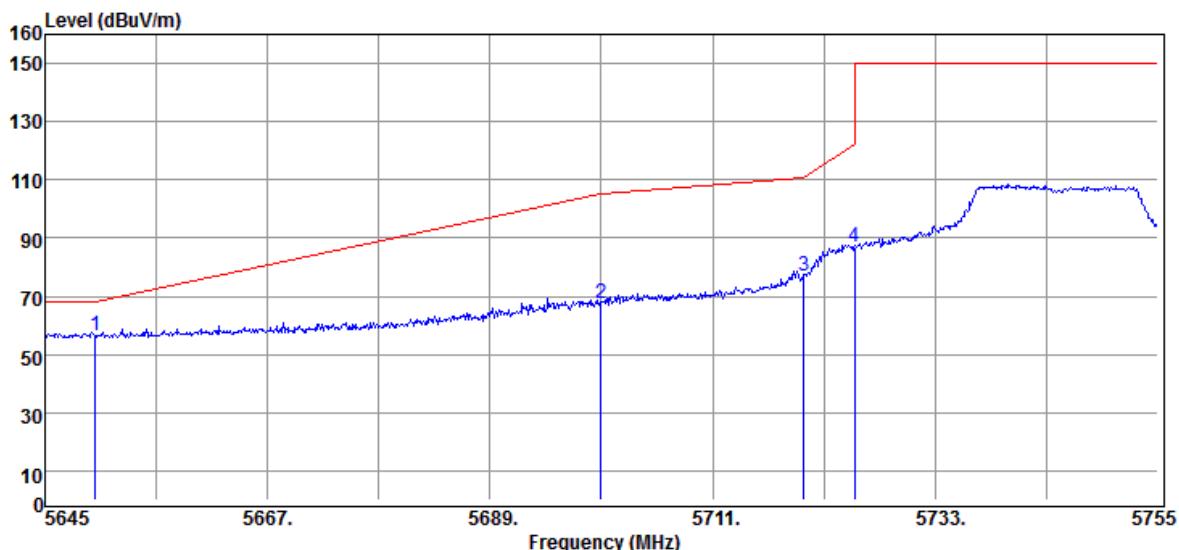
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Operation Mode :802.11a/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5745 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



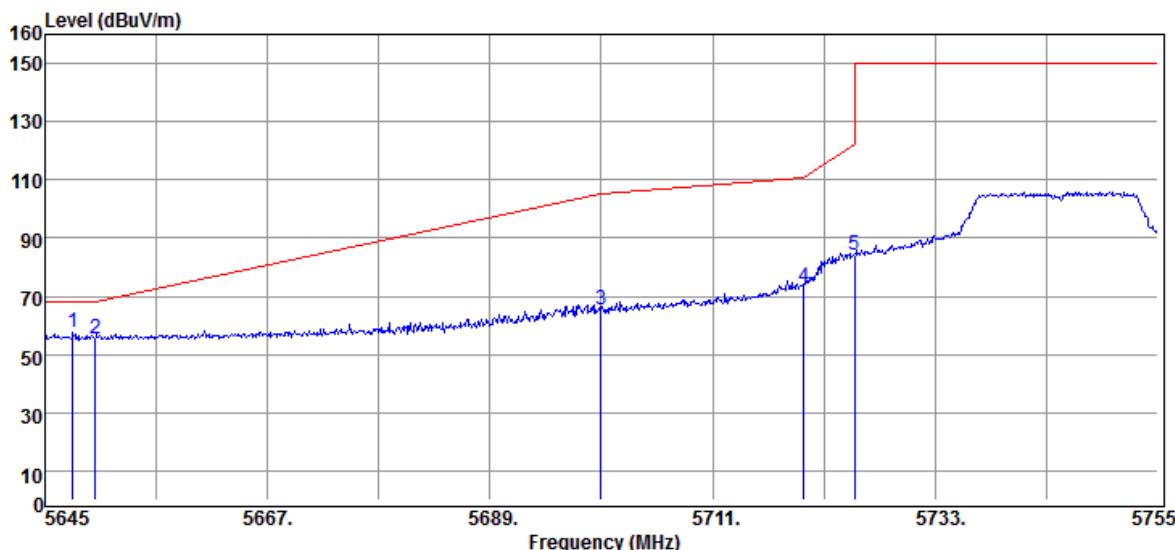
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	42.06	14.42	56.48	68.20	-11.72
5700.00	Peak	53.30	14.47	67.77	105.20	-37.43
5720.00	Peak	62.24	14.49	76.73	110.80	-34.07
5725.00	Peak	72.30	14.50	86.80	122.20	-35.40

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Operation Mode :802.11a/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5745 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5647.75	Peak	43.10	14.41	57.51	68.20	-10.69
5650.00	Peak	40.98	14.42	55.40	68.20	-12.80
5700.00	Peak	51.00	14.47	65.47	105.20	-39.73
5720.00	Peak	58.49	14.49	72.98	110.80	-37.82
5725.00	Peak	69.80	14.50	84.30	122.20	-37.90

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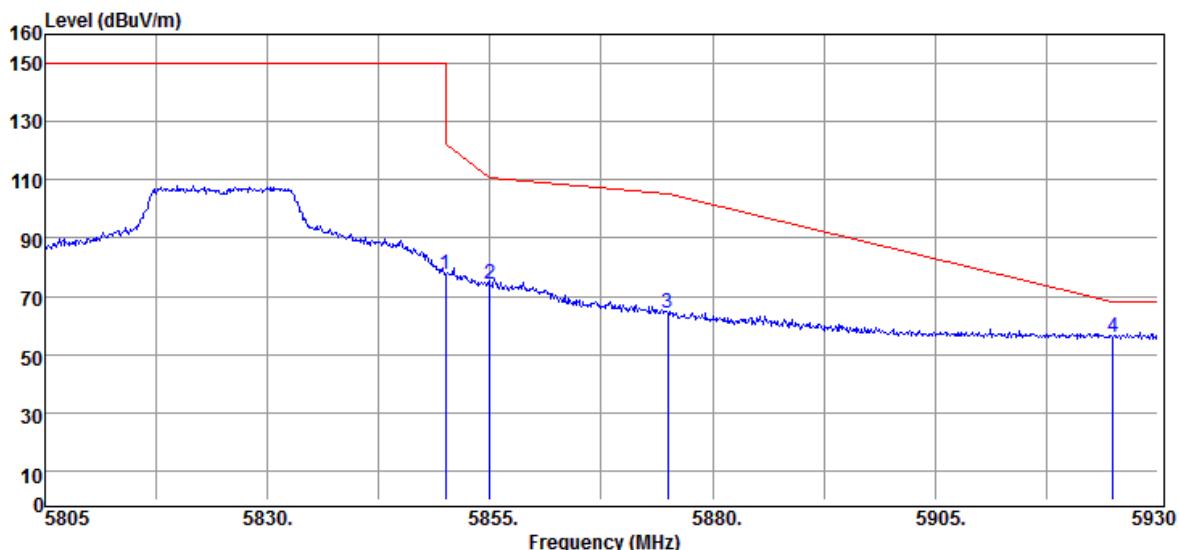
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Operation Mode :802.11a/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5825 MHz

Test Date :2018-07-17  
 Temp./Humi. :24/63  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



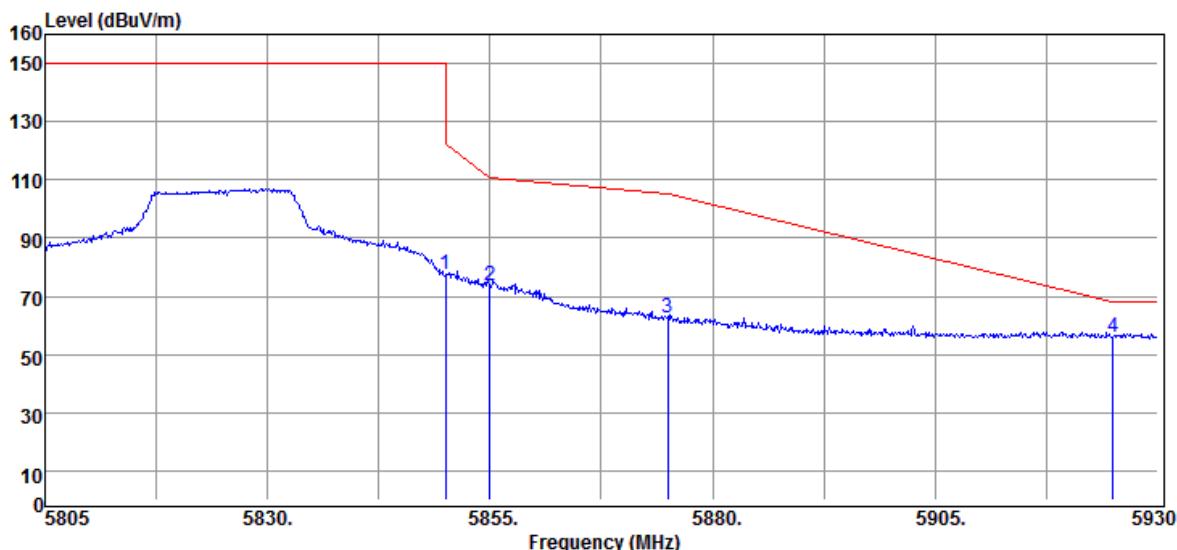
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	62.89	14.72	77.61	122.20	-44.59
5855.00	Peak	59.50	14.73	74.23	110.80	-36.57
5875.00	Peak	49.54	14.78	64.32	105.20	-40.88
5925.00	Peak	41.08	14.91	55.99	68.20	-12.21

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Operation Mode	:802.11a/Band 4	Test Date	:2018-07-17
Test Mode	:BE CH HIGH	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5825 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual	Limit @3m	Margin
				FS dB $\mu$ V/m	dB $\mu$ V/m	dB
5850.00	Peak	62.63	14.72	77.35	122.20	-44.85
5855.00	Peak	59.08	14.73	73.81	110.80	-36.99
5875.00	Peak	47.69	14.78	62.47	105.20	-42.73
5925.00	Peak	40.76	14.91	55.67	68.20	-12.53

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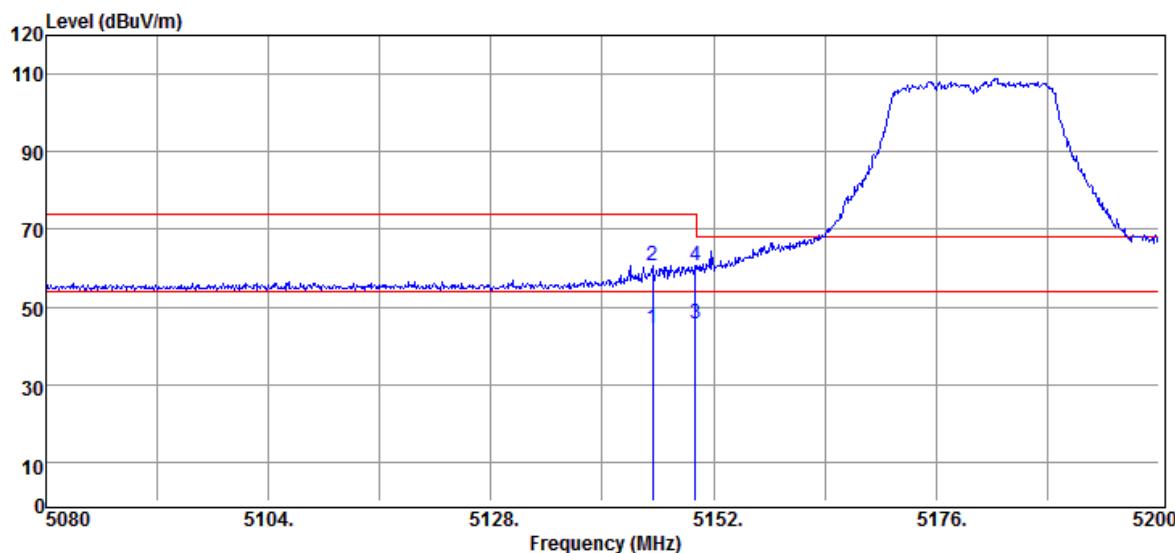
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**Band edge falling to restricted band****802.11n\_HT20 mode**

Operation Mode	:802.11n20/Band 1	Test Date	:2018-07-17
Test Mode	:BE CH LOW	Temp./Humi.	:24/63
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
	PK/QP/AV					
5145.40	Average	30.74	13.63	44.37	54.00	-9.63
5145.40	Peak	47.19	13.63	60.82	74.00	-13.18
5150.00	Average	32.16	13.65	45.81	54.00	-8.19
5150.00	Peak	46.95	13.65	60.60	74.00	-13.40

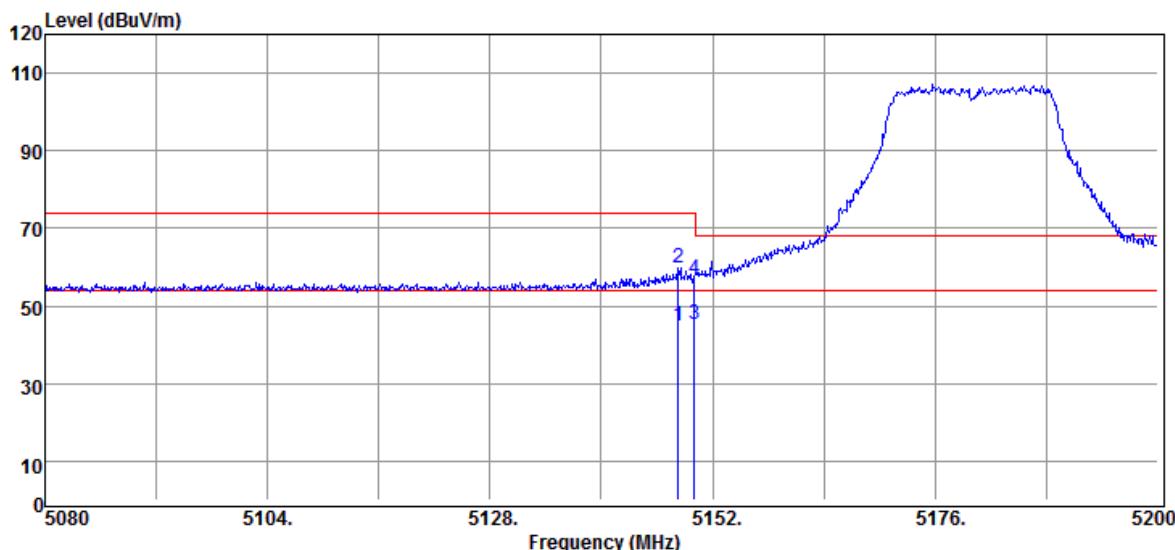
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Operation Mode :802.11n20/Band 1  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5180 MHz

Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
5148.28	Average	31.40	13.63	45.03	54.00	-8.97
5148.28	Peak	46.32	13.63	59.95	74.00	-14.05
5150.00	Average	31.70	13.65	45.35	54.00	-8.65
5150.00	Peak	43.18	13.65	56.83	74.00	-17.17

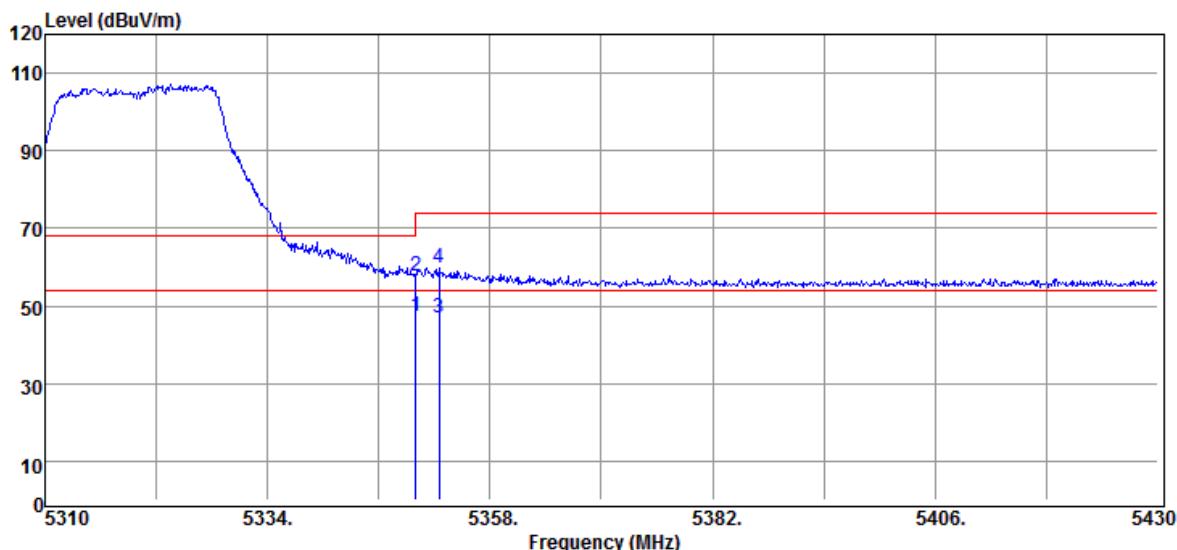
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Operation Mode :802.11n20/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5320 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	32.99	14.16	47.15	54.00	-6.85
5350.00	Peak	43.73	14.16	57.89	74.00	-16.11
5352.48	Average	32.77	14.17	46.94	54.00	-7.06
5352.48	Peak	45.69	14.17	59.86	74.00	-14.14

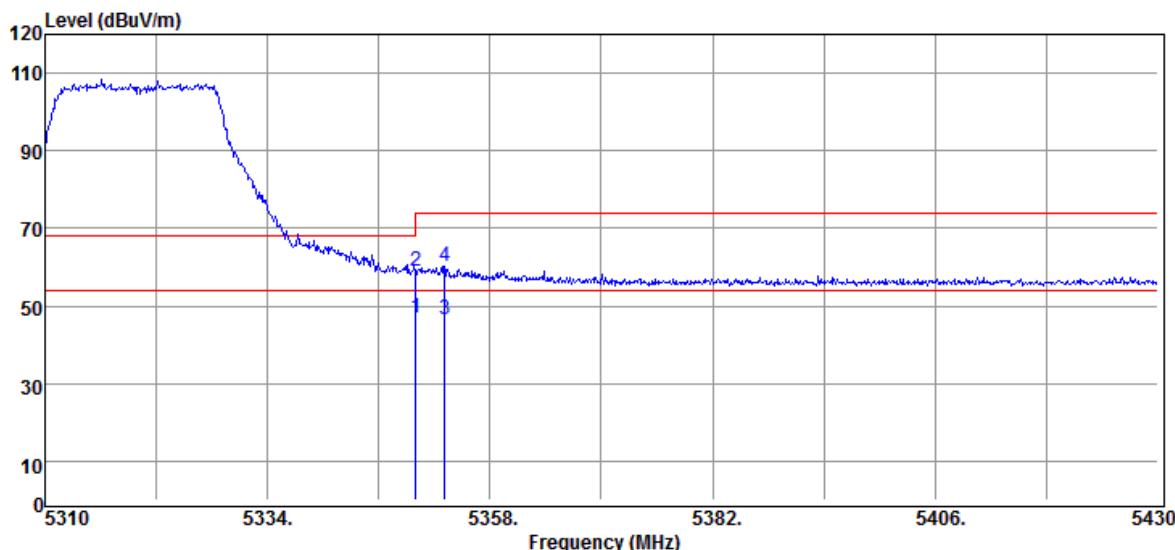
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Operation Mode :802.11n20/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5320 MHz

Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual	Limit @3m	Margin
				FS dB $\mu$ V/m	dB $\mu$ V/m	dB
5350.00	Average	32.68	14.16	46.84	54.00	-7.16
5350.00	Peak	44.87	14.16	59.03	74.00	-14.97
5353.08	Average	32.24	14.17	46.41	54.00	-7.59
5353.08	Peak	46.20	14.17	60.37	74.00	-13.63

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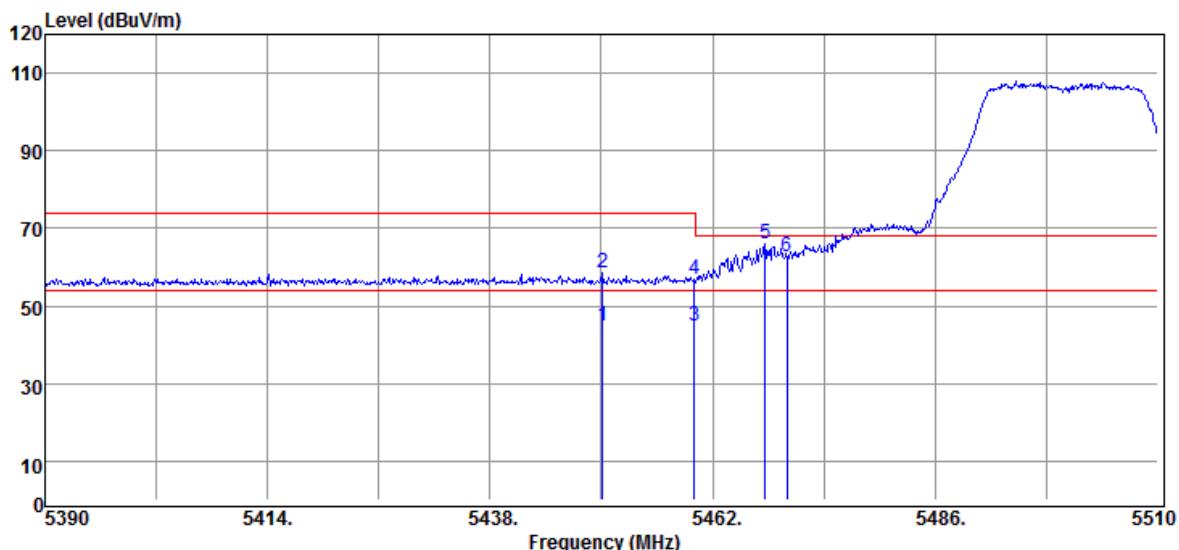
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Operation Mode :802.11n20/Band 3  
 Test Mode :BE CH LOW  
 EUT Pol :H Plan  
 Test Channel :5500 MHz

Test Date :2018-07-17  
 Temp./Humi. :24/63  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
MHz	PK/QP/AV					
5450.12	Average	30.37	14.30	44.67	54.00	-9.33
5450.12	Peak	44.05	14.30	58.35	74.00	-15.65
5460.00	Average	30.54	14.31	44.85	54.00	-9.15
5460.00	Peak	42.72	14.31	57.03	74.00	-16.97
5467.64	Peak	51.56	14.32	65.88	68.20	-2.32
5470.00	Peak	48.19	14.31	62.50	68.20	-5.70

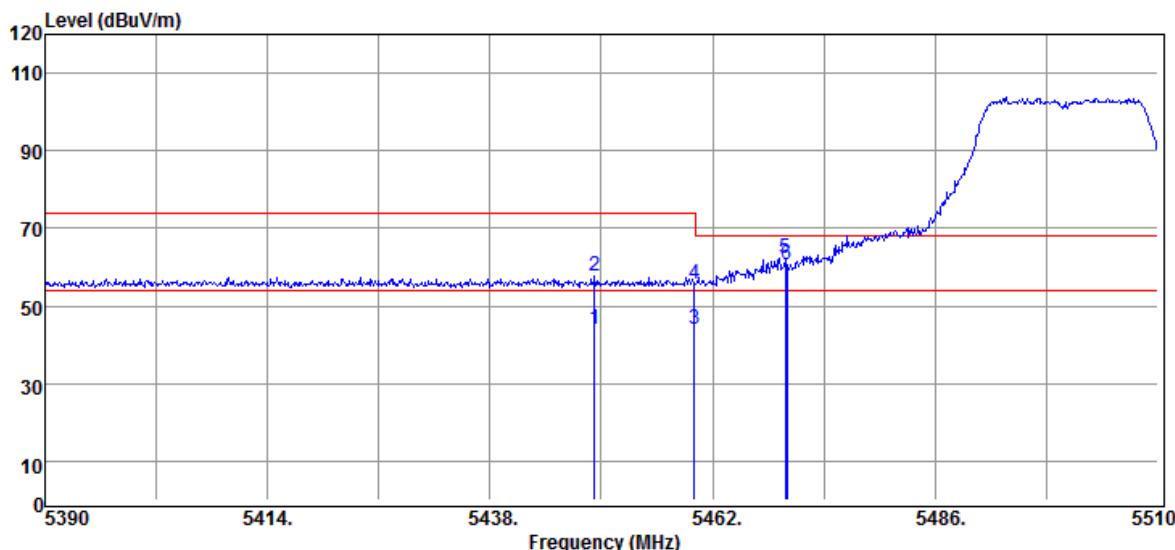
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Operation Mode :802.11n20/Band 3  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5500 MHz

Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5449.28	Average	29.71	14.31	44.02	54.00	-9.98
5449.28	Peak	43.22	14.31	57.53	74.00	-16.47
5460.00	Average	29.85	14.31	44.16	54.00	-9.84
5460.00	Peak	41.27	14.31	55.58	74.00	-18.42
5469.80	Peak	48.04	14.31	62.35	68.20	-5.85
5470.00	Peak	46.19	14.31	60.50	68.20	-7.70

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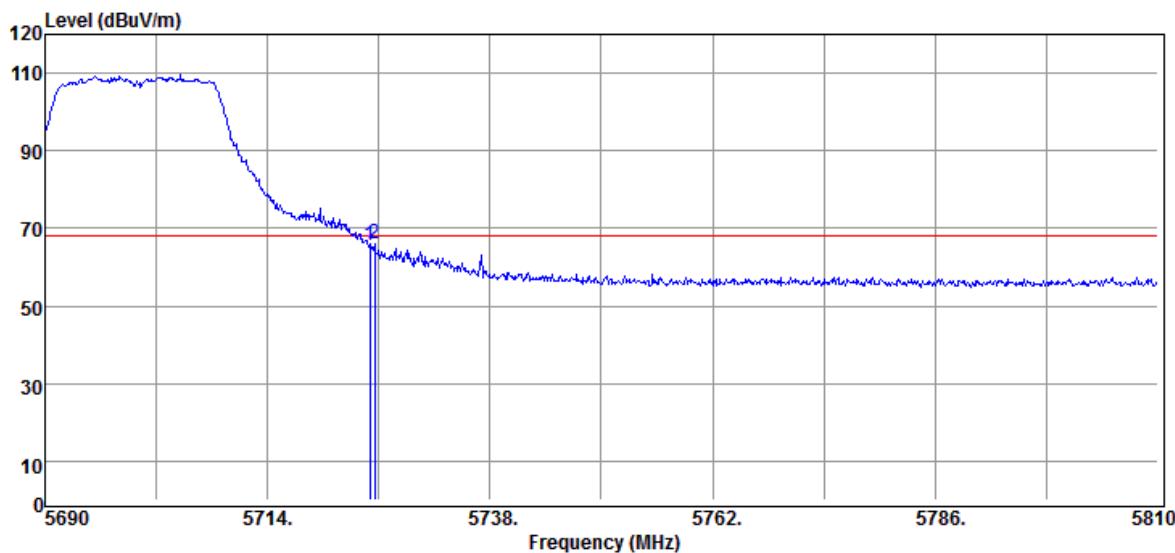
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Operation Mode :802.11n20/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5700 MHz

Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	51.29	14.50	65.79	68.20	-2.41
5725.52	Peak	51.48	14.50	65.98	68.20	-2.22

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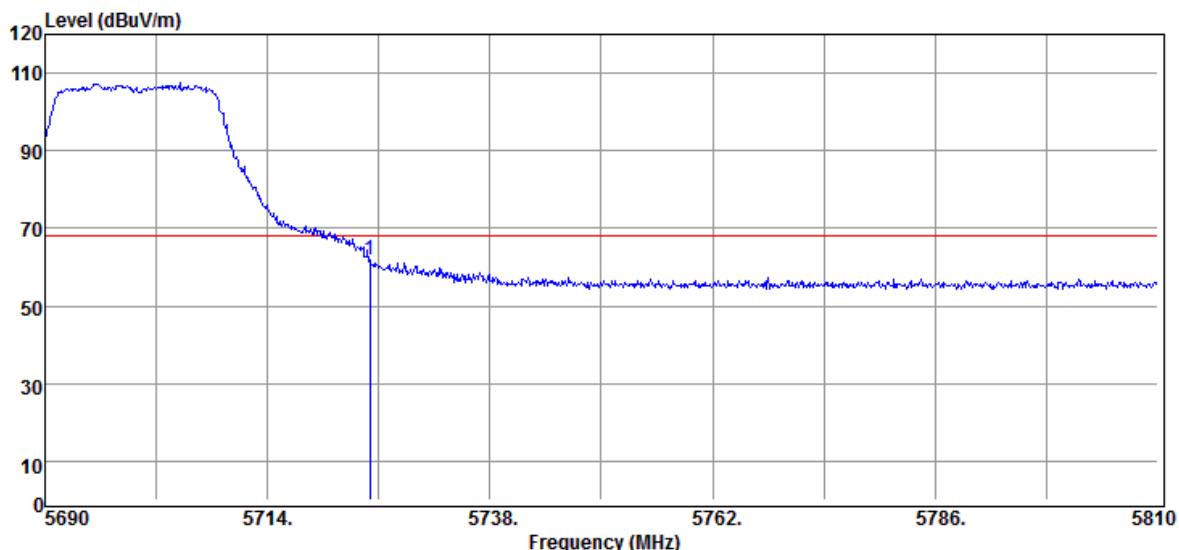
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Operation Mode :802.11n20/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5700 MHz  
Test Date :2018-07-17  
Temp./Humi. :24/63  
Antenna Pol. :VERTICAL  
Engineer :Ashton



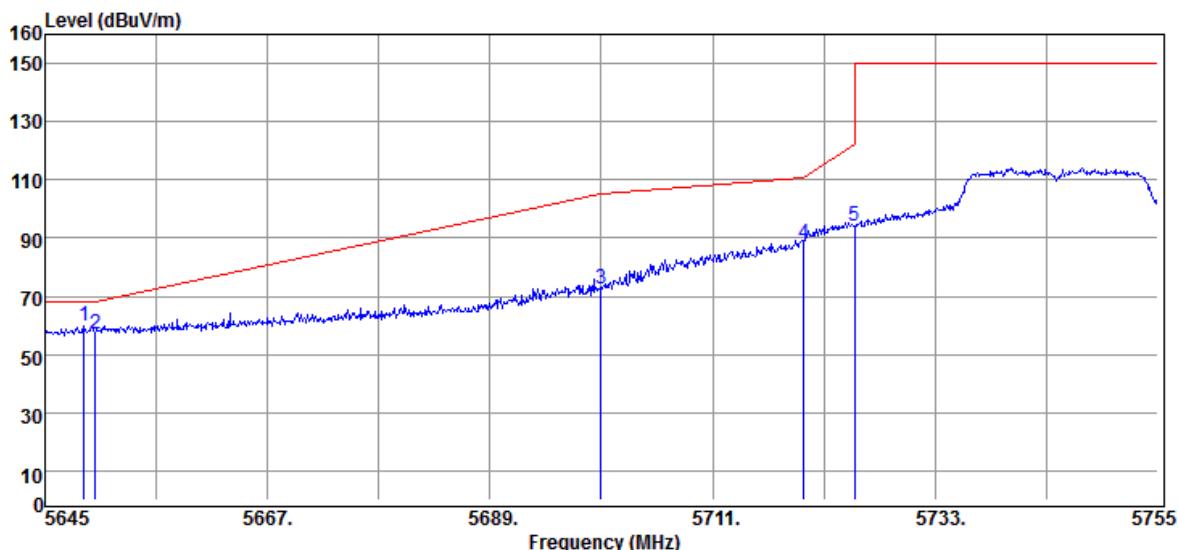
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	47.26	14.50	61.76	68.20	-6.44

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Operation Mode :802.11n20/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5745 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/70  
Antenna Pol. :VERTICAL  
Engineer :Ashton



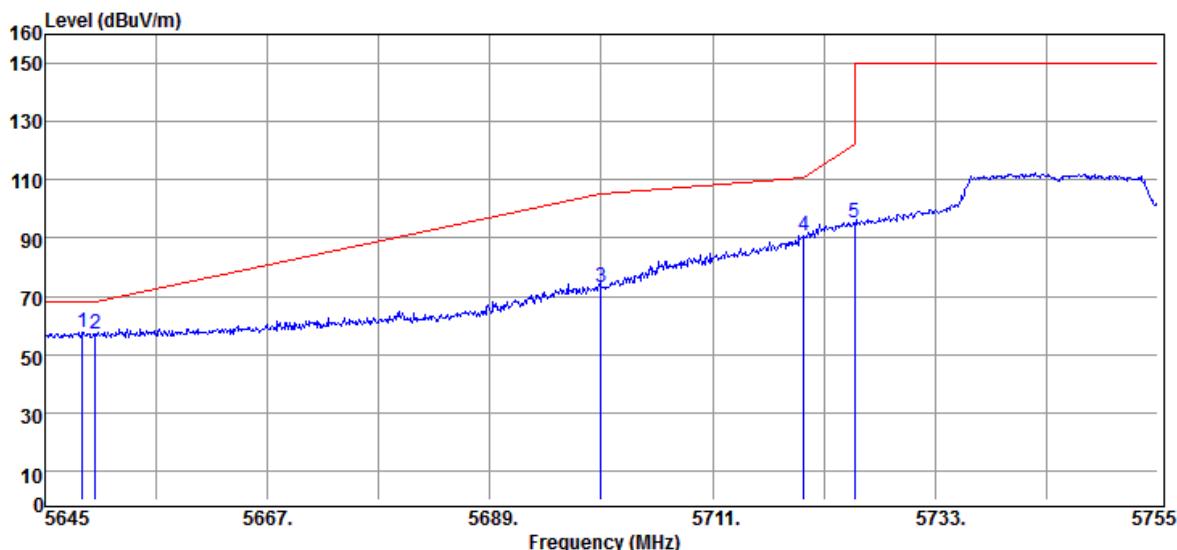
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5648.85	Peak	45.36	14.41	59.77	68.20	-8.43
5650.00	Peak	42.51	14.42	56.93	68.20	-11.27
5700.00	Peak	57.81	14.47	72.28	105.20	-32.92
5720.00	Peak	73.69	14.49	88.18	110.80	-22.62
5725.00	Peak	79.48	14.50	93.98	122.20	-28.22

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Operation Mode	:802.11n20/Band 4	Test Date	:2018-07-18
Test Mode	:BE CH LOW	Temp./Humi.	:24/70
EUT Pol	:H Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5745 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Factor dB	Limit @3m dB $\mu$ V/m
5648.74	Peak	43.30	14.41	57.71	68.20	-10.49
5650.00	Peak	42.46	14.42	56.88	68.20	-11.32
5700.00	Peak	58.58	14.47	73.05	105.20	-32.15
5720.00	Peak	76.35	14.49	90.84	110.80	-19.96
5725.00	Peak	80.76	14.50	95.26	122.20	-26.94

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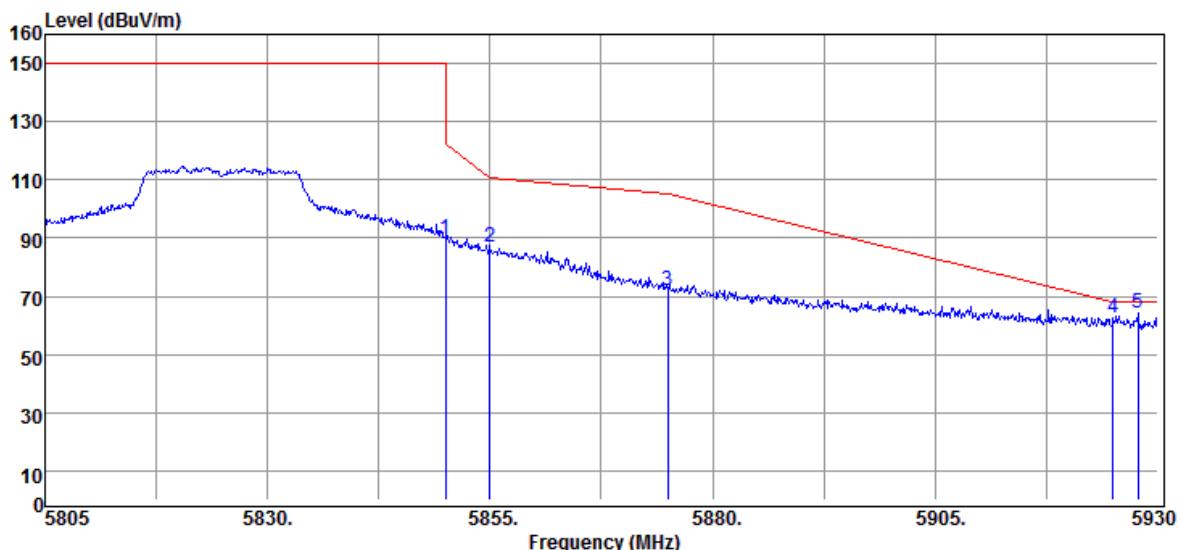
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Operation Mode :802.11n20/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5825 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/70  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					5850.00	5855.00
5850.00	Peak	74.73	14.72	89.45	122.20	-32.75
5855.00	Peak	72.10	14.73	86.83	110.80	-23.97
5875.00	Peak	56.94	14.78	71.72	105.20	-33.48
5925.00	Peak	47.43	14.91	62.34	68.20	-5.86
5927.75	Peak	49.48	14.92	64.40	68.20	-3.80

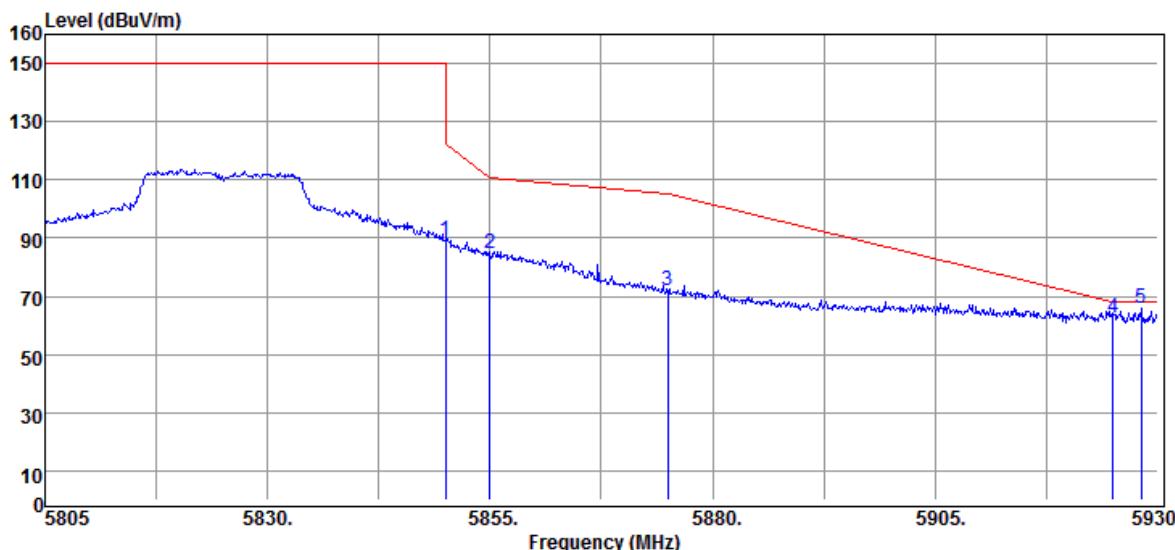
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Operation Mode :802.11n20/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5825 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/70  
 Antenna Pol. :HORIZONTAL  
 Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Margin dB	
5850.00	Peak	74.38	14.72	89.10	122.20	-33.10
5855.00	Peak	69.95	14.73	84.68	110.80	-26.12
5875.00	Peak	57.01	14.78	71.79	105.20	-33.41
5925.00	Peak	47.51	14.91	62.42	68.20	-5.78
5928.13	Peak	50.69	14.93	65.62	68.20	-2.58

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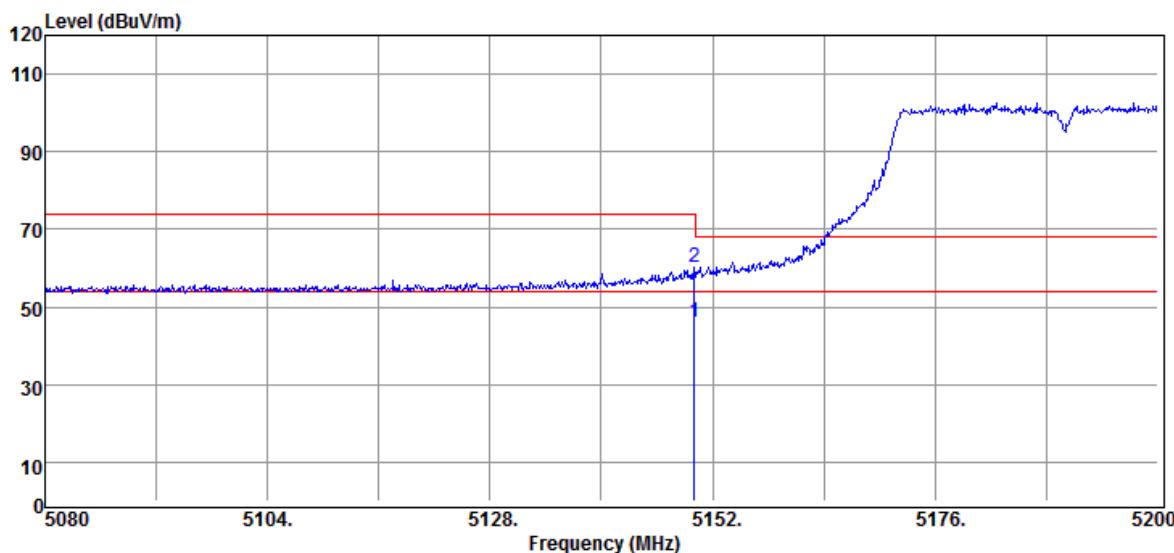
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**Band edge falling to restricted band****802.11n\_HT40 mode**

Operation Mode	:802.11n40/Band 1	Test Date	:2018-07-18
Test Mode	:BE CH LOW	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5190 MHz	Engineer	:Ashton



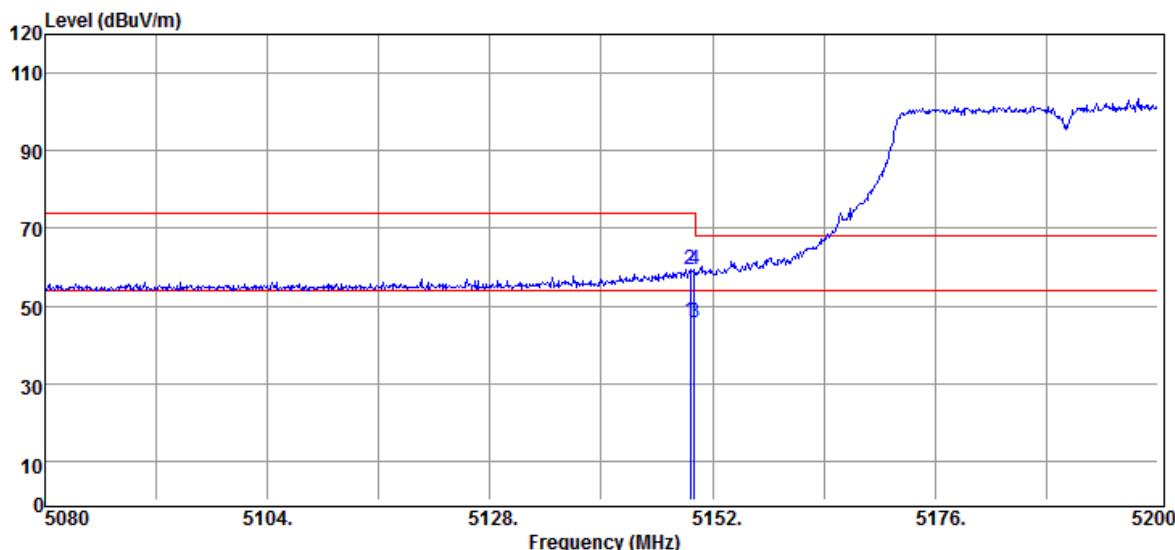
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	32.31	13.65	45.96	54.00	-8.04
5150.00	Peak	46.64	13.65	60.29	74.00	-13.71

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Operation Mode :802.11n40/Band 1  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5190 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5149.60	Average	32.36	13.64	46.00	54.00	-8.00
5149.60	Peak	45.78	13.64	59.42	74.00	-14.58
5150.00	Average	32.17	13.65	45.82	54.00	-8.18
5150.00	Peak	45.70	13.65	59.35	74.00	-14.65

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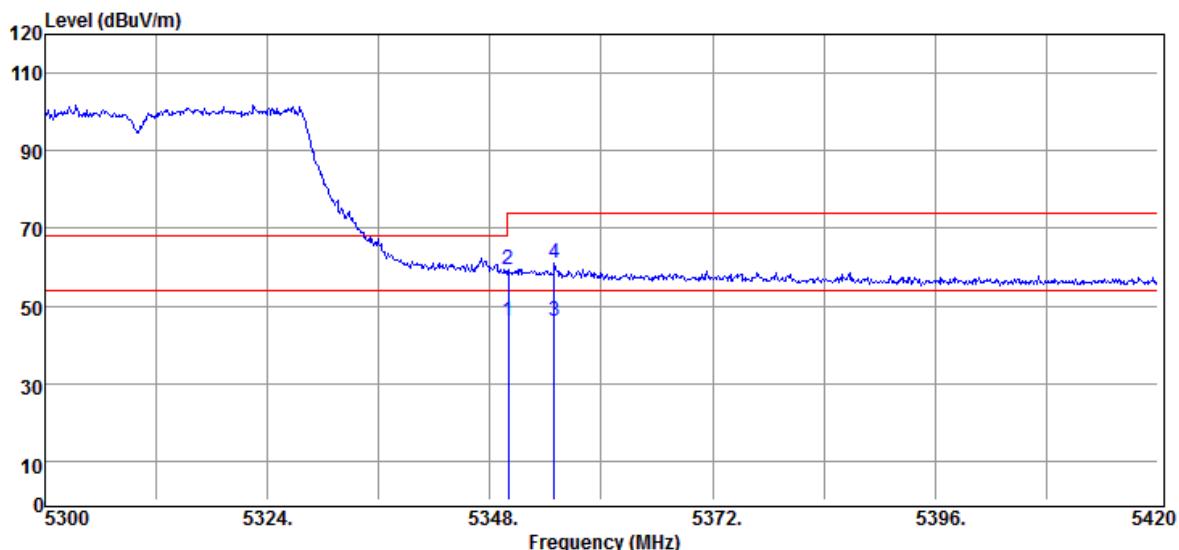
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Operation Mode :802.11n40/Band 2  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5310 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
MHz	PK/QP/AV					
5350.00	Average	31.97	14.16	46.13	54.00	-7.87
5350.00	Peak	45.42	14.16	59.58	74.00	-14.42
5354.96	Average	31.70	14.18	45.88	54.00	-8.12
5354.96	Peak	46.72	14.18	60.90	74.00	-13.10

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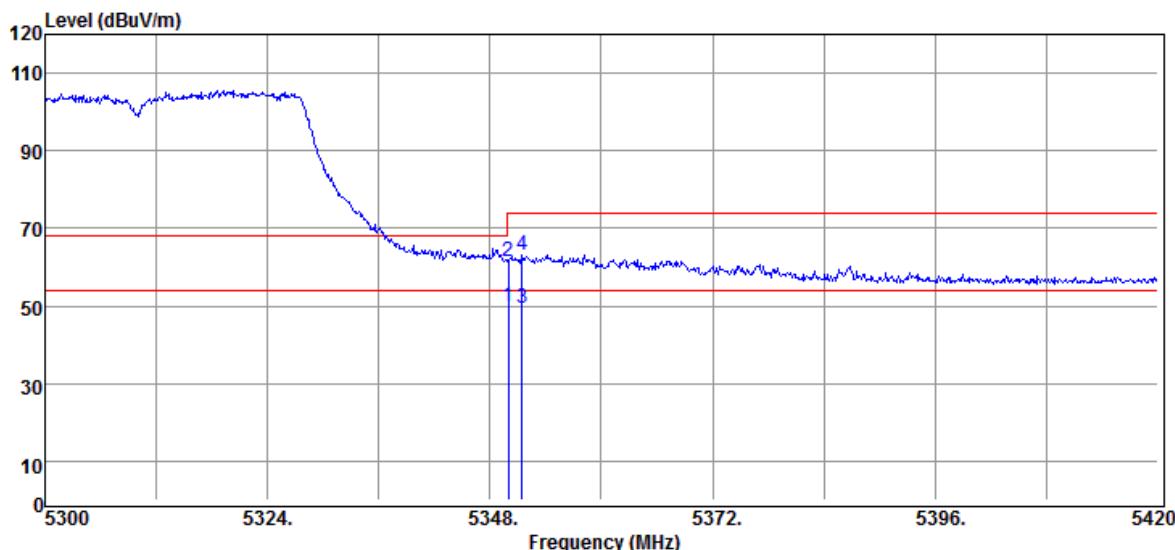
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Operation Mode :802.11n40/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5310 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
5350.00	Average	35.84	14.16	50.00	54.00	-4.00
5350.00	Peak	47.24	14.16	61.40	74.00	-12.60
5351.48	Average	35.42	14.17	49.59	54.00	-4.41
5351.48	Peak	49.03	14.17	63.20	74.00	-10.80

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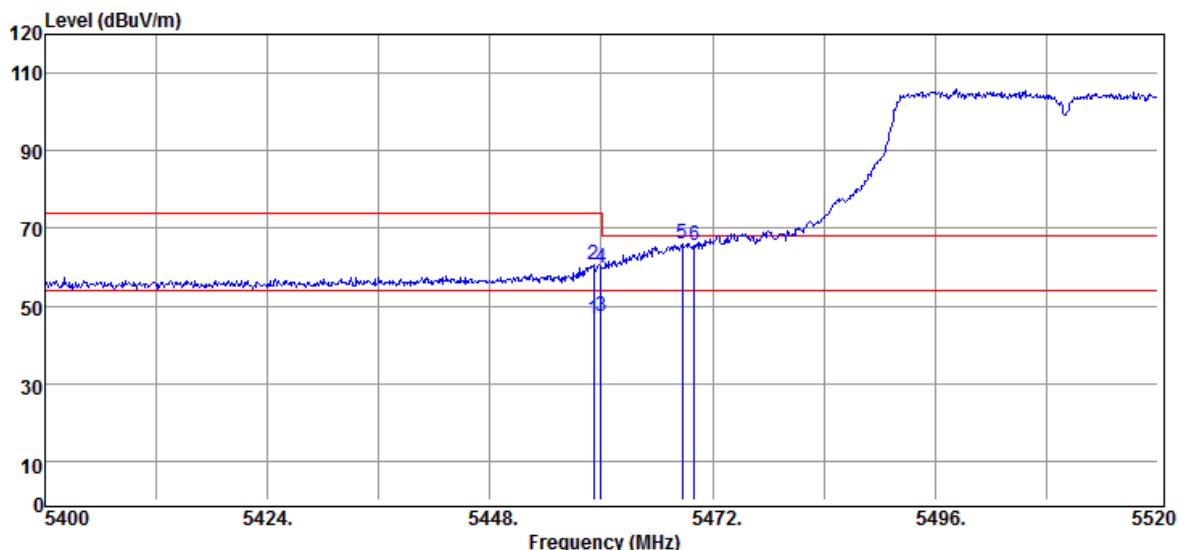
f (886-2) 2298-0488

[www.tw.sgs.com](http://www.tw.sgs.com)

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Operation Mode :802.11n40/Band 3  
 Test Mode :BE CH LOW  
 EUT Pol :H Plan  
 Test Channel :5510 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
5459.16	Average	32.31	14.31	46.62	54.00	-7.38
5459.16	Peak	46.37	14.31	60.68	74.00	-13.32
5460.00	Average	32.97	14.31	47.28	54.00	-6.72
5460.00	Peak	45.38	14.31	59.69	74.00	-14.31
5468.76	Peak	51.82	14.32	66.14	68.20	-2.06
5470.00	Peak	51.11	14.31	65.42	68.20	-2.78

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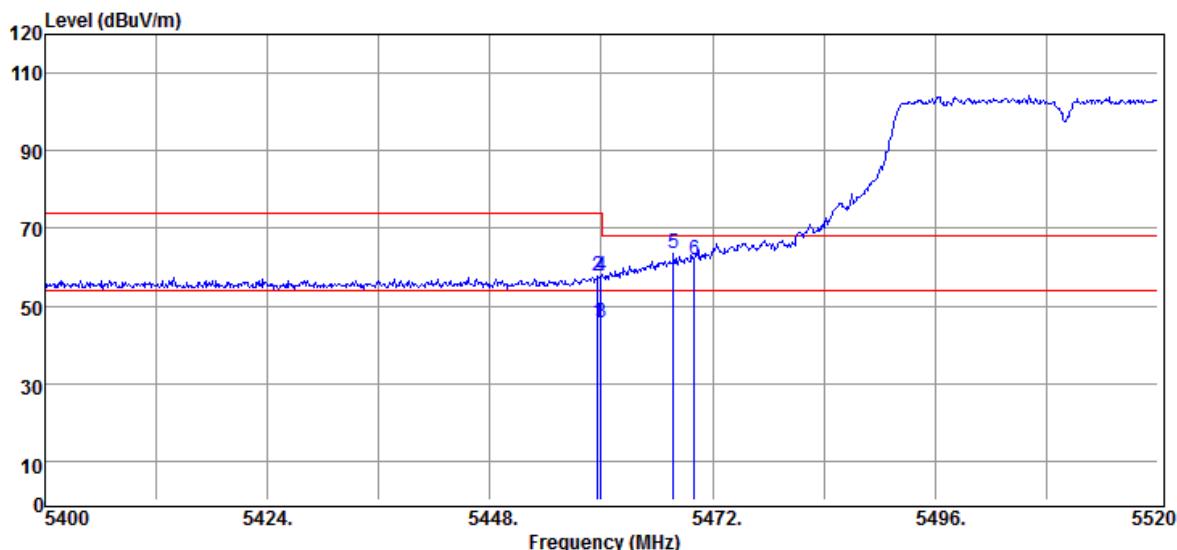
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Operation Mode :802.11n40/Band 3  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5510 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5459.64	Average	31.21	14.31	45.52	54.00	-8.48
5459.64	Peak	43.30	14.31	57.61	74.00	-16.39
5460.00	Average	31.31	14.31	45.62	54.00	-8.38
5460.00	Peak	43.37	14.31	57.68	74.00	-16.32
5467.80	Peak	49.22	14.32	63.54	68.20	-4.66
5470.00	Peak	47.49	14.31	61.80	68.20	-6.40

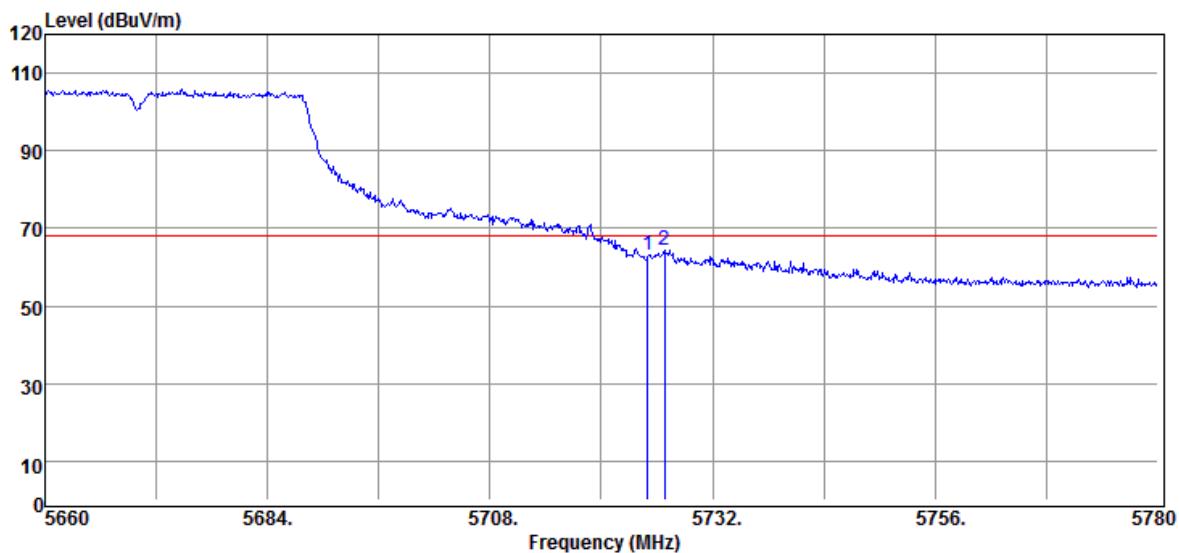
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Operation Mode :802.11n40/Band 3  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5670 MHz  
 Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.55	14.50	63.05	68.20	-5.15
5726.84	Peak	50.00	14.50	64.50	68.20	-3.70

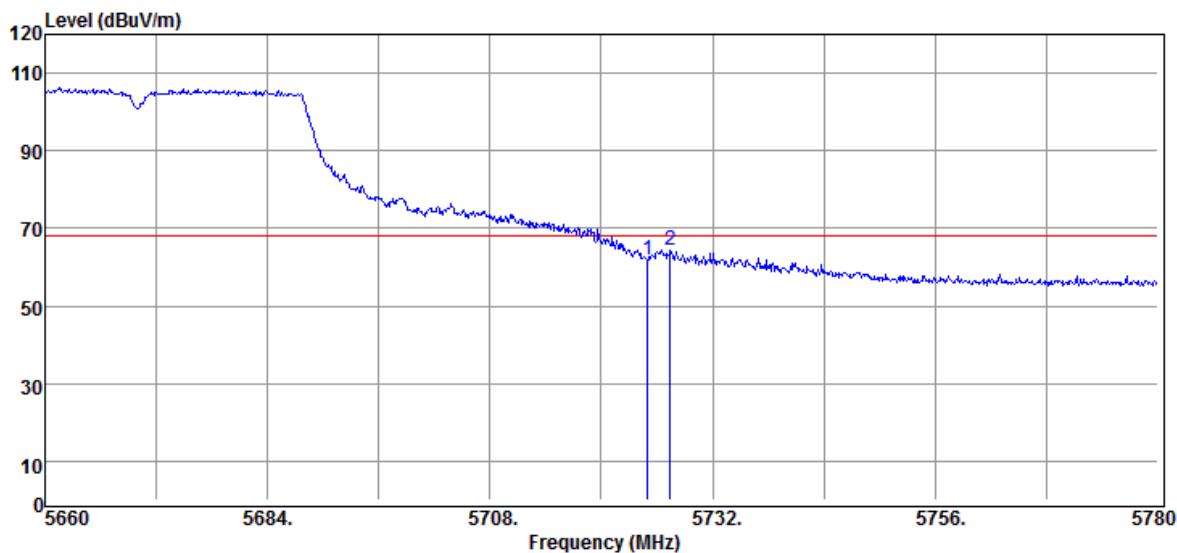
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Operation Mode :802.11n40/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5670 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	47.23	14.50	61.73	68.20	-6.47
5727.44	Peak	49.95	14.50	64.45	68.20	-3.75

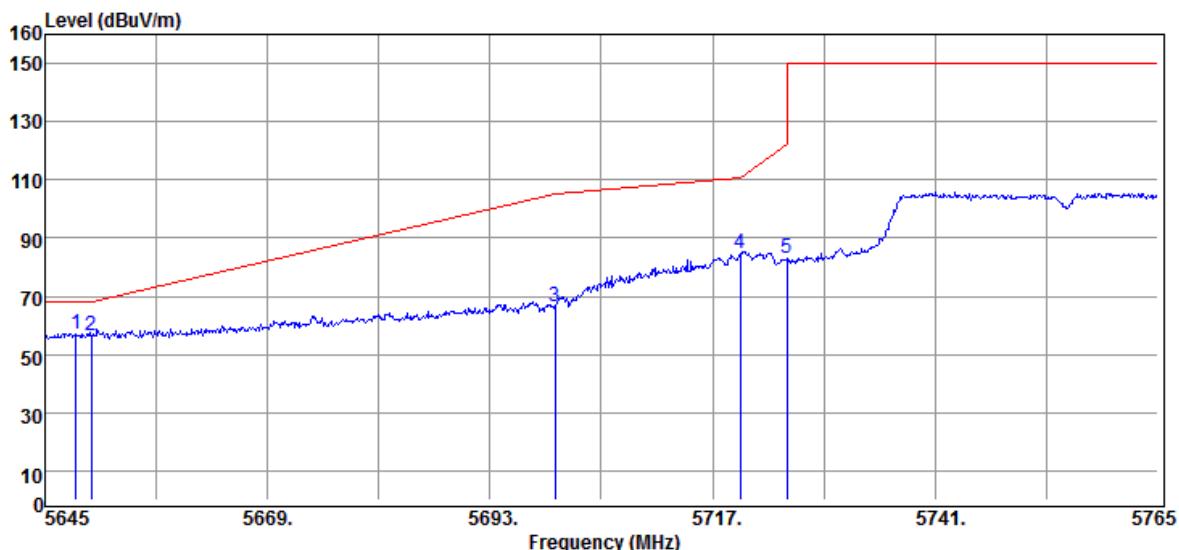
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Operation Mode :802.11n40/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5755 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Factor dB	Actual FS dB $\mu$ V/m
5648.36	Peak	42.87	14.41	57.28	68.20	-10.92
5650.00	Peak	42.01	14.42	56.43	68.20	-11.77
5700.00	Peak	51.93	14.47	66.40	105.20	-38.80
5720.00	Peak	70.08	14.49	84.57	110.80	-26.23
5725.00	Peak	68.78	14.50	83.28	122.20	-38.92

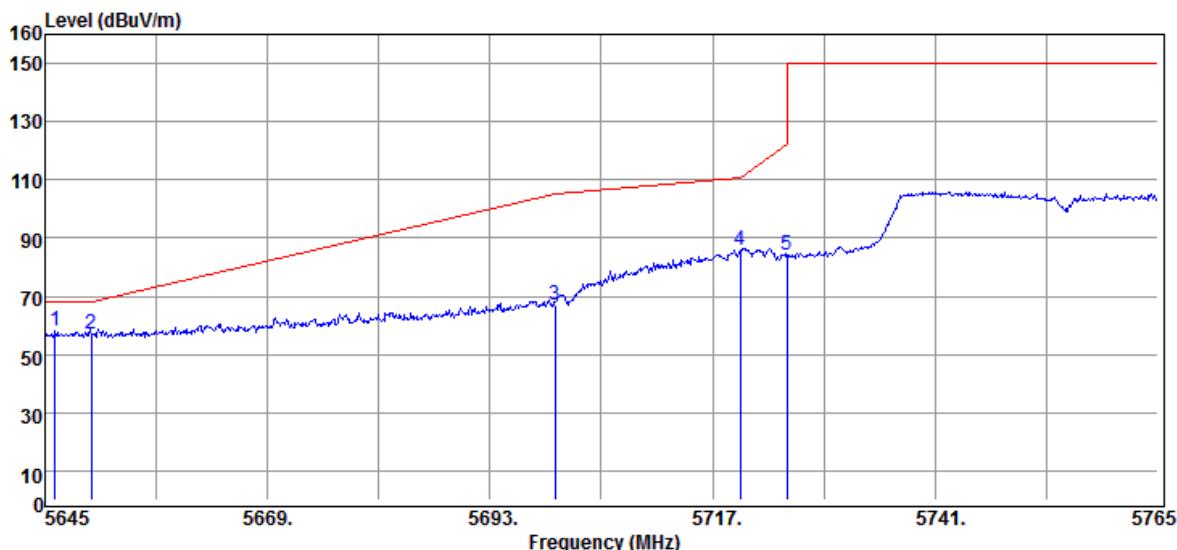
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Operation Mode :802.11n40/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5755 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5646.08	Peak	43.54	14.41	57.95	68.20	-10.25
5650.00	Peak	42.35	14.42	56.77	68.20	-11.43
5700.00	Peak	52.59	14.47	67.06	105.20	-38.14
5720.00	Peak	71.37	14.49	85.86	110.80	-24.94
5725.00	Peak	69.46	14.50	83.96	122.20	-38.24

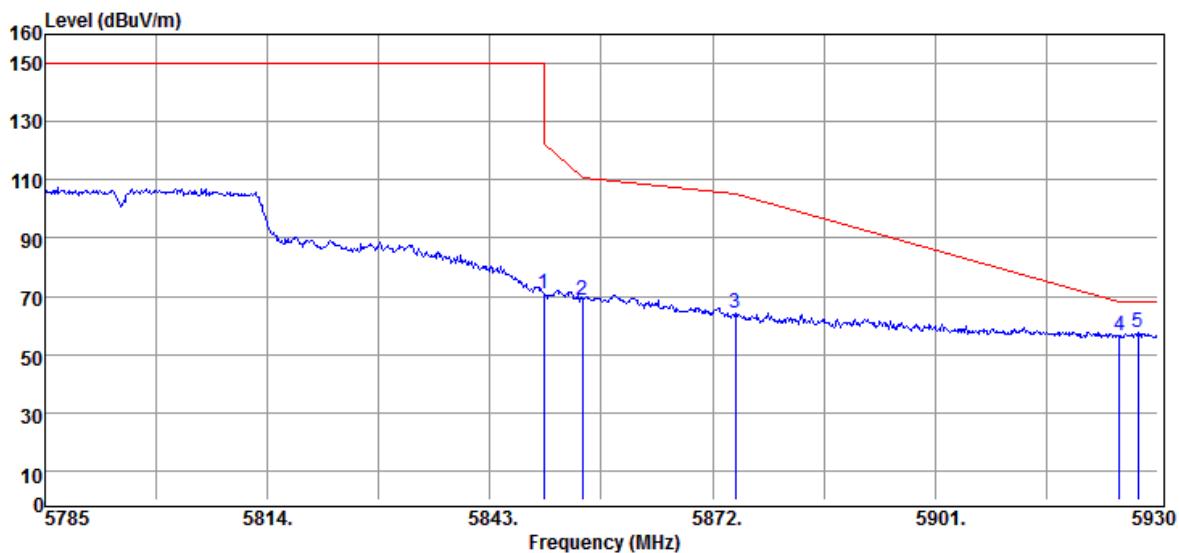
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Operation Mode :802.11n40/Band 4  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5795 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	55.91	14.72	70.63	122.20	-51.57
5855.00	Peak	53.95	14.73	68.68	110.80	-42.12
5875.00	Peak	49.36	14.78	64.14	105.20	-41.06
5925.00	Peak	41.38	14.91	56.29	68.20	-11.91
5927.39	Peak	42.66	14.92	57.58	68.20	-10.62

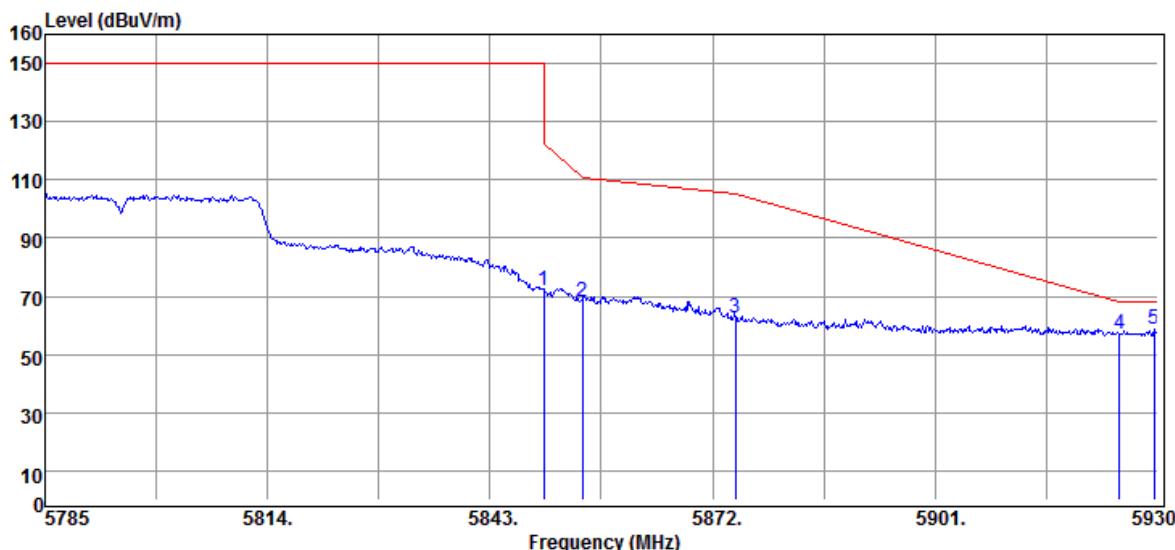
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Operation Mode :802.11n40/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5795 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :HORIZONTAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
MHz	PK/QP/AV					
5850.00	Peak	57.50	14.72	72.22	122.20	-49.98
5855.00	Peak	53.64	14.73	68.37	110.80	-42.43
5875.00	Peak	47.55	14.78	62.33	105.20	-42.87
5925.00	Peak	42.00	14.91	56.91	68.20	-11.29
5929.57	Peak	43.49	14.93	58.42	68.20	-9.78

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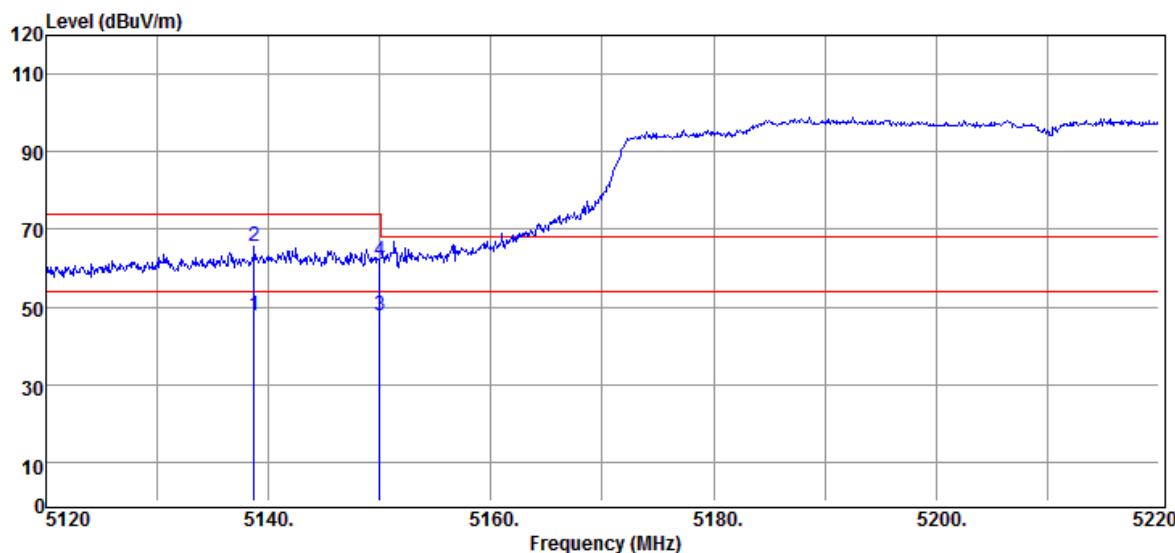
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**Band edge falling to restricted band****802.11ac\_VHT80 mode**

Operation Mode	:802.11ac80/Band 1	Test Date	:2018-07-18
Test Mode	:BE CH LOW	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5210 MHz	Engineer	:Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Margin	
PK/QP/AV						
5138.70	Average	34.26	13.60	47.86	54.00	-6.14
5138.70	Peak	52.01	13.60	65.61	74.00	-8.39
5150.00	Average	34.24	13.65	47.89	54.00	-6.11
5150.00	Peak	48.20	13.65	61.85	74.00	-12.15

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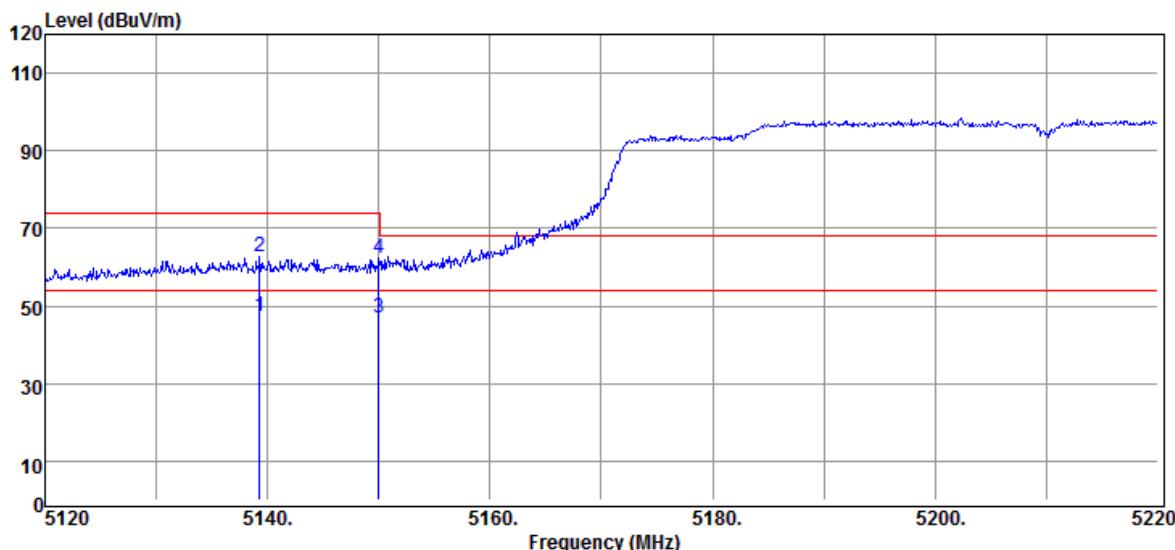
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Operation Mode :802.11ac80/Band 1  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5210 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5139.30	Average	33.79	13.60	47.39	54.00	-6.61
5139.30	Peak	49.03	13.60	62.63	74.00	-11.37
5150.00	Average	33.34	13.65	46.99	54.00	-7.01
5150.00	Peak	48.53	13.65	62.18	74.00	-11.82

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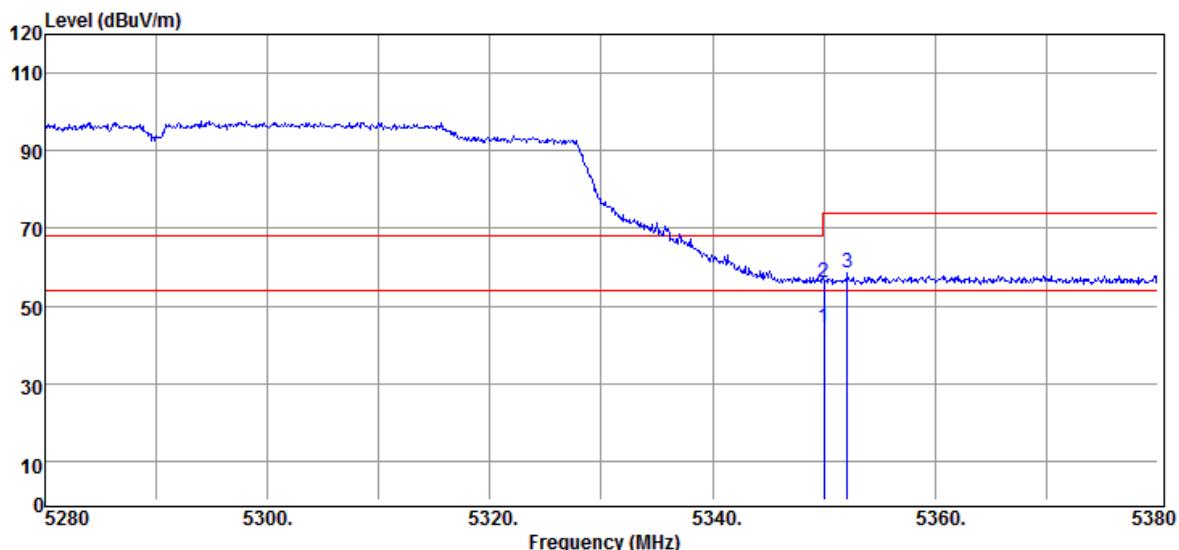
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f (886-2) 2298-0488

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Member of SGS Group

Operation Mode :802.11ac80/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5290 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



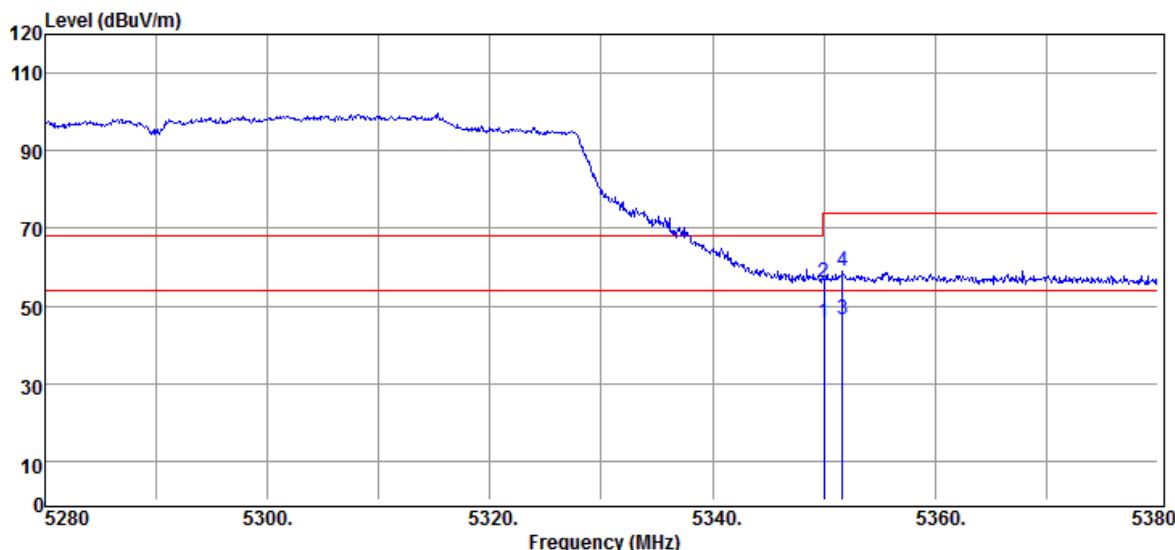
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	30.36	14.16	44.52	54.00	-9.48
5350.00	Peak	41.79	14.16	55.95	74.00	-18.05
5352.10	Peak	44.28	14.17	58.45	74.00	-15.55

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Operation Mode :802.11ac80/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5290 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB $\mu$ V/m	
5350.00	Average	31.68	14.16	45.84	54.00	-8.16
5350.00	Peak	42.06	14.16	56.22	74.00	-17.78
5351.70	Average	32.31	14.17	46.48	54.00	-7.52
5351.70	Peak	44.96	14.17	59.13	74.00	-14.87

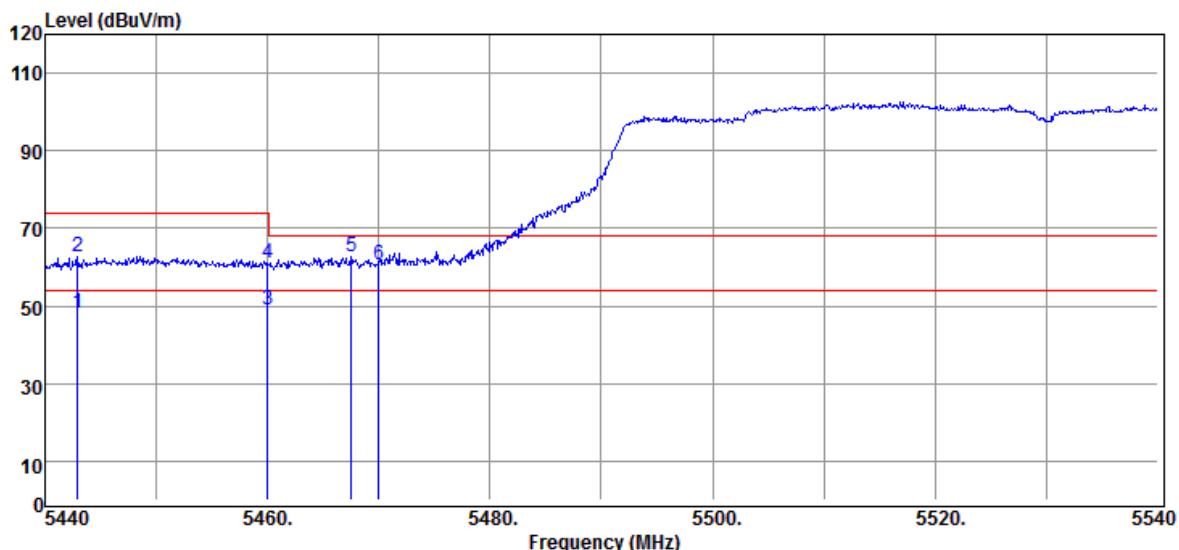
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Operation Mode :802.11ac80/Band 3  
 Test Mode :BE CH LOW  
 EUT Pol :H Plan  
 Test Channel :5530 MHz  
 Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Factor dB	Limit @3m dB $\mu$ V/m
5442.90	Average	34.02	14.30	48.32	54.00	-5.68
5442.90	Peak	48.36	14.30	62.66	74.00	-11.34
5460.00	Average	34.54	14.31	48.85	54.00	-5.15
5460.00	Peak	46.62	14.31	60.93	74.00	-13.07
5467.50	Peak	48.20	14.32	62.52	68.20	-5.68
5470.00	Peak	46.33	14.31	60.64	68.20	-7.56

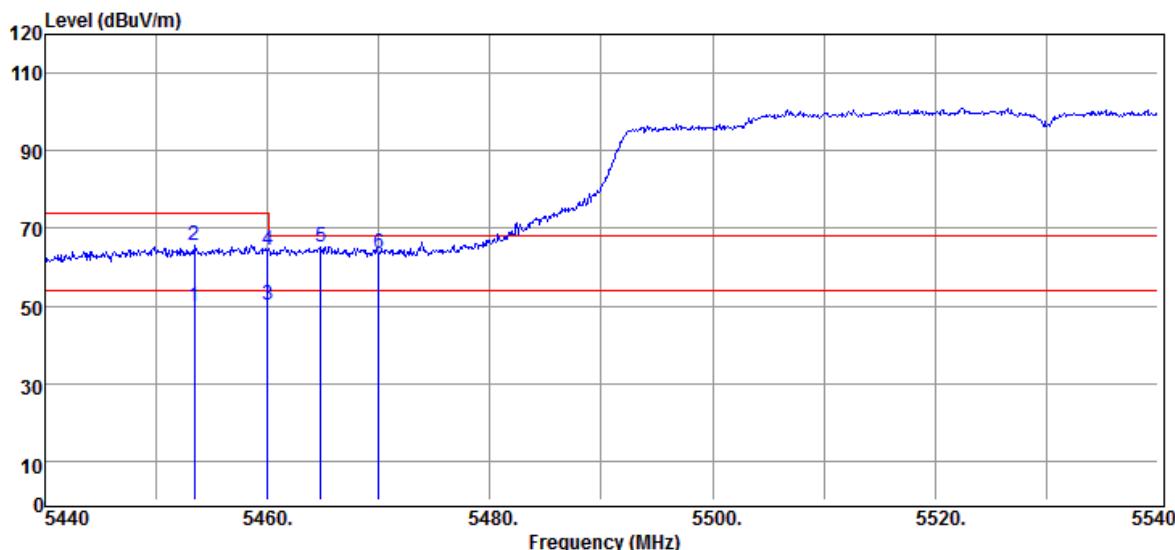
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Operation Mode :802.11ac80/Band 3  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5530 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5453.40	Average	35.56	14.31	49.87	54.00	-4.13
5453.40	Peak	51.23	14.31	65.54	74.00	-8.46
5460.00	Average	36.13	14.31	50.44	54.00	-3.56
5460.00	Peak	50.01	14.31	64.32	74.00	-9.68
5464.80	Peak	50.91	14.32	65.23	68.20	-2.97
5470.00	Peak	49.28	14.31	63.59	68.20	-4.61

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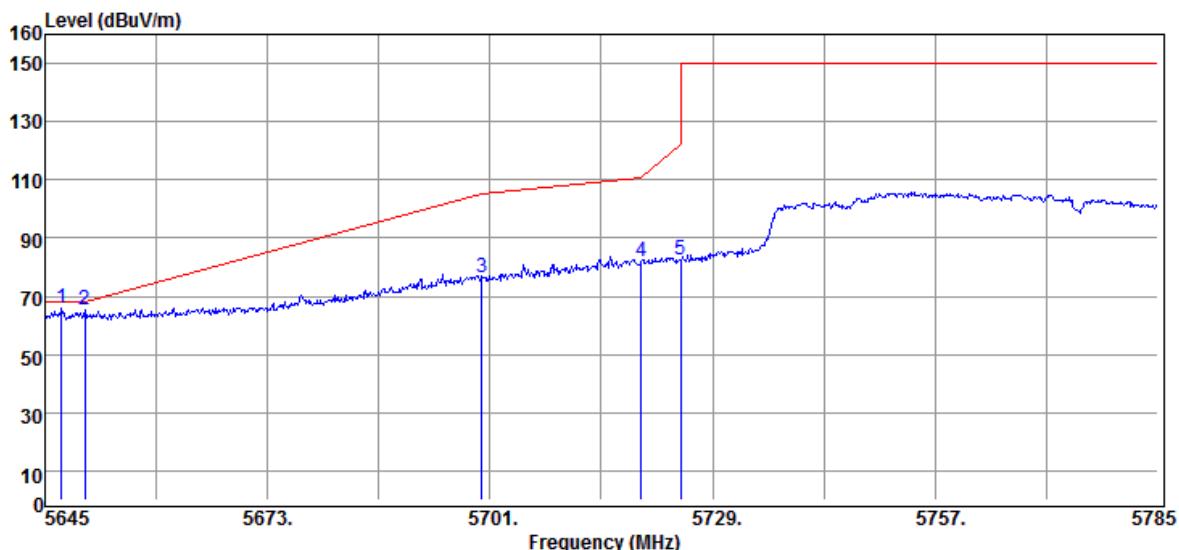
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Operation Mode :802.11ac80/Band 4 Test Date :2018-07-18  
Test Mode :BE CH LOW Temp./Humi. :24/64  
EUT Pol :H Plan Antenna Pol. :VERTICAL  
Test Channel :5775 MHz Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					dB	
5647.10	Peak	51.34	14.41	65.75	68.20	-2.45
5650.00	Peak	50.68	14.42	65.10	68.20	-3.10
5700.00	Peak	61.77	14.47	76.24	105.20	-28.96
5720.00	Peak	67.23	14.49	81.72	110.80	-29.08
5725.00	Peak	67.79	14.50	82.29	122.20	-39.91

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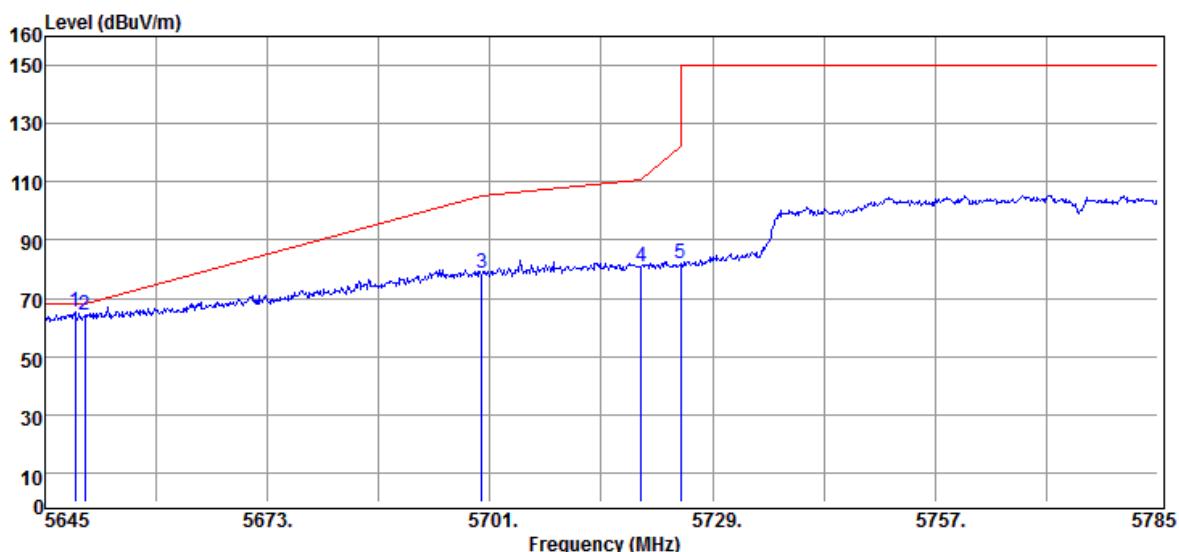
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Operation Mode :802.11ac80/Band 4  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5775 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5648.78	Peak	51.08	14.41	65.49	68.20	-2.71
5650.00	Peak	49.53	14.42	63.95	68.20	-4.25
5700.00	Peak	64.36	14.47	78.83	105.20	-26.37
5720.00	Peak	66.09	14.49	80.58	110.80	-30.22
5725.00	Peak	67.23	14.50	81.73	122.20	-40.47

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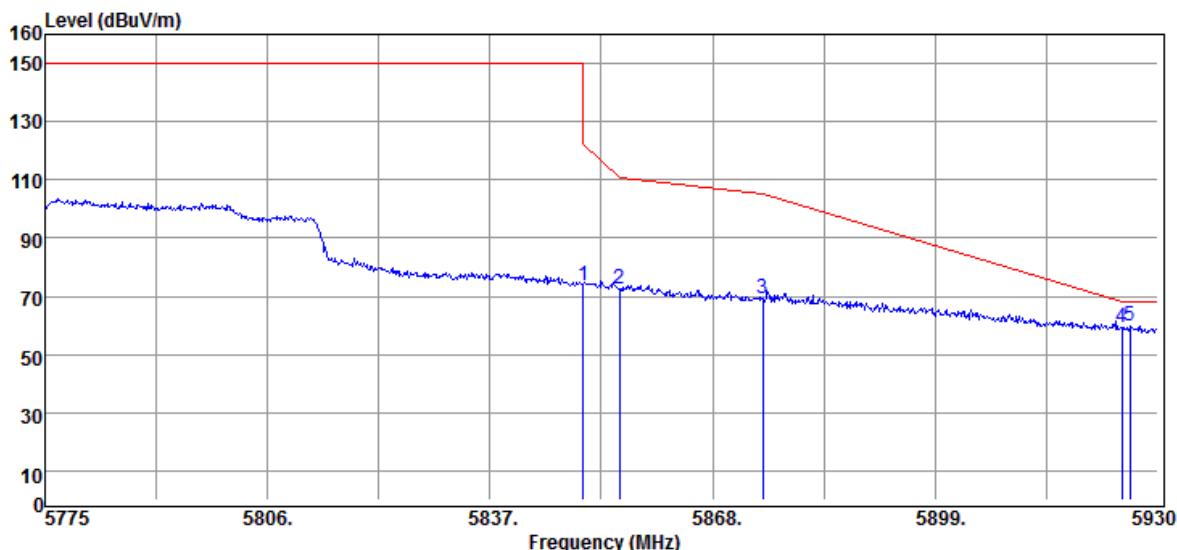
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Operation Mode :802.11ac80/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5775 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :VERTICAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	59.19	14.72	73.91	122.20	-48.29
5855.00	Peak	57.75	14.73	72.48	110.80	-38.32
5875.00	Peak	54.60	14.78	69.38	105.20	-35.82
5925.00	Peak	44.23	14.91	59.14	68.20	-9.06
5926.13	Peak	45.08	14.91	59.99	68.20	-8.21

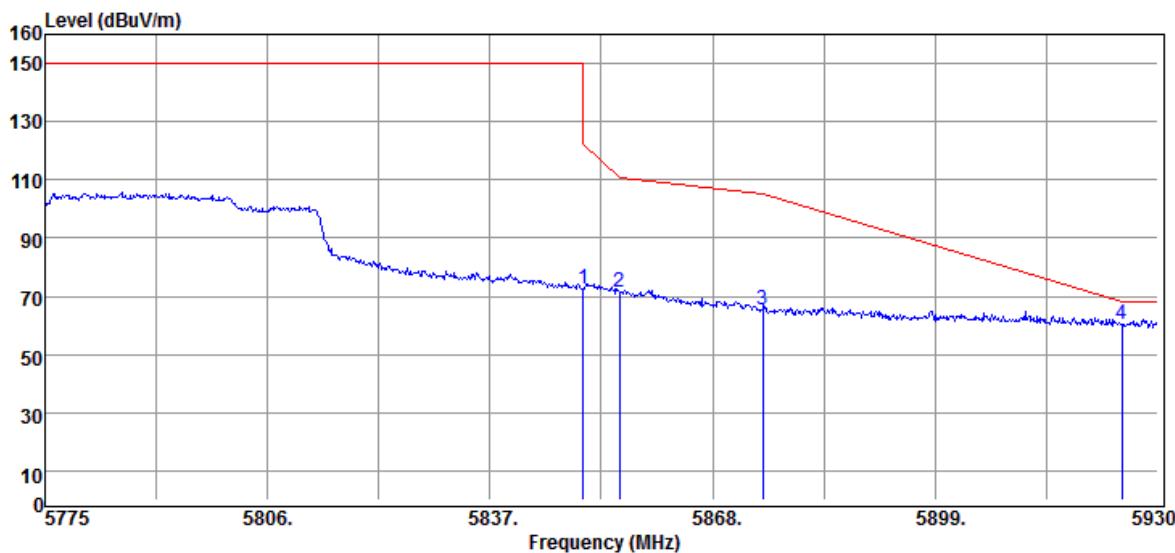
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Operation Mode :802.11ac80/Band 4  
 Test Mode :BE CH HIGH  
 EUT Pol :H Plan  
 Test Channel :5775 MHz

Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :HORIZONTAL  
 Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	57.75	14.72	72.47	122.20	-49.73
5855.00	Peak	56.74	14.73	71.47	110.80	-39.33
5875.00	Peak	50.76	14.78	65.54	105.20	-39.66
5925.00	Peak	45.52	14.91	60.43	68.20	-7.77

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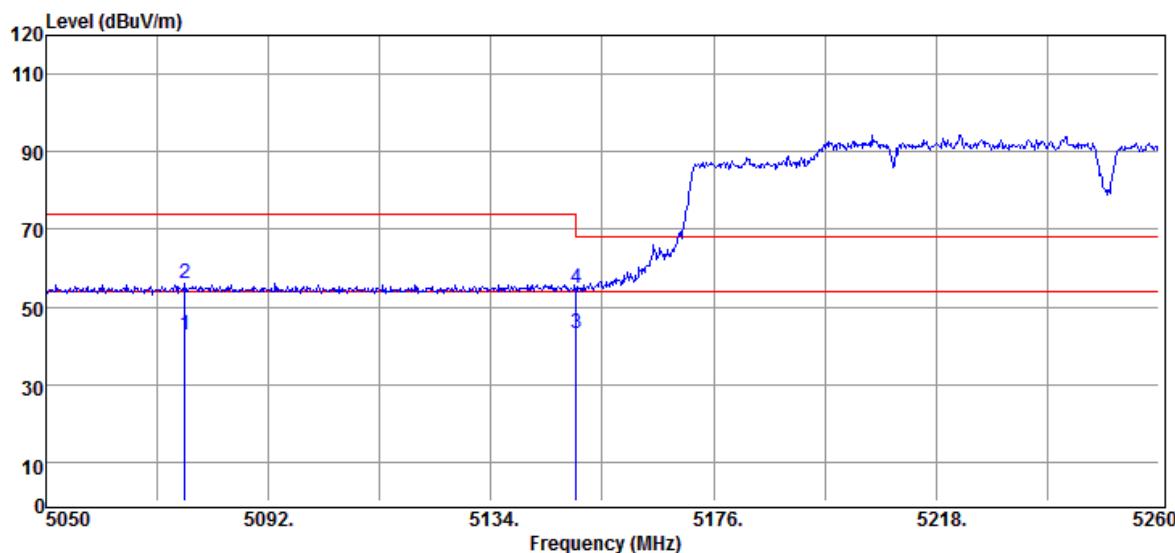
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**Band edge falling to restricted band****802.11ac\_VHT160 mode**

Operation Mode	:802.11ac160/Band 1	Test Date	:2018-07-18
Test Mode	:BE CH LOW	Temp./Humi.	:24/64
EUT Pol	:H Plan	Antenna Pol.	:VERTICAL
Test Channel	:5250 MHz	Engineer	:Ashton



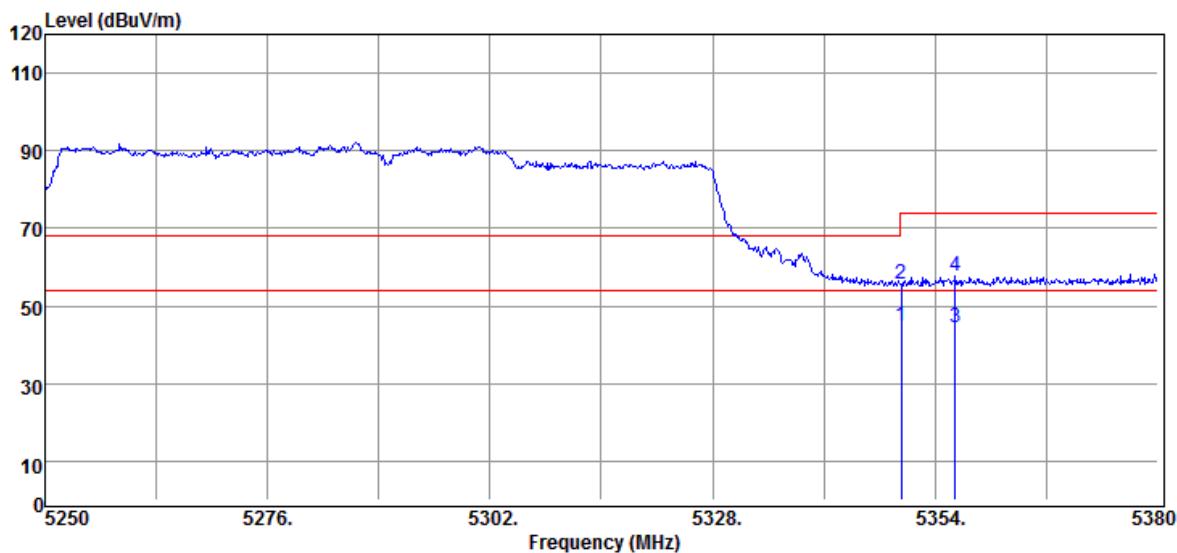
Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Margin	
PK/QP/AV						
5076.25	Average	29.22	13.38	42.60	54.00	-11.40
5076.25	Peak	42.71	13.38	56.09	74.00	-17.91
5150.00	Average	29.45	13.65	43.10	54.00	-10.90
5150.00	Peak	41.03	13.65	54.68	74.00	-19.32

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Operation Mode :802.11ac160/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5250 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	30.54	14.16	44.70	54.00	-9.30
5350.00	Peak	41.34	14.16	55.50	74.00	-18.50
5356.34	Average	30.43	14.18	44.61	54.00	-9.39
5356.34	Peak	43.53	14.18	57.71	74.00	-16.29

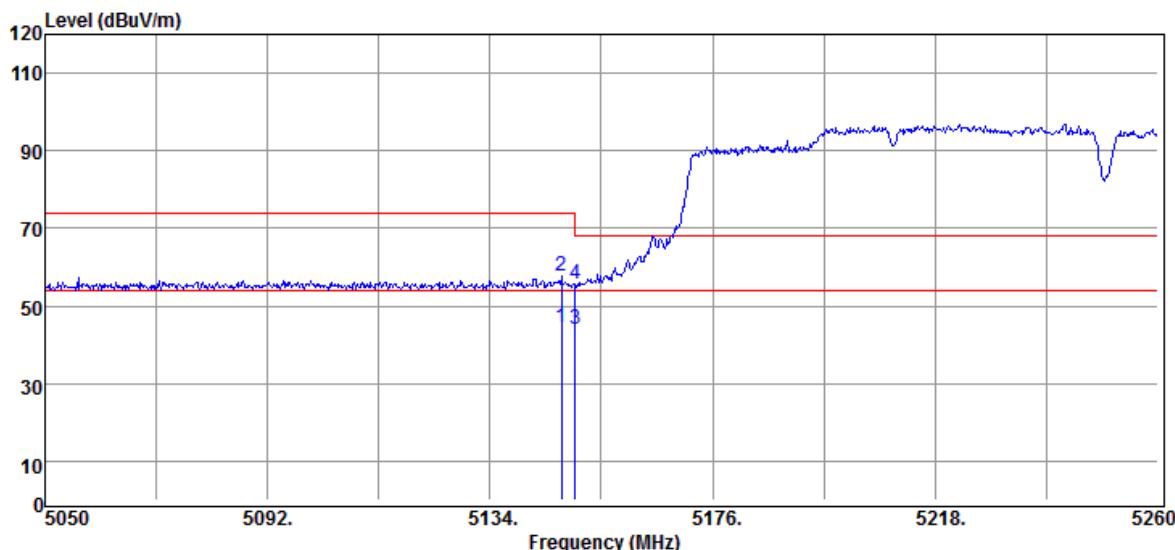
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Operation Mode :802.11ac160/Band 1  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5250 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5147.44	Average	30.85	13.63	44.48	54.00	-9.52
5147.44	Peak	44.23	13.63	57.86	74.00	-16.14
5150.00	Average	30.28	13.65	43.93	54.00	-10.07
5150.00	Peak	41.86	13.65	55.51	74.00	-18.49

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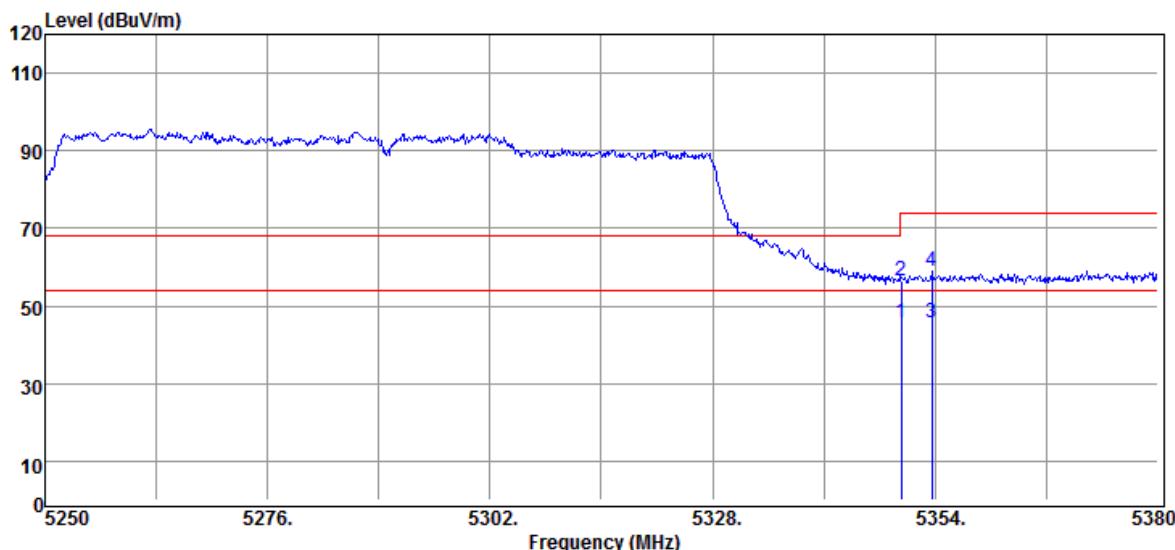
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Operation Mode :802.11ac160/Band 2  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5250 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	31.33	14.16	45.49	54.00	-8.51
5350.00	Peak	42.33	14.16	56.49	74.00	-17.51
5353.61	Average	31.62	14.17	45.79	54.00	-8.21
5353.61	Peak	44.71	14.17	58.88	74.00	-15.12

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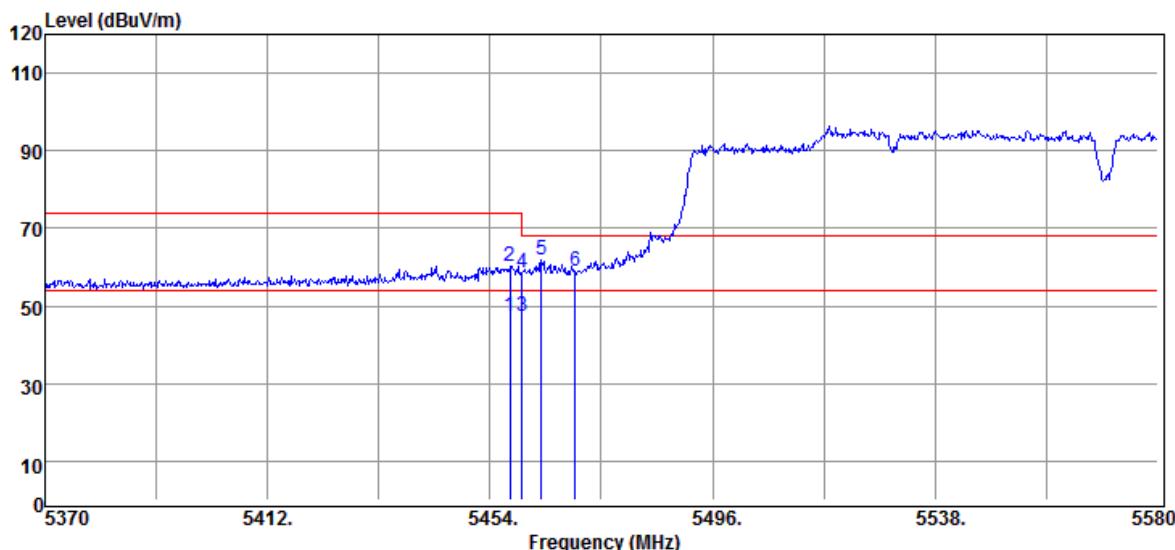
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Operation Mode :802.11ac160/Band 3  
Test Mode :BE CH LOW  
EUT Pol :H Plan  
Test Channel :5570 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



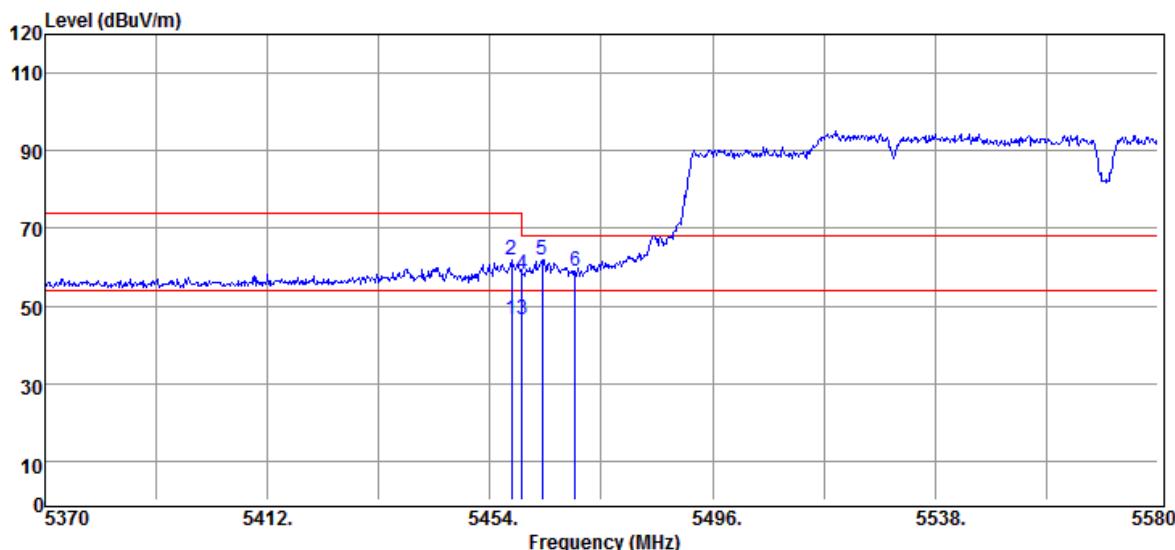
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
					Limit @3m dB $\mu$ V/m	Margin dB
5457.78	Average	33.01	14.31	47.32	54.00	-6.68
5457.78	Peak	45.88	14.31	60.19	74.00	-13.81
5460.00	Average	33.01	14.31	47.32	54.00	-6.68
5460.00	Peak	44.38	14.31	58.69	74.00	-15.31
5463.66	Peak	47.50	14.32	61.82	68.20	-6.38
5470.00	Peak	44.83	14.31	59.14	68.20	-9.06

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Operation Mode :802.11ac160/Band 3  
 Test Mode :BE CH LOW  
 EUT Pol :H Plan  
 Test Channel :5570 MHz  
 Test Date :2018-07-18  
 Temp./Humi. :24/64  
 Antenna Pol. :HORIZONTAL  
 Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
PK/QP/AV						
5457.99	Average	32.34	14.31	46.65	54.00	-7.35
5457.99	Peak	47.40	14.31	61.71	74.00	-12.29
5460.00	Average	31.99	14.31	46.30	54.00	-7.70
5460.00	Peak	43.82	14.31	58.13	74.00	-15.87
5463.87	Peak	47.74	14.32	62.06	68.20	-6.14
5470.00	Peak	44.72	14.31	59.03	68.20	-9.17

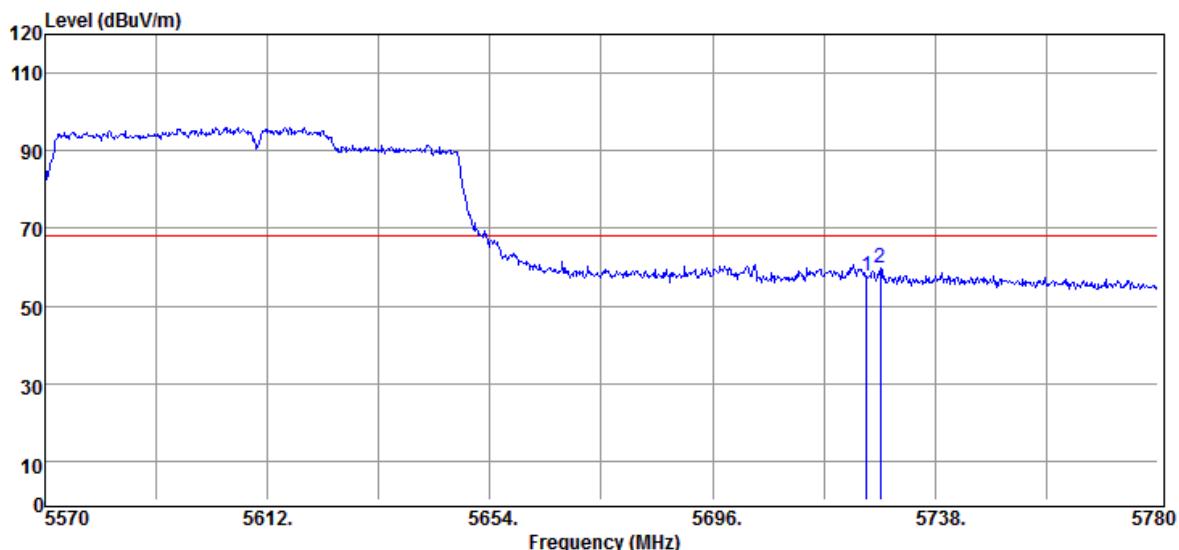
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Operation Mode :802.11ac160/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5570 MHz  
Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	43.15	14.50	57.65	68.20	-10.55
5727.71	Peak	45.48	14.50	59.98	68.20	-8.22

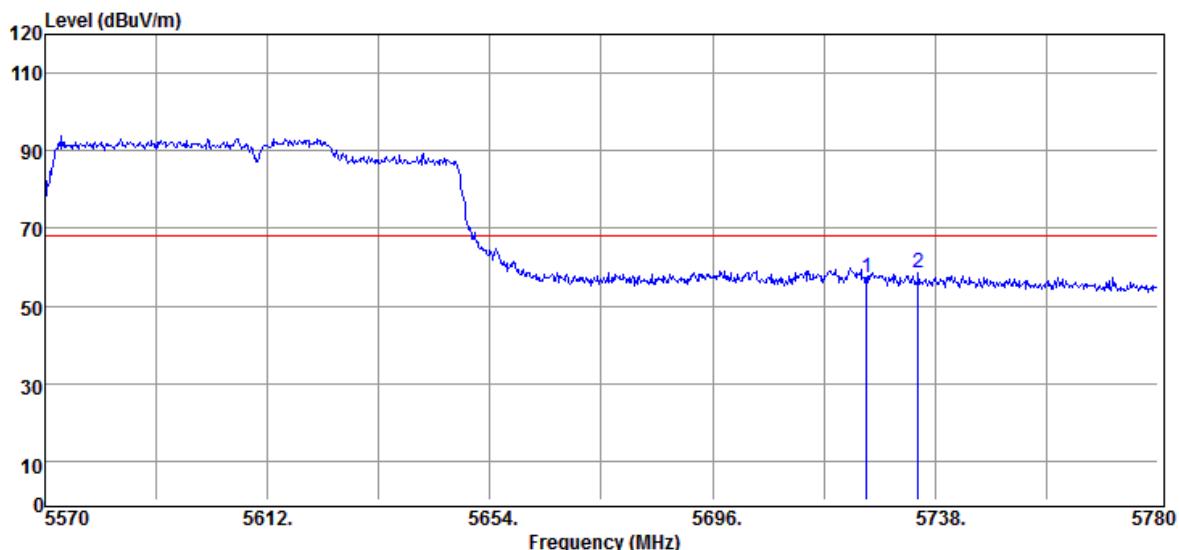
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Operation Mode :802.11ac160/Band 3  
Test Mode :BE CH HIGH  
EUT Pol :H Plan  
Test Channel :5570 MHz

Test Date :2018-07-18  
Temp./Humi. :24/64  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton



Freq. MHz	Detector Mode	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Margin	
					Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	42.65	14.50	57.15	68.20	-11.05
5734.85	Peak	44.08	14.52	58.60	68.20	-9.60

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## 8. ANTENNA REQUIREMENT

### 8.1 Standard Applicable

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

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

### 8.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement.

Please see EUT photo for details.

*~ End of Report ~*

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