

# 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

**Product Name:** 802.11a/b/g/n/ac + BT4.1 M.2 2230 Type Card  
**Brand Name:** Qualcomm Atheros  
**Model No.:** QCNFA344A  
**Model Difference:** N/A  
**FCC ID:** PPD-QCNFA344AH  
**IC:** 4104A-QCNFA344A  
**Report No.:** E2/2017/B0030  
**Issue Date:** Dec. 06, 2017  
**FCC Rule Part:** §15.407  
**IC Rule Part:** RSS-247 issue 2 :2017  
**Prepared for:** Qualcomm Atheros, Inc.  
1700 Technology Drive, San Jose, CA 95110  
SGS Taiwan Ltd.  
**Prepared by:** Electronics & Communication Laboratory  
No.2, Keji 1st Rd., Guishan District, Taoyuan City,  
Taiwan 333



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## VERIFICATION OF COMPLIANCE

**Applicant:** Qualcomm Atheros, Inc.  
1700 Technology Drive, San Jose, CA 95110

**Product Name:** 802.11a/b/g/n/ac + BT4.1 M.2 2230 Type Card

**Brand Name:** Qualcomm Atheros

**Model No.:** QCNFA344A

**Model Difference:** N/A

**FCC ID:** PPD-QCNFA344AH

**IC:** 4104A-QCNFA344A

**File Number:** E2/2017/B0030

**Date of test:** Oct. 21, 2017 ~ Dec. 06, 2017

**Date of EUT Received:** Oct. 21, 2017

### 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.

**Test By:**

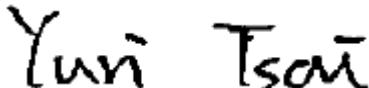


**Date:**

Dec. 06, 2017

*Jerry Lu / Sr. Engineer*

**Prepared By:**

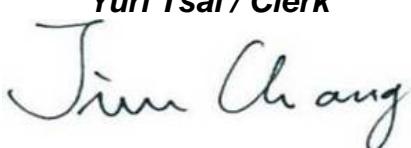


**Date:**

Dec. 06, 2017

*Yuri Tsai / Clerk*

**Approved By:**



**Date:**

Dec. 06, 2017

*Jim Chang / Asst. Manager*

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## Revision History

Report Number	Revision	Description	Issue Date
E2/2017/B0030	Rev.00	Initial creation of document	Dec. 06, 2017

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## 1. GENERAL INFORMATION

### 1.1. Product Description

General Information of Host:

Product Name of Host:	Notebook Computer	
Brand Name:		
Marketing Name of Host:	SF315-41, SF315-41G	
Model No. of Host:	N17P4	
Model Difference:	N/A	
Hardware Version:	REV:1.1	
Software Version:	Win 10	
Model No. of BT/WLAN Module:	QCNFA344A	
Module FCC ID:	PPD-QCNFA344AH	
Module IC:	4104A-QCNFA344A	
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:	802.11a/b/g/n/ac + BT4.1 M.2 2230 Type Card INSTALLED IN Notebook Computer	
Power Supply:	15.20Vdc from Rechargeable Li-polymer Battery Pack or 19V by AC/DC Power Adapter	
	Battery:	Model No.: AC14B8K, Supplier: LG
	Adapter:	Model No.: A11-065N1A, Supplier: Chicony

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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: 16.71dBm EIRP: 17.17dBm	OFDM	17M5D1D
	5250~5350	4	Avg. Power: 17.04dBm EIRP: 17.88dBm		17M6D1D
	5470~5725	12	Avg. Power: 16.95dBm EIRP: 17.04dBm		17M2D1D
	5725~5850	5	Avg. Power: 16.03dBm EIRP: 16.12dBm		17M7D1D
11n / ac_20M	HT20 / VHT20 5150~5250	4	Avg. Power: 16.51dBm EIRP: 16.97dBm (Worst Case)	OFDM	17M5D1D
	HT20 / VHT20 5250~5350	4	Avg. Power: 17.11dBm EIRP: 17.95dBm (Worst Case)		17M6D1D
	HT20 / VHT20 5470~5725	12	Avg. Power: 14.67dBm EIRP: 14.76dBm (Worst Case)		17M5D1D
	HT20 / VHT20 5725~5850	5	Avg. Power: 16.69dBm EIRP: 16.78dBm (Worst Case)		17M7D1D
11n / ac_40M	HT40 / VHT40 5150-5250	2	Avg. Power: 12.17dBm EIRP: 12.63dBm (Worst Case)	OFDM	36M2D1D
	HT40 / VHT40 5250-5350	2	Avg. Power: 14.84dBm EIRP: 15.68dBm (Worst Case)		36M2D1D
	HT40 / VHT40 5470-5725	6	Avg. Power: 16.45dBm EIRP: 16.54dBm (Worst Case)		36M2D1D
	HT40 / VHT40 5725-5850	2	Avg. Power: 16.34dBm EIRP: 16.43dBm (Worst Case)		36M2D1D
11ac_80M	VHT80 5150~5250	1	Avg. Power: 11.40dBm EIRP: 11.86dBm	OFDM	75M1D1D
	VHT80 5250~5350	1	Avg. Power: 12.55dBm EIRP: 13.39dBm		75M1D1D
	VHT80 5470~5725	3	Avg. Power: 12.78dBm EIRP: 12.87dBm		74M6D1D
	VHT80 5725-5850	1	Avg. Power: 11.15dBm EIRP: 11.24dBm		72M4D1D

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Antenna Designation	PIFA Antenna, Supplier: Wistron Corporation 1. P/N: 81EAAL15.GGM (Main) Gain: -2.55dBi (5150~5250MHz) Gain: -3.95dBi (5250~5350MHz) Gain: -2.92dBi (5470~5725MHz) Gain: -2.92dBi (5725~5850MHz)  2. P/N: 81EAAL15.GGN (Aux) Gain: -2.62dBi (5150~5250MHz) Gain: -2.17dBi (5250~5350MHz) Gain: -3.51dBi (5470~5725MHz) Gain: -4.49dBi (5725~5850MHz)
Modulation type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, 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

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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

Canada RSS-247 issue 2 May 2017

RSS-Gen Issue 4 Nov. 2014

ANSI C63.10:2013

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 Numbers are: 735305 / TW0002

Canada Registration Number: 4620A-5

## 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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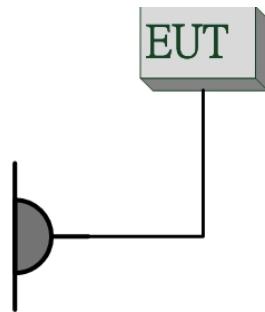
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## 2.5. Configuration of Tested System

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



**Fig. 2-2 Conducted 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, 802.11ac\_VHT20

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
42	5210 MHz

Operated band in 5250 MHz ~5350 MHz:

4 channels are provided for 802.11a, 802.11n\_HT20, 802.11ac\_VHT20

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

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Operated band in 5470 MHz ~5725 MHz:

12 channels are provided for 802.11a, 802.11n\_HT20, 802.11ac\_VHT20

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 MHz

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

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

3 channel is provided for 802.11ac\_VHT80

CHANNEL	FREQUENCY
106	5530 MHz
122	5610 MHz
138	5690 MHz

Operated band in 5725 MHz ~5850 MHz:

5 channels are provided for 802.11a, 802.11n\_HT20, 802.11ac\_VHT20

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, 802.11ac\_VHT40

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	44	OFDM	6	2TX
802.11a	5260~5320	52 to 64	60	OFDM	6	MAIN
802.11a	5500~5700	100 to 140	100	OFDM	6	MAIN
802.11a	5745~5825	149 to 165	157	OFDM	6	MAIN

**BANDEDGE**

802.11a	5180~5240	36 to 48	36	OFDM	6	2TX
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	MCS8	MIMO
802.11a	5260~5320	52 to 64	64	OFDM	6	2TX
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	MCS8	MIMO
802.11a	5500~5700	100 to 140	100, 140	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102, 134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5690	106 to 138	106	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149, 165	OFDM	6	2TX
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	MCS8	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.

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.**

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**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	OFDM	6	2TX
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	MCS8	MIMO
802.11a	5260~5320	52 to 64	64	OFDM	6	2TX
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	MCS8	MIMO
802.11a	5500~5700	100 to 140	100,140	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5690	106 to 138	106	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,165	OFDM	6	2TX
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	MCS8	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:

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1	Access Point (Mater device )		1 Watt(30dBm)
	Fixed point-to-point Acess Ponit		1 Watt(30dBm)
	√ Mobile and portable clinet 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)

OPERZTION 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 =  $-2.55 + 3.01 = 0.46 \text{ dBi}$  (5150MHz-5250MHz)*

*Effective Legacy Gain =  $-2.17 + 3.01 = 0.84 \text{ dBi}$  (5250MHz-5350MHz)*

*Effective Legacy Gain =  $-2.92 + 3.01 = 0.09 \text{ dBi}$  (5470MHz-5725MHz)*

*Effective Legacy Gain =  $-2.92 + 3.01 = 0.09 \text{ dBi}$  (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  $10 \log(1/x)$ ,  $n_{HT20}=0.10$ ,  $n_{HT40}=0.12$
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.

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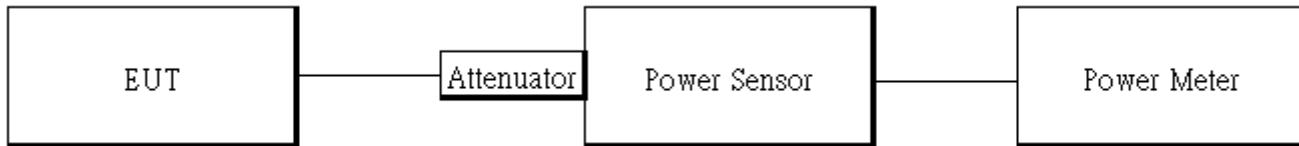
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### 6.3 Measurement Equipment Used:

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

### 6.4 Test Set-up:



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## 6.5 Measurement Result

### 802.11a

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
36	5180	13.84	13.55	<b>16.71</b>	<b>46.857</b>	23.98	PASS
64	5320	14.58	13.41	<b>17.04</b>	<b>50.636</b>	23.98 or $11+10\log(B) = 23.99$	PASS
100	5500	14.02	12.65	16.40	<b>43.643</b>	23.98 or $11+10\log(B) = 24.02$	PASS
140	5700	14.87	12.76	<b>16.95</b>	<b>49.570</b>	23.98 or $11+10\log(B) = 23.98$	PASS
149	5745	12.24	10.62	14.52	28.284	30	PASS
165	5825	14.07	11.64	<b>16.03</b>	<b>40.115</b>	30	PASS

### 802.11n\_VHT20 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
36	5180	13.65	13.35	<b>16.51</b>	<b>44.801</b>	23.98	PASS
64	5320	14.73	13.36	<b>17.11</b>	<b>51.394</b>	23.98 or $11+10\log(B) = 24.31$	PASS
100	5500	13.84	12.07	16.05	<b>40.317</b>	23.98 or $11+10\log(B) = 24.13$	PASS
140	5700	12.51	10.61	<b>14.67</b>	29.332	23.98 or $11+10\log(B) = 24.26$	PASS
149	5745	11.90	10.71	<b>14.36</b>	27.264	30	PASS
165	5825	14.77	12.23	16.69	<b>46.703</b>	30	PASS

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## 802.11n\_VHT40 (MIMO)

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
38	5190	9.79	8.42	12.17	16.478	23.98	PASS
62	5310	12.76	10.65	14.84	30.494	23.98 or 11+10log(B) =27.29	PASS
102	5510	9.89	8.86	12.42	17.441	23.98 or 11+10log(B) =27.23	PASS
134	5670	14.45	12.11	16.45	44.117	23.98 or 11+10log(B) =27.27	PASS
151	5755	9.97	8.82	12.44	17.552	30	PASS
159	5795	14.28	12.12	16.34	43.085	30	PASS

## 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	8.41	8.36	11.40	13.789	23.98	PASS
58	5290	9.56	9.51	12.55	17.970	23.98 or 11+10log(B) =30.19	PASS
106	5530	9.77	9.76	12.78	18.947	23.98 or 11+10log(B) =30.16	PASS
155	5775	8.21	8.06	11.15	13.020	23.98	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	16.71	46.881	0.46	<b>17.17</b>	23.01 or $10+10\log(B) = 22.13$	PASS
64	5320	17.04	50.582	0.84	<b>17.88</b>	30 or $17+10\log(B) = 29.12$	PASS
100	5500	16.40	43.652	0.09	16.49	30 or $17+10\log(B) = 29.12$	PASS
140	5700	16.95	49.545		<b>17.04</b>	30 or $17+10\log(B) = 29.11$	PASS
149	5745	14.52	28.314	0.09	14.61	30	PASS
165	5825	16.03	40.087		<b>16.12</b>	30	PASS

**\* Note:** EIRP = Average Power + Gain

802.11n\_VHT20 (MIMO)

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
36	5180	16.51	44.771	0.46	<b>16.97</b>	23.01 or $10+10\log(B) = 22.42$	PASS
64	5320	17.11	51.404	0.84	<b>17.95</b>	30 or $17+10\log(B) = 29.43$	PASS
100	5500	16.05	40.272	0.09	<b>16.14</b>	30 or $17+10\log(B) = 29.40$	PASS
140	5700	14.67	29.309		14.76	30 or $17+10\log(B) = 29.40$	PASS
149	5745	14.36	27.290	0.09	14.45	30	PASS
165	5825	16.69	46.666		<b>16.78</b>	30	PASS

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## 802.11n\_VHT40 (MIMO)

Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
5190	12.17	16.482	0.46 0.84	<b>12.63</b>	23.01 or $10+10\log(B) = 28.75$	PASS
5310	14.84	30.479		<b>15.68</b>	30 or $17+10\log(B) = 32.53$	PASS
5510	12.42	17.458	0.09	12.51	30 or $17+10\log(B) = 32.53$	PASS
5670	16.45	44.157		<b>16.54</b>	30 or $17+10\log(B) = 32.53$	PASS
5755	12.44	17.539	0.09	12.53	30	PASS
5795	16.34	43.053		<b>16.43</b>	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	11.40	13.804	0.46	<b>11.86</b>	23.01 or $10+10\log(B) = 28.75$	PASS
58	5290	12.55	17.989	0.84	<b>13.39</b>	30 or $17+10\log(B) = 35.74$	PASS
106	5530	12.78	18.967	0.09	<b>12.87</b>	30 or $17+10\log(B) = 35.74$	PASS
155	5775	11.15	13.032	0.09	<b>11.24</b>	30	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:

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2017	11/02/2018
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	08/01/2017	07/31/2018
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

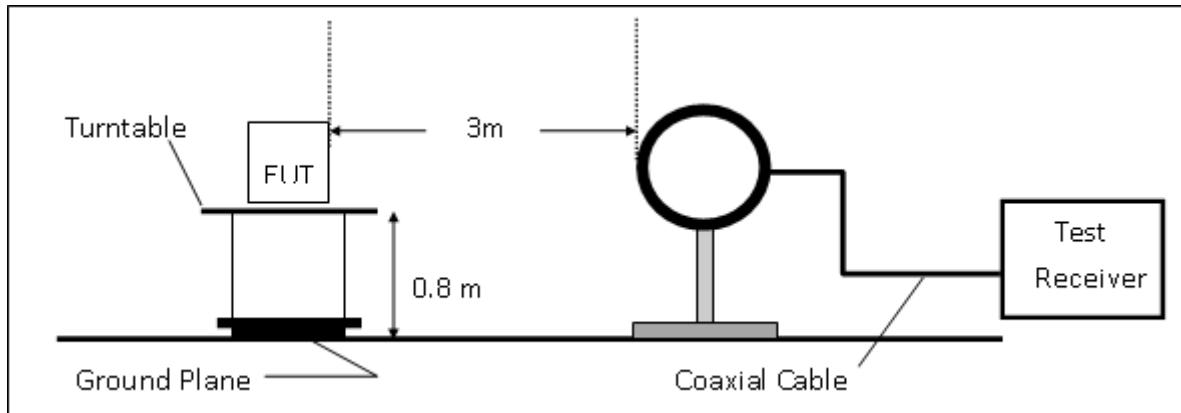
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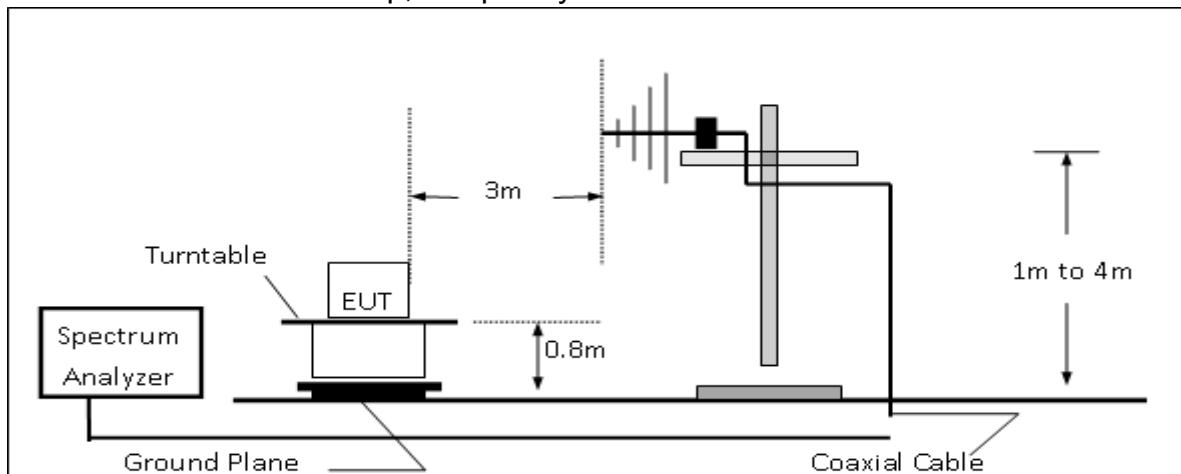
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### 7.3 Test SET-UP

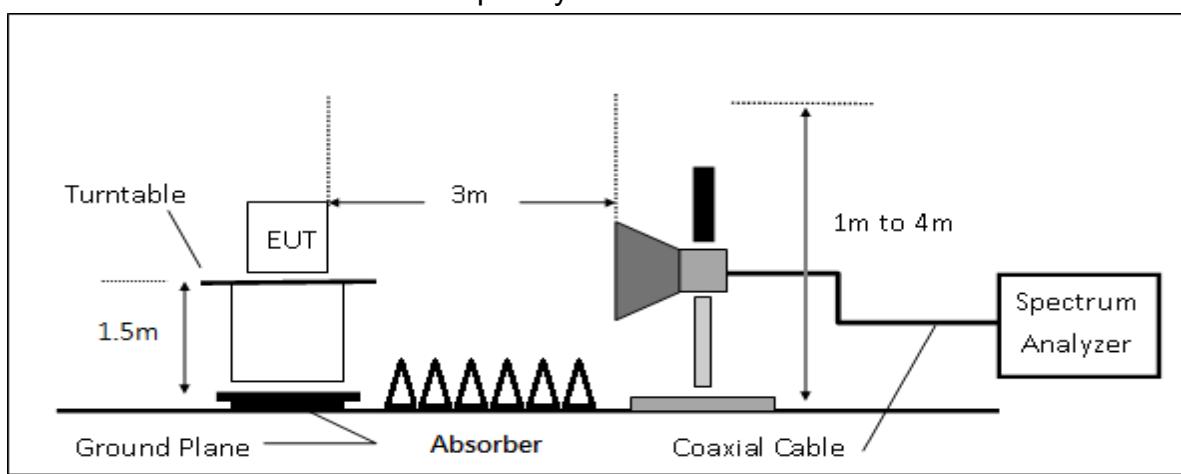
#### (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



#### (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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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

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**Note :**

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

## 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

Refer to attach tabular data sheets.

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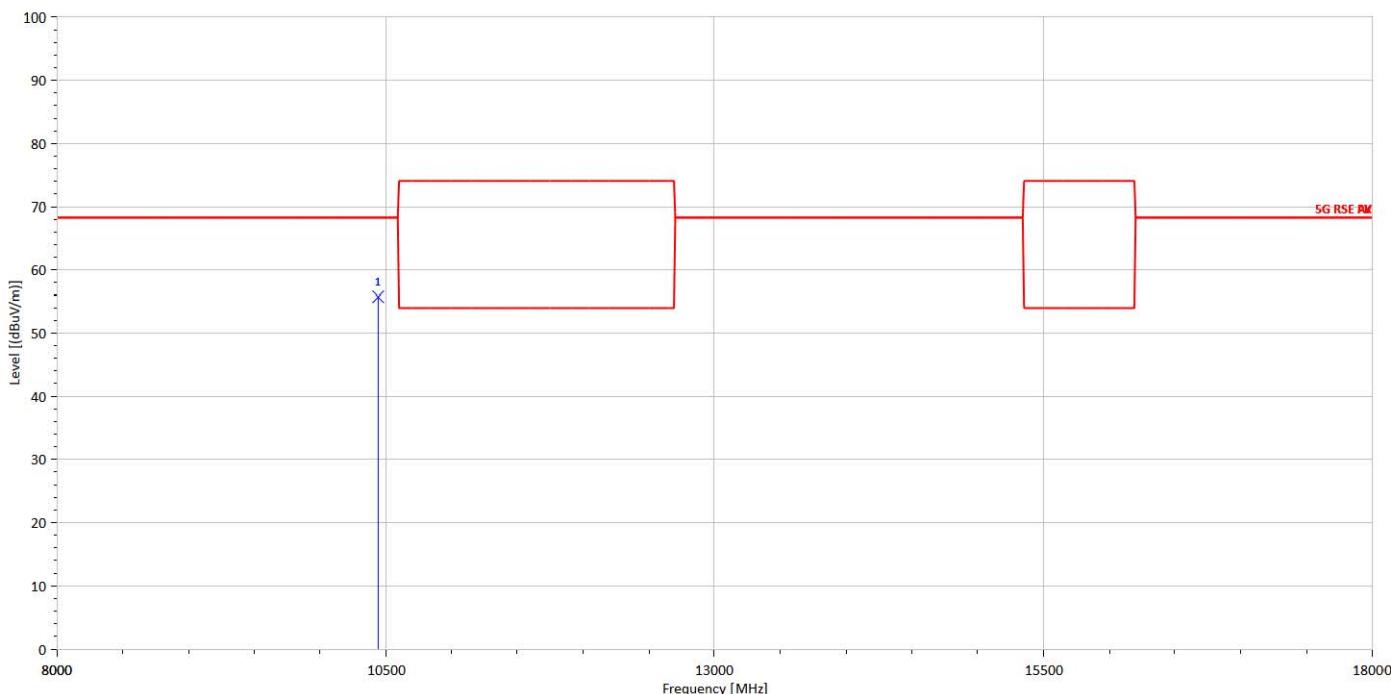
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**Radiated Spurious Emission Measurement Result****Above 1GHz Worst-Case Data:****802.11a, 5150~5250 MHz**

Operation Mode : 802.11aB1 Test Date : 2017/10/23  
Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH Mid Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



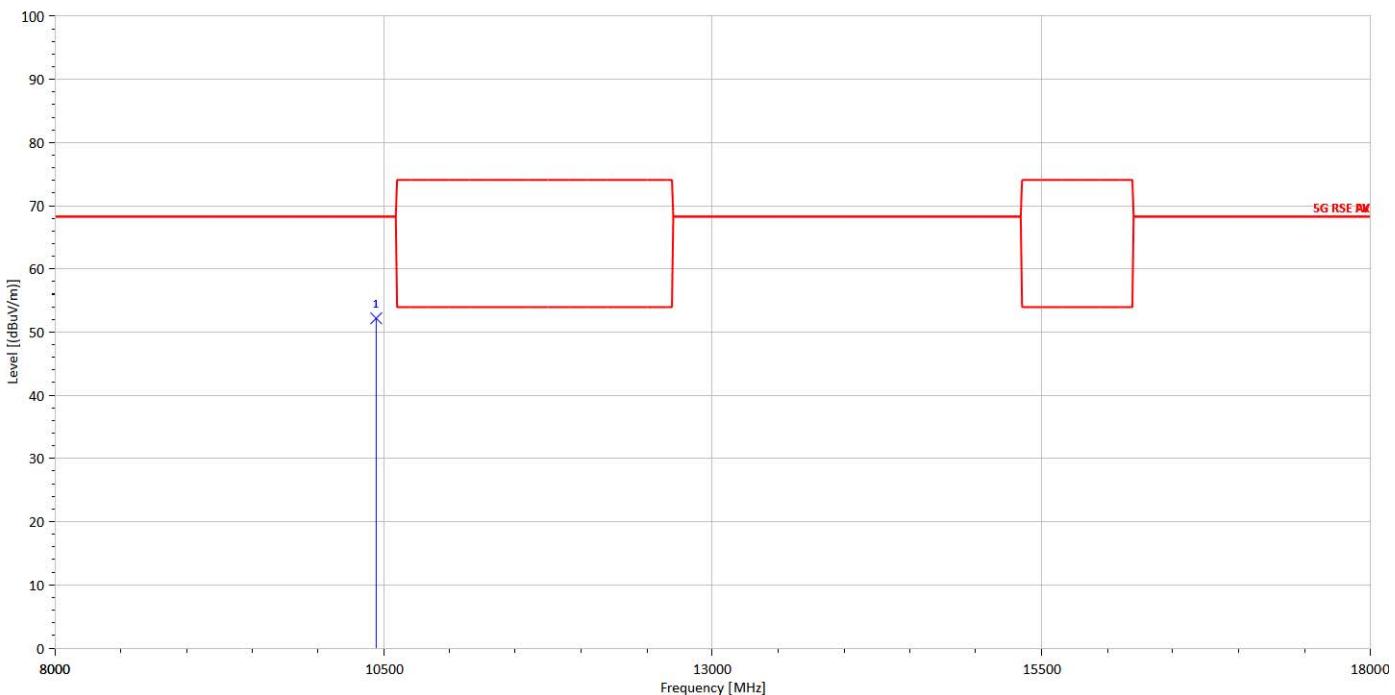
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10440.00	H	Peak	35.44	20.29	55.73	68.3	-12.57

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Operation Mode : 802.11aB1 Test Date : 2017/10/23  
Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH Mid Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	H	Peak	31.92	20.29	52.21	68.3	-16.09

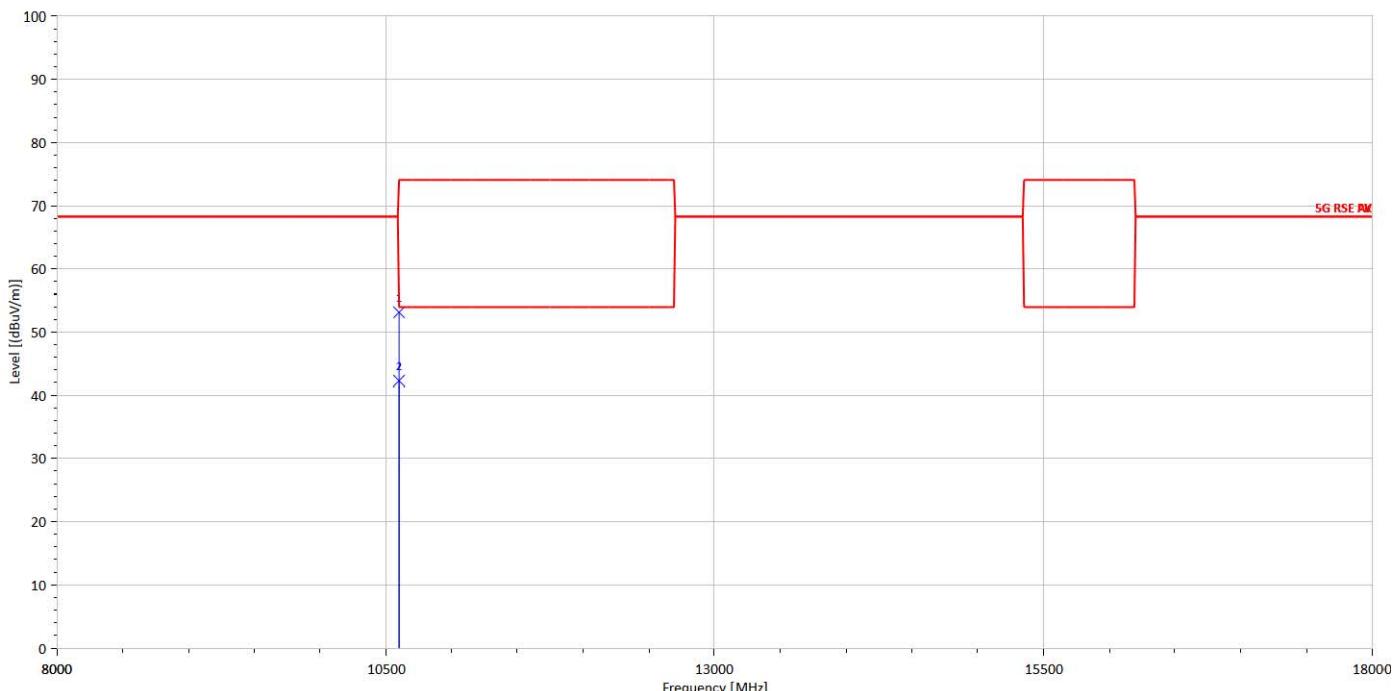
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## Radiated Spurious Emission Measurement Result 802.11a, 5250~5350MHz

Operation Mode : 802.11aB2 Test Date : 2017/10/23  
Fundamental Frequency : 5300 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH Mid Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



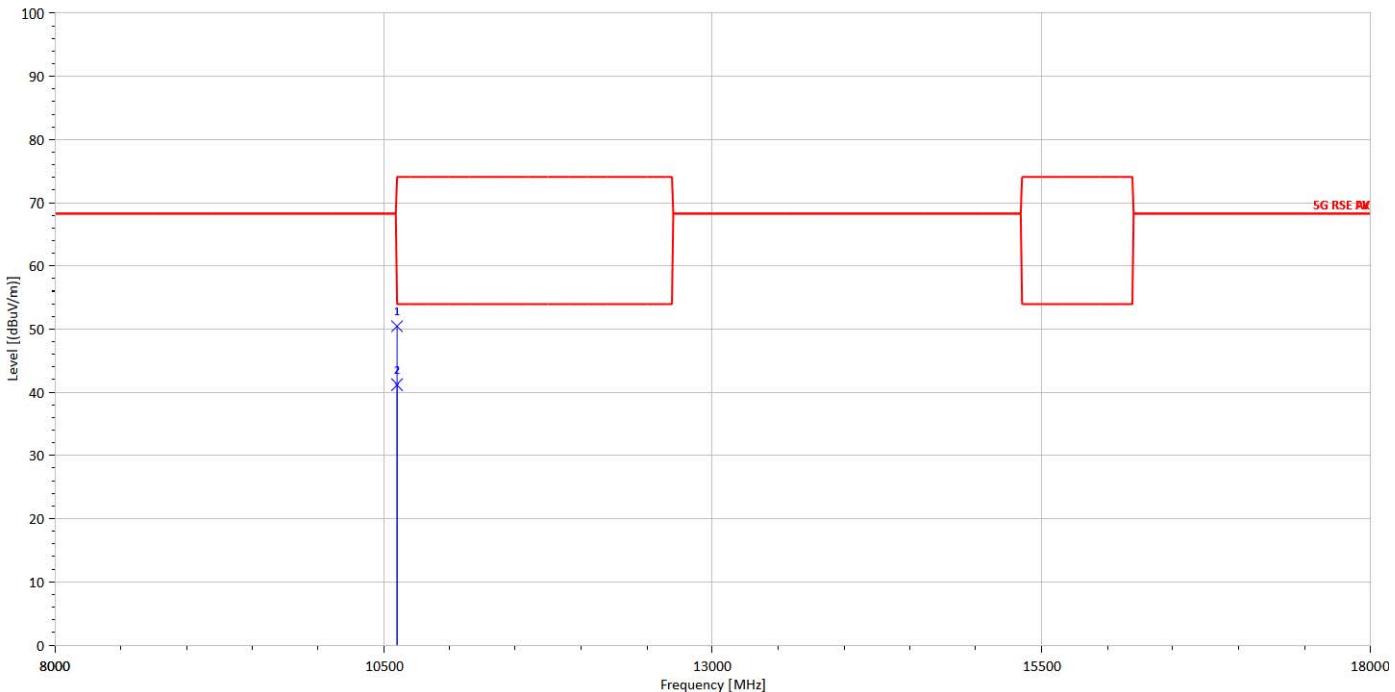
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10600.00	H	Peak	33.01	20.17	53.18	74	-20.82
10600.00	H	Average	22.09	20.17	42.26	54	-11.74

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Operation Mode : 802.11aB2 Test Date : 2017/10/23  
Fundamental Frequency : 5300 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH Mid Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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
10600.00	H	Peak	30.30	20.17	50.47	74	-23.53
10600.00	H	Average	21.05	20.17	41.22	54	-12.78

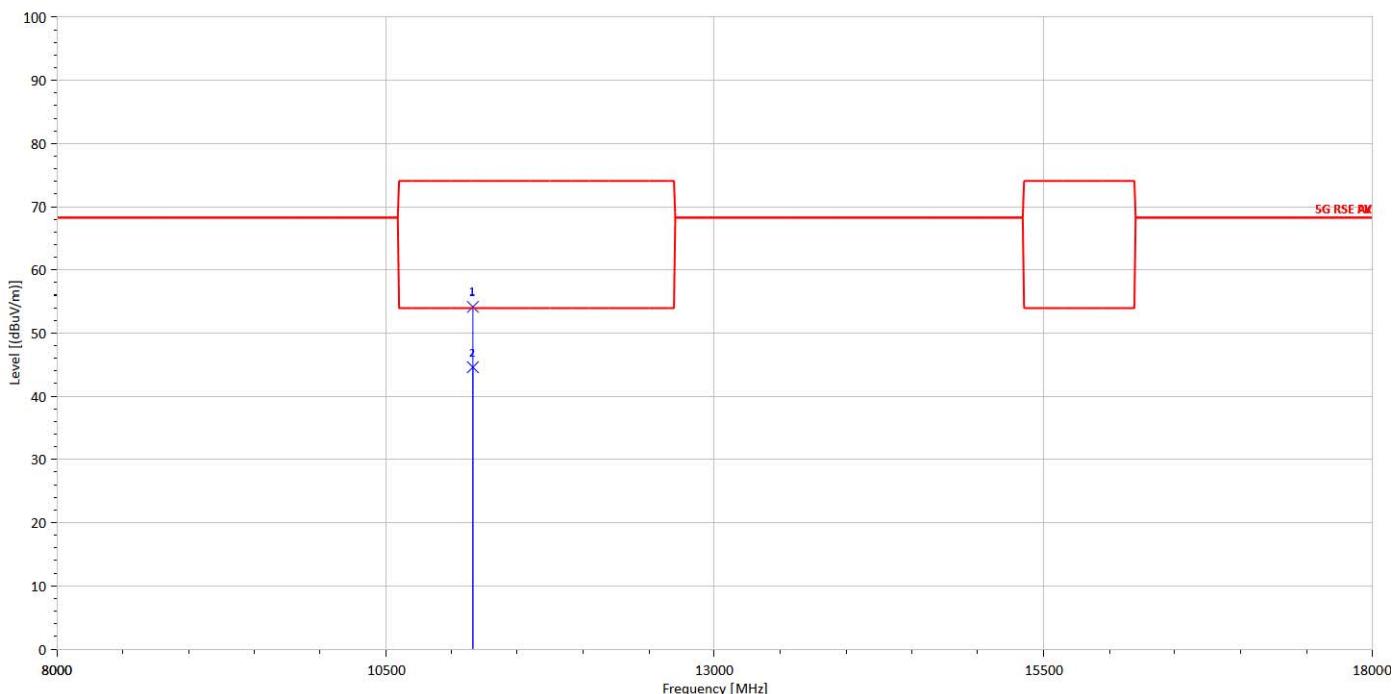
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**Radiated Spurious Emission Measurement Result****802.11a, 5470~5725 MHz**

Operation Mode : 802.11aB3 Test Date : 2017/10/23  
Fundamental Frequency : 5580 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH Mid Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



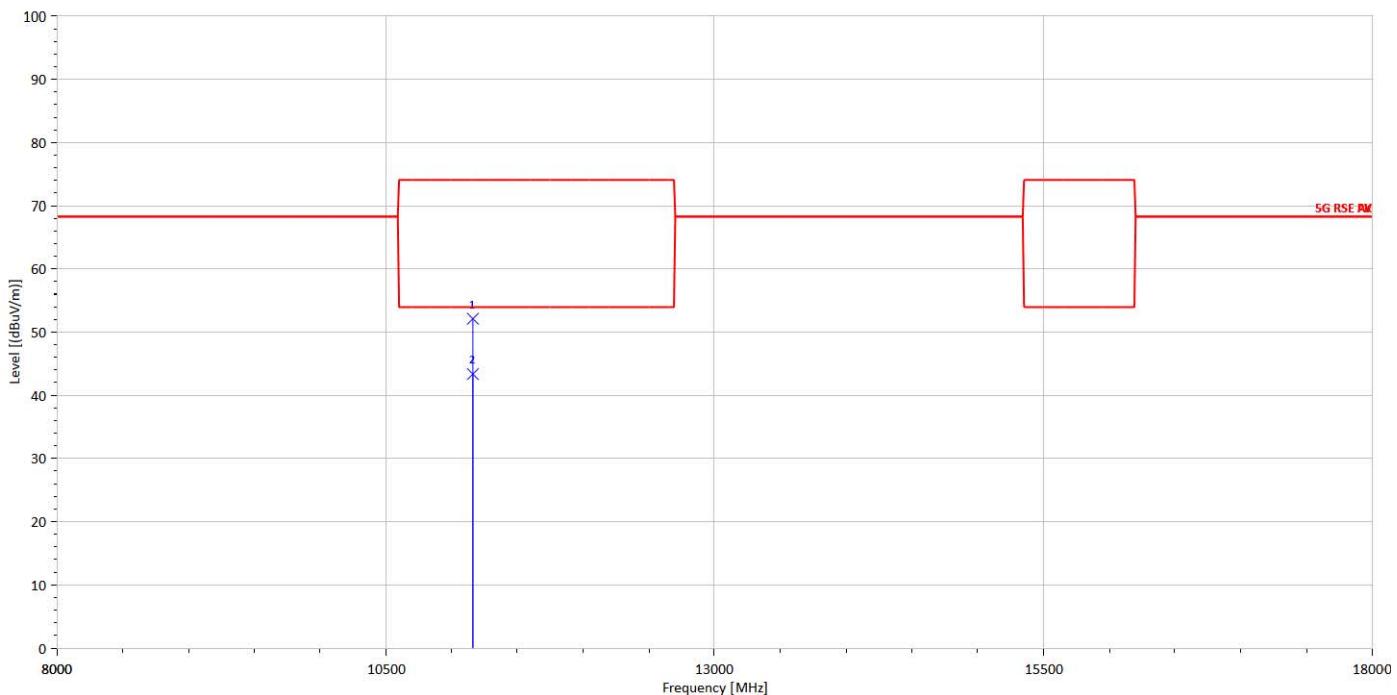
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11160.00	H	Peak	32.17	22.04	54.20	74	-19.80
11160.00	H	Average	22.53	22.04	44.57	54	-9.43

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Operation Mode : 802.11aB3 Test Date : 2017/10/23  
 Fundamental Frequency : 5580 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11160.00	H	Peak	30.11	22.04	52.14	74	-21.86
11160.00	H	Average	21.27	22.04	43.31	54	-10.69

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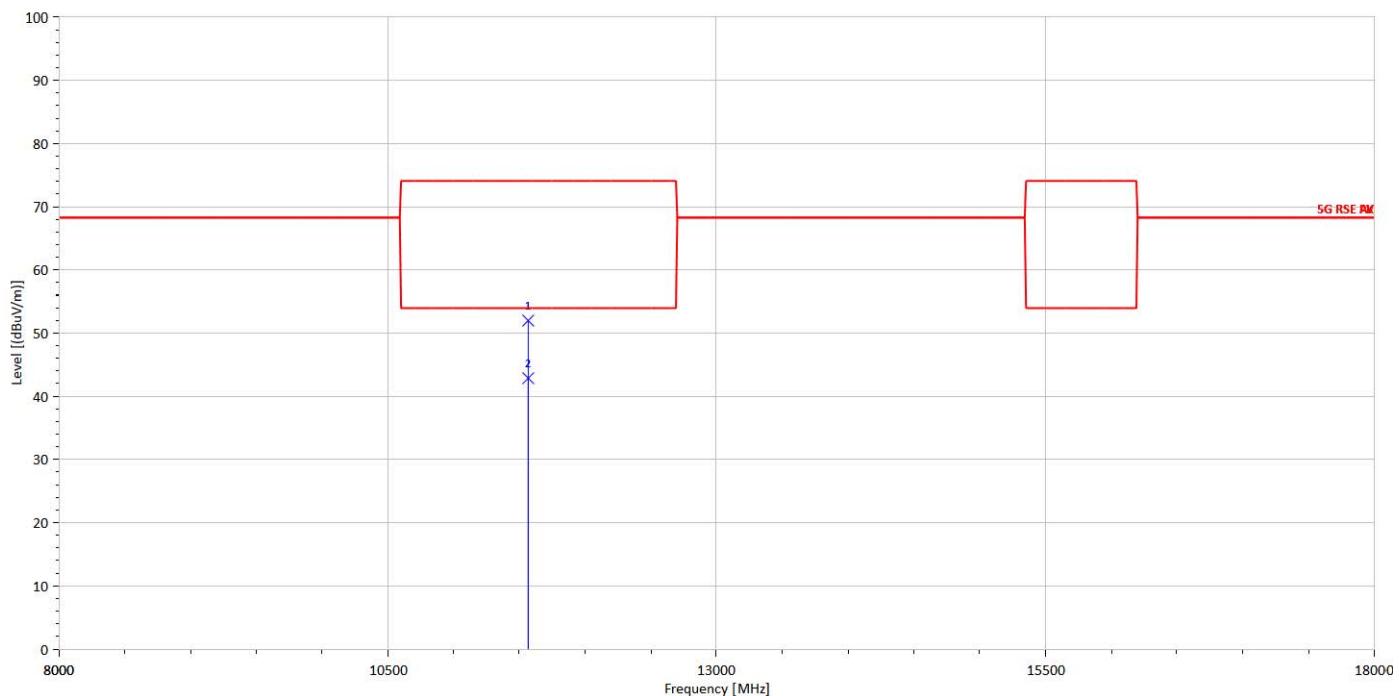
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## Radiated Spurious Emission Measurement Result

## 802.11a, 5725~5850 MHz

Operation Mode : 802.11aB4 Test Date : 2017/10/23  
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



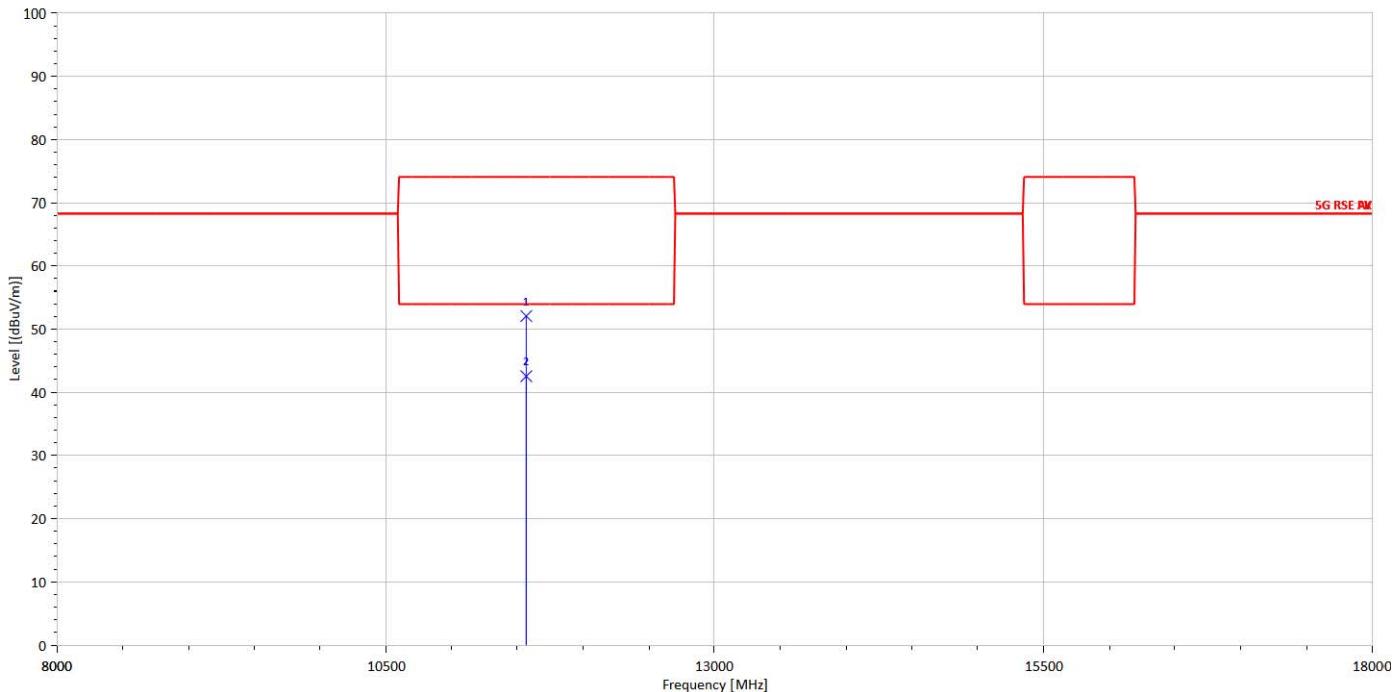
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11570.00	H	Peak	30.57	21.44	52.02	74	-21.98
11570.00	H	Average	21.37	21.44	42.81	54	-11.19

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Operation Mode : 802.11aB4 Test Date : 2017/10/23  
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : Tx CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	H	Peak	30.66	21.44	52.10	74	-21.90
11570.00	H	Average	21.04	21.44	42.48	54	-11.52

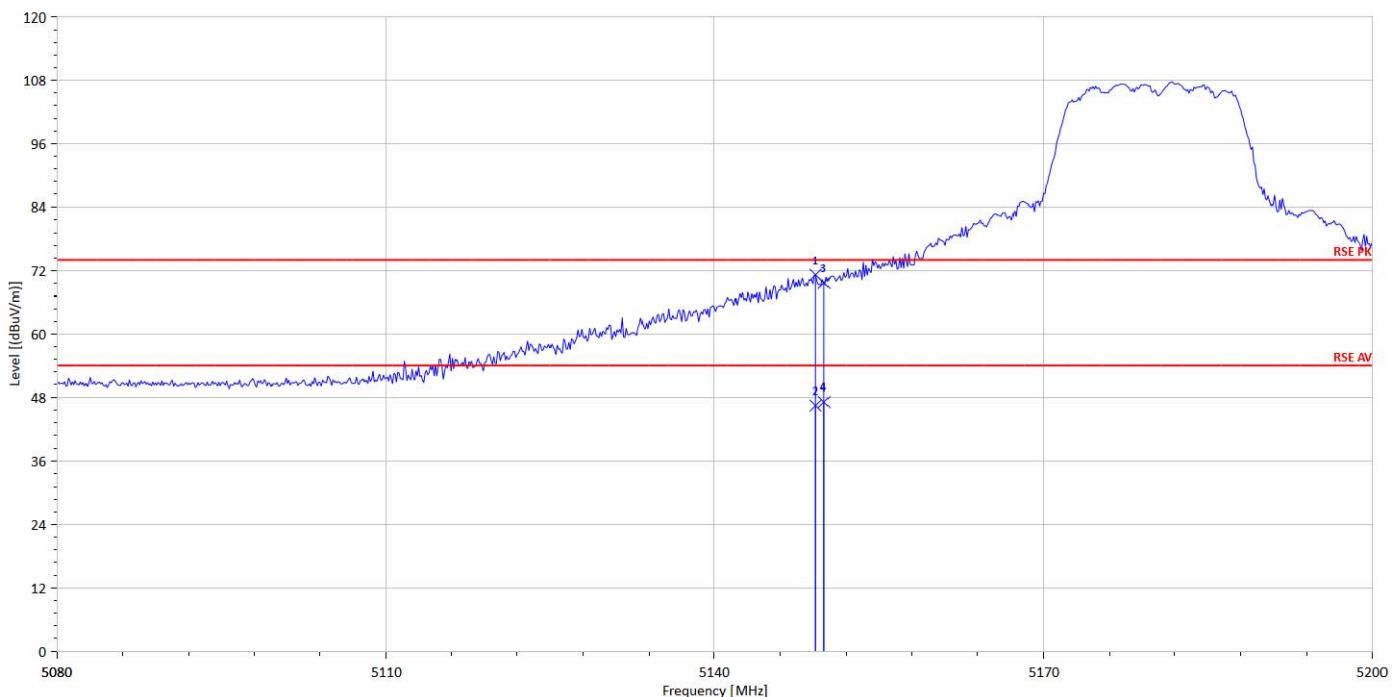
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**Band edge falling to restricted band****802.11a mode**

Operation Mode : 802.11aB1 Test Date : 2017/10/20  
 Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH Low Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



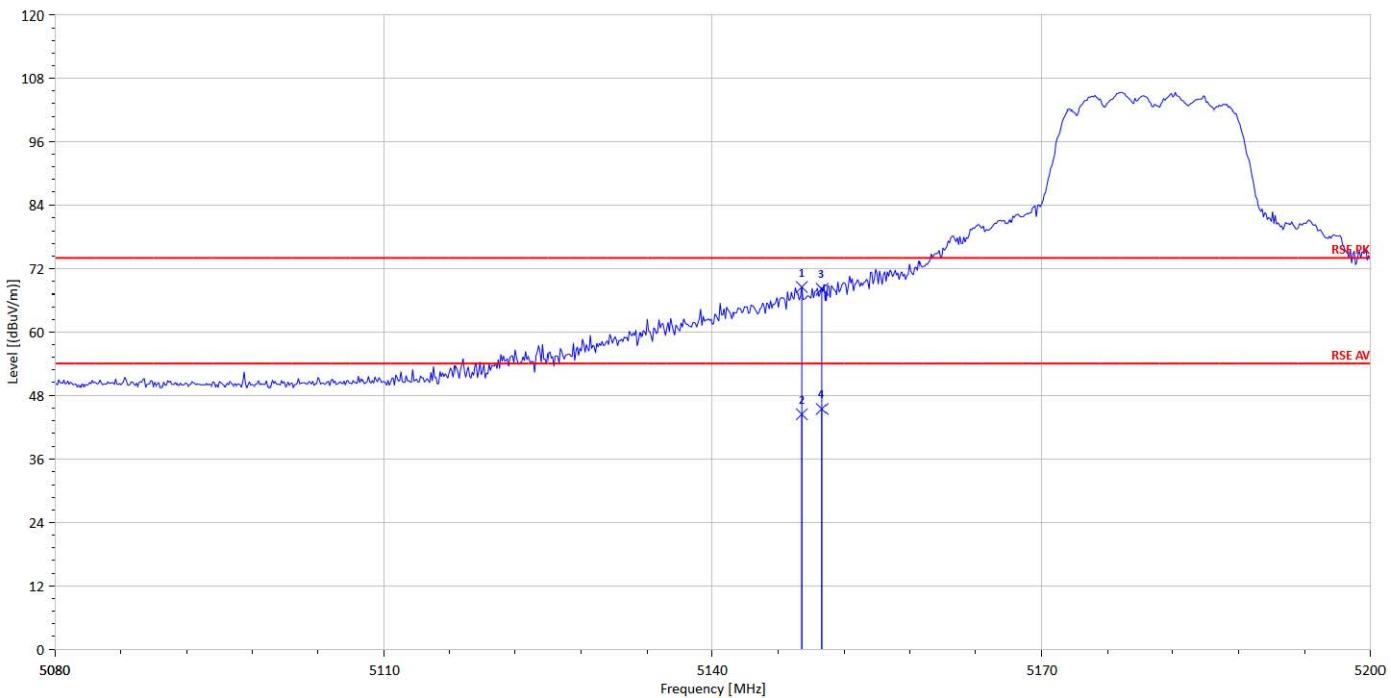
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5149.24	S	Peak	62.98	8.19	71.17	74	-2.83
5149.24	S	Average	38.36	8.19	46.55	54	-7.45
5150.00	E	Peak	61.43	8.19	69.62	74	-4.38
5150.00	E	Average	39.02	8.19	47.21	54	-6.79

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Operation Mode : 802.11aB1 Test Date : 2017/10/20  
Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



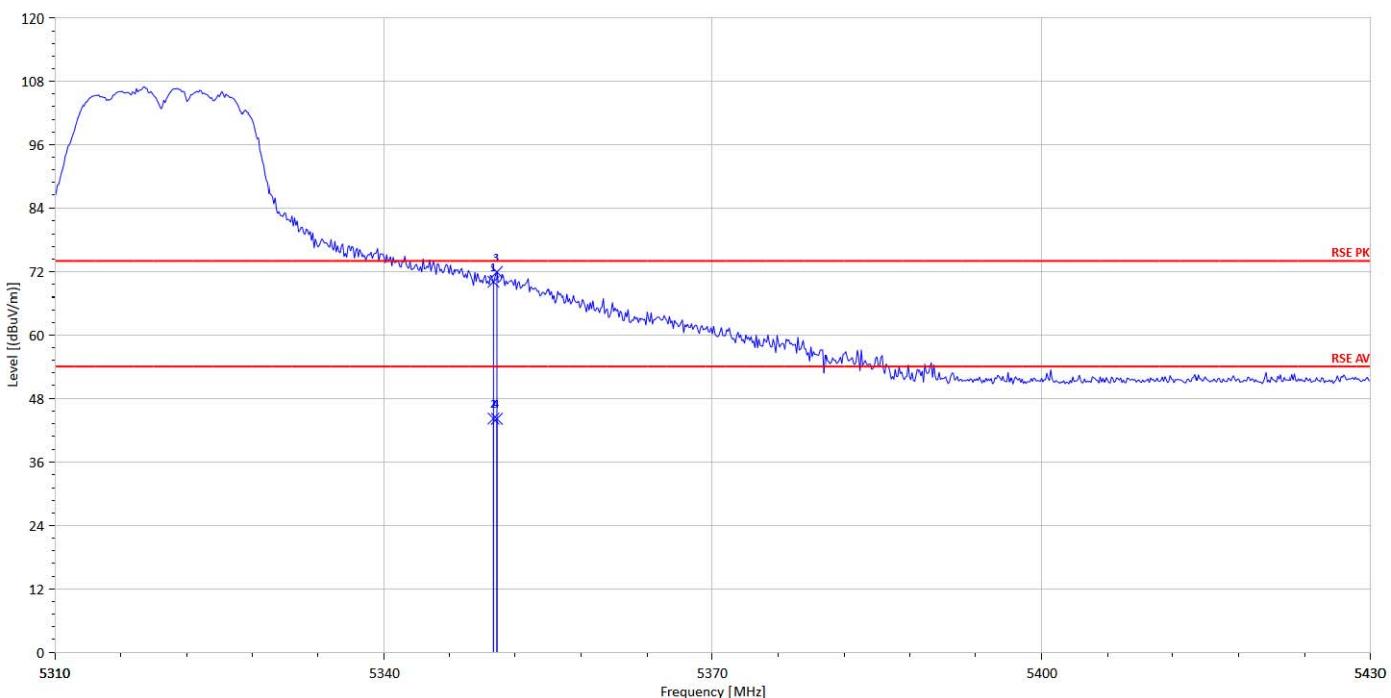
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5148.16	S	Peak	60.25	8.18	68.43	74	-5.57
5148.16	S	Average	36.32	8.18	44.50	54	-9.50
5150.00	E	Peak	59.90	8.19	68.09	74	-5.91
5150.00	E	Average	37.32	8.19	45.51	54	-8.49

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Operation Mode : 802.11aB2      Test Date : 2017/10/20  
 Fundamental Frequency : 5320 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



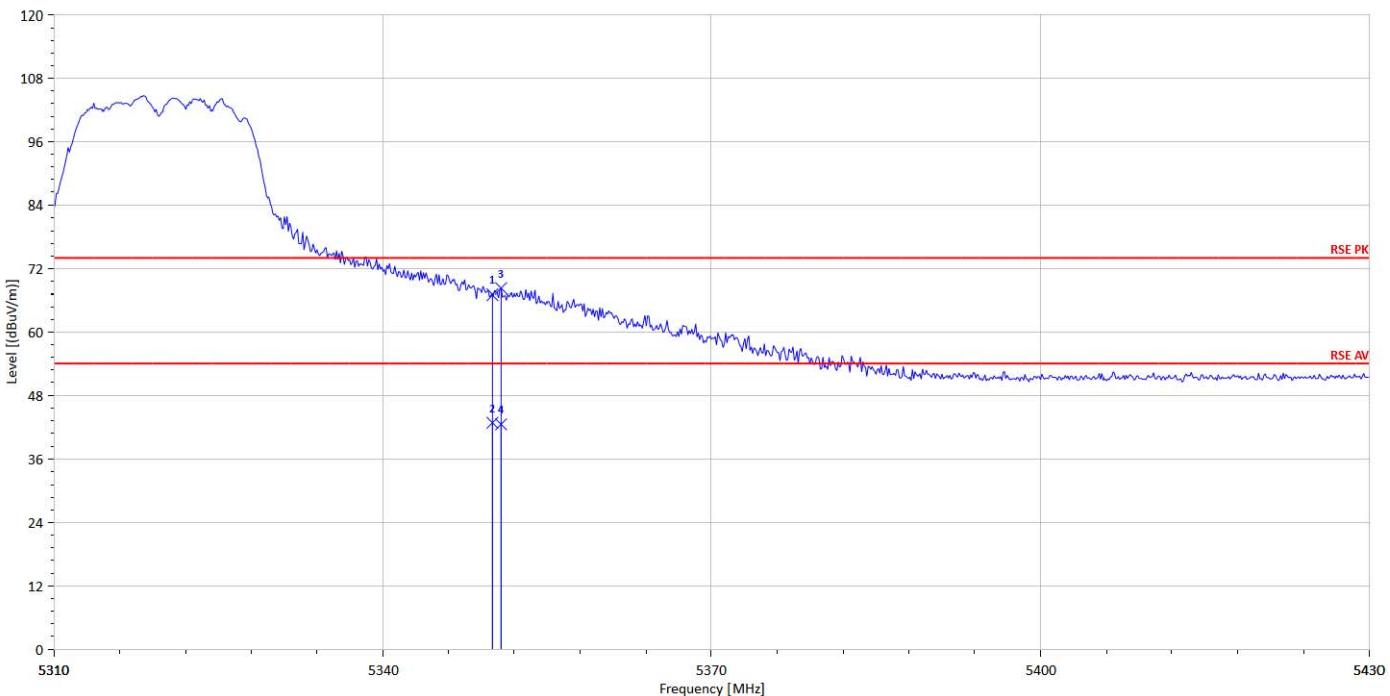
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	E	Peak	61.04	8.96	70.01	74	-3.99
5350.00	E	Average	35.29	8.96	44.25	54	-9.75
5350.32	S	Peak	62.92	8.97	71.89	74	-2.11
5350.32	S	Average	35.24	8.97	44.21	54	-9.79

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Operation Mode : 802.11aB2 Test Date : 2017/10/20  
Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



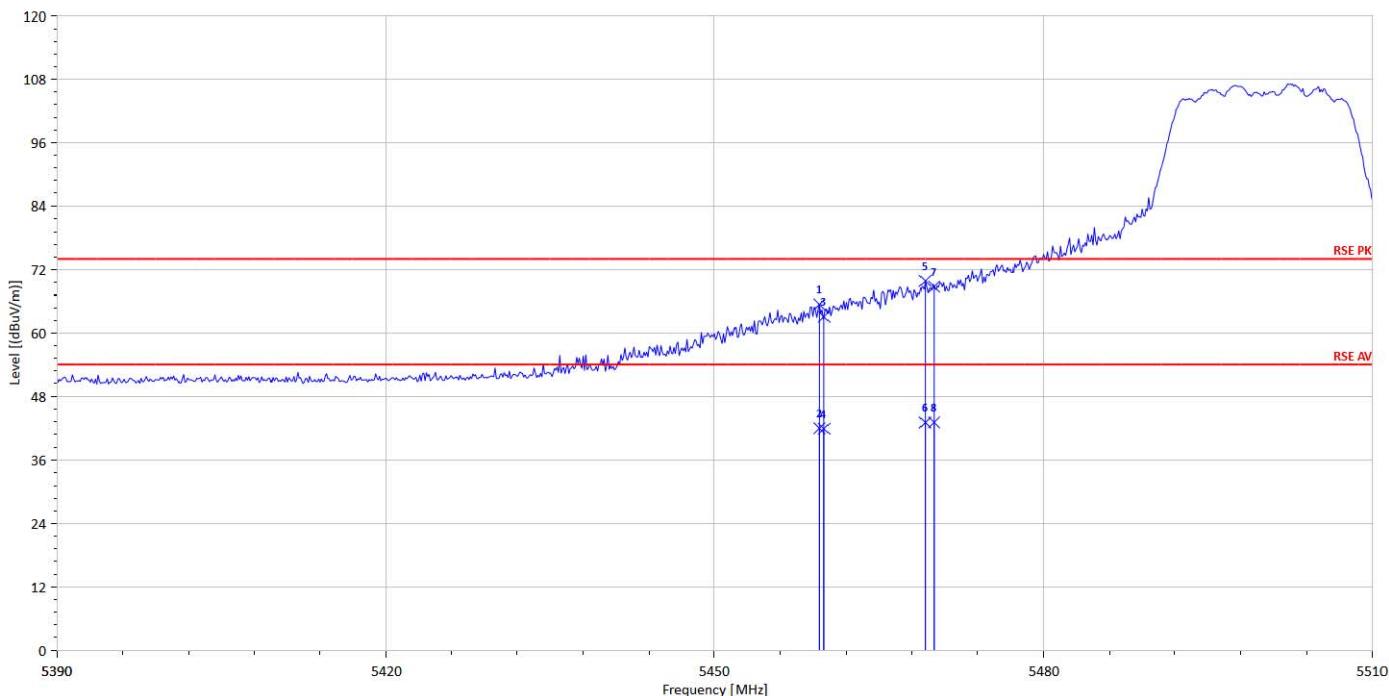
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level		Factor	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			Reading	Level dB $\mu$ V				
5350.00	E	Peak	58.10	8.96	67.06	74	-6.94	
5350.00	E	Average	33.92	8.96	42.88	54	-11.12	
5350.80	S	Peak	59.27	8.98	68.24	74	-5.76	
5350.80	S	Average	33.59	8.98	42.57	54	-11.43	

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Operation Mode : 802.11aB3 Test Date : 2017/11/28  
 Fundamental Frequency : 5500 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



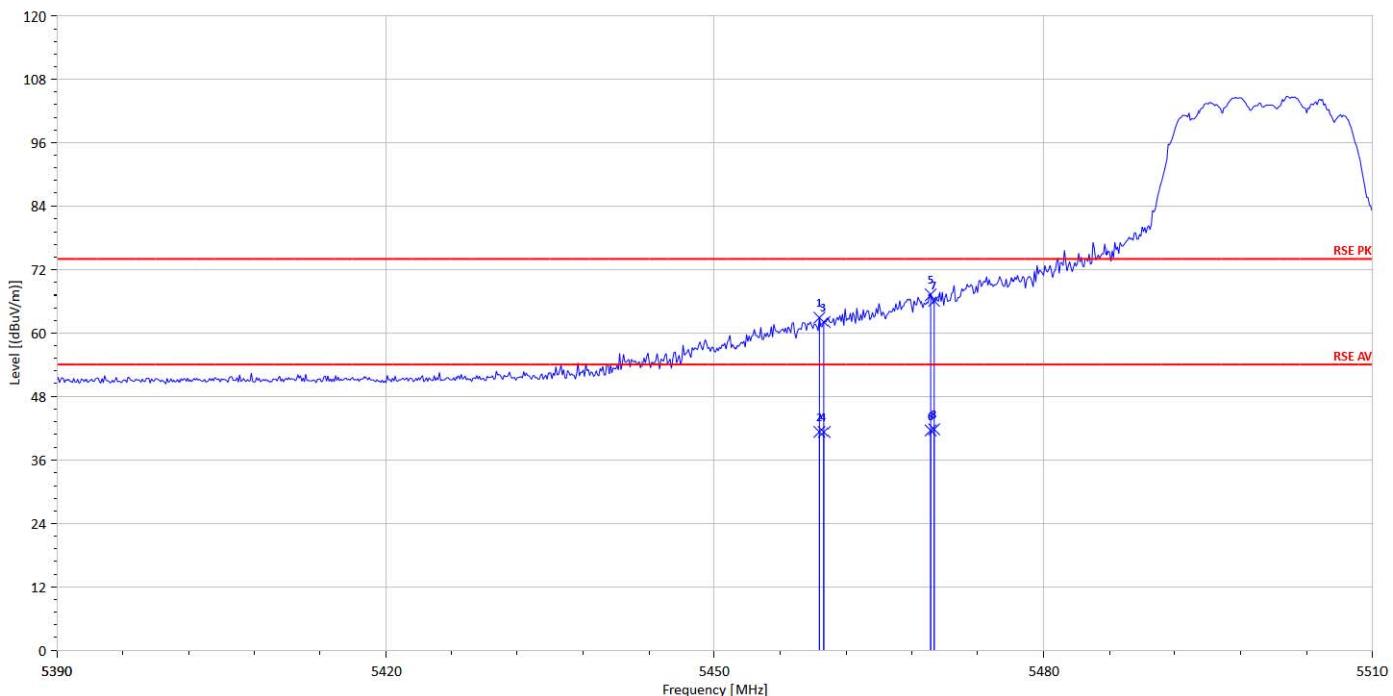
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5459.60	S	Peak	56.60	8.89	65.49	74	-8.51
5459.60	S	Average	33.13	8.89	42.02	54	-11.98
5460.00	E	Peak	54.25	8.88	63.13	74	-10.87
5460.00	E	Average	33.05	8.88	41.93	54	-12.07
5469.20	S	Peak	61.01	8.80	69.80	74	-4.20
5469.20	S	Average	34.31	8.80	43.11	54	-10.89
5470.00	E	Peak	59.92	8.79	68.70	74	-5.30
5470.00	E	Average	34.35	8.79	43.14	54	-10.86

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Operation Mode : 802.11aB3 Test Date : 2017/11/28  
 Fundamental Frequency : 5500 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Horizontal



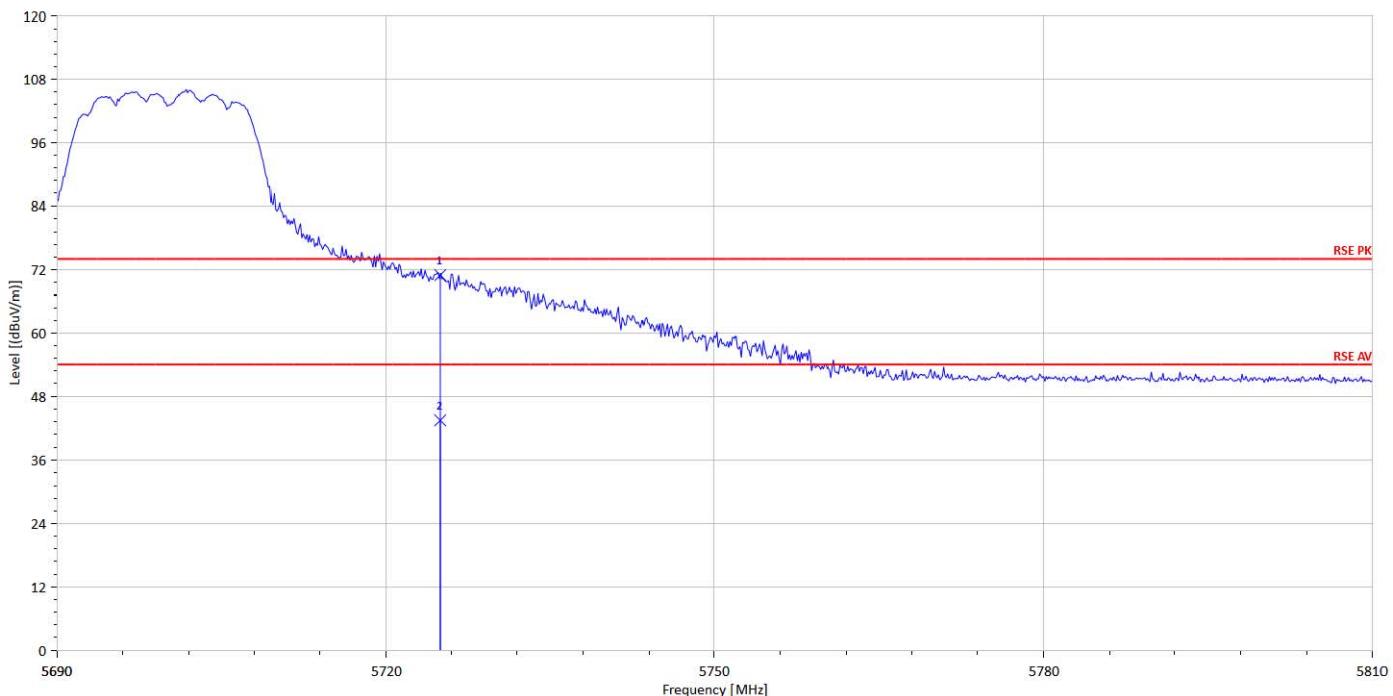
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5459.60	S	Peak	54.07	8.89	62.96	74	-11.04
5459.60	S	Average	32.43	8.89	41.32	54	-12.68
5460.00	E	Peak	53.26	8.88	62.14	74	-11.86
5460.00	E	Average	32.42	8.88	41.30	54	-12.70
5469.68	S	Peak	58.44	8.79	67.23	74	-6.77
5469.68	S	Average	32.81	8.79	41.60	54	-12.40
5470.00	E	Peak	57.40	8.79	66.19	74	-7.81
5470.00	E	Average	33.03	8.79	41.82	54	-12.18

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Operation Mode : 802.11aB3 Test Date : 2017/10/18  
Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH HIGH Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



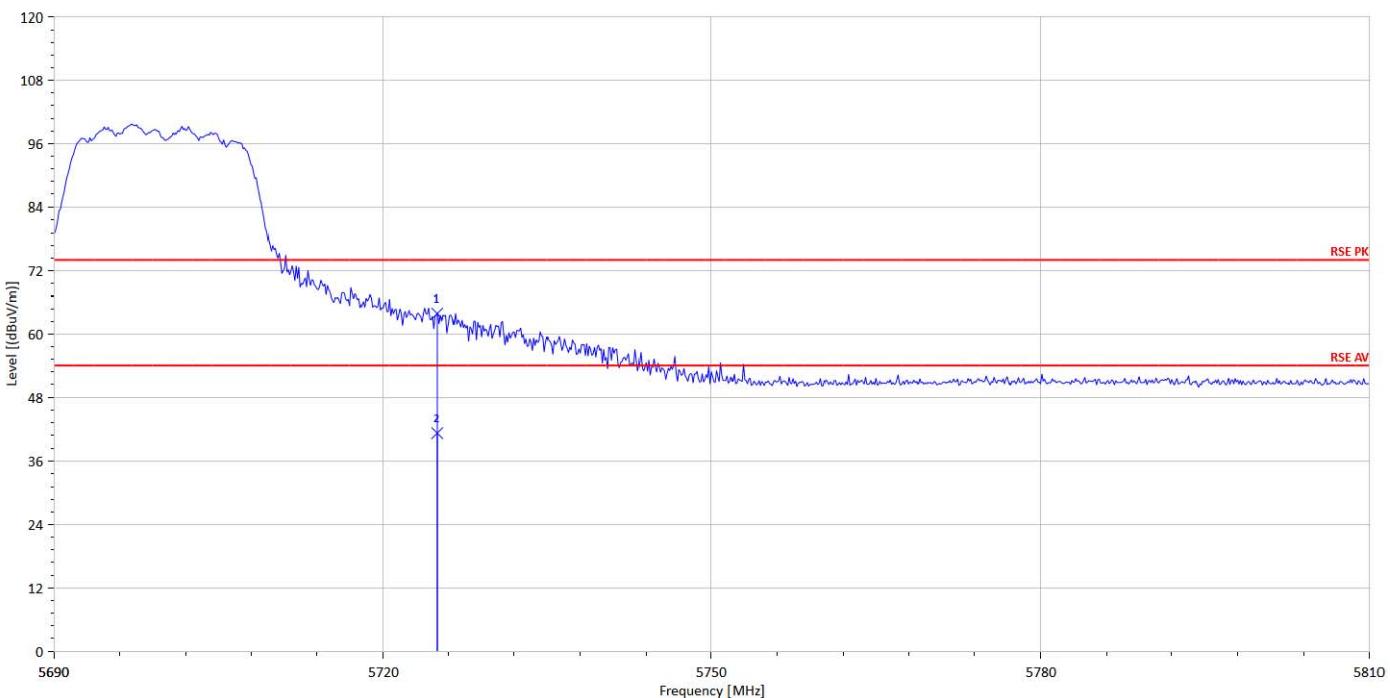
Freq.	Note	Detector Mode	Spectrum Reading	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	Level dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
5725.00	E	Peak	61.61	9.30	70.91	74	-3.09
5725.00	E	Average	34.22	9.30	43.52	54	-10.48

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Operation Mode : 802.11aB3 Test Date : 2017/10/18  
Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH HIGH Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



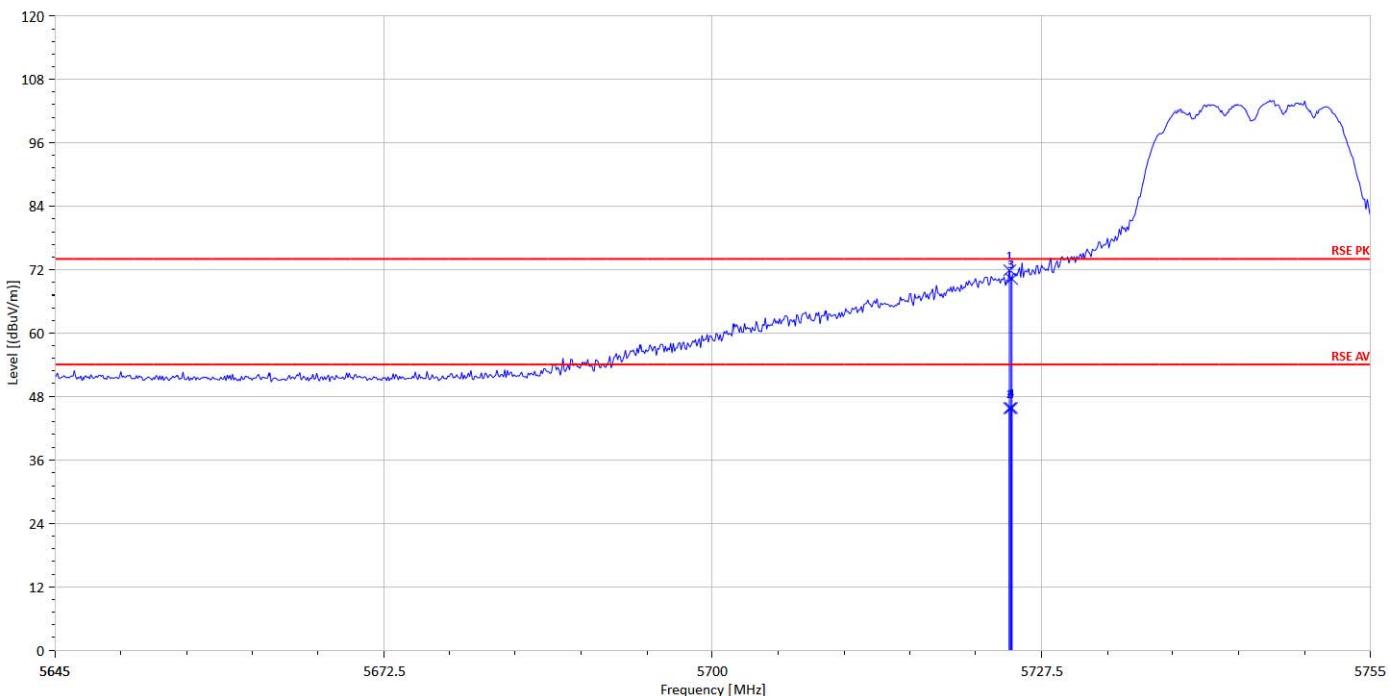
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	E	Peak	54.62	9.30	63.92	74	-10.08
5725.00	E	Average	31.97	9.30	41.27	54	-12.73

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Operation Mode : 802.11aB4      Test Date : 2017/10/20  
 Fundamental Frequency : 5745 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5724.86	S	Peak	62.53	9.30	71.83	74	-2.17
5724.86	S	Average	36.55	9.30	45.85	54	-8.15
5725.00	E	Peak	60.89	9.30	70.19	74	-3.81
5725.00	E	Average	36.59	9.30	45.89	54	-8.11

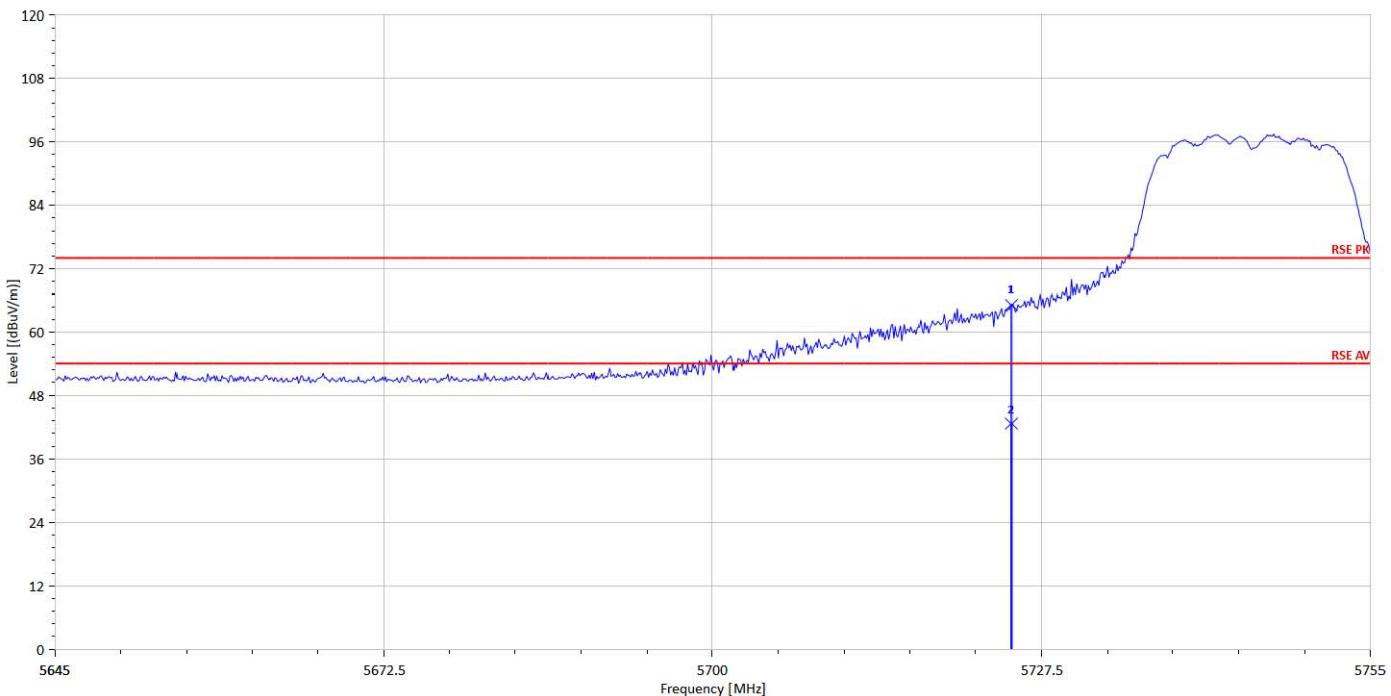
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Operation Mode : 802.11aB4 Test Date : 2017/10/20  
Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH LOW Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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	E	Peak	55.89	9.30	65.19	74	-8.81
5725.00	E	Average	33.42	9.30	42.72	54	-11.28

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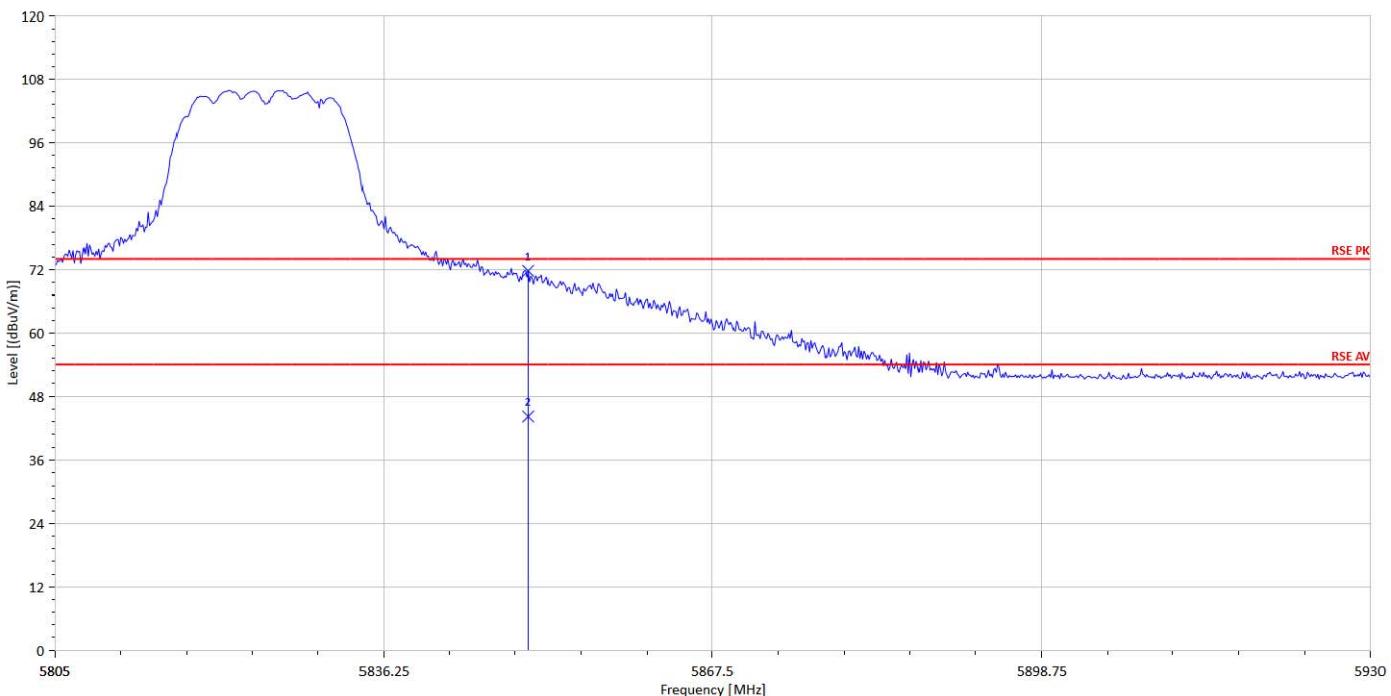
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Operation Mode : 802.11aB4      Test Date : 2017/10/20  
 Fundamental Frequency : 5825 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



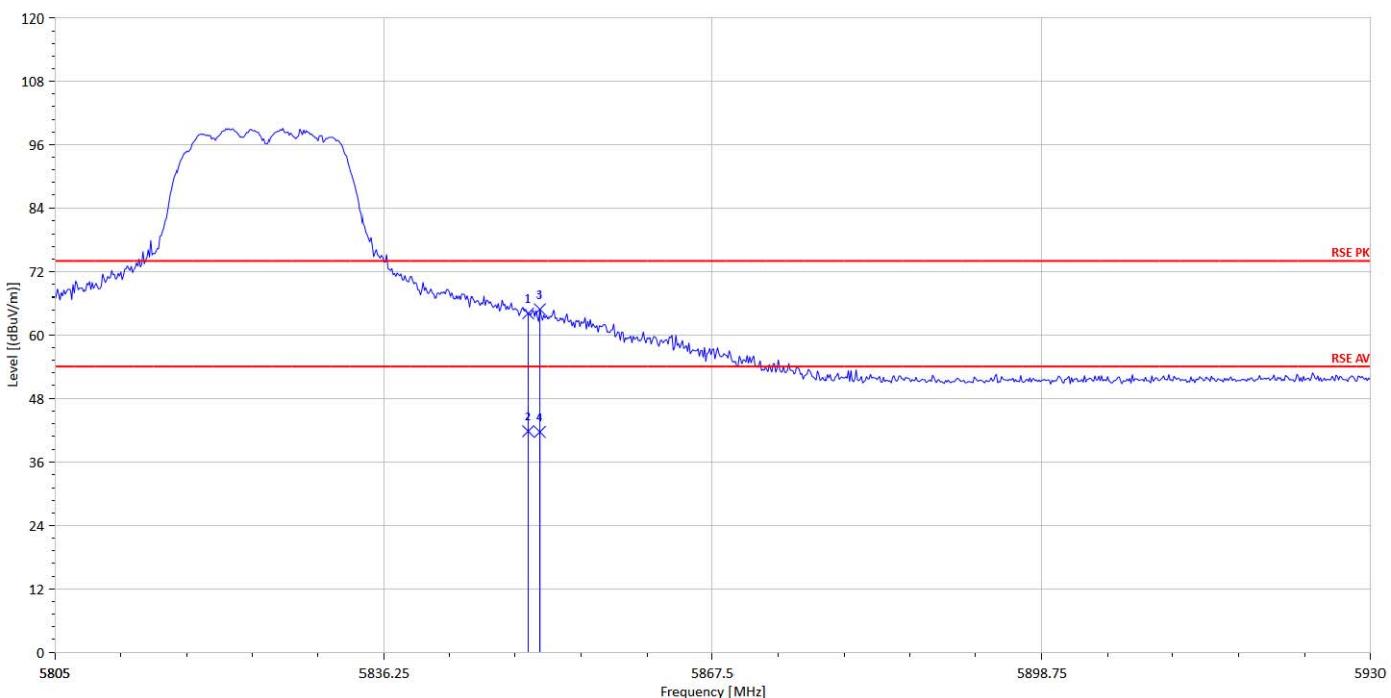
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	E	Peak	62.23	9.49	71.72	74	-2.28
5850.00	E	Average	34.77	9.49	44.26	54	-9.74

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Operation Mode : 802.11aB4      Test Date : 2017/10/20  
 Fundamental Frequency : 5825 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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	E	Peak	54.67	9.49	64.16	74	-9.84
5850.00	E	Average	32.34	9.49	41.83	54	-12.17
5851.13	S	Peak	55.43	9.51	64.94	74	-9.06
5851.13	S	Average	32.19	9.51	41.70	54	-12.30

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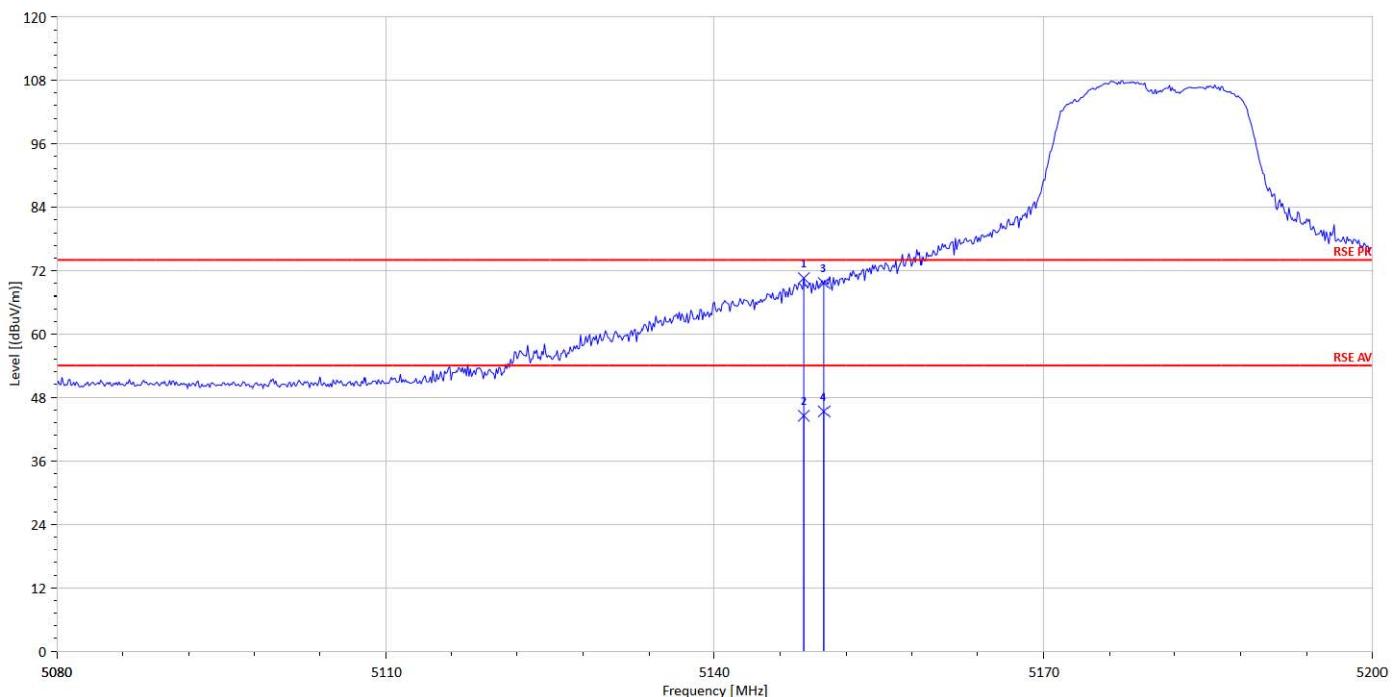
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## Band edge falling to restricted band

## 802.11n\_VHT20 mode

Operation Mode : 802.11ac20B1 Test Date : 2017/10/20  
 Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH Low Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5148.16	S	Peak	62.33	8.18	70.51	74	-3.49
5148.16	S	Average	36.41	8.18	44.59	54	-9.41
5150.00	E	Peak	61.39	8.19	69.58	74	-4.42
5150.00	E	Average	37.24	8.19	45.43	54	-8.57

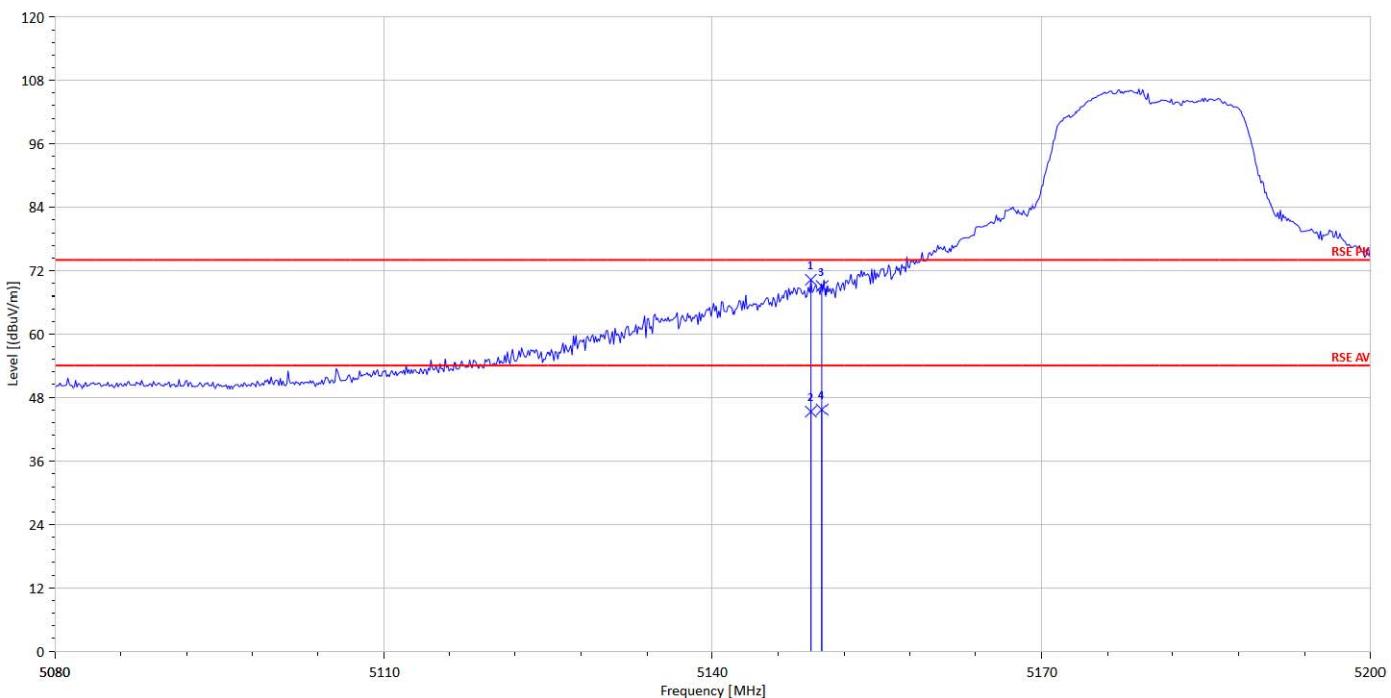
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Operation Mode : 802.11ac20B1 Test Date : 2017/10/20  
Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5149.00	S	Peak	62.03	8.19	70.21	74	-3.79
5149.00	S	Average	37.21	8.19	45.40	54	-8.60
5150.00	E	Peak	60.79	8.19	68.99	74	-5.01
5150.00	E	Average	37.58	8.19	45.77	54	-8.23

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台灣檢驗科技股份有限公司

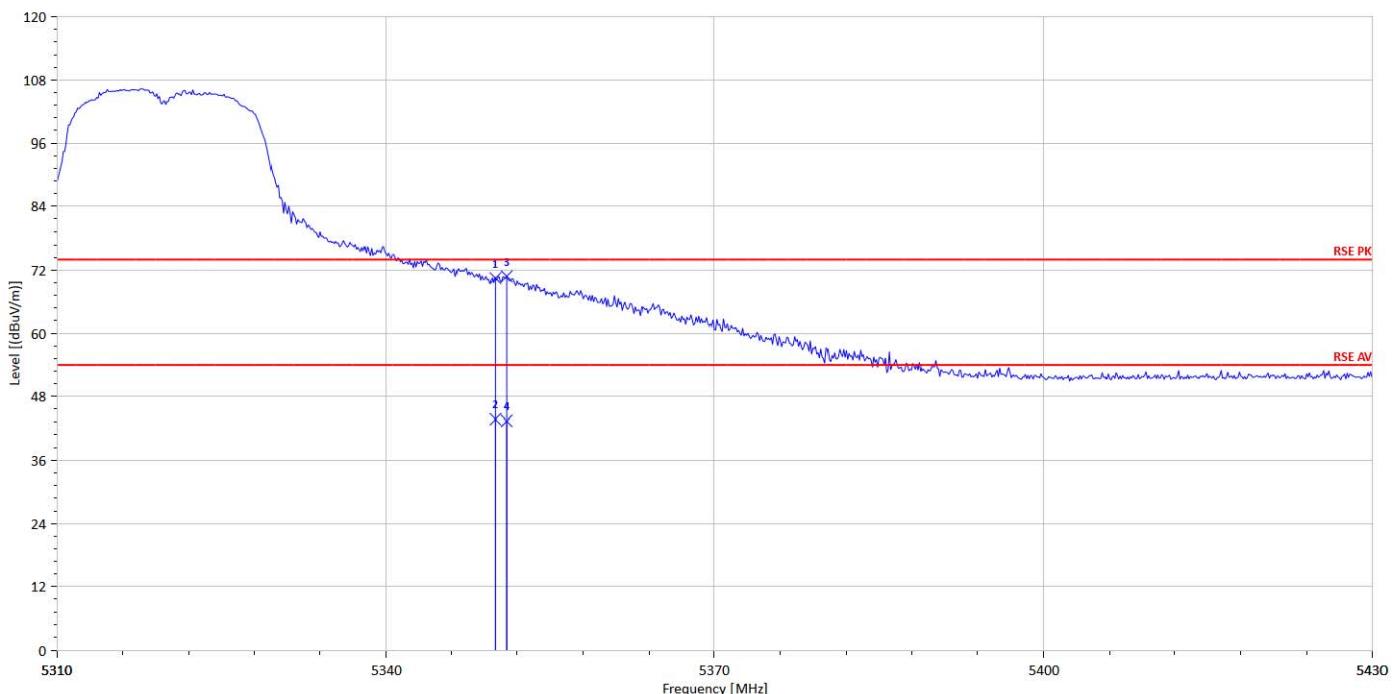
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Operation Mode : 802.11ac20B2 Test Date : 2017/10/20  
Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5350.00	E	Peak	61.48	8.96	70.45	74	-3.55
5350.00	E	Average	34.77	8.96	43.73	54	-10.27
5351.04	S	Peak	61.82	8.98	70.80	74	-3.20
5351.04	S	Average	34.43	8.98	43.41	54	-10.59

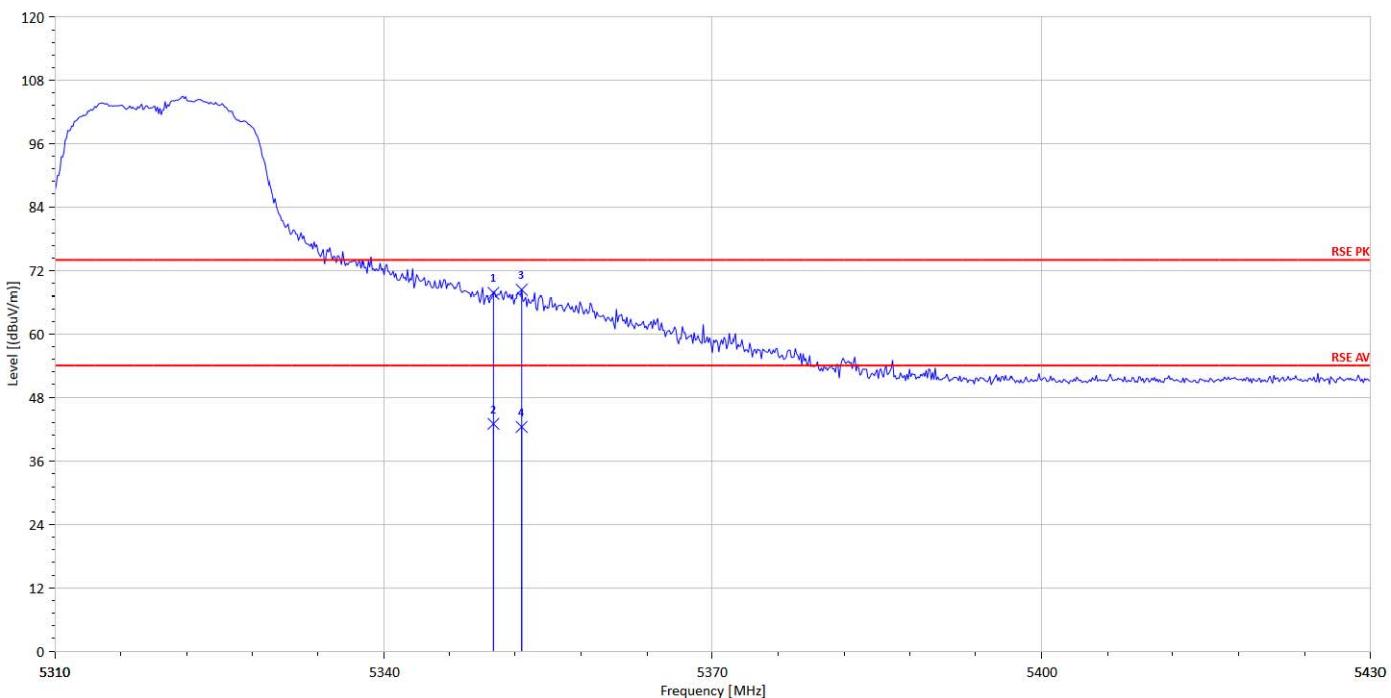
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Operation Mode : 802.11ac20B2 Test Date : 2017/10/20  
Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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
5350.00	E	Peak	58.76	8.96	67.72	74	-6.28
5350.00	E	Average	34.09	8.96	43.05	54	-10.95
5352.60	S	Peak	59.32	8.99	68.31	74	-5.69
5352.60	S	Average	33.48	8.99	42.47	54	-11.53

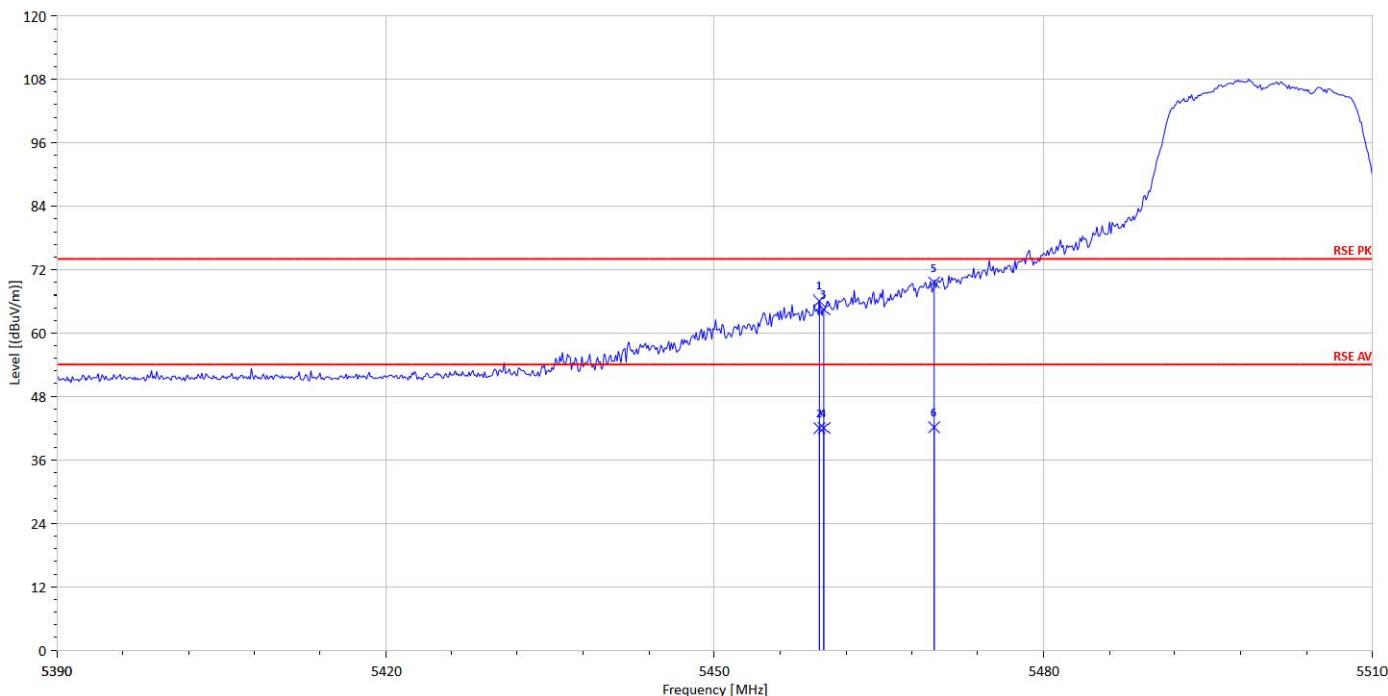
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Operation Mode : 802.11ac20B3  
Fundamental Frequency : 5500 MHz  
Operation Band : BE CH Low  
EUT Pol. : H

Test Date : 2017/11/28  
Temp. / Humi. : 22.7deg\_C/57RH  
Test Engineer : Ashton  
Measurement Antenna Pol. : Vertical



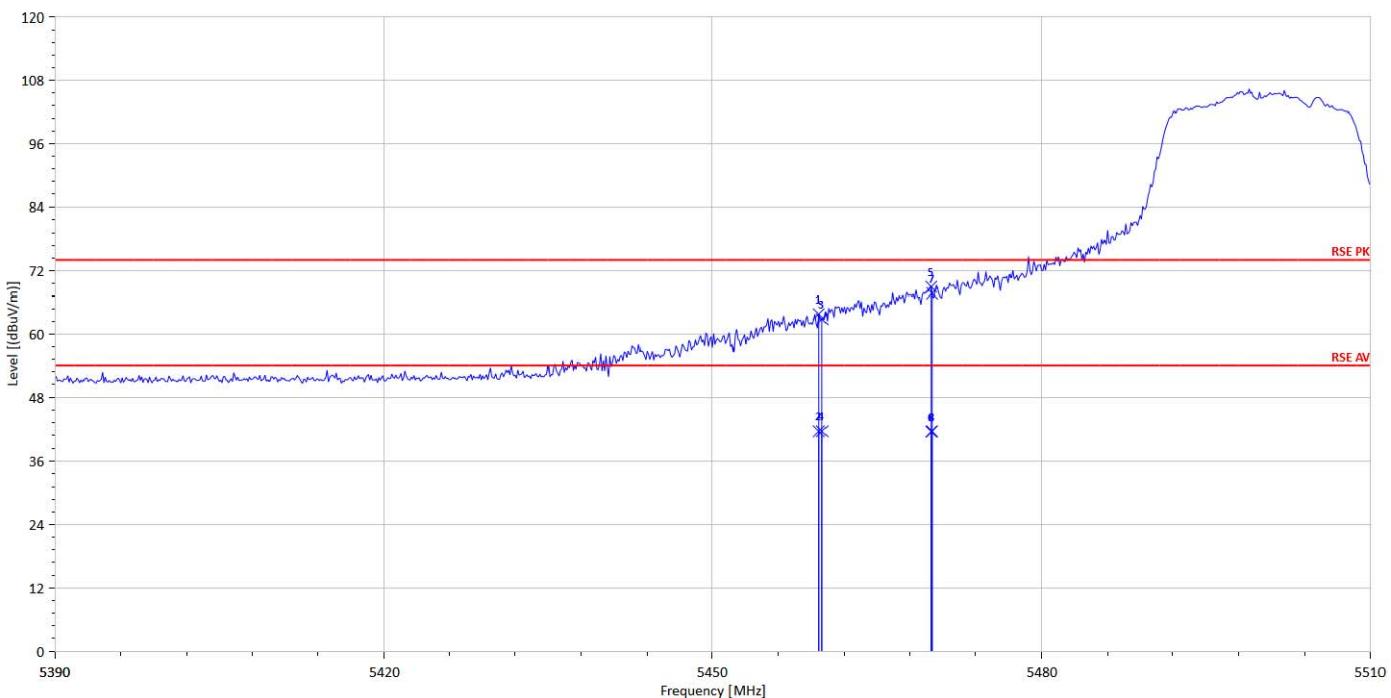
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			Factor dB				
5459.60	S	Peak	57.24	8.89	66.13	74	-7.87
5459.60	S	Average	33.15	8.89	42.04	54	-11.96
5460.00	E	Peak	55.68	8.88	64.57	74	-9.43
5460.00	E	Average	33.20	8.88	42.08	54	-11.92
5470.00	E	Peak	60.73	8.79	69.52	74	-4.48
5470.00	E	Average	33.42	8.79	42.21	54	-11.79

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Operation Mode : 802.11ac20B3      Test Date : 2017/11/28  
 Fundamental Frequency : 5500 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH Low      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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
5459.72	S	Peak	54.92	8.89	63.81	74	-10.19
5459.72	S	Average	32.74	8.89	41.63	54	-12.37
5460.00	E	Peak	53.95	8.88	62.84	74	-11.16
5460.00	E	Average	32.75	8.88	41.63	54	-12.37
5469.92	S	Peak	60.13	8.79	68.92	74	-5.08
5469.92	S	Average	32.78	8.79	41.57	54	-12.43
5470.00	E	Peak	58.93	8.79	67.72	74	-6.28
5470.00	E	Average	32.83	8.79	41.62	54	-12.38

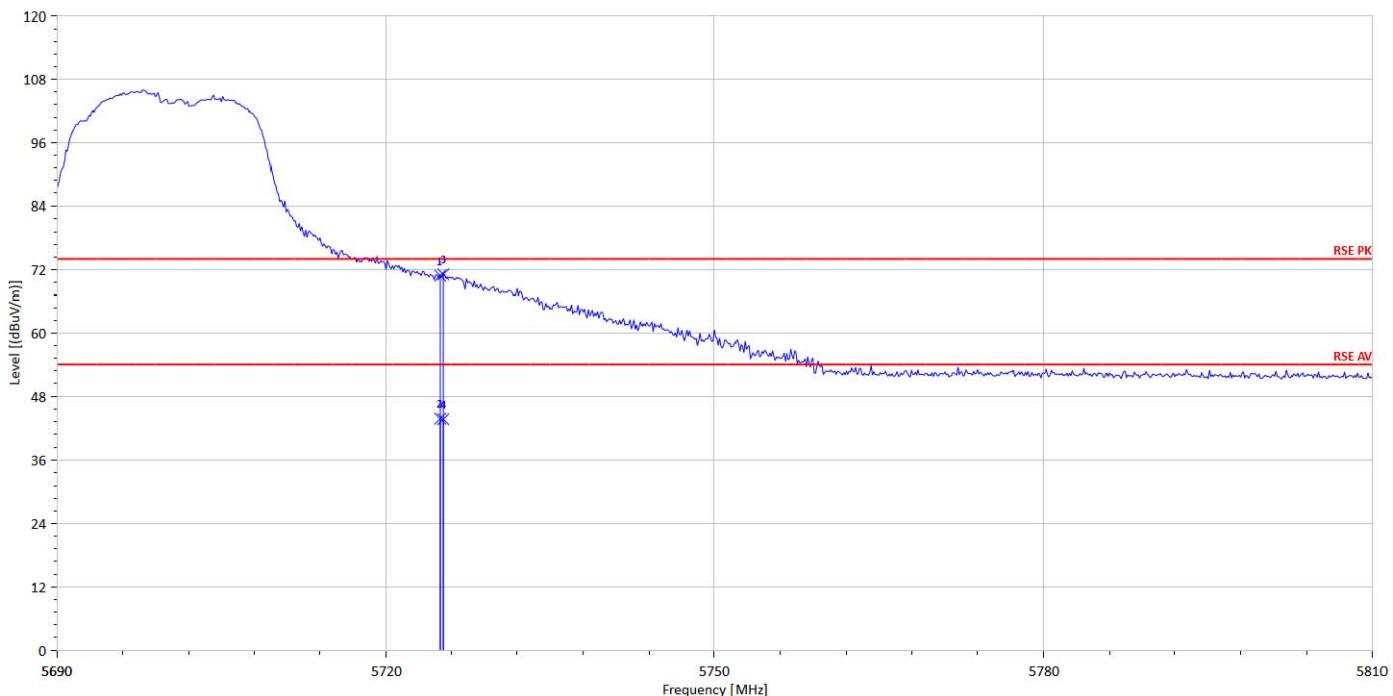
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Operation Mode : 802.11ac20B3      Test Date : 2017/10/20  
 Fundamental Frequency : 5700 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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	E	Peak	61.52	9.30	70.82	74	-3.18
5725.00	E	Average	34.56	9.30	43.86	54	-10.14
5725.28	S	Peak	61.77	9.30	71.07	74	-2.93
5725.28	S	Average	34.45	9.30	43.75	54	-10.25

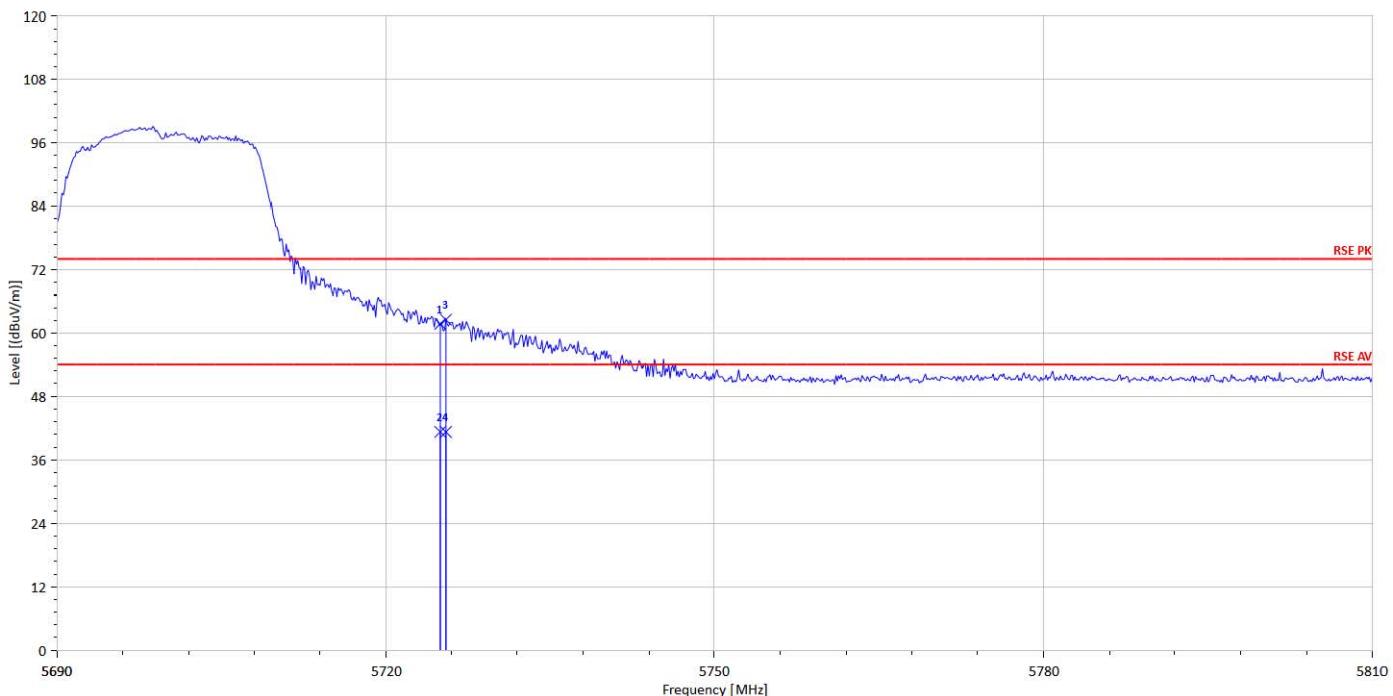
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Operation Mode : 802.11ac20B3 Test Date : 2017/10/20  
Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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	E	Peak	52.48	9.30	61.78	74	-12.22
5725.00	E	Average	32.03	9.30	41.33	54	-12.67
5725.52	S	Peak	53.27	9.30	62.58	74	-11.42
5725.52	S	Average	32.01	9.30	41.31	54	-12.69

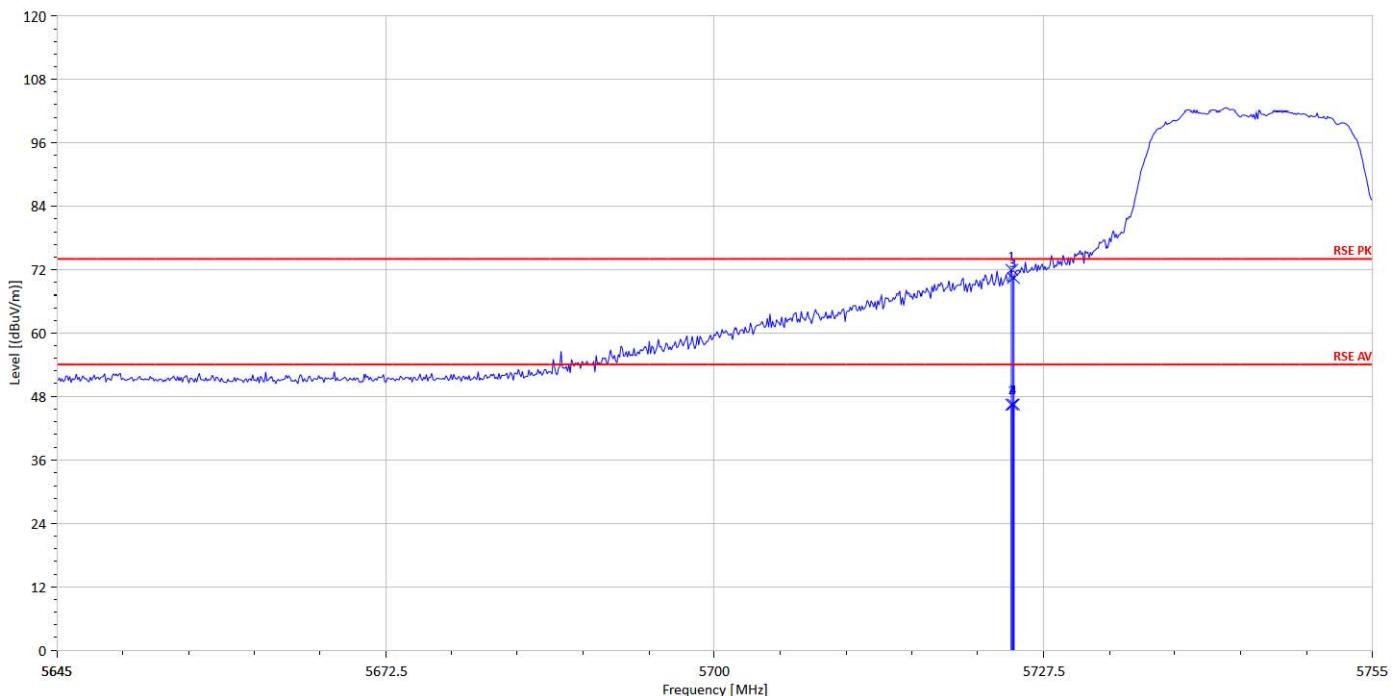
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Operation Mode : 802.11ac20B4      Test Date : 2017/10/18  
Fundamental Frequency : 5745 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH LOW      Test Engineer : Ashton  
EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5724.86	S	Peak	62.64	9.30	71.94	74	-2.06
5724.86	S	Average	37.22	9.30	46.52	54	-7.48
5725.00	E	Peak	61.04	9.30	70.34	74	-3.66
5725.00	E	Average	37.27	9.30	46.57	54	-7.43

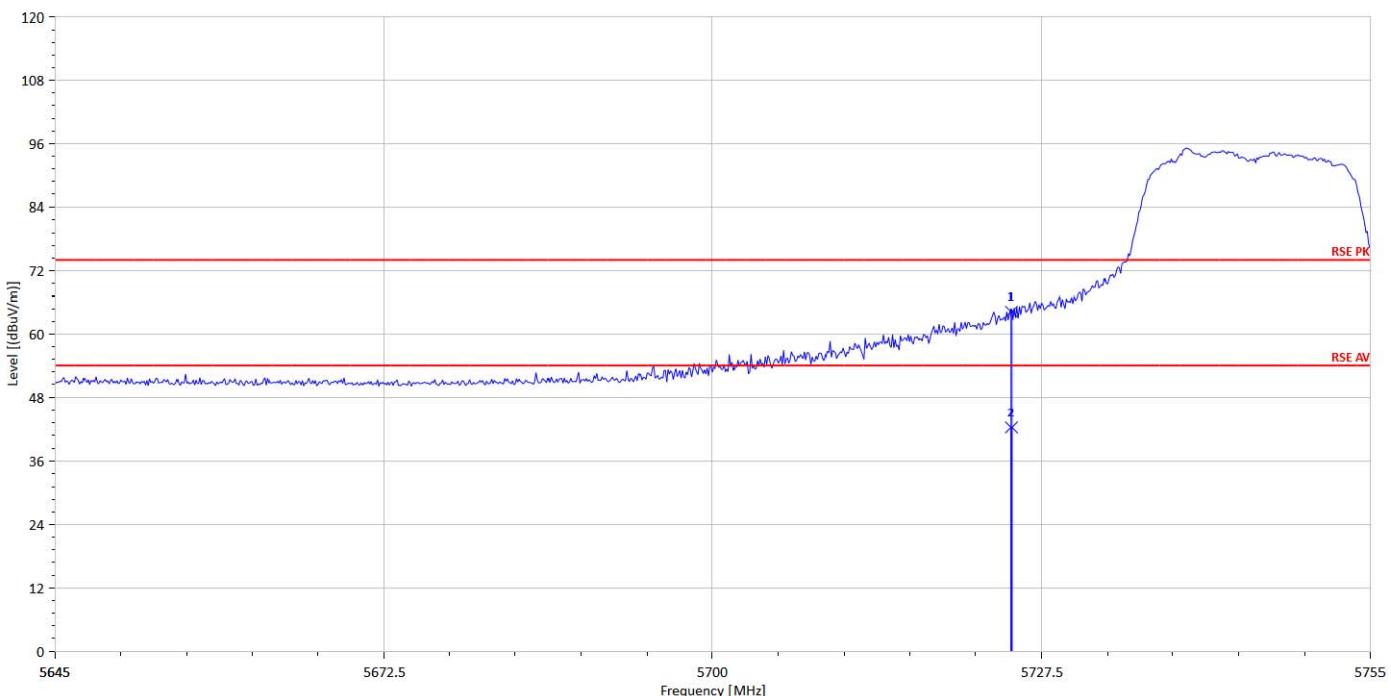
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Operation Mode : 802.11ac20B4      Test Date : 2017/10/18  
 Fundamental Frequency : 5745 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



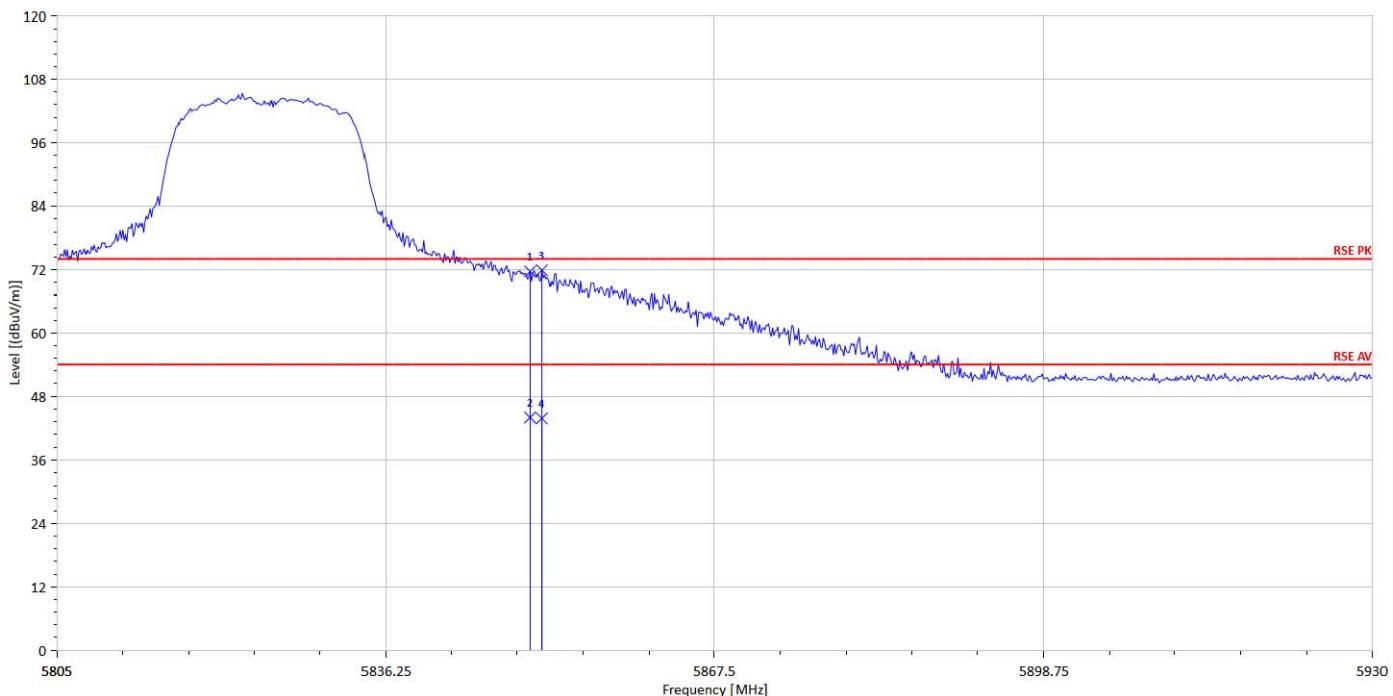
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	E	Peak	54.98	9.30	64.28	74	-9.72
5725.00	E	Average	33.08	9.30	42.38	54	-11.62

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Operation Mode : 802.11ac20B4      Test Date : 2017/10/21  
 Fundamental Frequency : 5825 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH HIGH      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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	E	Peak	62.12	9.49	71.60	74	-2.40
5850.00	E	Average	34.58	9.49	44.07	54	-9.93
5851.13	S	Peak	62.34	9.51	71.85	74	-2.15
5851.13	S	Average	34.39	9.51	43.90	54	-10.10

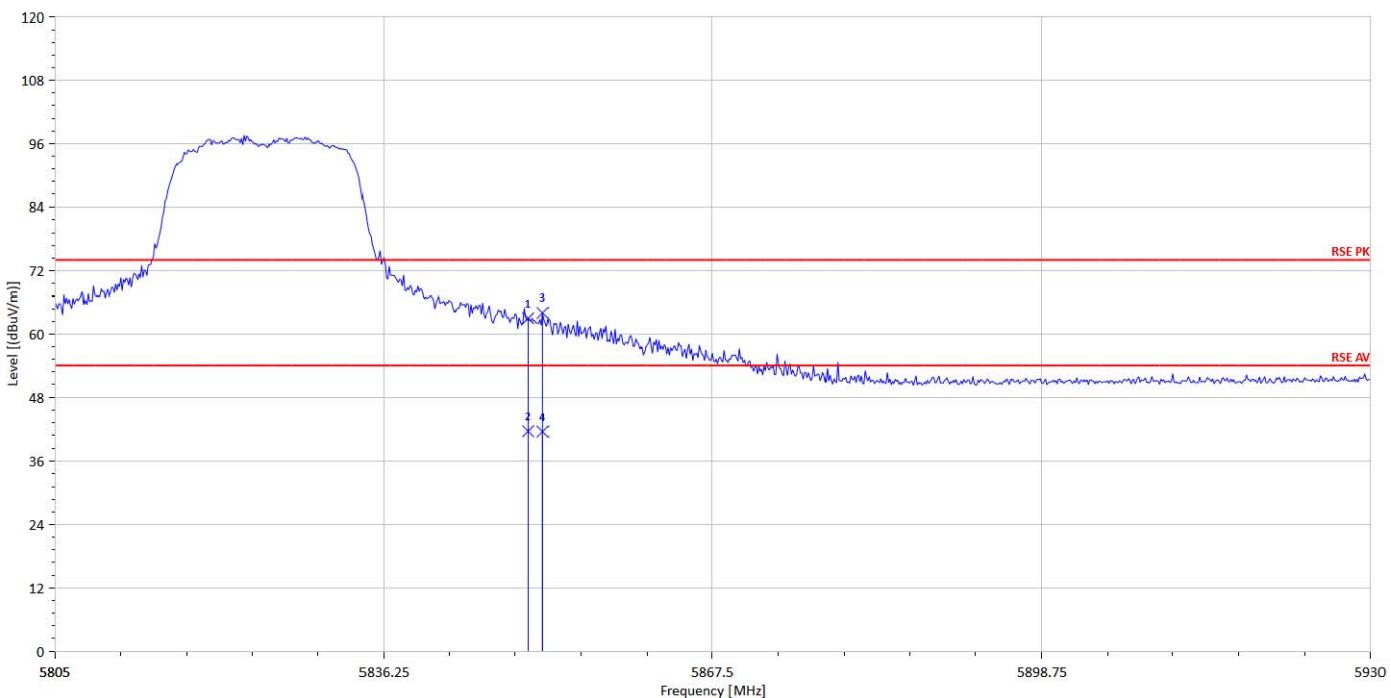
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Operation Mode : 802.11ac20B4 Test Date : 2017/10/18  
Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH HIGH Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level		Factor	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			Reading	Level dB $\mu$ V				
5850.00	E	Peak	53.54	9.49	63.03	74	-10.97	
5850.00	E	Average	32.15	9.49	41.64	54	-12.36	
5851.38	S	Peak	54.53	9.51	64.05	74	-9.95	
5851.38	S	Average	32.06	9.51	41.57	54	-12.43	

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

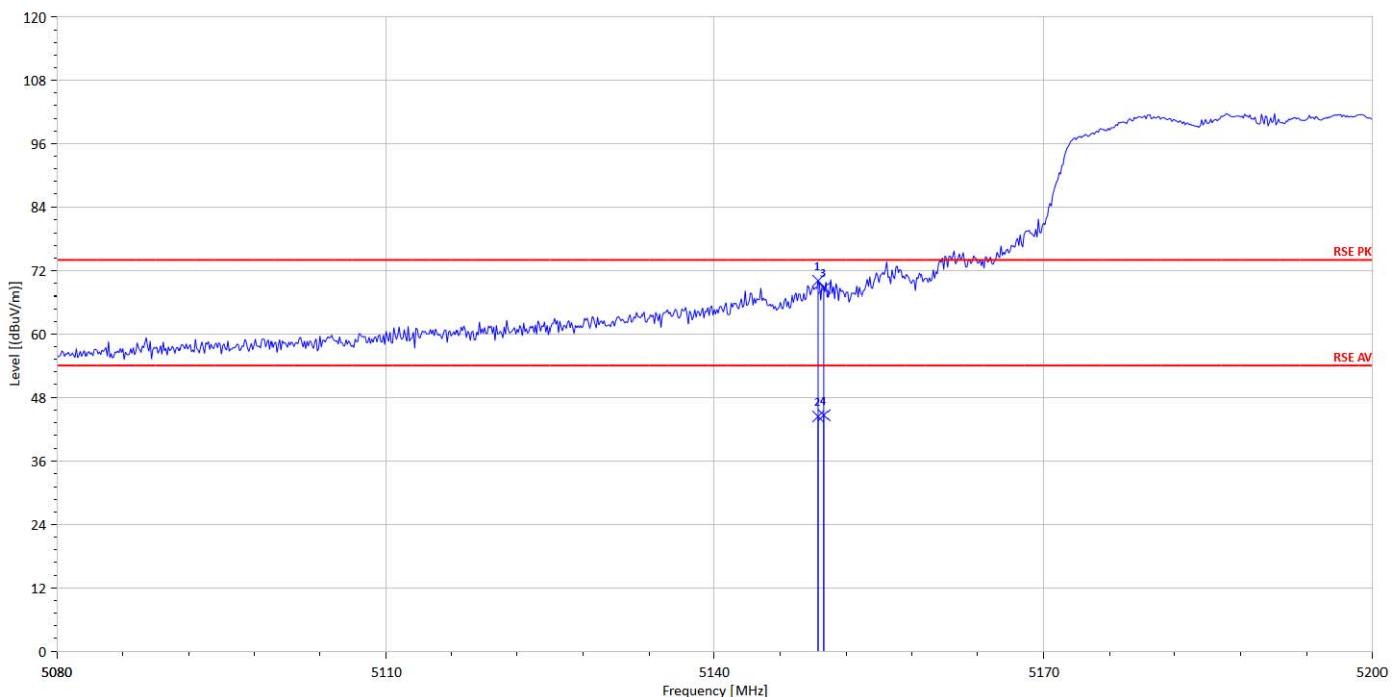
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## Band edge falling to restricted band

## 802.11n\_VHT40 mode

Operation Mode : 802.11ac40B1 Test Date : 2017/10/20  
 Fundamental Frequency : 5190 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5149.48	S	Peak	61.84	8.19	70.02	74	-3.98
5149.48	S	Average	36.27	8.19	44.46	54	-9.54
5150.00	E	Peak	60.46	8.19	68.65	74	-5.35
5150.00	E	Average	36.51	8.19	44.70	54	-9.30

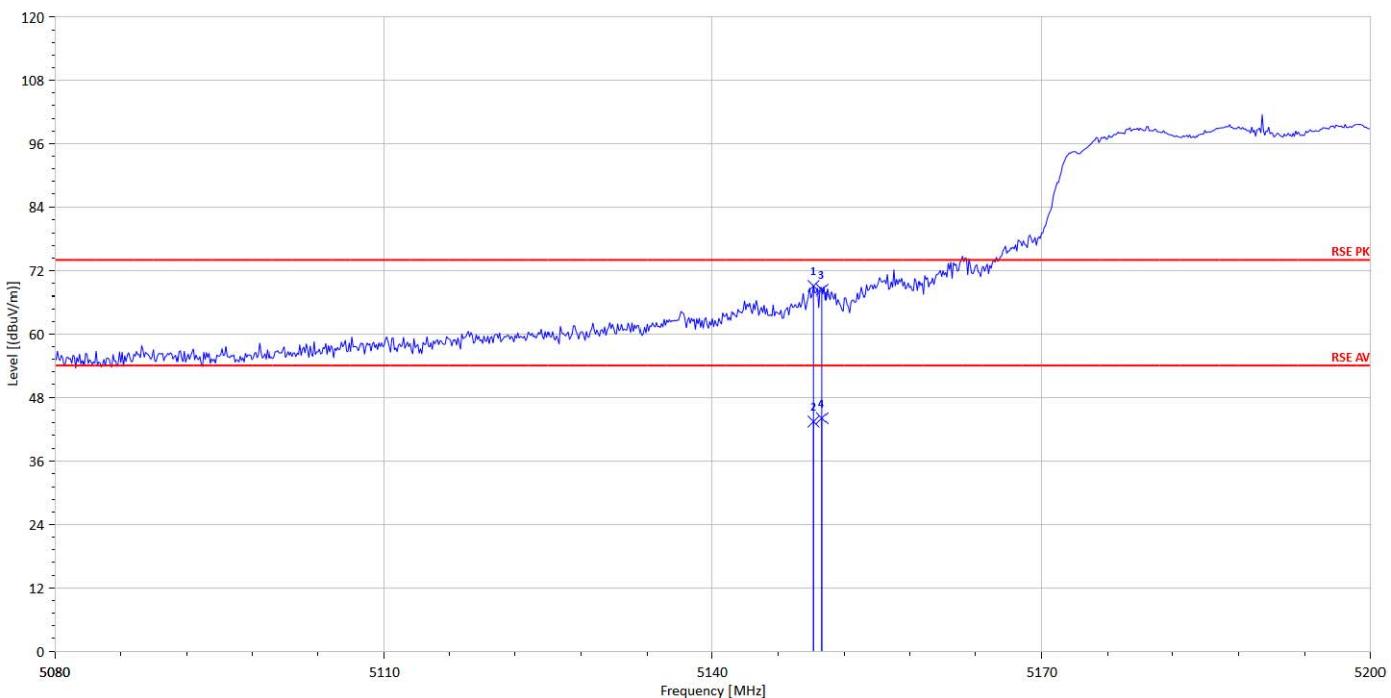
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Operation Mode : 802.11ac40B1 Test Date : 2017/10/20  
 Fundamental Frequency : 5190 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
5149.24	S	Peak	60.84	8.19	69.03	74	-4.97
5149.24	S	Average	35.29	8.19	43.48	54	-10.52
5150.00	E	Peak	60.13	8.19	68.32	74	-5.68
5150.00	E	Average	35.94	8.19	44.13	54	-9.87

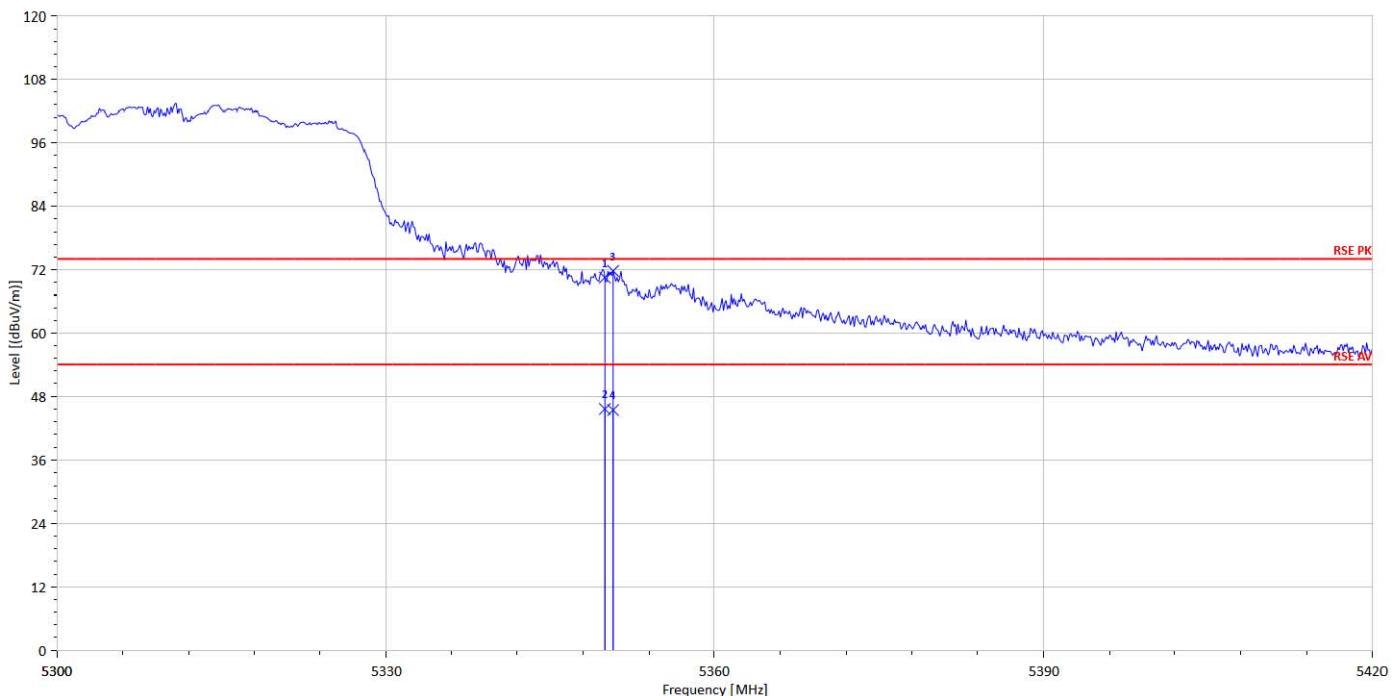
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Operation Mode : 802.11ac40B2      Test Date : 2017/10/20  
 Fundamental Frequency : 5310 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5350.00	E	Peak	61.49	8.96	70.45	74	-3.55
5350.00	E	Average	36.73	8.96	45.69	54	-8.31
5350.76	S	Peak	62.74	8.98	71.72	74	-2.28
5350.76	S	Average	36.52	8.98	45.50	54	-8.50

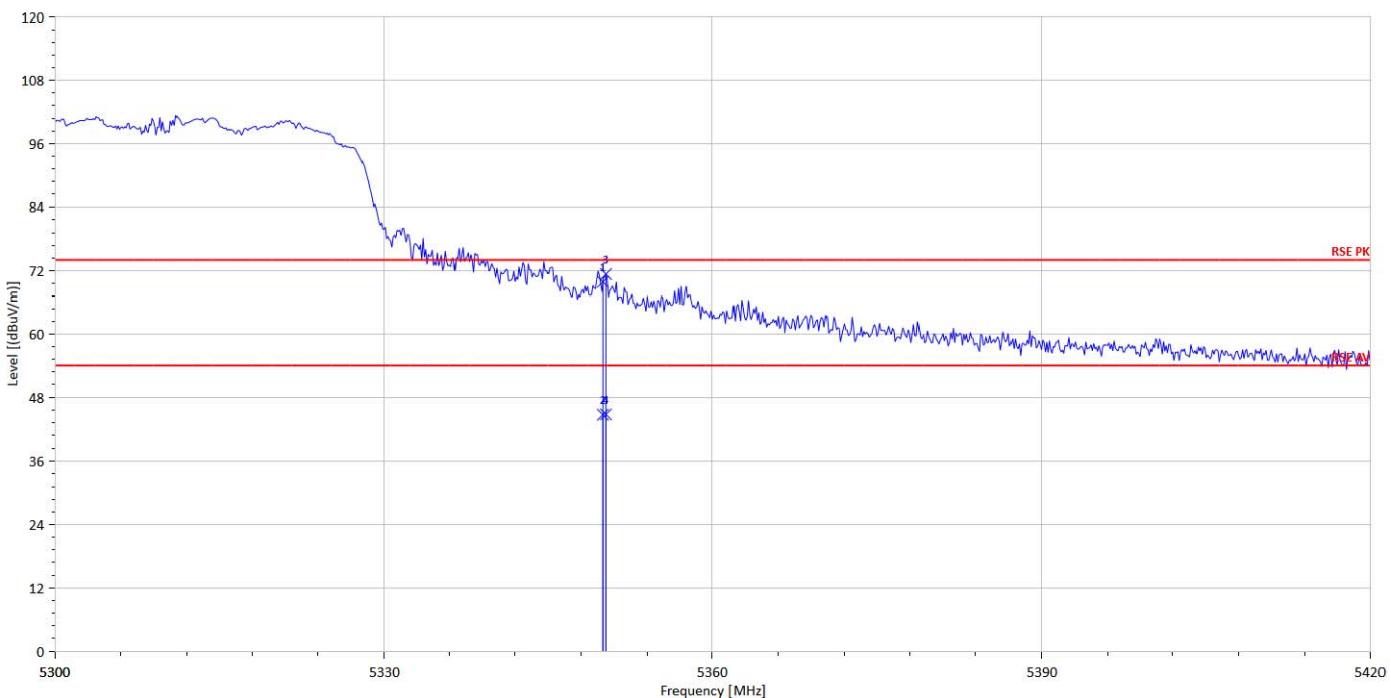
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Operation Mode : 802.11ac40B2 Test Date : 2017/10/20  
Fundamental Frequency : 5310 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



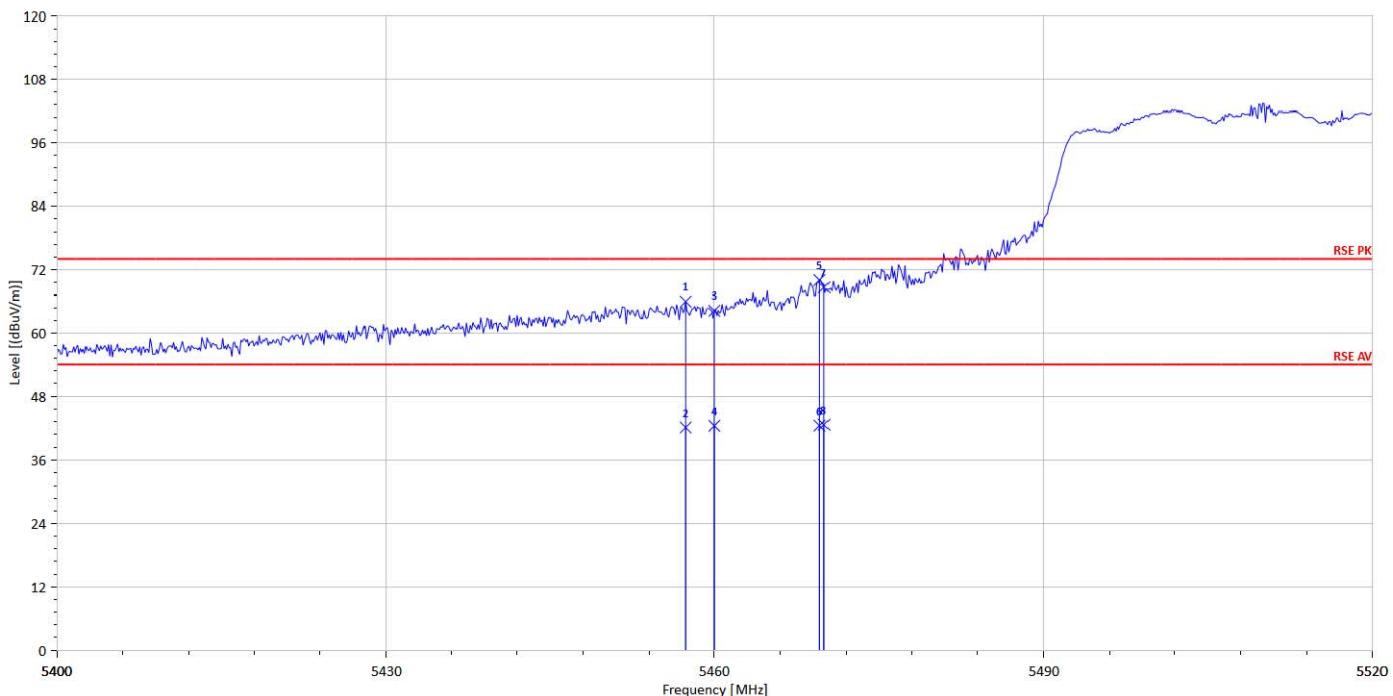
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level		Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			Reading	Level dB $\mu$ V				
5350.00	E	Peak	60.89	8.96	69.86	74	-4.14	
5350.00	E	Average	35.82	8.96	44.78	54	-9.22	
5350.28	S	Peak	62.35	8.97	71.32	74	-2.68	
5350.28	S	Average	35.89	8.97	44.86	54	-9.14	

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Operation Mode : 802.11ac40B3      Test Date : 2017/11/28  
 Fundamental Frequency : 5510 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH Low      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



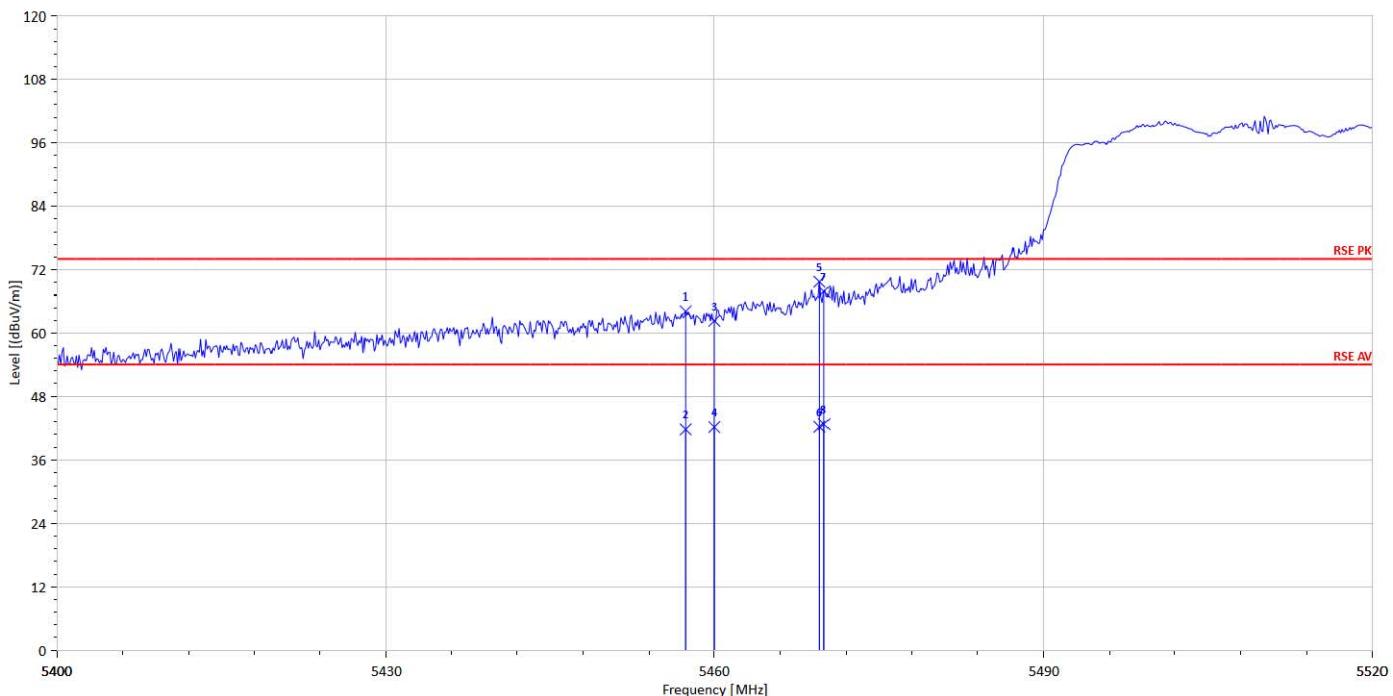
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5457.36	S	Peak	57.10	8.91	66.00	74	-8.00
5457.36	S	Average	33.26	8.91	42.17	54	-11.83
5460.00	E	Peak	55.38	8.88	64.27	74	-9.73
5460.00	E	Average	33.60	8.88	42.48	54	-11.52
5469.60	S	Peak	61.18	8.79	69.97	74	-4.03
5469.60	S	Average	33.72	8.79	42.51	54	-11.49
5470.00	E	Peak	59.81	8.79	68.59	74	-5.41
5470.00	E	Average	33.91	8.79	42.70	54	-11.30

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Operation Mode : 802.11ac40B3      Test Date : 2017/11/28  
 Fundamental Frequency : 5510 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH Low      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



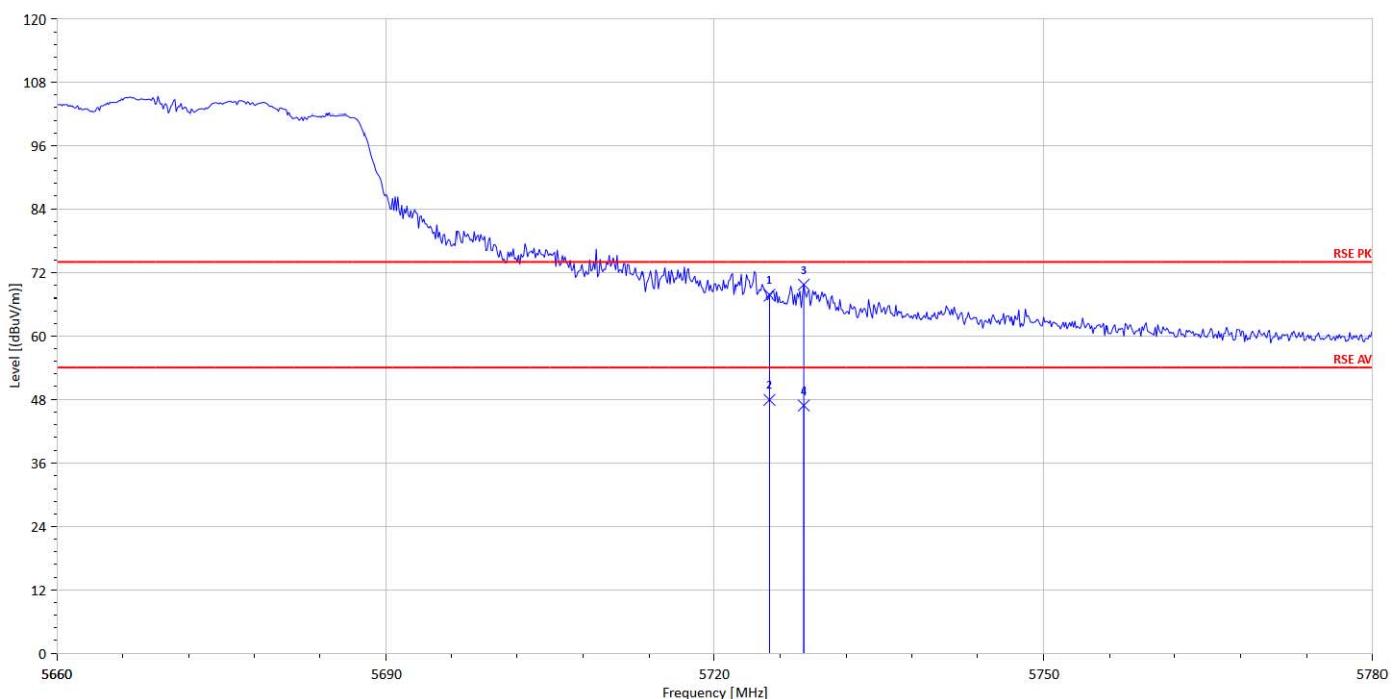
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5457.36	S	Peak	55.26	8.91	64.17	74	-9.83
5457.36	S	Average	32.90	8.91	41.81	54	-12.19
5460.00	E	Peak	53.48	8.88	62.36	74	-11.64
5460.00	E	Average	33.37	8.88	42.25	54	-11.75
5469.60	S	Peak	60.87	8.79	69.66	74	-4.34
5469.60	S	Average	33.51	8.79	42.30	54	-11.70
5470.00	E	Peak	59.03	8.79	67.82	74	-6.18
5470.00	E	Average	34.01	8.79	42.80	54	-11.20

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Operation Mode : 802.11ac40B3 Test Date : 2017/10/20  
 Fundamental Frequency : 5670 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	E	Peak	58.44	9.30	67.74	74	-6.26
5725.00	E	Average	38.70	9.30	48.00	54	-6.00
5728.16	S	Peak	60.38	9.30	69.68	74	-4.32
5728.16	S	Average	37.65	9.30	46.95	54	-7.05

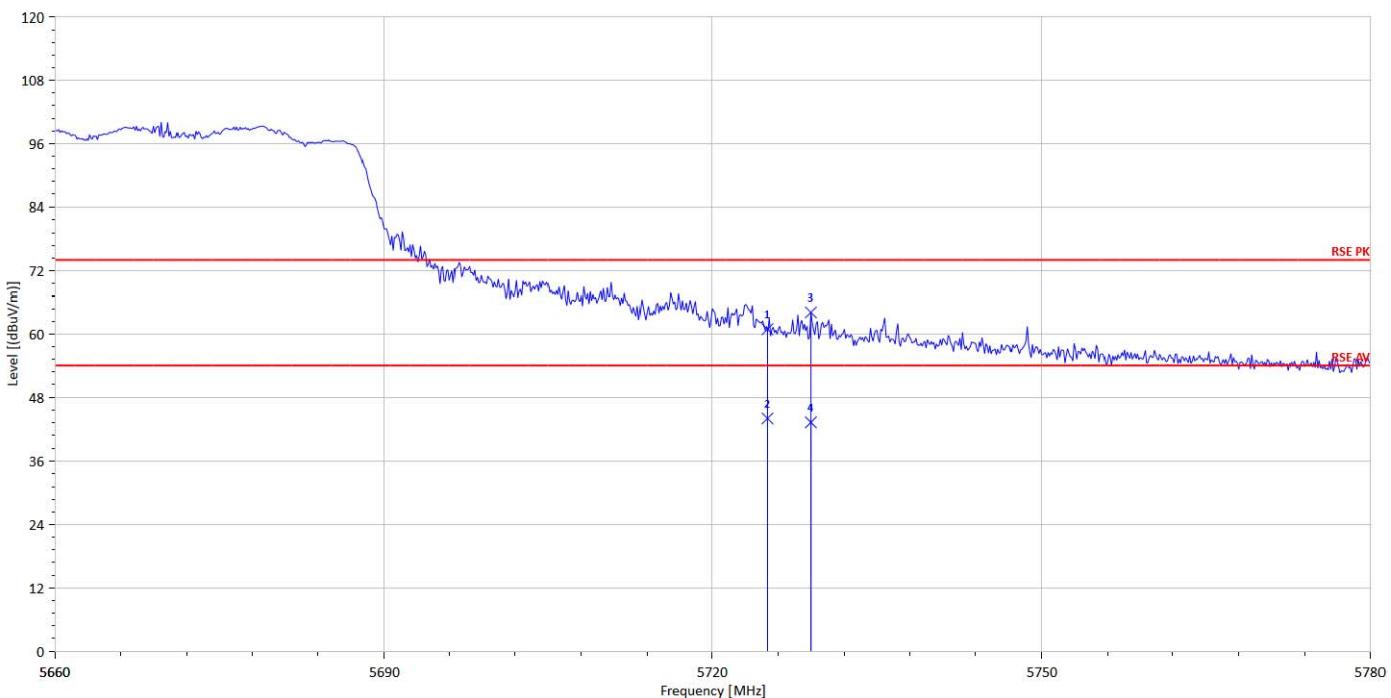
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Operation Mode : 802.11ac40B3      Test Date : 2017/10/20  
 Fundamental Frequency : 5670 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	E	Peak	51.65	9.30	60.95	74	-13.05
5725.00	E	Average	34.78	9.30	44.08	54	-9.92
5729.00	S	Peak	54.85	9.30	64.15	74	-9.85
5729.00	S	Average	34.04	9.30	43.34	54	-10.66

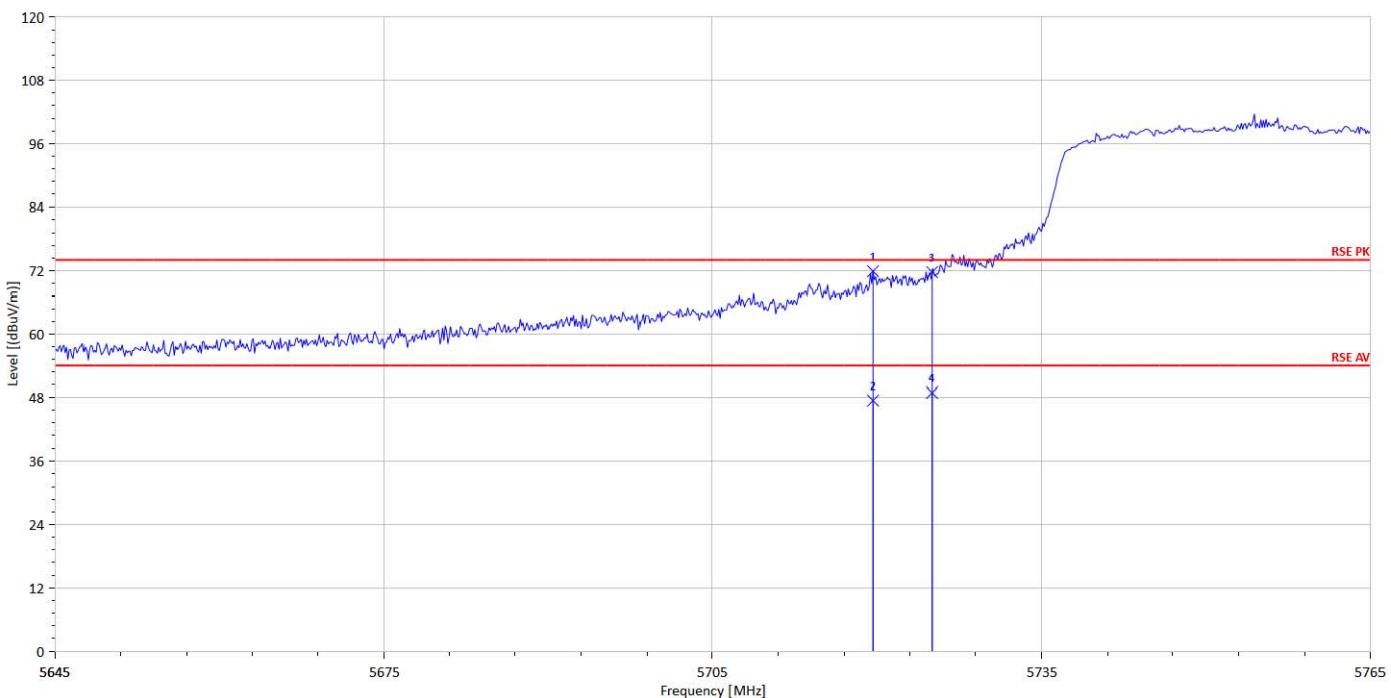
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Operation Mode : 802.11ac40B4      Test Date : 2017/10/18  
 Fundamental Frequency : 5755 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
5719.64	S	Peak	62.58	9.28	71.86	74	-2.14
5719.64	S	Average	38.21	9.28	47.49	54	-6.51
5725.00	E	Peak	62.38	9.30	71.68	74	-2.32
5725.00	E	Average	39.64	9.30	48.94	54	-5.06

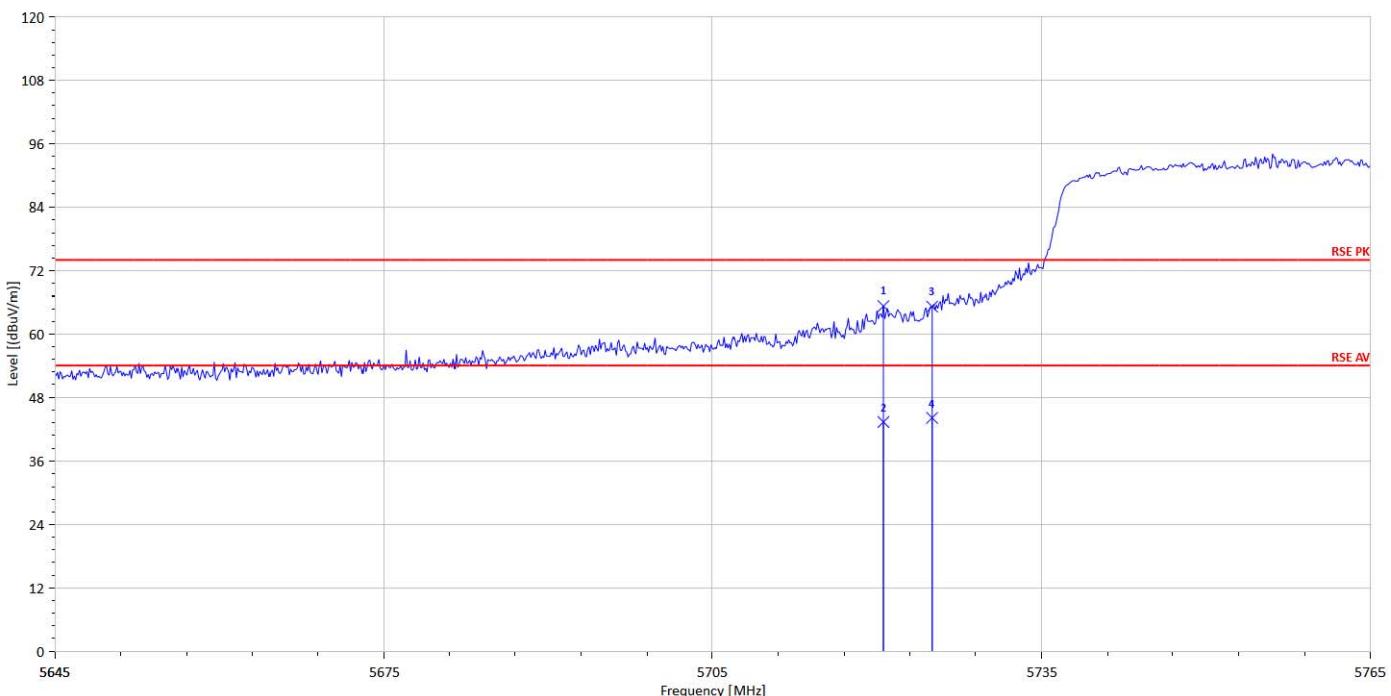
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Operation Mode : 802.11ac40B4      Test Date : 2017/10/18  
 Fundamental Frequency : 5755 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



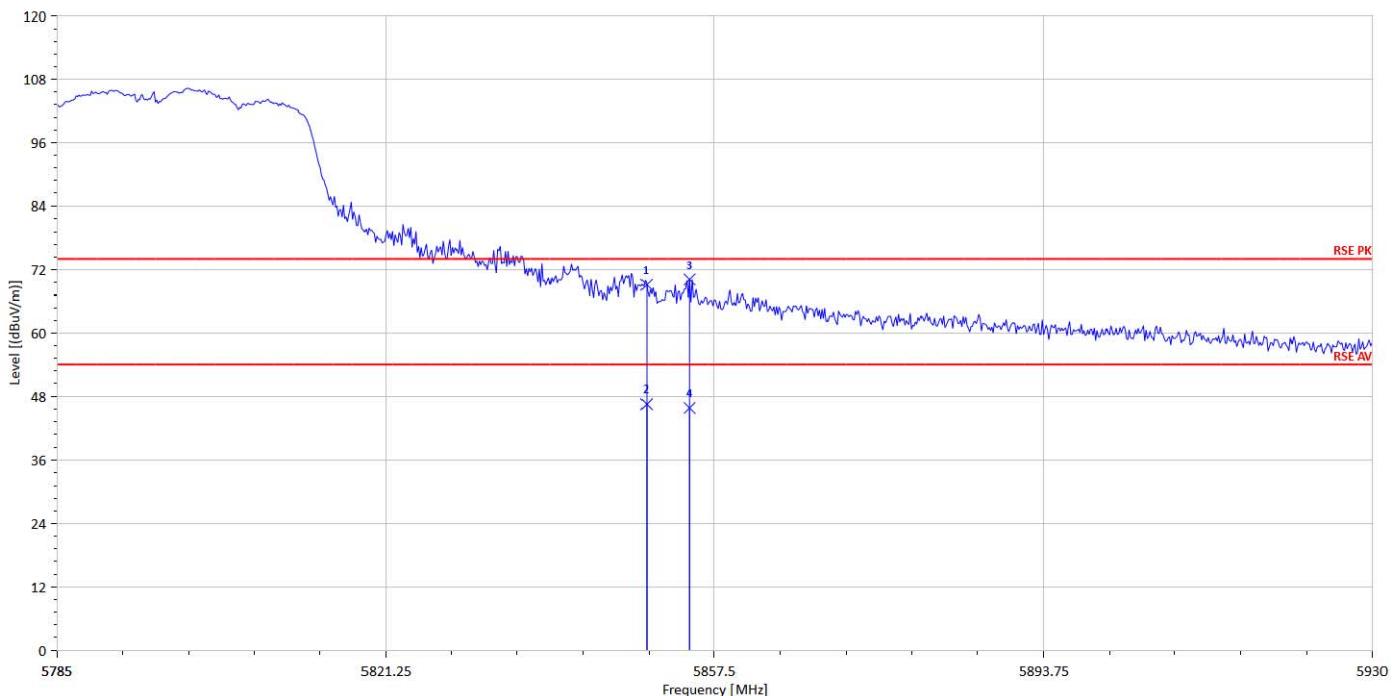
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5720.60	S	Peak	56.07	9.28	65.36	74	-8.64
5720.60	S	Average	34.12	9.28	43.40	54	-10.60
5725.00	E	Peak	55.96	9.30	65.26	74	-8.74
5725.00	E	Average	34.89	9.30	44.19	54	-9.81

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Operation Mode : 802.11ac40B4      Test Date : 2017/10/21  
 Fundamental Frequency : 5795 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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	E	Peak	59.59	9.49	69.08	74	-4.92
5850.00	E	Average	37.12	9.49	46.61	54	-7.39
5854.75	S	Peak	60.51	9.58	70.09	74	-3.91
5854.75	S	Average	36.32	9.58	45.90	54	-8.10

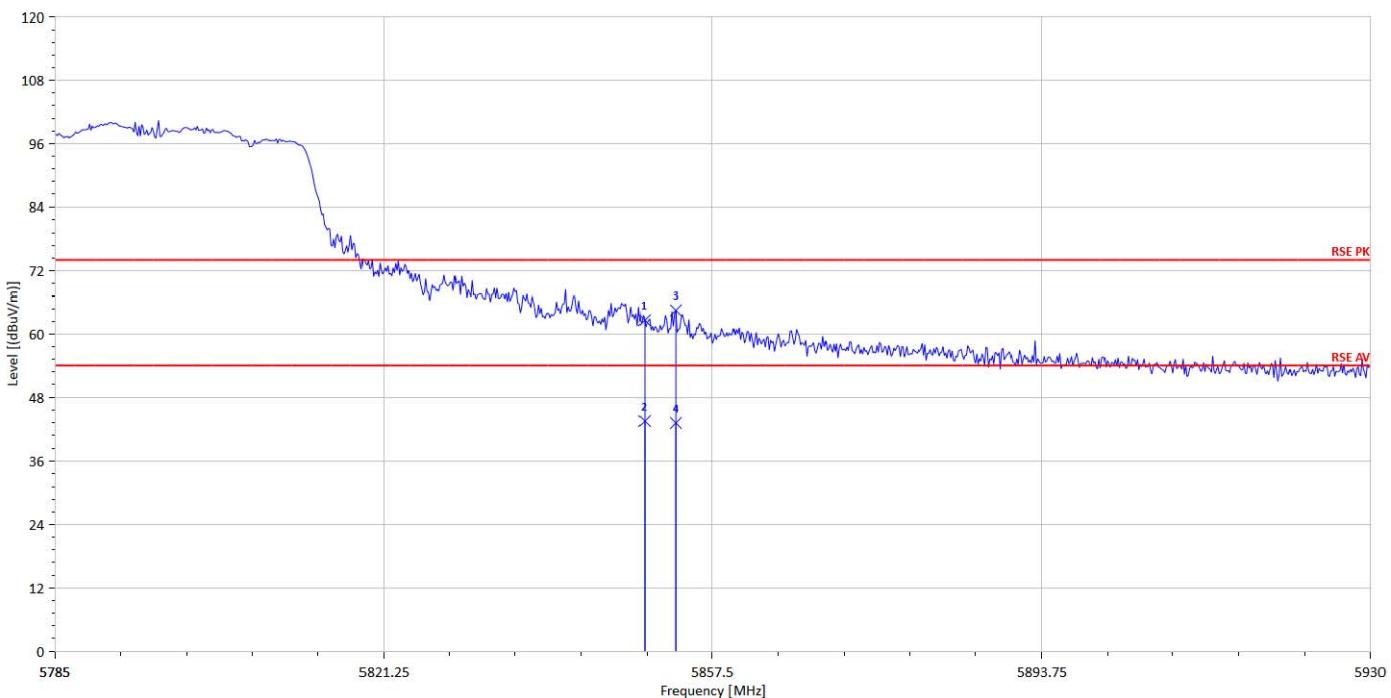
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Operation Mode : 802.11ac40B4 Test Date : 2017/10/20  
Fundamental Frequency : 5795 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
5850.00	E	Peak	53.16	9.49	62.65	74	-11.35
5850.00	E	Average	34.09	9.49	43.58	54	-10.42
5853.44	S	Peak	54.98	9.55	64.54	74	-9.46
5853.44	S	Average	33.67	9.55	43.22	54	-10.78

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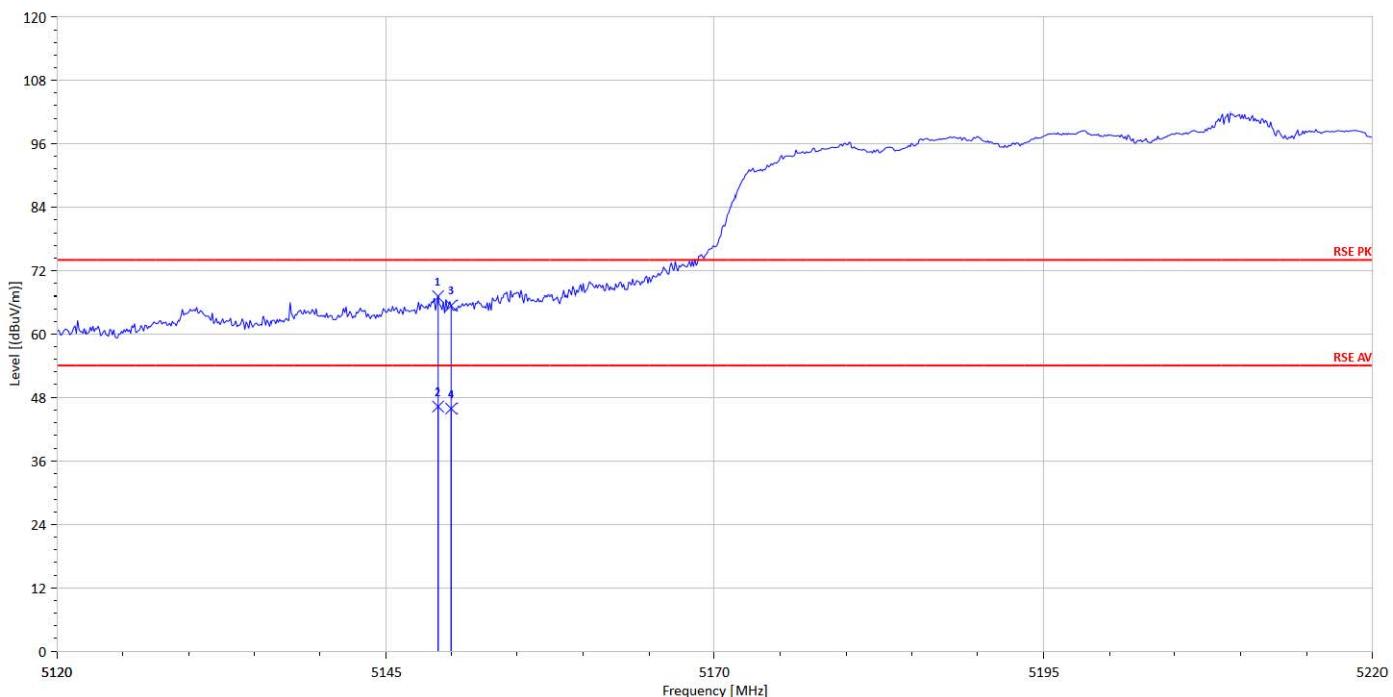
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## Band edge falling to restricted band

## 802.11ac\_VHT80 mode

Operation Mode : 802.11ac80B1 Test Date : 2017/10/20  
 Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Vertical



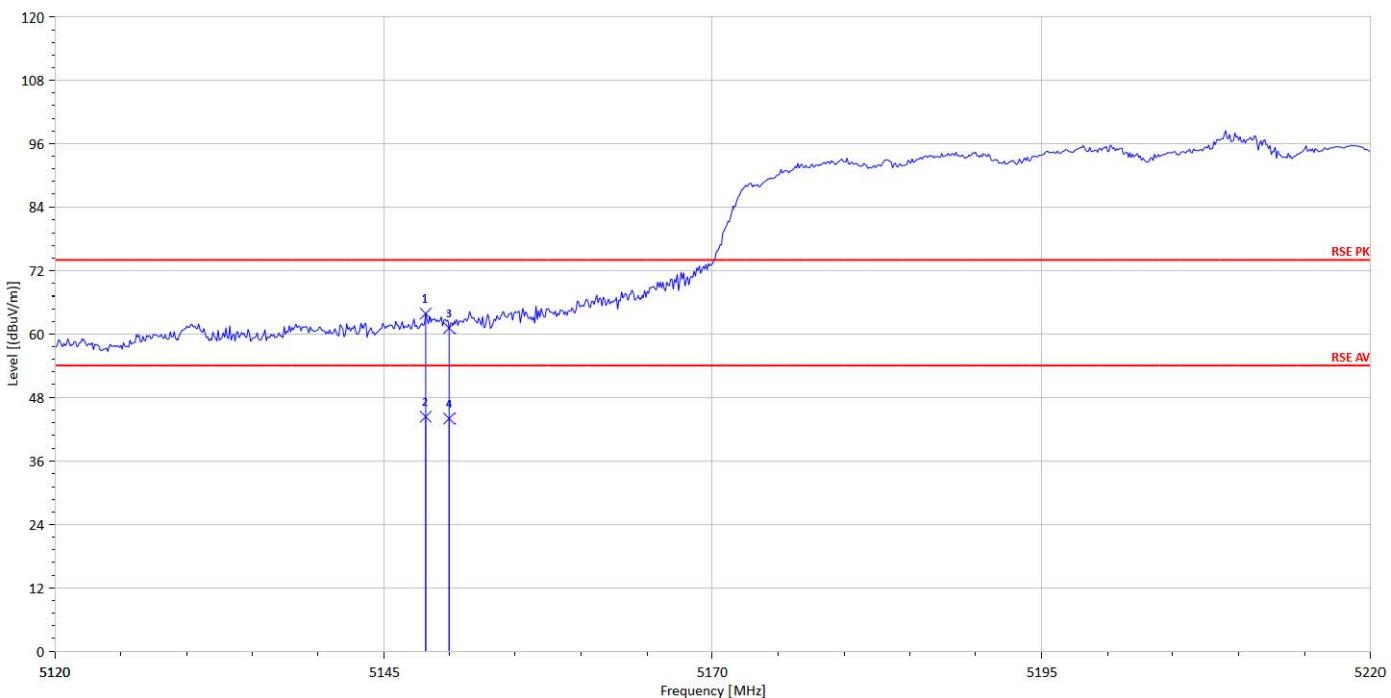
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5149.00	S	Peak	58.89	8.19	67.07	74	-6.93
5149.00	S	Average	38.17	8.19	46.36	54	-7.64
5150.00	E	Peak	57.27	8.19	65.46	74	-8.54
5150.00	E	Average	37.79	8.19	45.98	54	-8.02

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Operation Mode : 802.11ac80B1 Test Date : 2017/10/20  
Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH LOW Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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
5148.20	S	Peak	55.76	8.18	63.94	74	-10.06
5148.20	S	Average	36.24	8.18	44.42	54	-9.58
5150.00	E	Peak	52.98	8.19	61.17	74	-12.83
5150.00	E	Average	35.88	8.19	44.07	54	-9.93

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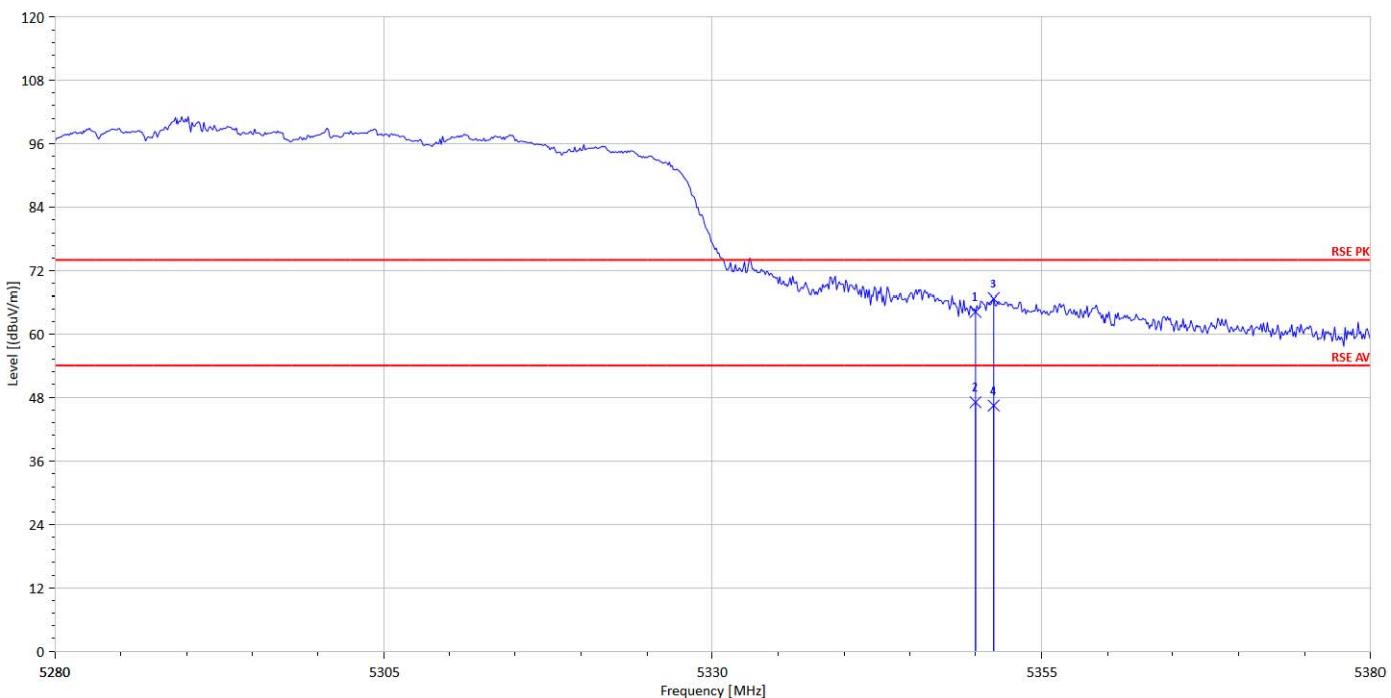
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Operation Mode : 802.11ac80B2      Test Date : 2017/10/20  
 Fundamental Frequency : 5290 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5350.00	E	Peak	55.28	8.96	64.25	74	-9.75
5350.00	E	Average	38.21	8.96	47.17	54	-6.83
5351.40	S	Peak	57.74	8.99	66.73	74	-7.27
5351.40	S	Average	37.56	8.99	46.55	54	-7.45

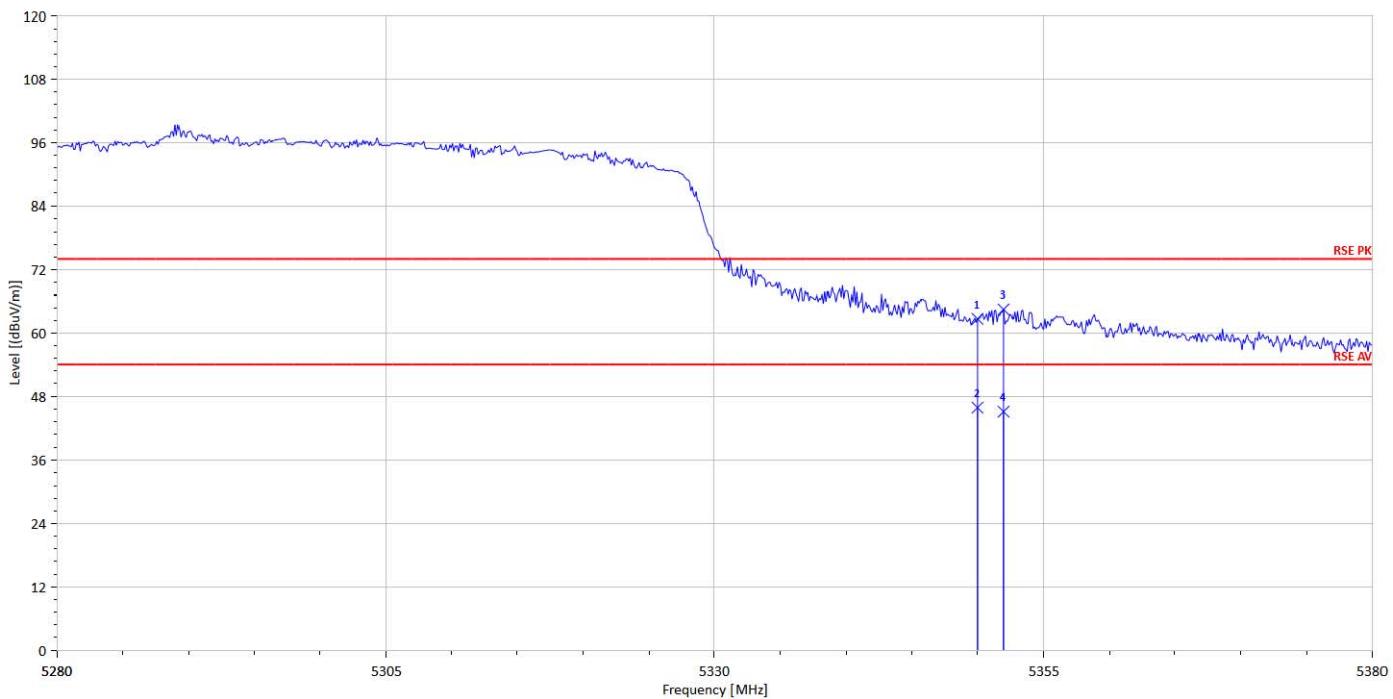
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Operation Mode : 802.11ac80B2      Test Date : 2017/10/20  
 Fundamental Frequency : 5290 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH High      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Horizontal



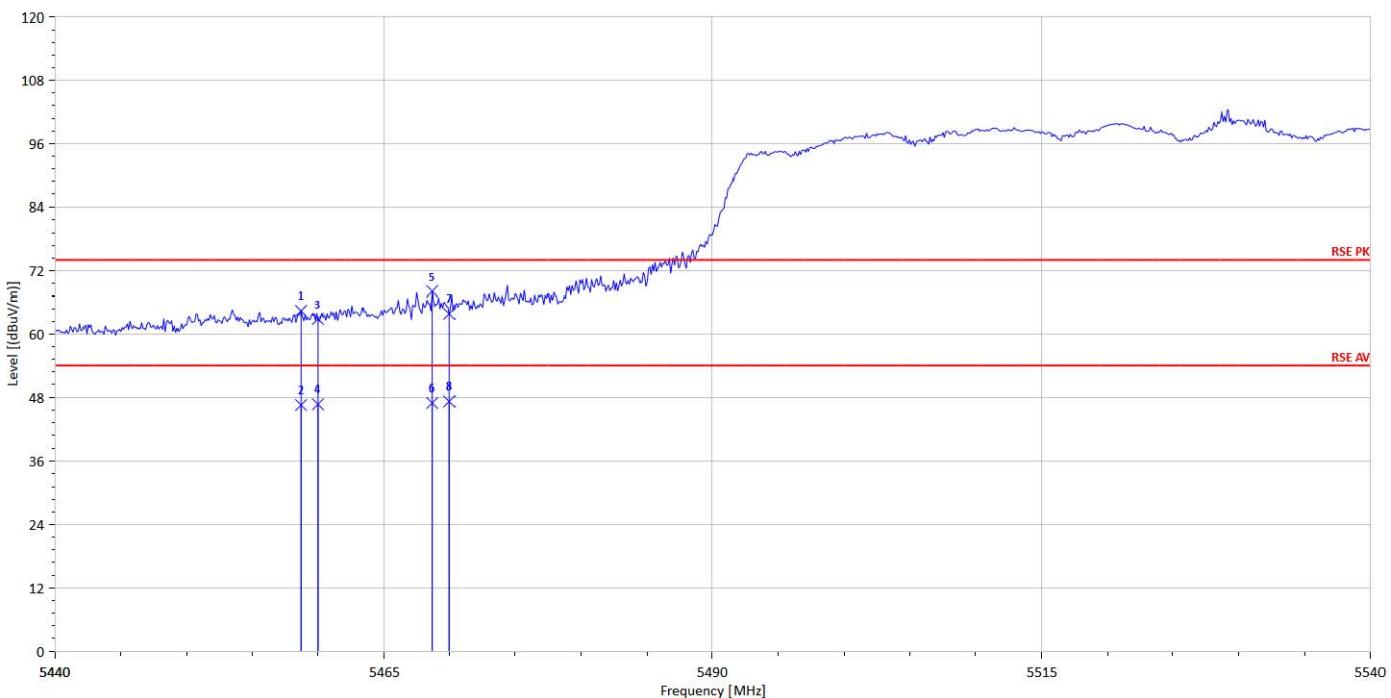
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	E	Peak	53.77	8.96	62.74	74	-11.26
5350.00	E	Average	37.01	8.96	45.97	54	-8.03
5352.00	S	Peak	55.53	9.00	64.53	74	-9.47
5352.00	S	Average	36.19	9.00	45.19	54	-8.81

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Operation Mode : 802.11ac80B3      Test Date : 2017/11/28  
 Fundamental Frequency : 5530 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
5458.70	S	Peak	55.54	8.90	64.44	74	-9.56
5458.70	S	Average	37.75	8.90	46.65	54	-7.35
5460.00	E	Peak	54.03	8.88	62.91	74	-11.09
5460.00	E	Average	37.91	8.88	46.79	54	-7.21
5468.70	S	Peak	59.26	8.80	68.06	74	-5.94
5468.70	S	Average	38.23	8.80	47.03	54	-6.97
5470.00	E	Peak	55.09	8.79	63.88	74	-10.12
5470.00	E	Average	38.54	8.79	47.33	54	-6.67

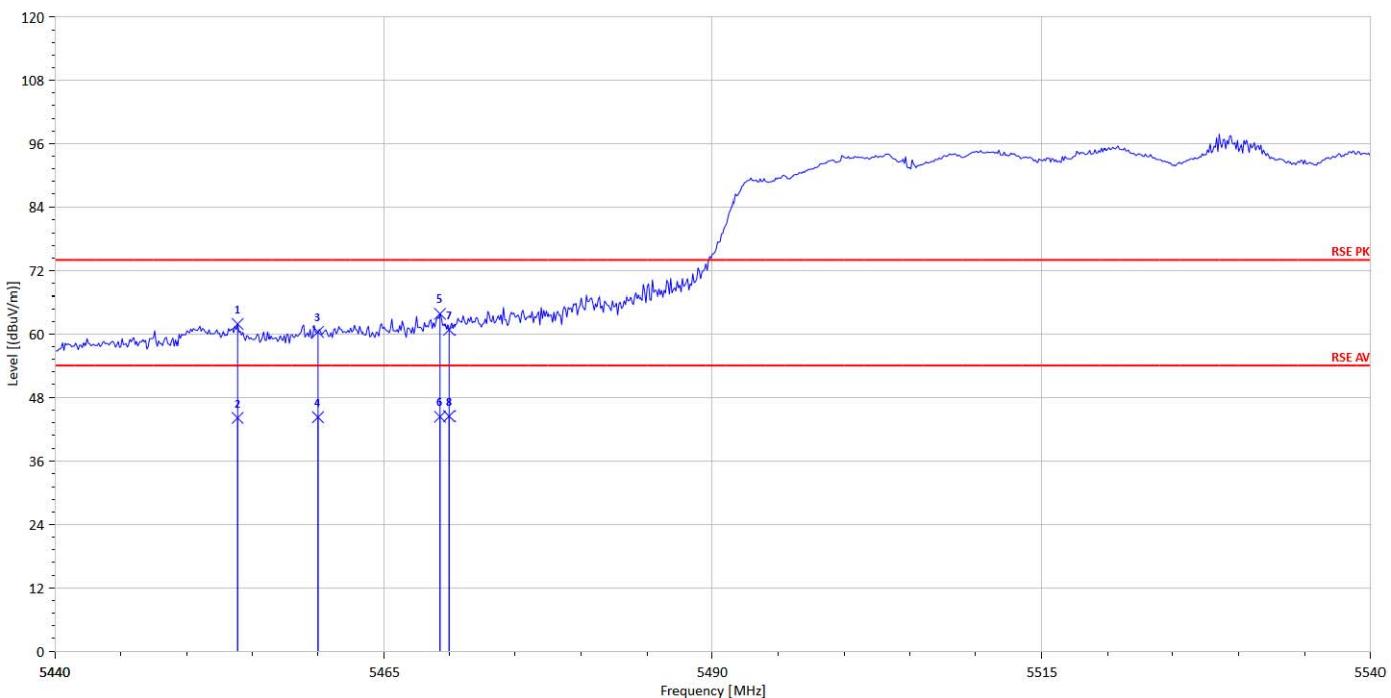
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Operation Mode : 802.11ac80B3 Test Date : 2017/11/28  
 Fundamental Frequency : 5530 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH LOW Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	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
5453.90	S	Peak	53.00	8.94	61.95	74	-12.05
5453.90	S	Average	35.25	8.94	44.19	54	-9.81
5460.00	E	Peak	51.55	8.88	60.43	74	-13.57
5460.00	E	Average	35.44	8.88	44.32	54	-9.68
5469.30	S	Peak	55.09	8.79	63.89	74	-10.11
5469.30	S	Average	35.62	8.79	44.41	54	-9.59
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5470.00	E	Average	35.73	8.79	44.52	54	-9.48

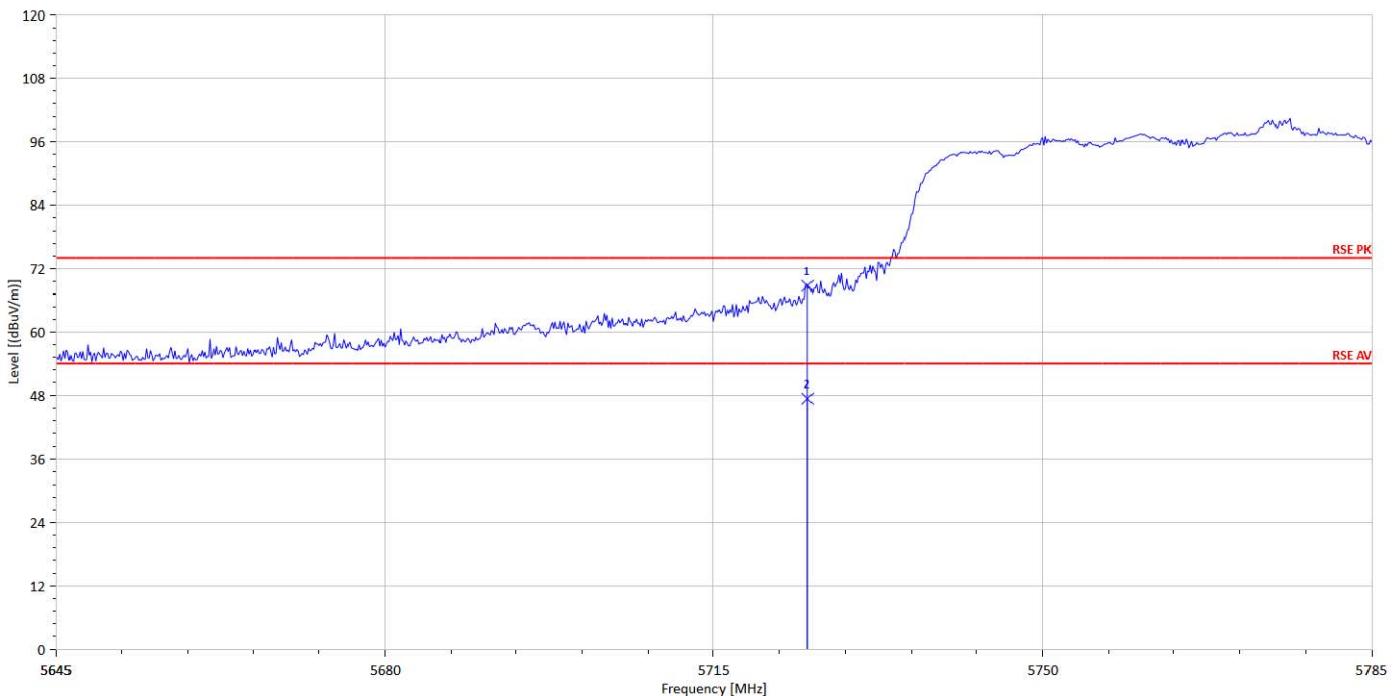
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Operation Mode : 802.11ac80B4 Test Date : 2017/10/18  
Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH LOW Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Vertical



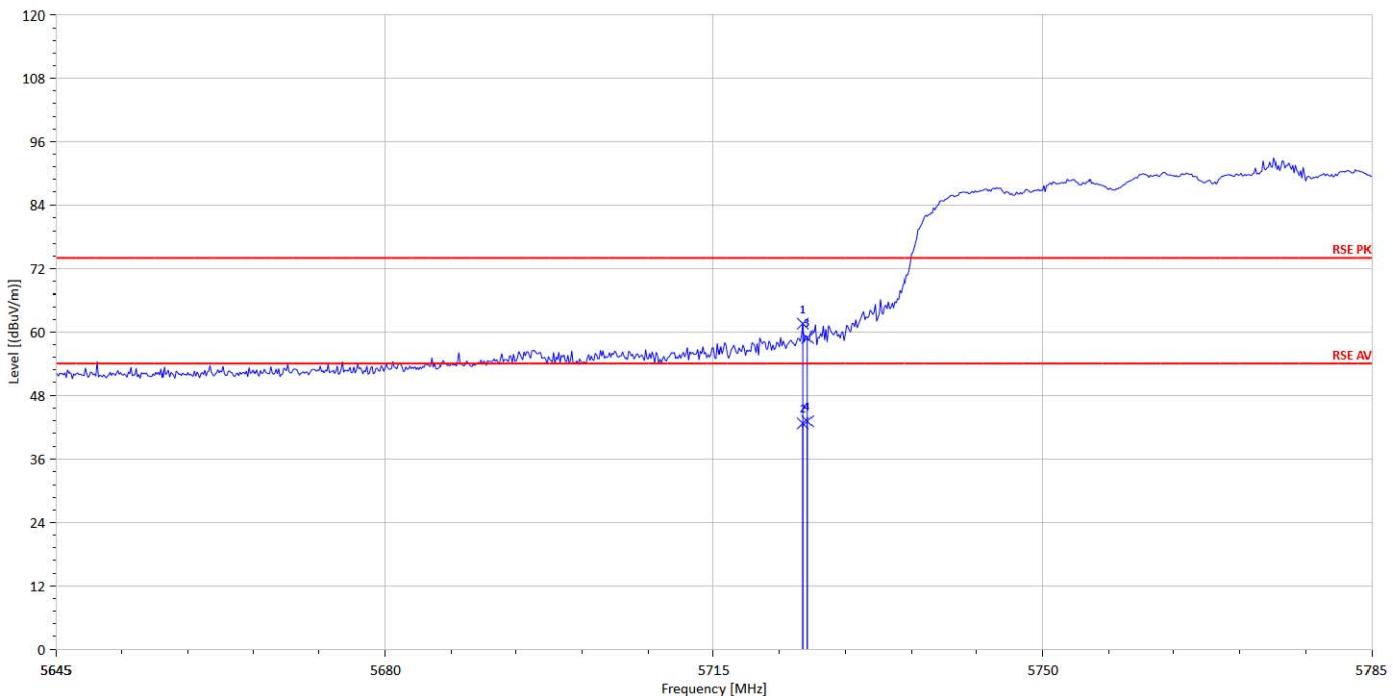
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	E	Peak	59.41	9.30	68.71	74	-5.29
5725.00	E	Average	38.17	9.30	47.47	54	-6.53

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Operation Mode : 802.11ac80B4 Test Date : 2017/10/18  
Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH LOW Test Engineer : Ashton  
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level		Factor	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			Reading	Level dB $\mu$ V				
5724.52	S	Peak	52.34	9.30	61.64	74	-12.36	
5724.52	S	Average	33.47	9.30	42.77	54	-11.23	
5725.00	E	Peak	49.61	9.30	58.91	74	-15.09	
5725.00	E	Average	33.86	9.30	43.16	54	-10.84	

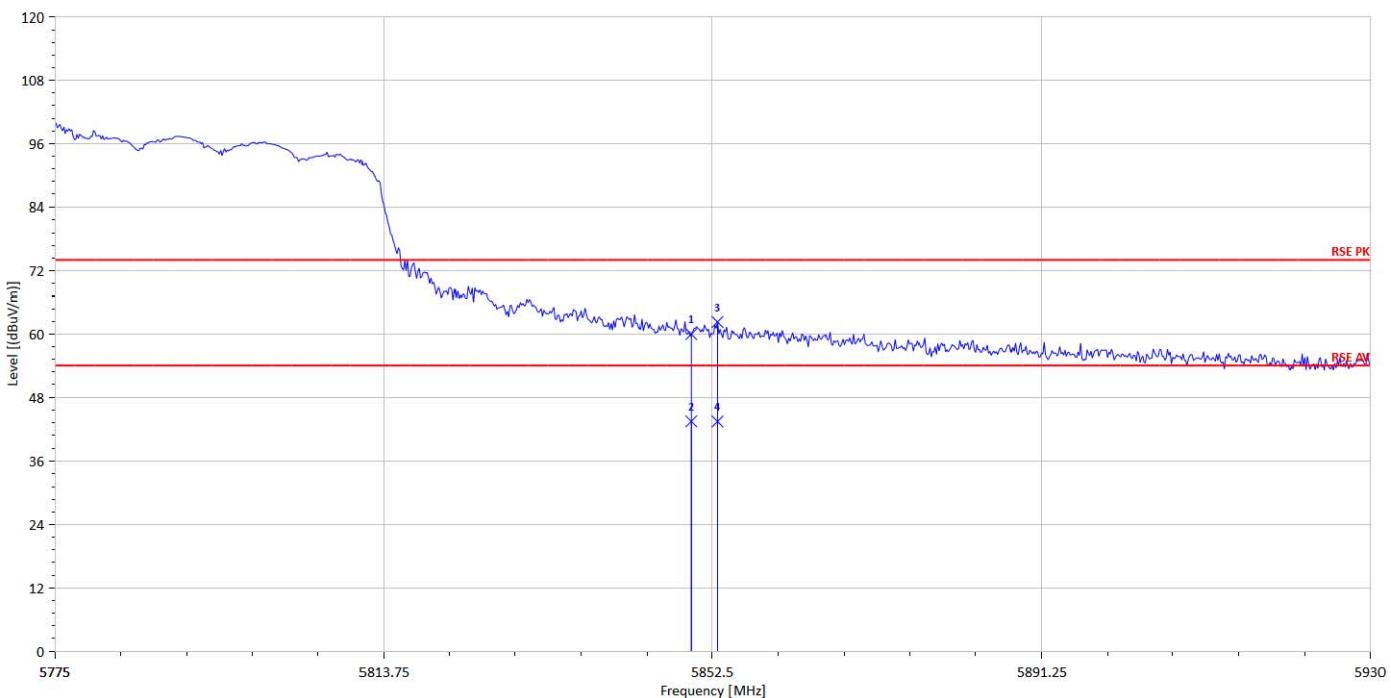
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Operation Mode : 802.11ac80B4      Test Date : 2017/10/18  
 Fundamental Frequency : 5775 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH HIGH      Test Engineer : Ashton  
 EUT Pol. : H      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5850.00	E	Peak	50.51	9.49	60.00	74	-14.00
5850.00	E	Average	34.04	9.49	43.53	54	-10.47
5853.12	S	Peak	52.79	9.55	62.33	74	-11.67
5853.12	S	Average	33.95	9.55	43.50	54	-10.50

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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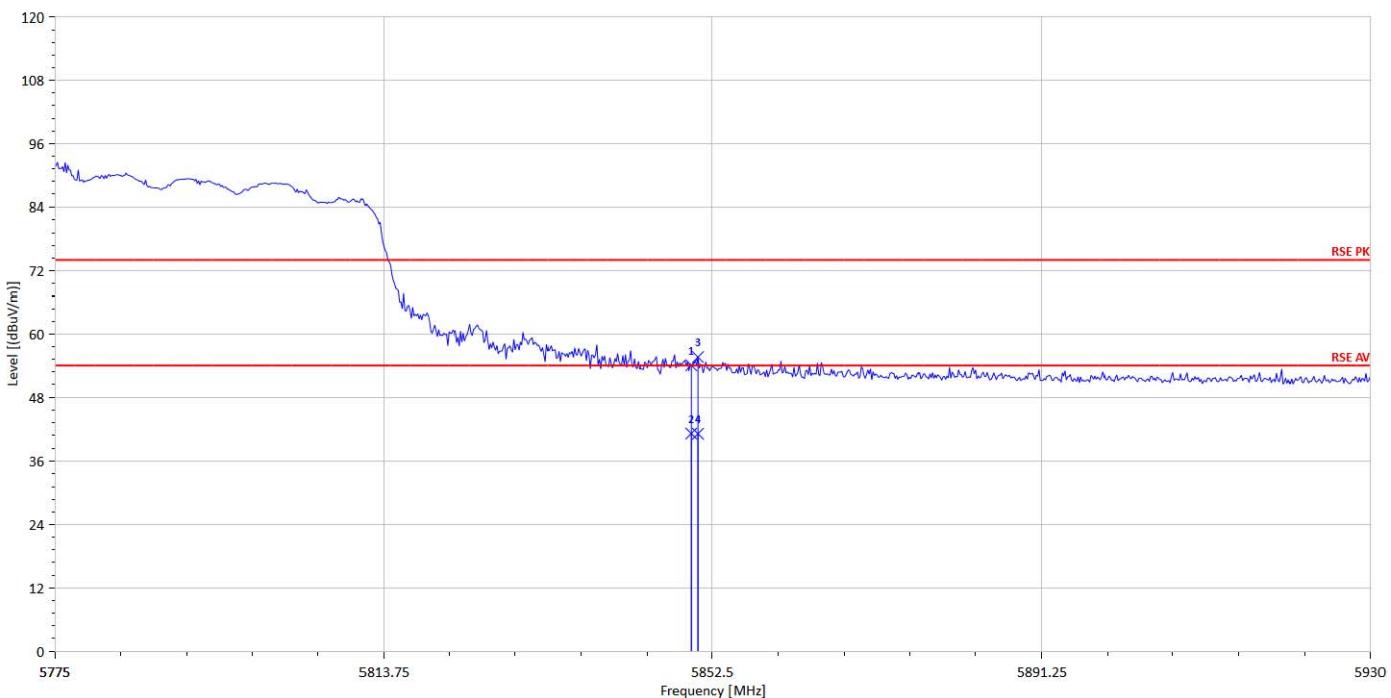
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Operation Mode : 802.11ac80B4 Test Date : 2017/10/18  
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : BE CH HIGH Test Engineer : Ashton  
 EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5850.00	E	Peak	44.56	9.49	54.05	74	-19.95
5850.00	E	Average	31.71	9.49	41.20	54	-12.80
5850.80	S	Peak	46.12	9.50	55.63	74	-18.37
5850.80	S	Average	31.66	9.50	41.16	54	-12.84

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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

An embedded-in antenna design is used.

The antenna is designed with permanent attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

*~ End of Report ~*

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