

# RADIO TEST REPORT

(for 5 GHz WLAN)

Project No. : SKZ-21-066  
Client : Sony Group Corporation  
Client's Address : 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan  
Product Name : Wireless LAN module  
Model No. : WCBN3515A  
FCC ID : AK8100224111  
Test Standard : 47 CFR Part 15 Subpart E  
Sample Receipt Date : March 19, 2021  
Test Date : March 26, 2021 to March 30, 2021  
Report Date : April 27, 2021  
Test Result : Complied

Notice:

*\* These test results relate only to the items (combination equipment, test configuration, operation condition etc.) tested.*

*\* This report shall not be reproduced except in full, without written approval of the laboratory.*

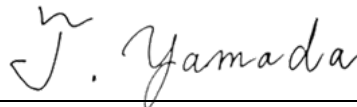
*\* All test results are traceable to the national and /or international standards.*

Reported by:



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Note

- indicates that the listed condition, standard or equipment is applicable for this report.
- indicates that the listed condition, standard or equipment is not applicable for this report.

### Revision History

Revision	Date	Overview	Page
SKZ-21-066 (Original)	April 27, 2021	-	-

### Disclaimer

This report includes the information provided by the customer as below;

- Cover page: Client and product related information
- Clause 1.1 : Description of Equipment Under Test (EUT)
- Clause 2 : Operating mode / conditions

\* The laboratory is not responsible for any test results affected by the above information.

## 1. General Information

### 1.1. Description of Equipment Under Test (EUT)

#### General Specification

Test Sample Condition :  Prototype  Pre-production  Mass-production  
 Product Name : Wireless LAN module  
 Trade Name : LITE-ON  
 Model No. : WCBN3515A  
 Serial No. : 001

Similar model(s) to be covered by this report

Model No. : None

#### Radio Specification

Function of the Equipment : Transceiver

Operating Frequency :

IEEE Standard	Operating Frequency Band [MHz]	Channel Spacing [MHz]	Bandwidth [MHz]	Number of Channel
802.11a 802.11n-HT20	5180 to 5240	20 MHz	5*	4
	5745 to 5825		10*	5
802.11ac-VHT20	5180 to 5240	20 MHz	20	4
	5745 to 5825		20	5
802.11n-HT40	5190 to 5230	40 MHz	40	2
	5755 to 5795			
802.11ac-VHT40	5190 to 5230	40 MHz	40	2
	5755 to 5795			
802.11ac-VHT80	5210	80 MHz	80	1
	5775	80 MHz	80	

\* Special Wireless System

Antenna Type / Antenna Gain :

Port/Chain	Antenna Type	Antenna Gain	
		U-NII-1	U-NII-3
Port 1 / Chain 0	Dipole antenna	+ 3.5	+ 4.6
Port 2 / Chain 1	Patch antenna	+ 4.6	+ 3.2

Antenna Connector Type : MHF

## 1.2. Summary of Test Result

Test Item	Test Method	Worst Margin	Results	Note
AC Power-line Conducted Emissions	-	-	N/A	*1
26dB Emission Bandwidth	-	-	N/A	*1
6dB Emission Bandwidth	-	-	N/A	*1
Maximum Conducted Output Power	-	-	N/A	*1
Maximum Power Spectral Density	-	-	N/A	*1
Unwanted Emissions	Radiated	3.6 dB (AV) 11490.926 MHz Horizontal	Complied	-
Dynamic Frequency Selection	-	-	-	-

Note

\*1: This item is referred to Test Report No. FR020615AN (issued by Sporton International Inc. Hsinhua Laboratory).

### Other requirements

Part 15.31(e) Supply voltage requirement

: Complied (The EUT was supplied with a stable voltage by host device)

Part 15.203 / 212 Antenna requirement

: Complied (Users cannot replace the external antenna, since it is mounted to the inside of the host device.)

## 1.3. Tested Methodology

Test Standard : 47 CFR Part15 Subpart E

Test Method : ANSI C63.10 - 2013

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Condition

### Unwanted Emissions

Test Distance :  3 m  10m (9 kHz to 30 MHz)  
 3 m  10m (30 MHz to 1000 MHz)  
 3 m (1 GHz to 40 GHz)

Dimensions of the EUT table : 0.8 m (below 1 GHz) or 1.5 m (above 1 GHz) height, 2 m width and 1 m depth.

Dimensions of validated test volume : 2.5 m diameter, 3 m top height, 0.5 m bottom height.

## 1.4. Measurement Procedures

We performed the measurements in accordance with NV3-10, available upon the request.

No deviation

Deviation from the above procedure

The summary of the above procedure is mentioned below

**Unwanted Emissions**

- The non-conductive table (EUT table) made of ( FRP,  Styrene Foam,  other non-conductive material) was placed in the center of the turntable.
- The EUT was placed on the center of the tabletop.
- The test antenna was placed away from the EUT at test distance.
- The limits were compensated the distance factor with follows:  
 $9 \text{ kHz to } 490 \text{ kHz [Limit at } 3 \text{ m]} = [\text{Limit at } 300 \text{ m}] + 40\log(300[\text{m}] / 3[\text{m}])$   
 $490 \text{ kHz to } 30 \text{ MHz [Limit at } 3 \text{ m]} = [\text{Limit at } 30 \text{ m}] + 40\log(30[\text{m}] / 3[\text{m}])$
- Find the worst arrangement of the EUT according to follows:
  - Rotating the turntable and/or scanning the antenna.
  - On every condition, exploring the highest emissions with the spectrum analyzer. (9 kHz to 40 GHz, peak detector)
- On the worst arrangement of the EUT found in above, choose the six highest harmonics or spurious emissions on the spectrum data.(\*excluding carrier band edges)  
 The final measurements of all test operating modes carried out on these emissions as follows:

The test antenna and the turntable were performed with follows:

	9 kHz to 30 MHz	30 MHz to 1000 MHz	1 GHz to 40 GHz
Antenna	Loop Antenna	Bi-conical Antenna, Log-periodic Antenna	Horn Antenna
Antenna scanning range	1 m, Vertical, 360 degrees	1 m to 4 m, Horizontal and Vertical	1 m to 4 m *, Horizontal and Vertical
Turntable rotating range	360 degrees	360 degrees	360 degrees

\*: When the measurement frequencies above 1 GHz, final measurements are performed keeping the antenna in the "cone of radiation" from EUT area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.

Instruments settings were carried out with follows:

	9 kHz to 90 kHz 110 kHz to 490 kHz	90 kHz to 110 kHz 490 kHz to 30 MHz	30 MHz to 1000 MHz	1 GHz to 40 GHz
Detector	Peak / Average	Quasi-peak	Quasi-peak	Peak / Average
RBW	200 Hz (6 dB) or 9 kHz (6 dB) *1	200 Hz (6 dB) or 9 kHz (6 dB) *1	120 kHz (6 dB)	1 MHz (6 dB)
VBW	N/A	N/A	N/A	3 MHz (for peak) 10 kHz (for average) *2
Instrument	EMI test receiver	EMI test receiver	EMI test receiver	Spectrum analyzer

\*1: When the measurement frequencies below 150 kHz, RBW: 200 Hz was used.

\*2: VBW setting (for average) was higher than 1/T. (T is the minimum transmission duration)

- If the final average measurement result exceeded the limit in the authorized band edge, the integration method is carried out with follows:

	Unwanted emissions within 2 MHz of the band edge
Detector	Peak
RBW	100 kHz (6 dB)
Instrument	Spectrum analyzer
Function	Channel Power (integration BW : 1 MHz)

- Although these tests for below 30MHz were performed other than open field area test site, adequate comparison measurements were confirmed against 30 m open field area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

Further these test for above 1GHz were performed test site complied with CISPR 16-1-4.

In the case of EUT size smaller than the validated test volume, the antenna position is adjusted such that the distance between the EUT and the antenna reference point is identical to the 3m used for the S-VSWR validation measurements. These method based on clause 7.3.1 of CISPR16-1-4 Edition 4, therefore correcting distance factor is not applied.

### 1.5. Test Location

Test Facility Name : Sony Global Manufacturing & Operations Corporation  
EMC/RF Test Laboratory, Main Lab.  
Address : 8-4 Shiomi Kisarazu-shi Chiba-ken, 292-0834, Japan  
Phone : +81 438 37 2750

#### Unwanted Emissions

Semi-Anechoic chamber

4th Site     EMC Site

### 1.6. Uncertainty

Test Item	Frequency	Distance	4th Site
Radiated Emissions	9 kHz to 30 MHz	3m	± 2.60 dB
	30 MHz to 1000 MHz	3m	± 4.96 dB
	1 GHz to 18 GHz	3m	± 5.22 dB
	18 GHz to 26.5 GHz	3m	± 5.36 dB
	26.5 GHz to 40 GHz	3m	± 6.07 dB

## 2. Test Specification

### 2.1. Validation

The system was configured for testing in a typical (as a customer would normally use it).  
The tests were conducted with the worst-case modes as follows.

### 2.2. Operating Condition

The test mode was determined by client request.

The EUT was tested with maximum power settings in original test report No. FR020615AC.

The power settings A (in actual use) is lower than power settings B (maximum power of this module).

Spurious (Harmonics):

The Channel with the largest difference between A and B was selected.

\*In the representative channel, if there is no problem, it is omitted.

Spurious (Band Edge):

The Channel with the largest difference between A and B was selected, and the channel close to the Band Edge Limit was measured.

[ Transmitting mode ]

	Mode	Test Channels [MHz]	Data Rate	Normal mode Power Table Typ. [dBm]	Tolerance [dB]	1-7 GHz	Band Edge	7-18 GHz	18-26.5 GHz	26.5-40 GHz
Harmonics	802.11a-10M	5180	6Mbps	11.5	+2.0	-	-	x	x	x
Band Edge		Not applicable	-	-	-	-	-	-	-	-
Harmonics		5745	6Mbps	12.5	+2.0	-	-	x	x	x
Band Edge		Not applicable	-	-	-	-	-	-	-	-
Harmonics	802.11a-20M	5200	6Mbps	12	+1.5	-	-	Abridgement	Abridgement	Abridgement
Band Edge		5180	6Mbps	12	+1.5	-	x	-	-	-
Harmonics		5825	6Mbps	13	+1.5	-	-	Abridgement	Abridgement	Abridgement
Band Edge		5745	6Mbps	13	+1.5	-	x	-	-	-
Harmonics	802.11n(HT20)-10M	5180	MCS0	11.5	+2.0	-	-	x	x	x
Band Edge		Not applicable	-	-	-	-	-	-	-	-
Harmonics		5745	MCS0	12.5	+2.0	-	-	x	x	x
Band Edge		Not applicable	-	-	-	-	-	-	-	-
Harmonics	802.11ac-VHT20	5180	MCS0	12	+1.5	-	-	x	x	x
Band Edge		5180	MCS0	12	+1.5	-	x	-	-	-
Harmonics		5825	MCS0	13	+1.5	-	-	x	x	x
Band Edge		5745	MCS0	13	+1.5	-	x	-	-	-
Harmonics	802.11ac-VHT40	5230	MCS0	12	+1.5	-	-	x	x	x
Band Edge		5190	MCS0	12	+1.5	-	x	-	-	-
Harmonics		5795	MCS0	13	+1.5	-	-	x	x	x
Band Edge		5755	MCS0	13	+1.5	-	x	-	-	-

Note

The measurement axis was tested according to the worst condition of LITE-ON report.

**Power Setting**

IEEE Standard	Power Setting [dBm]			
	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
802.11a-10M	14.0	-	-	15.0
802.11a-20M	15.0	-	-	15.0
802.11n(HT20)-10M	14.0	-	-	15.0
802.11ac(VHT20)-20M	15.0	-	-	15.0
802.11ac(VHT40)	14.0	-	-	14.0 (5755 MHz) 15.0 (5795 MHz)

**The Software for Operating Mode**

Software Name : Radio Control Tool V4.0  
 Software Version : 4.0.00168.0

**2.3. Special Accessories**

Special accessories needed for connecting the EUT to achieve compliance:

Item	Manufacturer	Model No.	Serial No.	Remark
-	-	-	-	-

**2.4. EUT Modifications**

- No equipment modification to achieve compliance to the standard levels was done during the tests.  
 Equipment was modified to achieve compliance to the standard level as below.

Responsible Party Signature

\_\_\_\_\_  
 Typed/ Print Name :  
 Responsible Party :  
 Position :  
 Date :



## 2.5. Configuration of EUT System

### Unwanted Emissions

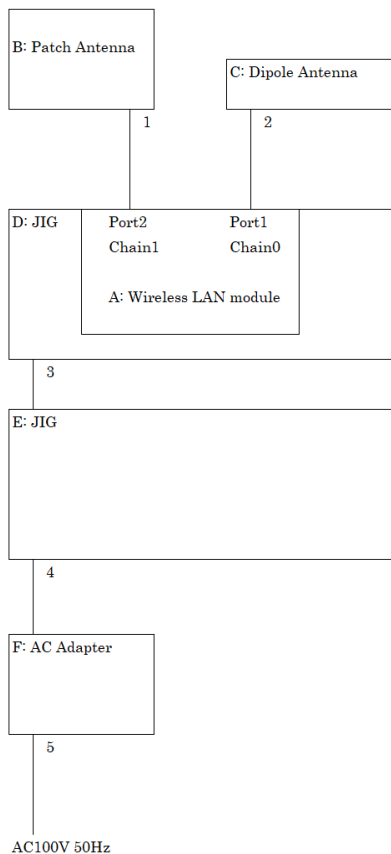
[ EUT and Associated Equipment (AE) ]

Symbol	EUT/AE	Item	Manufacturer	Model No.	Serial No.
A	EUT	Wireless LAN module	LITE-ON TECHNOLOGY(changzhou) CO.,LTD	WCBN3515A	001
B	EUT	Patch Antenna	INPAQ Technology Co.,Ltd	Patch 3001	001
C	EUT	Dipole Antenna	Itabashiseiki Co.,Ltd	ANW-3001	001
D	EUT	JIG	-	-	001
E	EUT	JIG	-	-	001
F	AE	AC Adapter	SONY	AC-UES1230M	18602954

[ Type of Cable ]

Symbol	Description	Identification (Manufacturer etc.)	Shielded Yes / No	Ferrite Core	Length (m)	Bundled
1	RF Cable	-	Yes	No	0.3	-
2	RF Cable	-	Yes	No	0.1	-
3	JIG Cable	-	No	No	0.1	-
4	DC Cable	-	No	No	1.0	-
5	AC Cable	-	No	No	1.6	-

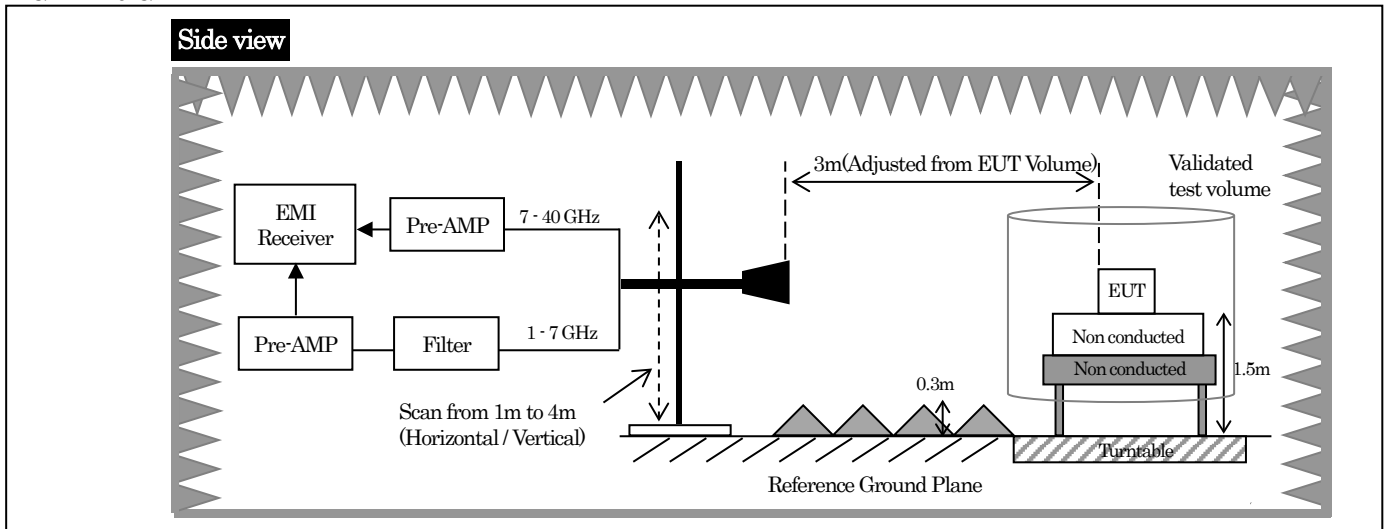
[ Connecting Diagram ]



## 2.6. Typical setup arrangement

### Radiated spurious emissions

< 1 GHz - 40 GHz >



### 3. Test Data

#### 3.1. Unwanted Emissions

Measurement band	Date of measurement	Ambient temperature	Relative humidity	Measured by
1 GHz to 7 GHz	March 26, 20210	23.0 deg.C	55.0 %	M. Kouga
7 GHz to 18 GHz	March 26, 20210	23.0 deg.C	55.0 %	M. Kouga
	March 27, 20210	23.0 deg.C	53.0 %	M. Kouga
18 GHz to 26.5 GHz	March 29, 20210	22.0 deg.C	60.0 %	M. Kouga
26.5 GHz to 40 GHz	March 30, 20210	24.0 deg.C	64.0 %	M. Kouga

#### 1 GHz to 40 GHz

\* Although "Height" in radiated emissions data, which shows the height of the boom of the antenna mast, might exceed 400.0 cm. because of the antenna tilt positioner attached to the edge of the boom for the bore-sighting measurement, the height of the reference point of the antenna does not exceed 400.0 cm.

#### [ 802.11a/ 5180 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5150.000	AV	H	46.8	0.2	47.0	54.0	7.0	164.0	33.6	X	10.0
5150.000	PK	H	56.4	0.2	56.6	74.0	17.4	165.1	34.0	X	-
5150.000	AV	V	44.2	0.2	44.4	54.0	9.6	386.0	0.0	X	10.0
5150.000	PK	V	54.3	0.2	54.5	74.0	19.5	387.0	359.0	X	-
10360.000	PK	H	46.0	-2.5	43.5	68.2	24.7	100.0	138.0	X	-
15540.000	AV	H	41.8	-2.3	39.5	54.0	14.5	100.0	144.0	X	10.0
20720.000	AV	H	32.0	5.4	37.4	54.0	16.6	270.0	345.7	X	10.0
25900.000	PK	H	43.1	4.7	47.8	68.2	20.4	108.0	358.7	X	-
36260.000	PK	H	62.8	-10.9	51.9	68.2	16.3	155.0	166.4	X	-
36458.408	AV	H	53.1	-10.9	42.2	54.0	11.8	184.0	251.4	X	10.0
10360.000	PK	V	47.5	-2.5	45.0	68.2	23.2	340.0	76.0	X	-
15540.000	AV	V	40.2	-2.3	37.9	54.0	16.1	321.6	6.0	X	10.0
20720.000	AV	V	37.6	5.4	43.0	54.0	11.0	396.0	101.7	X	10.0
20720.000	PK	V	44.5	5.4	49.9	74.0	24.1	395.0	99.7	X	-
31080.000	PK	V	60.6	-9.6	51.0	68.2	17.2	326.0	24.4	X	-
39071.212	AV	V	52.0	-10.9	41.1	54.0	12.9	204.0	272.4	X	10.0

#### [ 802.11a/ 5745 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5392.992	AV	H	44.0	0.1	44.1	54.0	9.9	142.0	37.0	X	10.0
5648.923	PK	H	52.0	0.7	52.7	68.2	15.5	170.0	105.1	X	-
5392.982	AV	V	45.0	0.1	45.1	54.0	8.9	274.0	180.0	X	10.0
5649.127	PK	V	51.1	0.7	51.8	68.2	16.4	350.3	131.4	X	-
11490.832	PK	H	62.8	-3.6	59.2	74.0	14.8	100.0	25.0	X	-
11490.926	AV	H	54.0	-3.6	50.4	54.0	3.6	102.0	26.0	X	10.0
22980.000	AV	H	32.4	4.6	37.0	54.0	17.0	100.0	21.7	X	10.0
22980.000	PK	H	42.4	4.6	47.0	74.0	27.0	100.0	26.8	X	-
28725.000	PK	H	61.5	-10.8	50.7	68.2	17.5	100.0	82.0	X	-
38930.968	AV	H	52.8	-11.1	41.7	54.0	12.3	208.0	282.4	X	10.0
11489.987	AV	V	51.6	-3.6	48.0	54.0	6.0	336.0	338.0	X	10.0
11490.154	PK	V	60.6	-3.6	57.0	74.0	17.0	337.0	338.9	X	-
22980.000	AV	V	34.9	4.6	39.5	54.0	14.5	321.0	41.0	X	10.0
22980.000	PK	V	43.5	4.6	48.1	74.0	25.9	322.0	39.7	X	-
34470.000	PK	V	61.4	-10.4	51.0	68.2	17.2	295.0	21.0	X	-
36491.168	AV	V	53.1	-10.9	42.2	54.0	11.8	296.0	151.4	X	10.0

## [ 802.11a/ 5825 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
11648.174	AV	H	46.8	-3.8	43.0	54.0	11.0	100.0	24.0	X	10.0
11651.393	PK	H	55.8	-3.8	52.0	74.0	22.0	100.0	25.0	X	-
11649.463	AV	V	44.4	-3.8	40.6	54.0	13.4	354.0	340.0	X	10.0
11650.501	PK	V	54.4	-3.8	50.6	74.0	23.4	355.0	340.0	X	-

## [ 802.11n-HT20 (MIMO) / 5180 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
10360.000	PK	H	46.6	-2.5	44.1	68.2	24.1	345.0	26.0	X	-
15540.000	AV	H	42.2	-2.3	39.9	54.0	14.1	100.0	145.0	X	10.0
20720.000	AV	H	31.6	5.4	37.0	54.0	17.0	267.0	328.0	X	10.0
25900.000	PK	H	42.6	4.7	47.3	68.2	20.9	124.0	143.7	X	-
31080.000	PK	H	60.5	-9.6	50.9	68.2	17.3	162.0	186.0	X	-
36442.740	AV	H	52.9	-10.9	42.0	54.0	12.0	148.0	0.4	X	10.0
10360.000	PK	V	47.5	-2.5	45.0	68.2	23.2	367.0	67.0	X	-
15540.000	AV	V	39.8	-2.3	37.5	54.0	16.5	357.0	116.1	X	10.0
20720.000	AV	V	37.5	5.4	42.9	54.0	11.1	396.0	98.7	X	10.0
20720.000	PK	V	43.6	5.4	49.0	74.0	25.0	392.0	97.7	X	-
36260.000	PK	V	62.4	-10.9	51.5	68.2	16.7	211.0	24.8	X	-
39553.544	AV	V	49.0	-7.7	41.3	54.0	12.7	269.0	48.4	X	10.0

## [ 802.11n-HT20 (MIMO) / 5745 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
11490.685	AV	H	49.8	-3.6	46.2	54.0	7.8	129.0	26.0	X	10.0
11490.726	PK	H	59.6	-3.6	56.0	74.0	18.0	129.0	25.0	X	-
22980.000	AV	H	32.6	4.6	37.2	54.0	16.8	100.0	24.7	X	10.0
22980.000	PK	H	42.5	4.6	47.1	74.0	26.9	100.0	25.9	X	-
28725.000	PK	H	62.2	-10.8	51.4	68.2	16.8	100.0	84.4	X	-
39183.304	AV	H	52.0	-10.2	41.8	54.0	12.2	181.0	82.0	X	10.0
11489.099	PK	V	57.2	-3.6	53.6	74.0	20.4	324.0	338.0	X	-
11489.731	AV	V	46.9	-3.6	43.3	54.0	10.7	324.0	336.0	X	10.0
22980.000	AV	V	34.4	4.6	39.0	54.0	15.0	348.0	47.7	X	10.0
22980.000	PK	V	43.2	4.6	47.8	74.0	26.2	356.0	47.7	X	-
34470.000	PK	V	62.0	-10.4	51.6	68.2	16.6	360.0	112.0	X	-
36448.240	AV	V	52.8	-10.9	41.9	54.0	12.1	206.0	145.4	X	10.0

## [ 802.11ac-VHT20 (MIMO) / 5180 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5150.000	AV	H	46.0	0.2	46.2	54.0	7.8	204.0	31.0	X	10.0
5150.000	PK	H	55.5	0.2	55.7	74.0	18.3	205.0	34.0	X	-
10360.000	PK	H	46.5	-2.5	44.0	68.2	24.2	100.0	24.0	X	-
15540.000	AV	H	38.4	-2.3	36.1	54.0	17.9	100.0	142.0	X	10.0
20720.000	AV	H	32.4	5.4	37.8	54.0	16.2	270.0	340.7	X	10.0
25900.000	PK	H	42.8	4.7	47.5	68.2	20.7	128.0	140.7	X	-
36260.000	PK	H	63.4	-10.9	52.5	68.2	15.7	144.0	68.4	X	-
38883.980	AV	H	52.2	-11.1	41.1	54.0	12.9	178.0	76.4	X	10.0
5150.000	AV	V	44.6	0.2	44.8	54.0	9.2	412.0	12.0	X	10.0
5150.000	PK	V	54.8	0.2	55.0	74.0	19.0	411.0	11.0	X	-
10360.000	PK	V	47.9	-2.5	45.4	68.2	22.8	298.0	70.0	X	-
15540.000	AV	V	37.7	-2.3	35.4	54.0	18.6	308.0	51.0	X	10.0
20720.000	AV	V	37.2	5.4	42.6	54.0	11.4	392.0	95.7	X	10.0
20720.000	PK	V	43.9	5.4	49.3	74.0	24.7	394.0	96.7	X	-
31080.000	PK	V	61.6	-9.6	52.0	68.2	16.2	299.0	124.4	X	-
36479.444	AV	V	52.9	-10.9	42.0	54.0	12.0	202.1	46.4	X	10.0

## [ 802.11ac-VHT20 (MIMO) / 5745 MHz]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5392.878	AV	H	44.2	0.1	44.3	54.0	9.7	142.0	38.0	X	10.0
5649.276	PK	H	52.2	0.7	52.9	68.2	15.3	112.0	48.0	X	-
5392.911	AV	V	44.4	0.1	44.5	54.0	9.5	234.0	174.0	X	10.0
5649.264	PK	V	51.0	0.7	51.7	68.2	16.5	216.0	166.0	X	-

## [ 802.11ac-VHT20 (MIMO) / 5825 MHz]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
11650.580	PK	H	54.8	-3.8	51.0	74.0	23.0	145.0	20.0	X	-
11651.080	AV	H	44.8	-3.8	41.0	54.0	13.0	146.0	20.0	X	10.0
23300.000	PK	H	43.4	4.5	47.9	68.2	20.3	272.0	345.7	X	-
23629.916	AV	H	32.0	4.5	36.5	54.0	17.5	176.0	116.7	X	10.0
29125.000	PK	H	61.5	-10.4	51.1	68.2	17.1	100.0	80.4	X	-
39796.604	AV	H	48.9	-7.0	41.9	54.0	12.1	100.0	50.0	X	10.0
11650.874	AV	V	41.1	-3.8	37.3	54.0	16.7	359.0	356.0	X	10.0
11651.283	PK	V	51.6	-3.8	47.8	74.0	26.2	360.5	355.8	X	-
20184.792	AV	V	31.3	5.5	36.8	54.0	17.2	150.0	128.7	X	10.0
23300.000	PK	V	44.2	4.5	48.7	68.2	19.5	320.0	41.7	X	-
34950.000	PK	V	61.9	-10.5	51.4	68.2	16.8	272.0	142.4	X	-
36430.368	AV	V	53.0	-10.8	42.2	54.0	11.8	120.0	125.4	X	10.0

## [ 802.11ac-VHT40 (MIMO) / 5190 MHz]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5150.000	AV	H	49.1	0.2	49.3	54.0	4.7	155.0	33.0	X	10.0
5150.000	PK	H	68.4	0.2	68.6	74.0	5.4	154.0	35.0	X	-
5150.000	AV	V	46.8	0.2	47.0	54.0	7.0	410.1	358.0	X	10.0
5150.000	PK	V	66.2	0.2	66.4	74.0	7.6	410.1	358.0	X	-

## [ 802.11ac (VHT40)/ 5230 MHz ]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
10460.000	PK	H	46.1	-2.4	43.7	68.2	24.5	430.0	34.0	X	-
15690.000	AV	H	38.8	-1.7	37.1	54.0	16.9	100.0	20.0	X	10.0
20920.000	AV	H	32.0	5.3	37.3	54.0	16.7	291.2	343.7	X	10.0
26150.000	PK	H	43.2	4.8	48.0	68.2	20.2	100.0	13.8	X	-
31380.000	AV	H	49.6	-8.4	41.2	54.0	12.8	242.1	321.4	X	10.0
36610.000	PK	H	63.4	-11.1	52.3	68.2	15.9	106.0	70.0	X	-
10460.000	PK	V	46.2	-2.4	43.8	68.2	24.4	348.0	74.0	X	-
15690.000	AV	V	37.9	-1.7	36.2	54.0	17.8	307.0	109.0	X	10.0
20920.000	AV	V	35.9	5.3	41.2	54.0	12.8	336.0	341.7	X	10.0
20920.000	PK	V	43.0	5.3	48.3	74.0	25.7	335.0	341.7	X	-
31380.000	AV	V	49.2	-8.4	40.8	54.0	13.2	358.0	46.4	X	10.0
36610.000	PK	V	63.2	-11.1	52.1	68.2	16.1	169.0	16.4	X	-

## [ 802.11ac-VHT40 (MIMO) / 5755 MHz]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
5402.997	AV	H	44.0	0.1	44.1	54.0	9.9	100.0	41.0	X	10.0
5650.000	PK	H	58.9	0.7	59.6	68.2	8.6	100.0	51.0	X	-
5402.909	AV	V	44.7	0.1	44.8	54.0	9.2	232.0	174.0	X	10.0
5650.000	PK	V	56.4	0.7	57.1	68.2	11.1	278.0	179.0	X	-

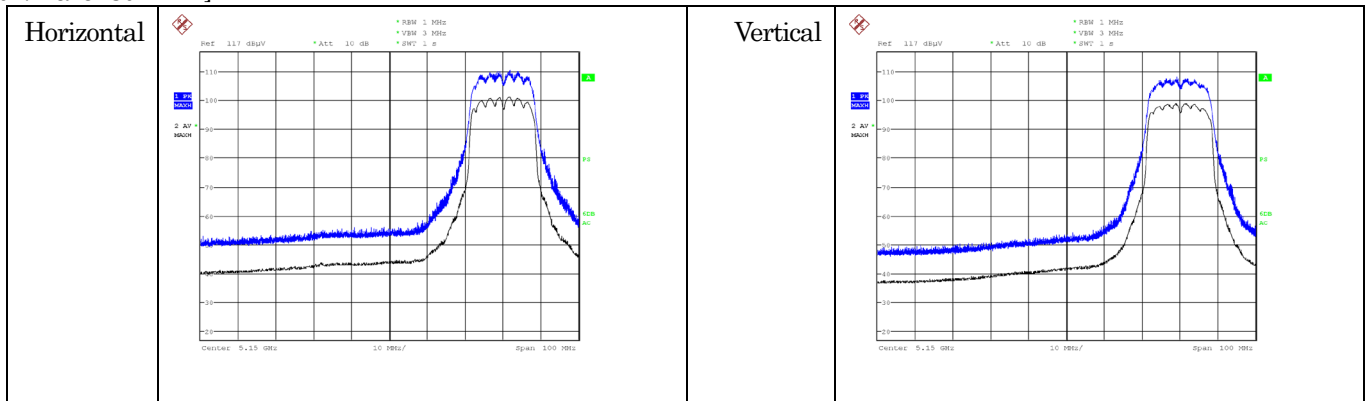
## [ 802.11ac (VHT40)/ 5795 MHz]

Frequency [MHz]	Detector	Polar.	Reading [dB $\mu$ V]	C.F. [dB/m]	Result [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [degree]	EUT Position	VBW [kHz]
11588.456	PK	H	56.1	-3.8	52.3	74.0	21.7	100.0	18.0	X	-
11588.475	AV	H	45.4	-3.8	41.6	54.0	12.4	100.0	18.1	X	10.0
18781.764	AV	H	32.3	5.1	37.4	54.0	16.6	128.0	224.7	X	10.0
23180.000	PK	H	43.6	4.6	48.2	68.2	20.0	270.0	341.7	X	-
34770.000	PK	H	62.5	-10.5	52.0	68.2	16.2	100.0	81.4	X	-
36471.116	AV	H	53.0	-10.9	42.1	54.0	11.9	136.0	111.4	X	10.0
11589.753	PK	V	53.6	-3.8	49.8	74.0	24.2	348.0	336.0	X	-
11590.026	AV	V	43.8	-3.8	40.0	54.0	14.0	346.7	336.0	X	10.0
22012.124	AV	V	32.2	4.9	37.1	54.0	16.9	155.0	89.7	X	10.0
23180.000	PK	V	44.0	4.6	48.6	68.2	19.6	324.0	39.7	X	-
28975.000	PK	V	61.5	-10.3	51.2	68.2	17.0	321.0	27.9	X	-
39291.936	AV	V	50.6	-9.4	41.2	54.0	12.8	282.0	40.4	X	10.0

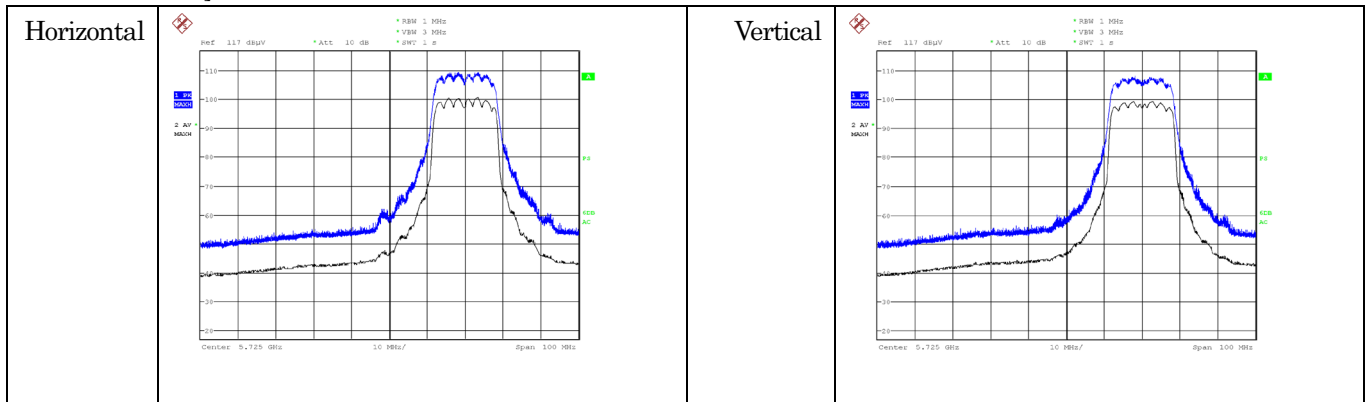
Plot data for 2.4 GHz Restricted-Band Edge

These plot data show peak (trace blue) and average (trace black) spectrum for worst case emissions in the restricted-band edges. The result of the final radiated emissions measurement refers in previous pages.

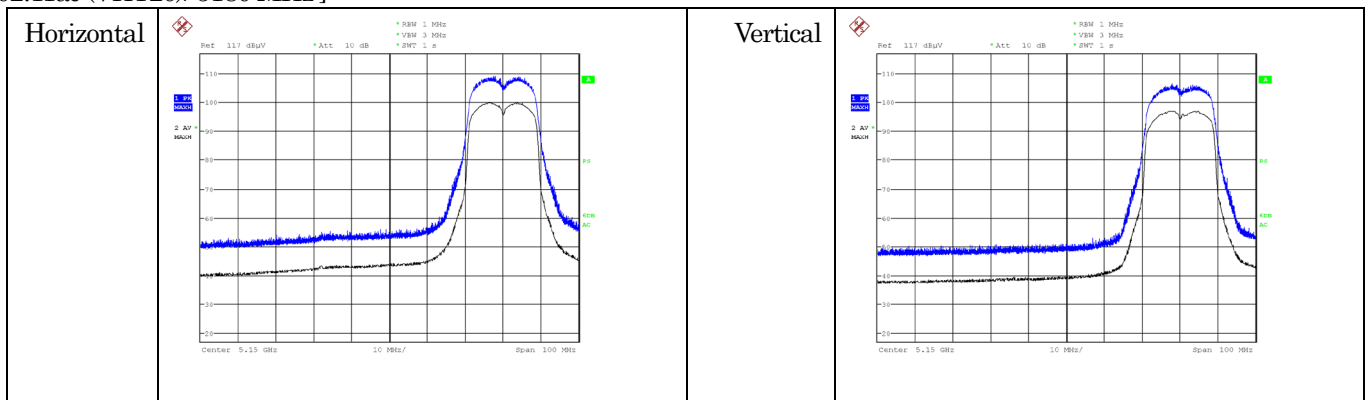
[ 802.11a/ 5180 MHz ]



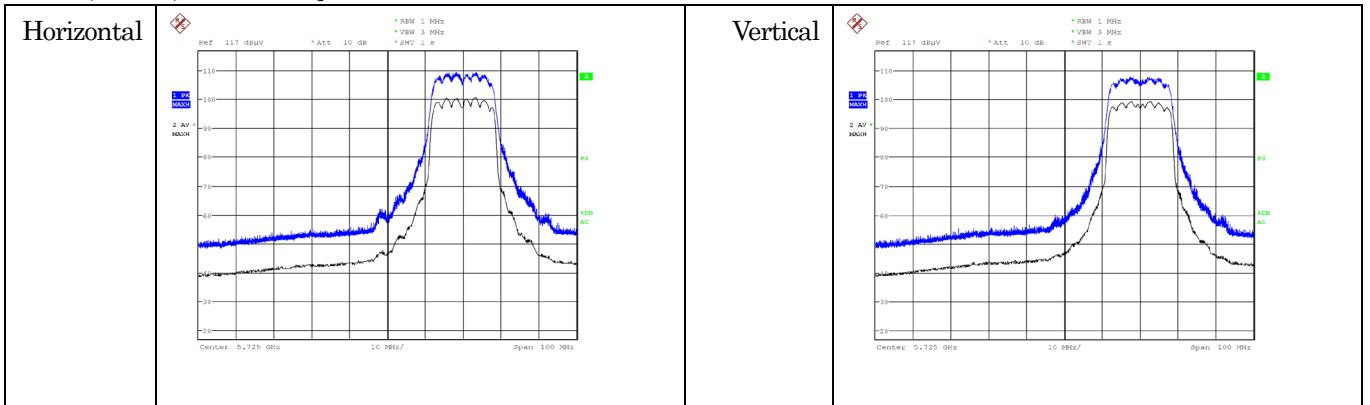
[ 802.11a/ 5745 MHz ]



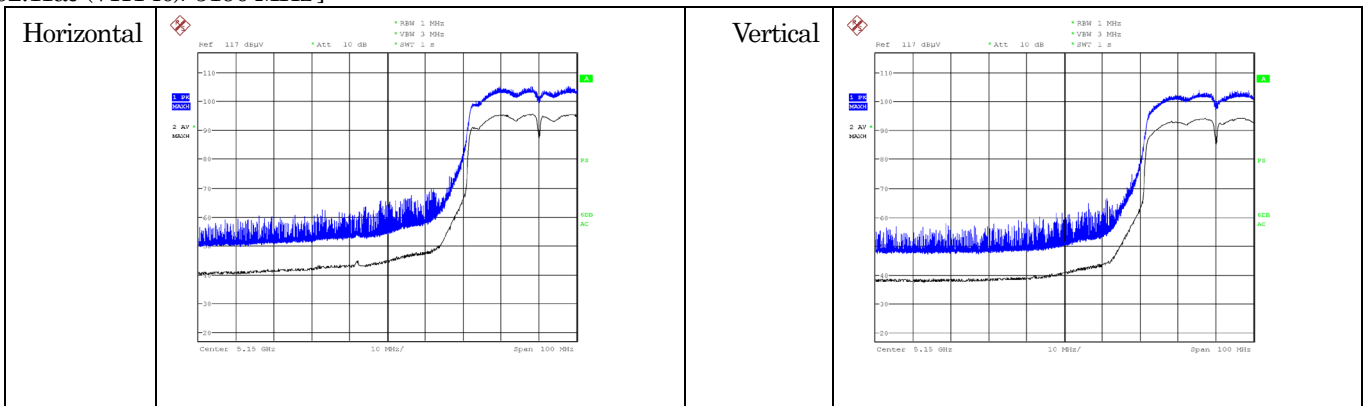
[ 802.11ac (VHT20)/ 5180 MHz ]



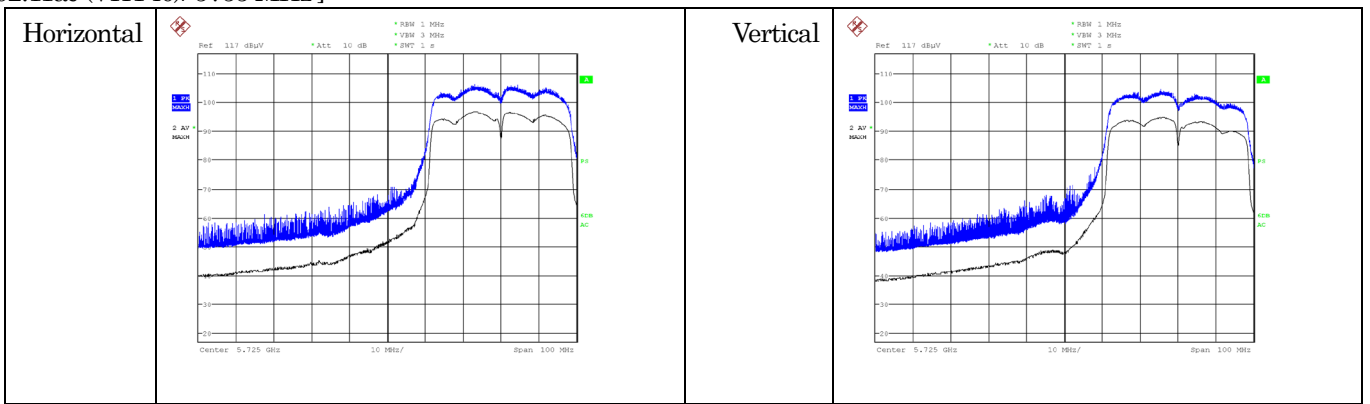
[ 802.11ac (VHT20)/ 5745 MHz ]



[ 802.11ac (VHT40)/ 5190 MHz ]

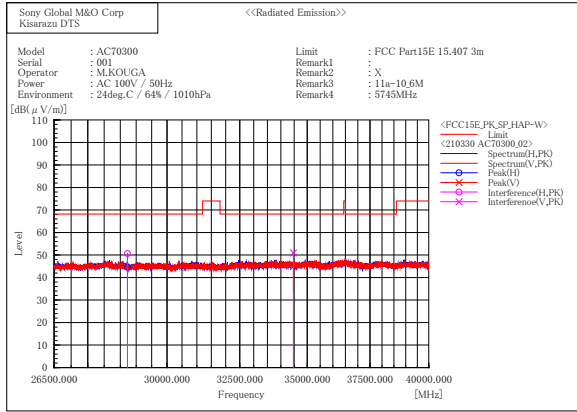
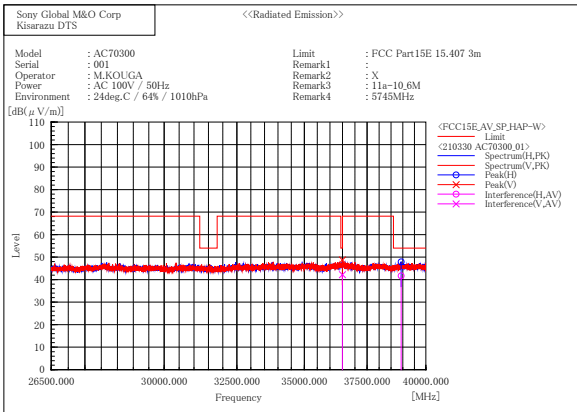
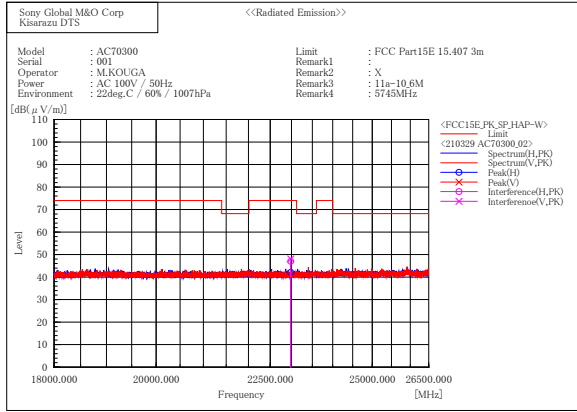
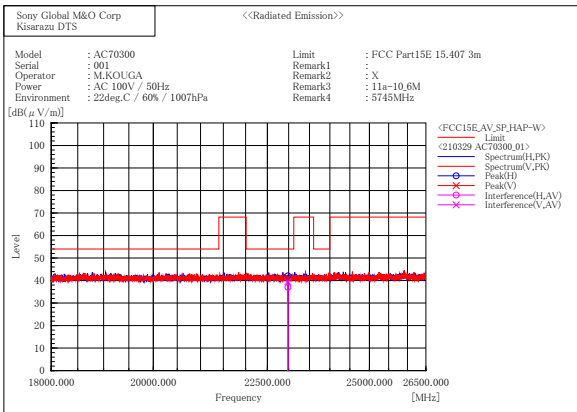
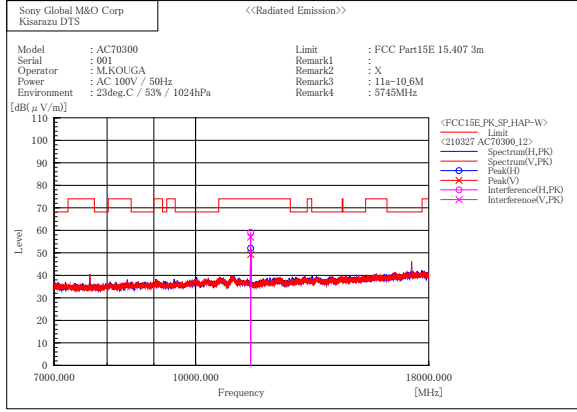
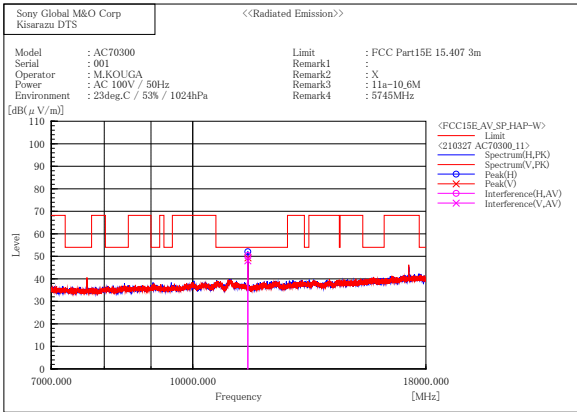


[ 802.11ac (VHT40)/ 5755 MHz ]





Plot data for above 1GHz in worst mode



## 4. Method of Calculation

### 4.1. Unwanted Emissions

Method of calculation : Software  
Software Name : V-Scan  
Software Version : Ver.4.0.30

Test Result [ dBuV/ m ] = Meter Reading [ dBuV ] + C.F. [ dB/ m ]

Note (a) Meter Reading : Reading of the EMI test receiver or spectrum analyzer.  
(b) C.F. :  Antenna Factor (including Balun Loss) + System GainLoss  
:  Antenna Factor (including Balun Loss) + System GainLoss + 20 log (3 m/ 10 m)

## 5. List of Test Equipment

All test results are traceable to the national and/ or international standards.

### 5.1. Unwanted Emissions

Used	Ctrl.#	Equipment	Model No.	Serial No.	Manufacturer	Cal.Interval	Last Cal.
-	M0515	EMI Receiver	ESCI	100606	Rohde & Schwarz	12 months	20.11.18
x	M0504	EMI Receiver	ESU40	100086	Rohde & Schwarz	12 months	20.12.02
-	A0073	Loop Antenna	HFH2-Z2	100171	Rohde & Schwarz	12 months	20.12.01
-	A0043	Biconical Antenna	BBA9106	V5(91032598)	Schwarzbeck	12 months	20.12.07
-	A0046	Log periodic Antenna	UHALP9108A1	0830	Schwarzbeck	12 months	20.12.07
x	A0056	Horn Antenna	BBHA9120D	670	Schwarzbeck	12 months	20.06.14
x	A0057	Horn Antenna	HAP06-18W	00000037	Toyo Corporation	12 months	20.06.14
x	A0058	Horn Antenna	HAP18-26W	00000016	Toyo Corporation	12 months	20.10.02
x	A0060	Horn Antenna	HAP26-40W	00000009	Toyo Corporation	12 months	20.12.02
-	CS0037	Fourth Site RE Cable SYS1	-	-	-	12 months	20.06.14
x	CS0039	Fourth Site RE Cable SYS3	-	-	-	12 months	20.06.14
x	CS0054	Fourth Site EMF Cable SYS	-	-	-	12 months	20.06.14
x	M1055	GHz Filter Box	WSF-109	17111786	Wakoh	12 months	20.06.14
x	M0510	RF Selector	NS4900	0802-226	Toyo Corporation	12 months	20.06.14
x	M0620	RF Pre-Amp	8447D	2944A10720	Agilent	12 months	20.06.14
x	M0706	3dB Attenuator	8491A	MY39267782	Agilent	12 months	20.06.14
x	M5151	Temperature Meter	608-H2	41475968	testo	24 months	19.11.20
x	M5061	Scientific Ambient Monitor	0560 6220	39515471/801	testo	12 months	20.04.17
x	M1048	Scientific Ambient Monitor	0560 6220	39512479/703	testo	12 months	20.07.15

About calibration interval

Valid until the end of the month listed in "Cal. Interval" column.