JQA File No. : KL80140410
Issue Date : October 22, 2014

TEST REPORT

Applicant	:	Sharp Corporation, Communication Systems Division
Address	:	2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, JAPAN
Products	:	Smart Phone
Model No.	:	402SH
SERIAL NO.	:	004401/11/524065/3 004401/11/524093/5 004401/11/524096/8
FCC ID	:	APYHRO00213
Test Standard	:	CFR 47 FCC Rules and Regulations Part 15
Test Results	:	**Passed**
Date of Test	:	October 2 ~11, 2014

ilac-MRA VLAC Lab Accreditation VLAC-001-2

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test
AE : Associated Equipment
N/A : Not Applicable
N/T : Not Tested
EMC : Electromagnetic Compatibility
EMI : Electromagnetic Interference
EMS : Electromagnetic Susceptibility

☒ - 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.

1 Description of the Equipment Under Test

1.	Manufacturer	:	Sharp Corporation, Communication Systems Division 2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, JAPAN
2.	Products	:	Smart Phone
3.	Model No.	:	402SH
4.	Serial No.	:	004401/11/524065/3 004401/11/524093/5 004401/11/524096/8
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	August, 2014
7.	Power Rating	:	4.0VDC (Lithium-ion Battery UBATIA250AFN1 2610mAh)
8.	EUT Grounding	:	None
9.	Operating Frequency	:	5180.0 MHz(36CH) –5700.0MHz(140CH): IEEE802.11a/n/ac(20MHz) 5190.0 MHz(38CH) –5670.0MHz(134CH): IEEE802.11n/ac(40MHz) 5210.0 MHz(42CH) –5610.0MHz(122CH): IEEE802.11ac(80MHz)
10.	Modulation	:	OFDM
11.	Antenna type	:	Inverted-L Type Antenna (Integral)
12.	Antenna Gain	:	0 dBi
13.	Category	:	Spread Spectrum Transmitter(OFDM)/UNII*
14.	EUT Authorization	:	Certification
15.	Received Date of EUT	:	September 30, 2014

*The EUT does not apply any emission testing as specified in FCC KDB 644545 (D02 and D01), Because it has no function shown in the(KDB) guidance.

2 Summary of Test Results

Applied Standard : CFR 47 FCC Rules and Regulations Part 15 – Radio Frequency Devices
Subpart E – Unlicensed National Information Infrastructure Devices

The EUT described in clause 1 was tested according to the applied standard shown above.
Details of the test configuration is shown in clause 6.
The conclusion for the test items of which are required by the applied standard is indicated under the test result.

☒ - The test result was **passed** for the test requirements of the applied standard.

☐ - The test result was **failed** for the test requirements of the applied standard.

☐ - The test result was **not judged** the test requirements of the applied standard.

In the approval of test results,
- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

S. Kino

Shigeru Kinoshita
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

Tested by:

Shigeru Osawa

Shigeru Osawa
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

The tests documented in this report were performed in accordance with
CFR 47 FCC Rules and Regulations Part 15
Subpart E – Unlicensed National Information Infrastructure Devices

ANSI C63.10–2009
Testing unlicensed wireless devices.

KDB 789033 D02
General UNII Test Procedures New Rules v01: June 6, 2014

KDB 905462 D02
UNII DFS Compliance Procedures New Rules v01r01: August 14, 2014

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No.	:	VLAC-001-2 (Expiry date : March 30, 2016)
VCCI Registration No.	:	A-0002 (Expiry date : March 30, 2016)
BSMI Registration No.	:	SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006 (Expiry date : September 14, 2016)
IC Registration No.	:	2079E-3, 2079E-4 (Expiry date : July 16, 2017)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Expiry date : February 22, 2016)

6 Details of the Equipment Under Test

6.1 Operating Condition

Test Voltage : 4.0VDC (Internal Lithium-ion Battery UBATIA250AFN1 2610mAh)

Operation Mode :

The EUT is set with the test mode, the specification of the test mode is as followings.

Transmitting frequency : 5180.0 MHz(36CH) –5700.0MHz(140CH): IEEE802.11a/n/ac(20MHz)
: 5190.0 MHz(38CH) –5670.0MHz(134CH): IEEE802.11n/ac(40MHz)
: 5210.0 MHz(42CH) –5610.0MHz(122CH): IEEE802.11ac(80MHz)

Receiver frequency : 5180.0 MHz(36CH) – 5700.0 MHz(140CH)

Modulation Type
1. 802.11a : OFDM
2. 802.11n/ac(20MHz) : OFDM
3. 802.11n/ac(40MHz) : OFDM
3. 802.11ac(80MHz) : OFDM

Other Clock Frequency
19.2MHz, 24MHz, 27MHz, 27.12MHz, 48MHz, 32.768kHz

The EUT was rotated through three orthogonal axis (X, Y and Z axis) in radiated measurement.
The EUT with temporary antenna port was used in conducted measurement.

6.2 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Smart Phone	Sharp	402SH	004401/11/524065/3*1) 004401/11/524093/5*2) 004401/11/524096/8*3)	APYHRO00213
B	AC Adapter	Sharp	SHCEJ1	--	N/A
C	Earphone	Softbank Mobile	ZTCAA1	--	N/A
D	DTV Antenna	Sharp	--	--	N/A

*1) Used for AC Powerline Conducted Emission and Field Strength of Spurious Emission
*2) Used for Antenna Conducted Emission
*3) Used for DFS Measurement

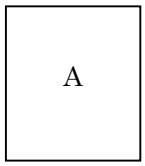
The auxiliary equipment used for testing :
None

Type of Cable:

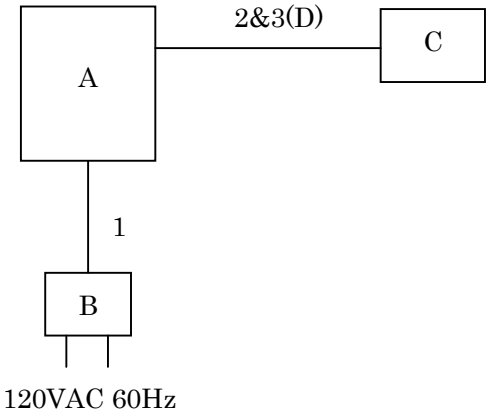
No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	DC Power Cord	--	--	NO	NO	1.5
2	Earphone Cable	--	--	NO	NO	0.5
3	DTV Antenna Cable	--	--	NO	NO	0.1

6.3 Test Arrangement (Drawings)

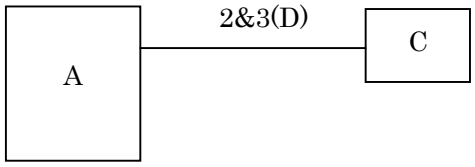
a) Single Unit



b) AC Adapter used



c) Earphone used



6.4 Maximum Output Power

The preliminary maximum peak conducted output power measurements were performed each TX rate and maximum value are listed as followings.

802.11a

Channel	36	44	48	52	56	64	100	116	140
Frequency(MHz)	5180	5220	5240	5260	5280	5320	5500	5580	5700
Power(dBm)	10.81	11.31	11.22	11.29	11.27	11.21	11.50	11.80	11.28

The TX rate 6Mbps was maximum case.(MCS0)

802.11n (20MHz BW)

Channel	36	44	48	52	56	64	100	116	140
Frequency(MHz)	5180	5220	5240	5260	5280	5320	5500	5580	5700
Power(dBm)	10.96	11.60	11.47	11.53	11.38	11.07	11.53	11.84	11.31

The TX rate 6.5Mbps was maximum case.(MCS0)

802.11n (40MHz BW)

Channel	38	46	54	62	102	134
Frequency(MHz)	5190	5230	5270	5310	5510	5670
Power(dBm)	11.31	11.36	11.29	11.04	11.61	11.28

The TX rate 13.5Mbps was maximum case.(MCS0)

802.11ac(80MHz BW)

Channel	42	58	106	122
Frequency(MHz)	5210	5290	5530	5610
Power(dBm)	11.20	11.13	11.26	11.24

The TX rate 29.3Mbps was maximum case.(MCS0)

All test cases were performed to the highest RF output power data rate listed above.

7 Details of the Test Item

7.0 Summary of the Test Results

Test Item	FCC Specification	Reference of the Test Report	Results	Remarks
Antenna Requirement	Section 15.203	Section 1.11	Passed	-
26dB Bandwidth	Section 15.407(2)(3)	Section 7.1	-	-
Maximum Conducted Output Power	Section 15.407(a)(1)(iv), (2),(3)	Section 7.2	Passed	For mobile and portable client device
Peak Power Spectral Density	Section 15.407(a)(1)(iv), (2),(3)	Section 7.3	Passed	For mobile and portable client device
Peak Excursion	--	Section 7.4	N/A	-
AC Powerline Conducted Emission	Section 15.407(b)(6) Section 15.207	Section 7.5	Passed	-
Unwanted Radiated Emission	Section 15.407(b) Section 15.205 Section 15.209	Section 7.6	Passed	-
Dynamic Frequency Selection	Section 15.407(h)(2)	Section 7.7	Passed	-

7.1 26dB Bandwidth

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☐ - **Passed** ☐ - **Failed** ☒ - **Not judged**

7.1.1 Worst Point and Measurement Uncertainty

Reporting Purpose (No limitation applied)

Uncertainty of Measurement Results +/- 0.9 %

Remarks : _____

7.1.2 Test Site and Instruments

7.1.2.1 Test Site

KITA-KANSAI Testing Center

Test site : SAITO

☐ - Anechoic chamber (A1) ☐ - Measurement room (M1)
☐ - Measurement room (M2) ☐ - Measurement room (M3)
☐ - Shielded room (S1) ☐ - Shielded room (S2)
☐ - Shielded room (S3) ☒ - Shielded room (S4)

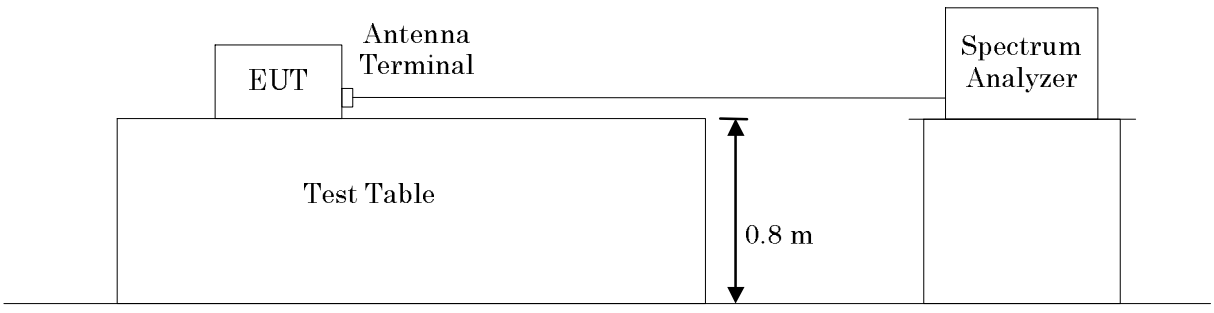
7.1.2.2 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2014/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2014/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2014/8	1 Year

7.1.3 Test Method and Test Setup (Diagrammatic illustration)

The occupied bandwidth measurements were carried out connecting to the spectrum analyzer.
The spectrum analyzer was set in accordance with KDB 789033 D02 as follows:.
The RBW was set approximately 1% of the emission bandwidth.
Set the VBW > RBW., Detector = Peak, and Trace mode = max hold.
The bandwidth function in the analyzer was used.

(referred documentation is No. G70364M)



7.1.4 Test Data

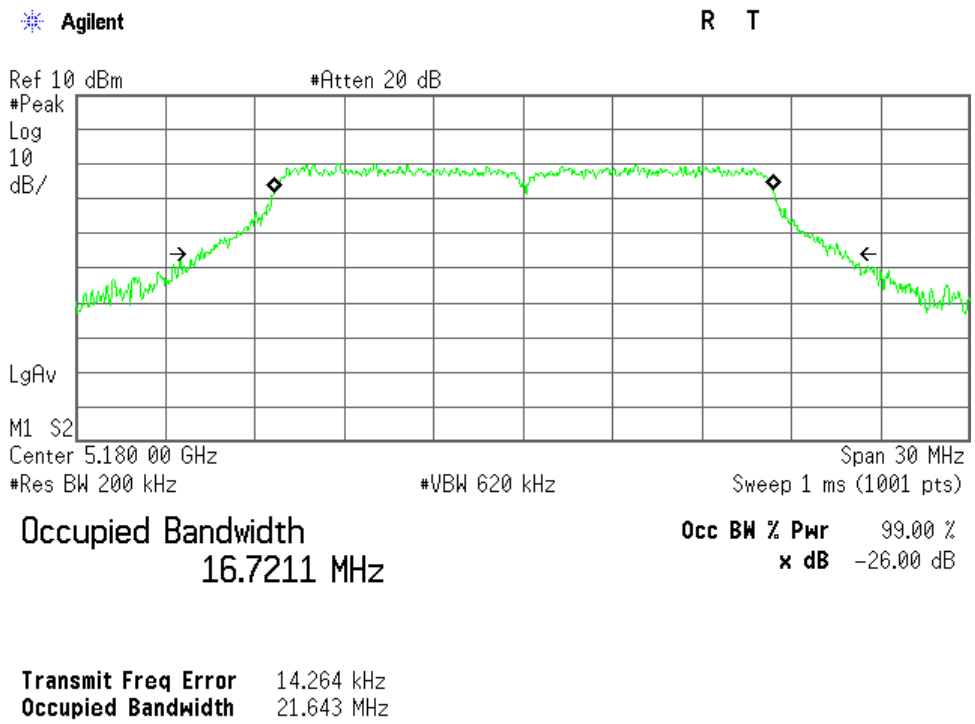
7.1.5.1 802.11a 26dB/ 99% OBW

Test Date : October 3, 2014
Temp.: 26°C, Humi: 63%

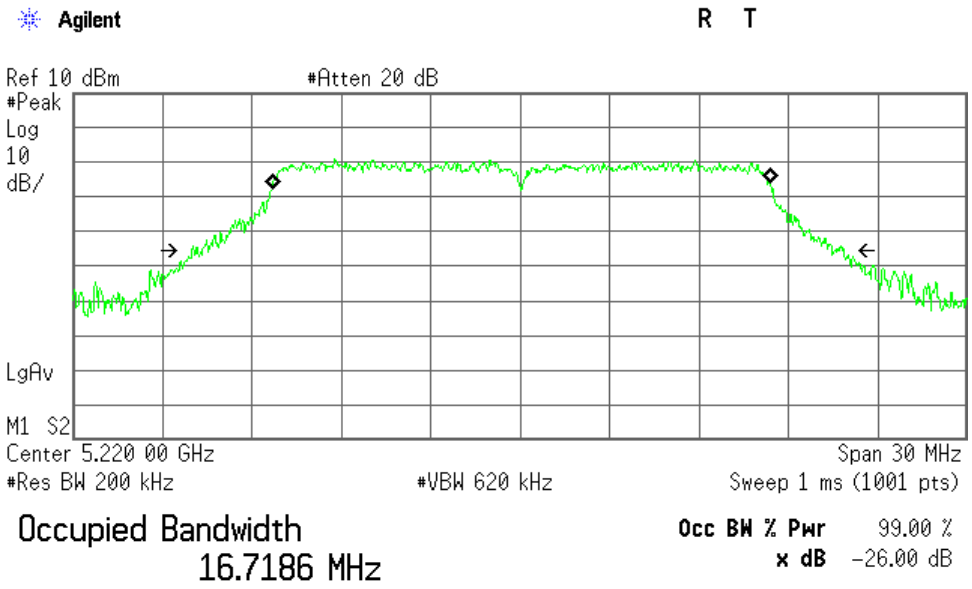
Mode of EUT: TX 802.11a
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	26dB OBW (MHz)	99% OBW (MHz)
36	5180	21.643	16.721
44	5220	21.883	16.719
48	5240	21.910	16.671
52	5260	21.721	16.697
56	5280	21.302	16.721
64	5320	21.737	16.728
100	5500	21.690	16.735
116	5580	21.443	16.755
140	5700	21.453	16.653

802.11a 36ch (5180 MHz)

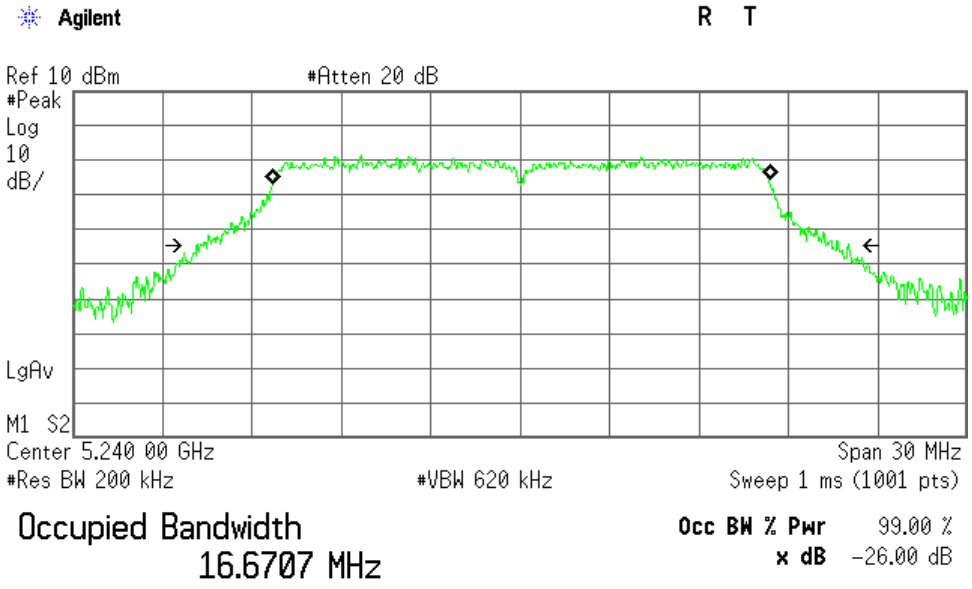


802.11a 44ch (5220 MHz)



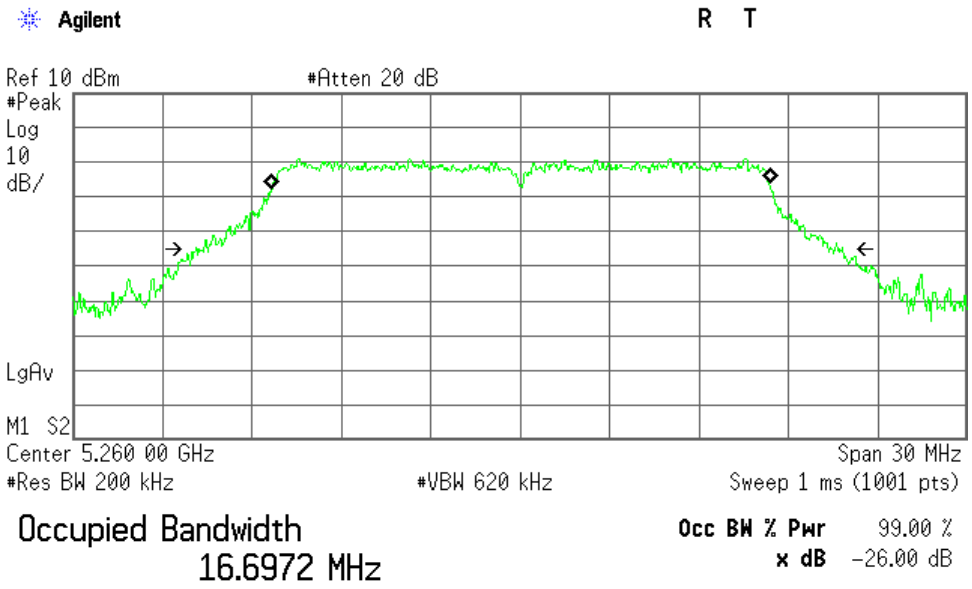
Transmit Freq Error 43.148 kHz
Occupied Bandwidth 21.883 MHz

802.11a 48ch (5240 MHz)



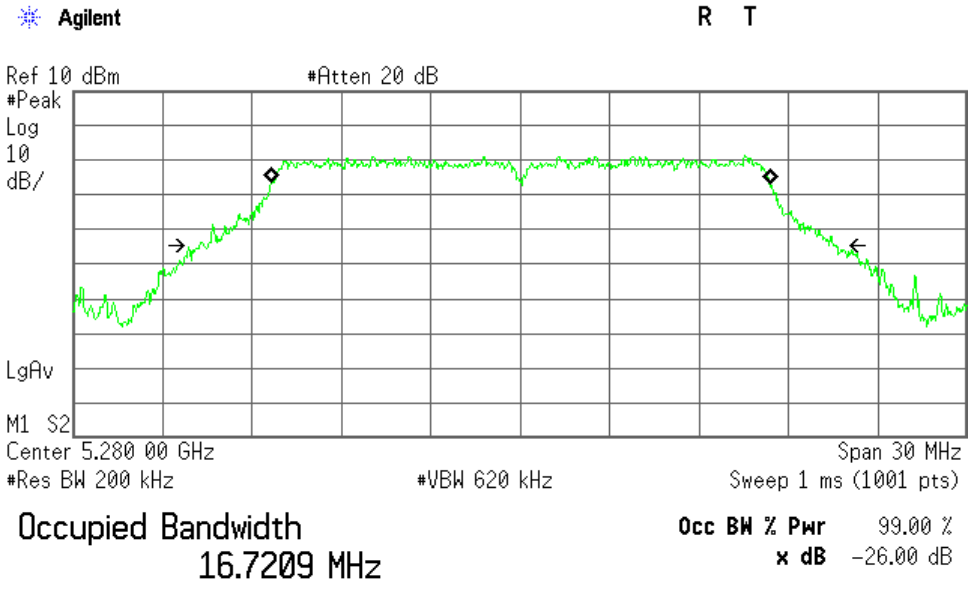
Transmit Freq Error 31.503 kHz
Occupied Bandwidth 21.910 MHz

802.11a 52ch (5260 MHz)



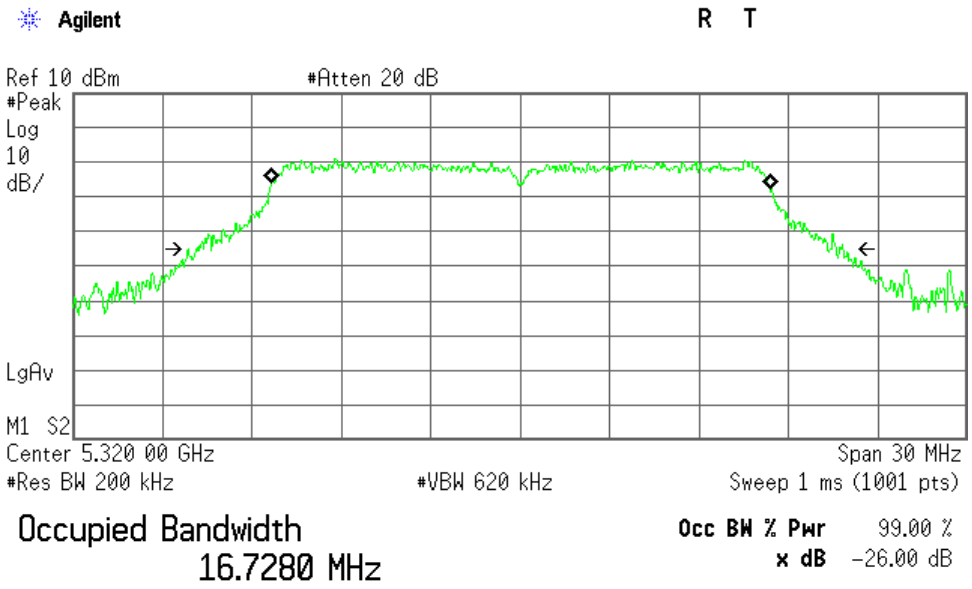
Transmit Freq Error 15.445 kHz
Occupied Bandwidth 21.721 MHz

802.11a 56ch (5280 MHz)



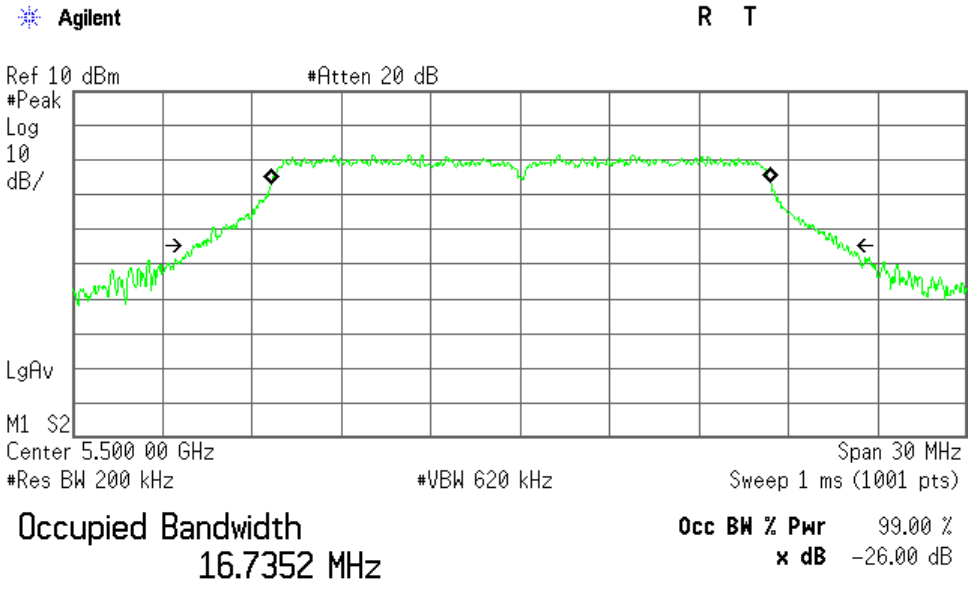
Transmit Freq Error 23.927 kHz
Occupied Bandwidth 21.302 MHz

802.11a 64ch (5320 MHz)



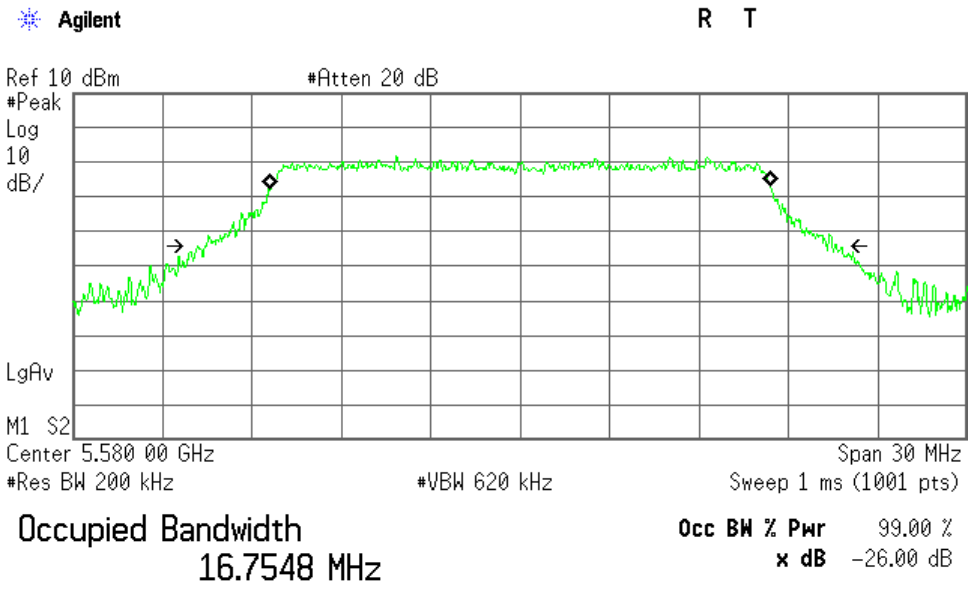
Transmit Freq Error 23.388 kHz
Occupied Bandwidth 21.737 MHz

802.11a 100ch (5500 MHz)



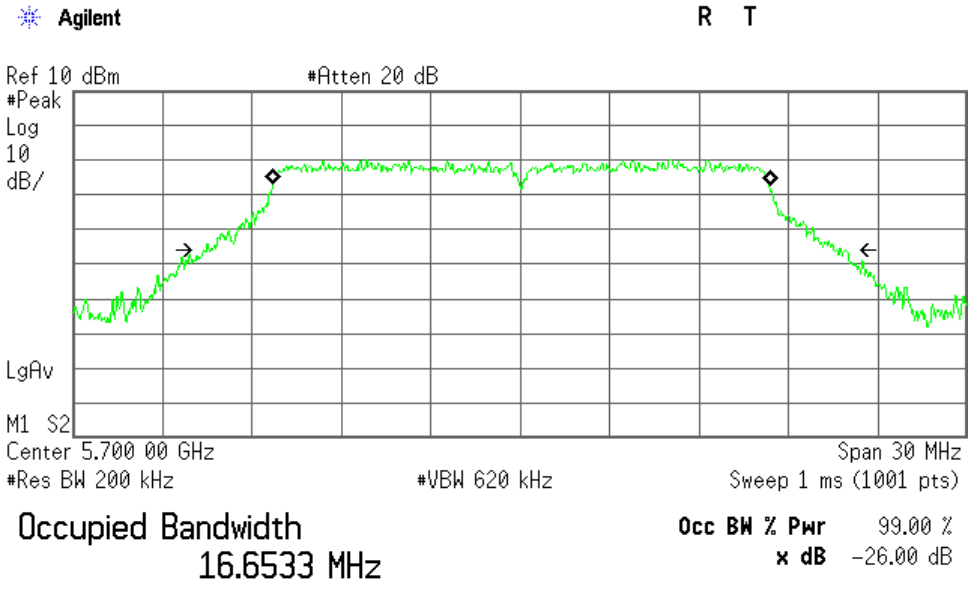
Transmit Freq Error 25.052 kHz
Occupied Bandwidth 21.690 MHz

802.11a 116ch (5580 MHz)



Transmit Freq Error 10.944 kHz
Occupied Bandwidth 21.443 MHz

802.11a 140ch (5700 MHz)



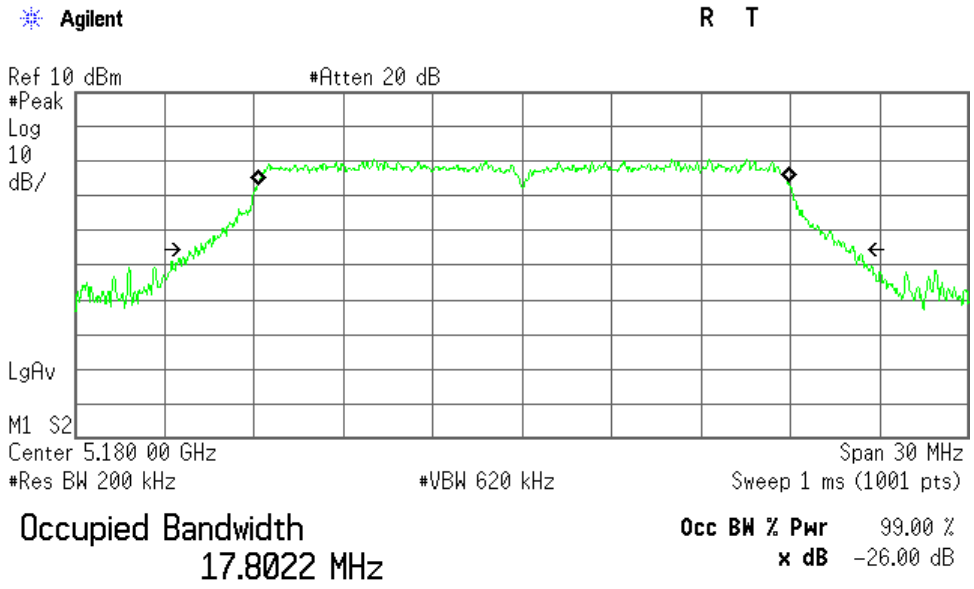
Transmit Freq Error 36.084 kHz
Occupied Bandwidth 21.453 MHz

7.1.5.2 802.11n (20 MHz BW) 26dB/ 99% OBW

Mode of EUT: Tx 802.11n(20 MHz)
Test Port: Temporary antenna connector

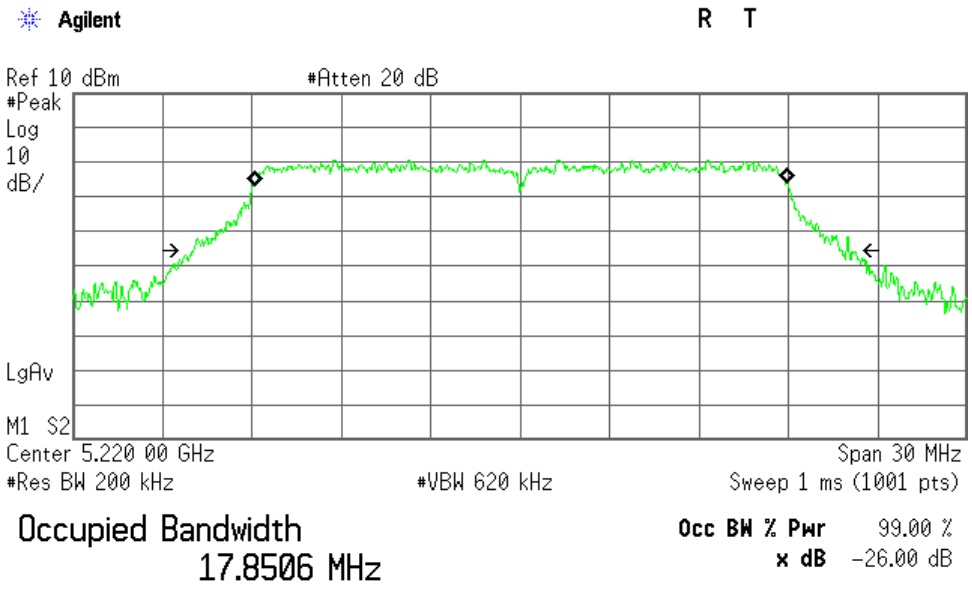
Channel	Frequency	26dB OBW	99% OBW
	(MHz)	(MHz)	(MHz)
36	5180	22.091	17.802
44	5220	21.995	17.851
48	5240	21.868	17.802
52	5260	22.090	17.820
56	5280	22.425	17.797
64	5320	22.051	17.787
100	5500	22.254	17.805
116	5580	21.701	17.801
140	5700	21.938	17.786

802.11n (20 MHz) 36ch (5180 MHz)



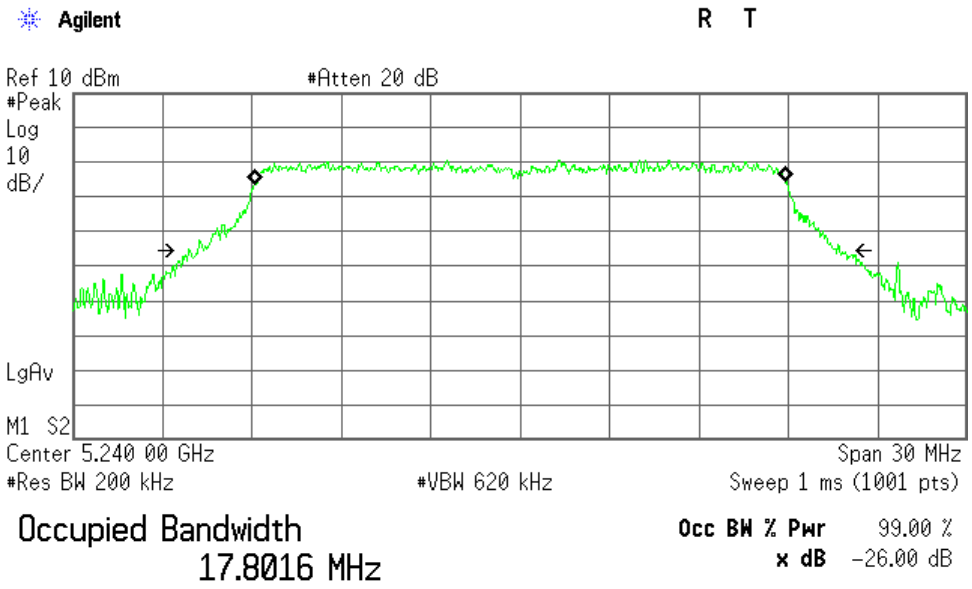
Transmit Freq Error 38.571 kHz
Occupied Bandwidth 22.091 MHz

802.11n (20 MHz) 44ch (5220 MHz)



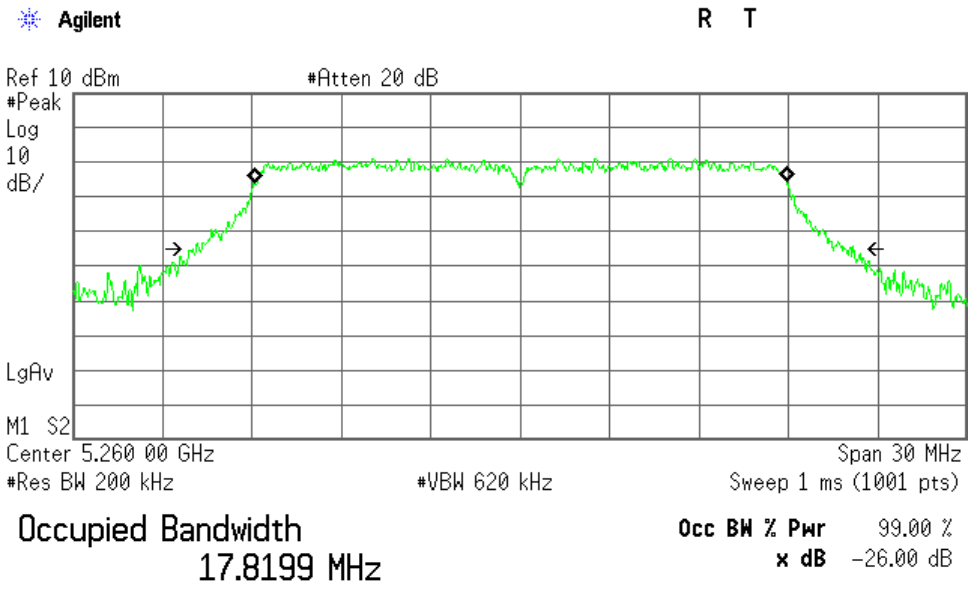
Transmit Freq Error 16.217 kHz
Occupied Bandwidth 21.995 MHz

802.11n (20 MHz) 48ch (5240 MHz)



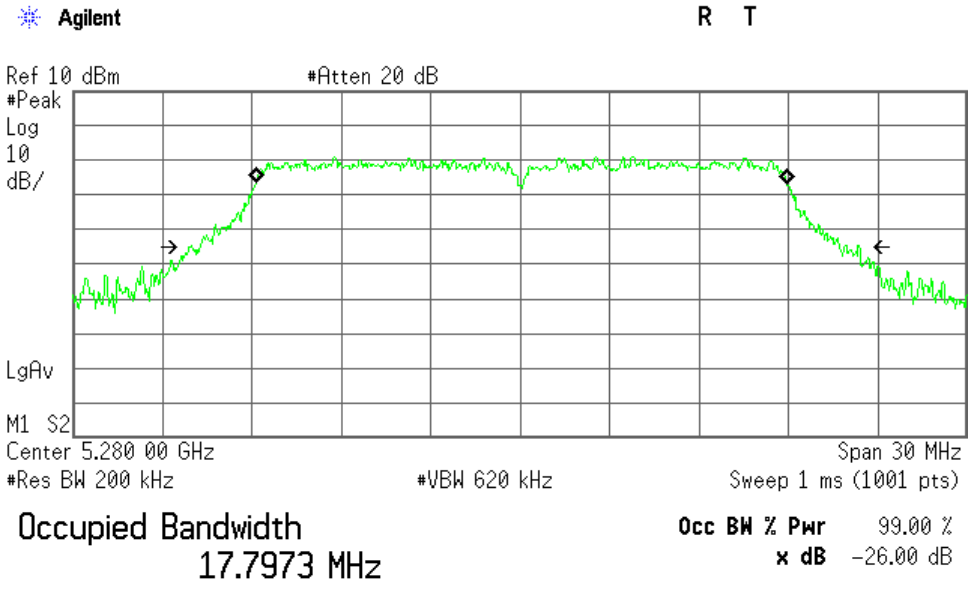
Transmit Freq Error 21.386 kHz
Occupied Bandwidth 21.868 MHz

802.11n (20 MHz) 52ch (5260 MHz)



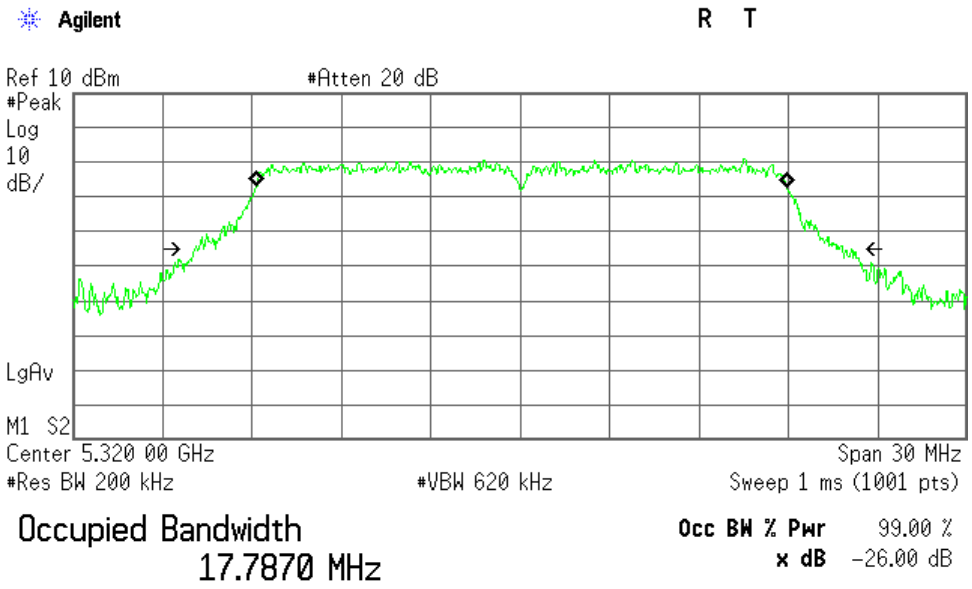
Transmit Freq Error	20.276 kHz
Occupied Bandwidth	22.090 MHz

802.11n (20 MHz) 56ch (5280 MHz)



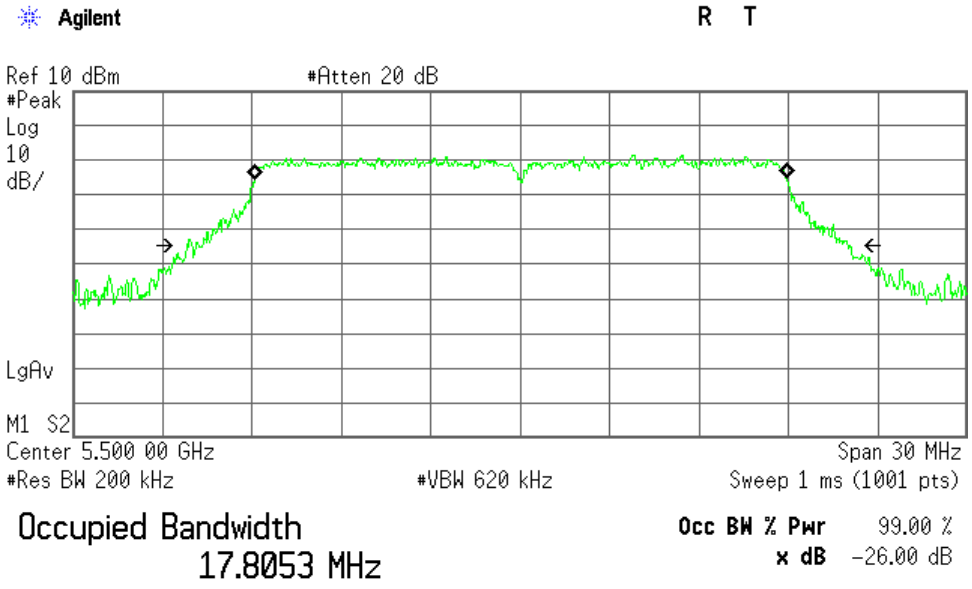
Transmit Freq Error	45.159 kHz
Occupied Bandwidth	22.425 MHz

802.11n (20 MHz) 64ch (5320 MHz)



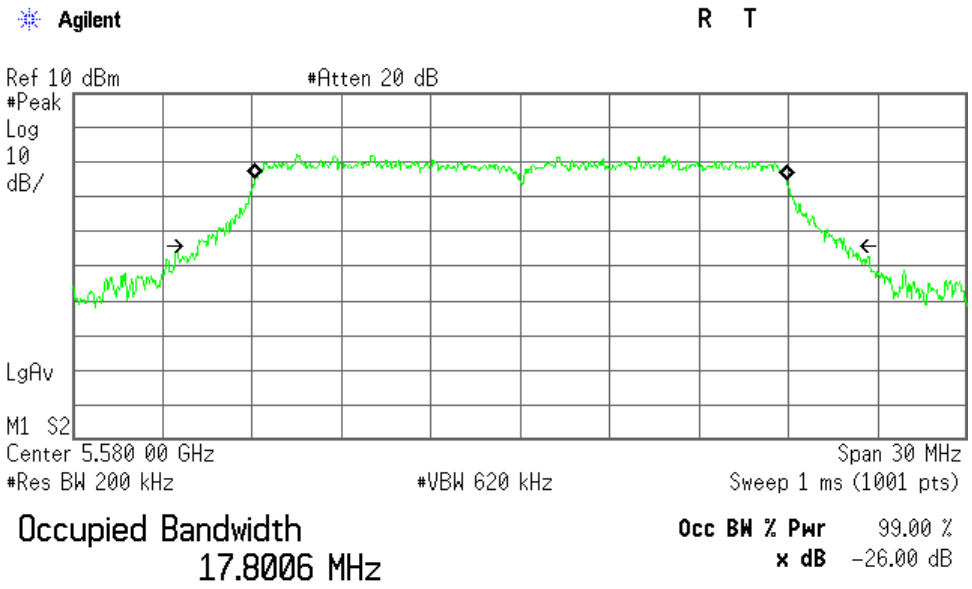
Transmit Freq Error 51.651 kHz
Occupied Bandwidth 22.051 MHz

802.11n (20 MHz) 100ch (5500 MHz)



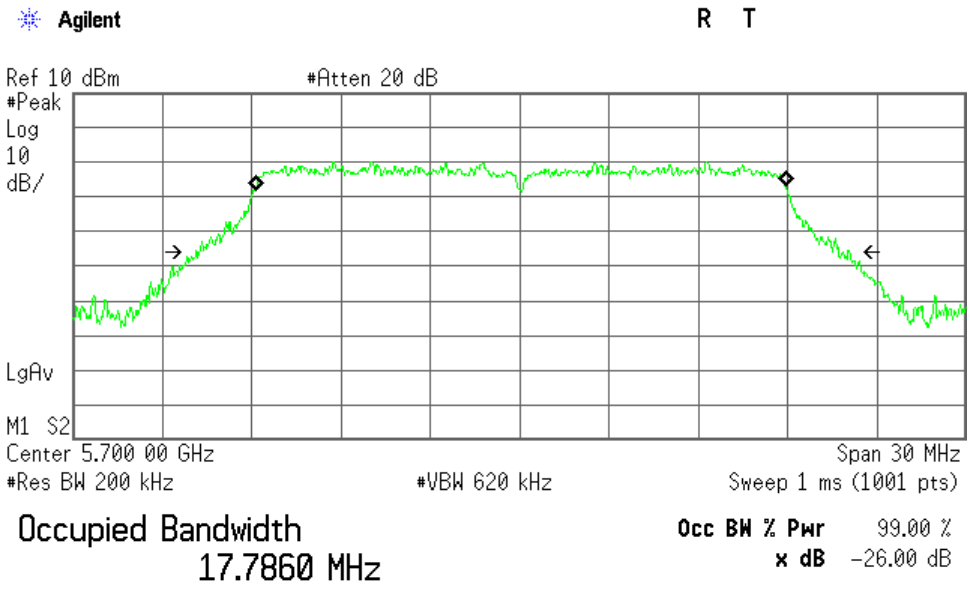
Transmit Freq Error 32.396 kHz
Occupied Bandwidth 22.254 MHz

802.11n (20 MHz) 116ch (5580 MHz)



Transmit Freq Error 28.183 kHz
Occupied Bandwidth 21.701 MHz

802.11n (20 MHz) 140ch (5700 MHz)



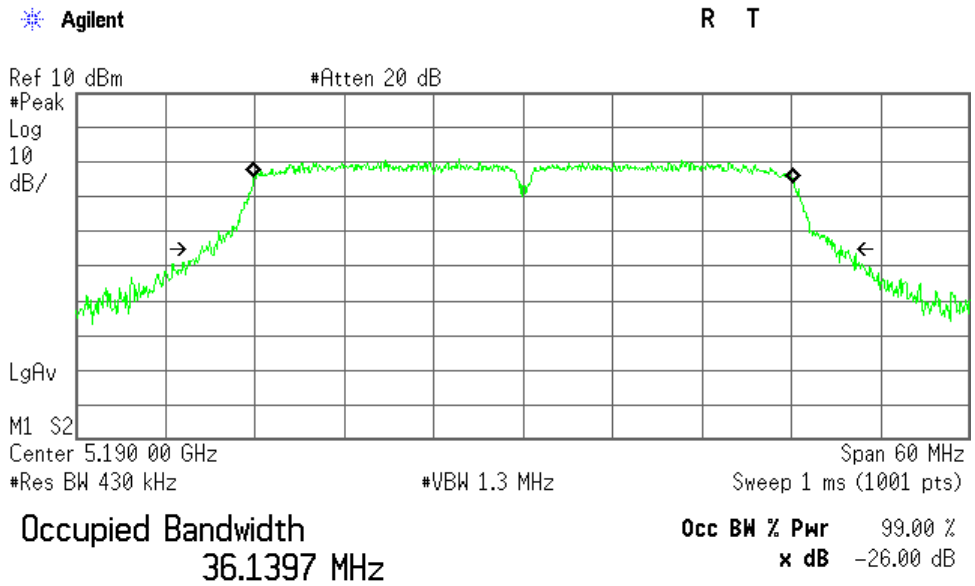
Transmit Freq Error 32.310 kHz
Occupied Bandwidth 21.938 MHz

7.1.5.3 802.11n (40 MHz BW) 26dB/ 99% OBW

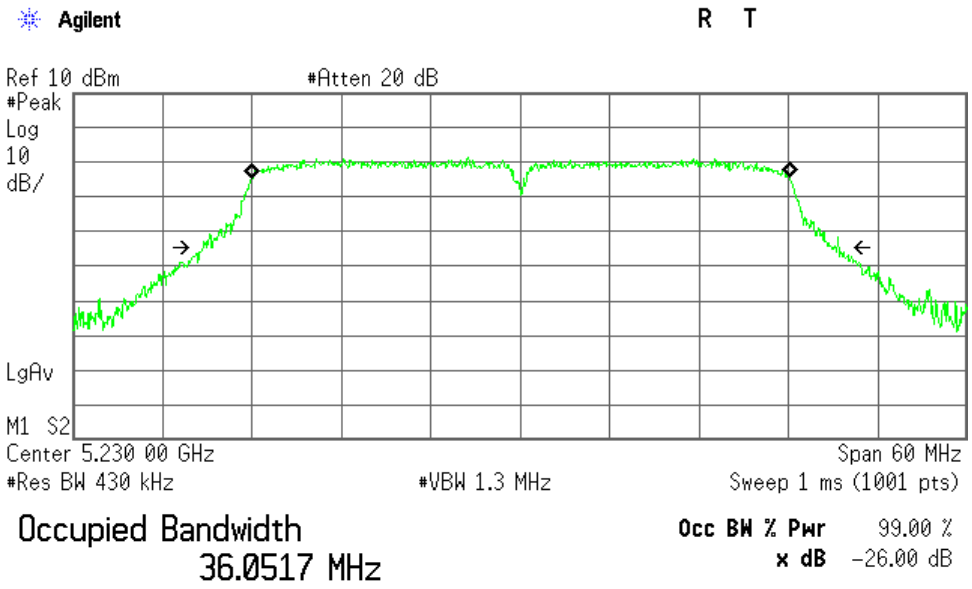
Mode of EUT: Tx 802.11n(40 MHz)
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	26dB OBW (MHz)	99% OBW (MHz)
38	5190	42.969	36.140
46	5230	42.655	36.052
54	5270	42.322	36.121
62	5310	43.993	36.097
102	5510	42.544	36.091
134	5670	43.060	36.104

802.11n (40 MHz) 38ch (5190 MHz)

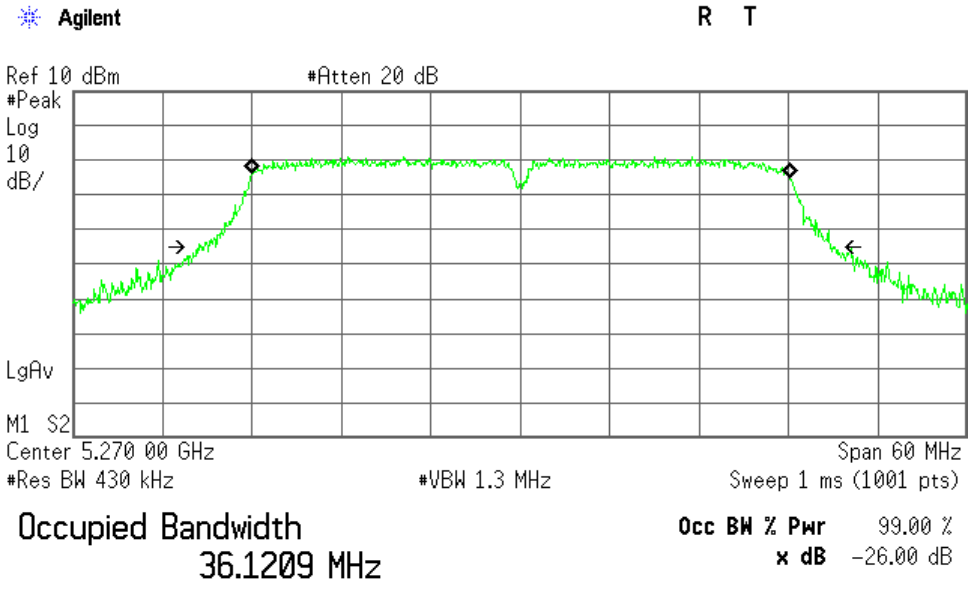


802.11n (40 MHz) 46ch (5230 MHz)



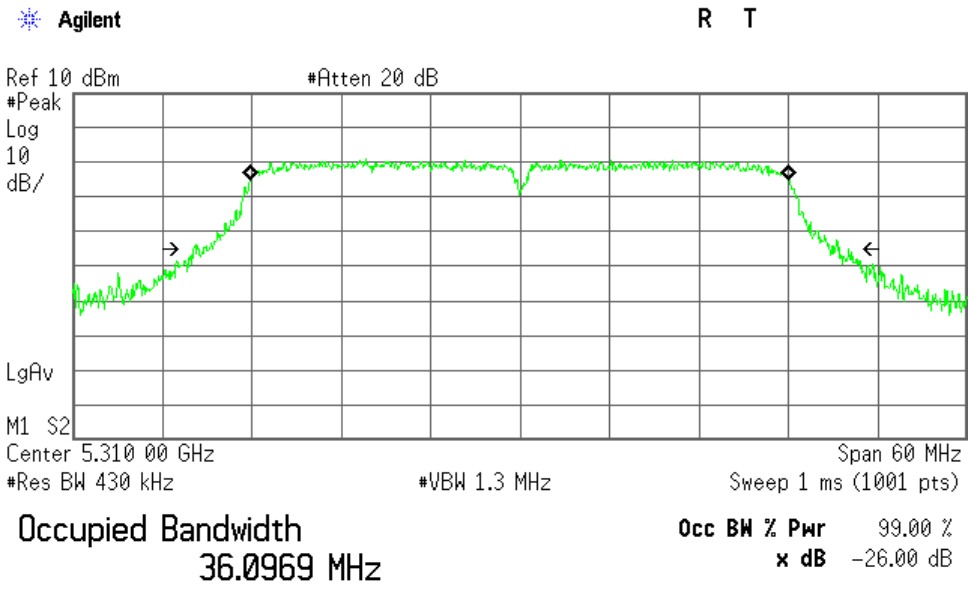
Transmit Freq Error 34.141 kHz
Occupied Bandwidth 42.655 MHz

802.11n (40 MHz) 54ch (5270 MHz)



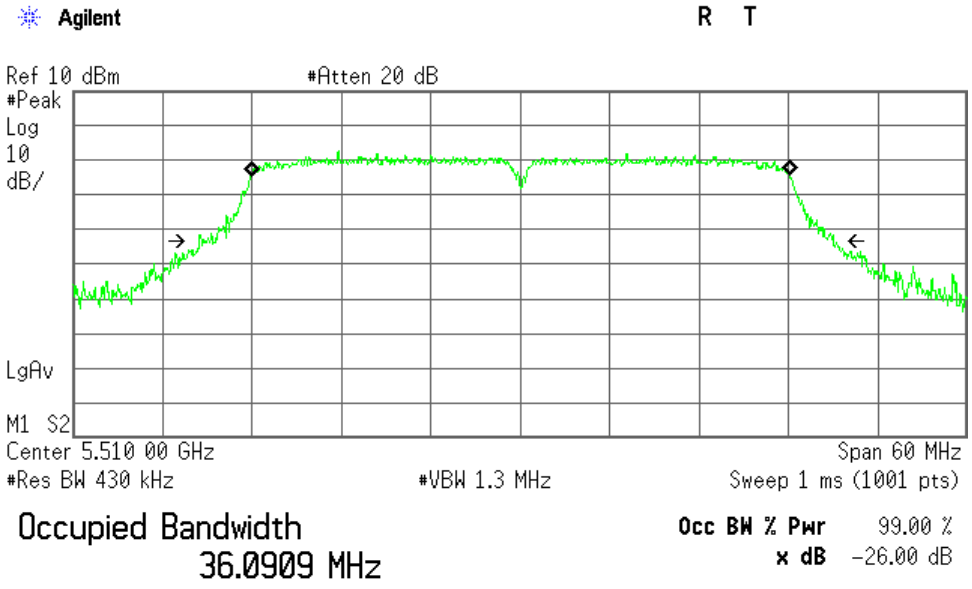
Transmit Freq Error 40.575 kHz
Occupied Bandwidth 42.322 MHz

802.11n (40 MHz) 62ch (5310 MHz)



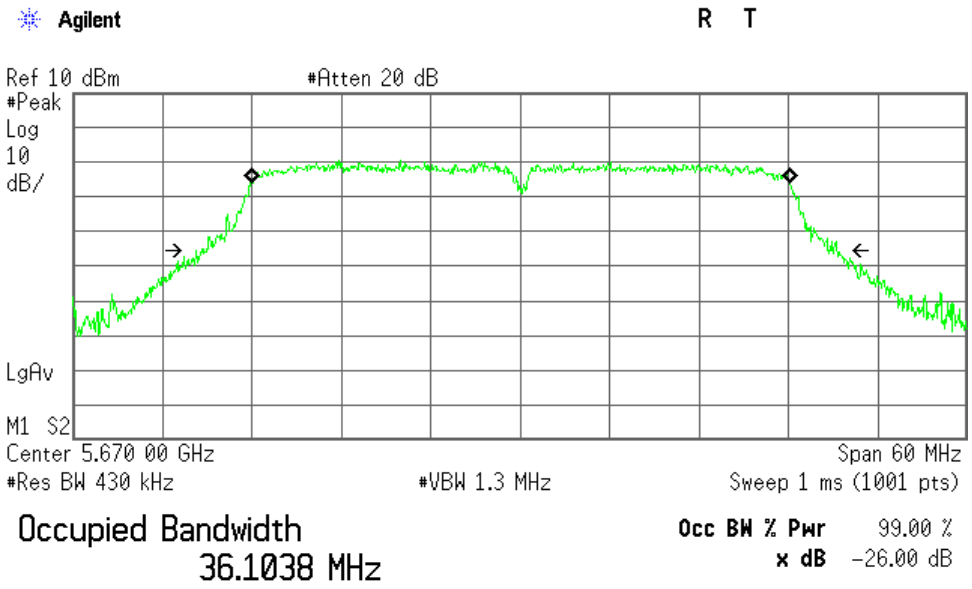
Transmit Freq Error -21.938 kHz
Occupied Bandwidth 43.993 MHz

802.11n (40 MHz) 102ch (5510 MHz)



Transmit Freq Error 34.505 kHz
Occupied Bandwidth 42.544 MHz

802.11n (40 MHz) 134ch (5670 MHz)



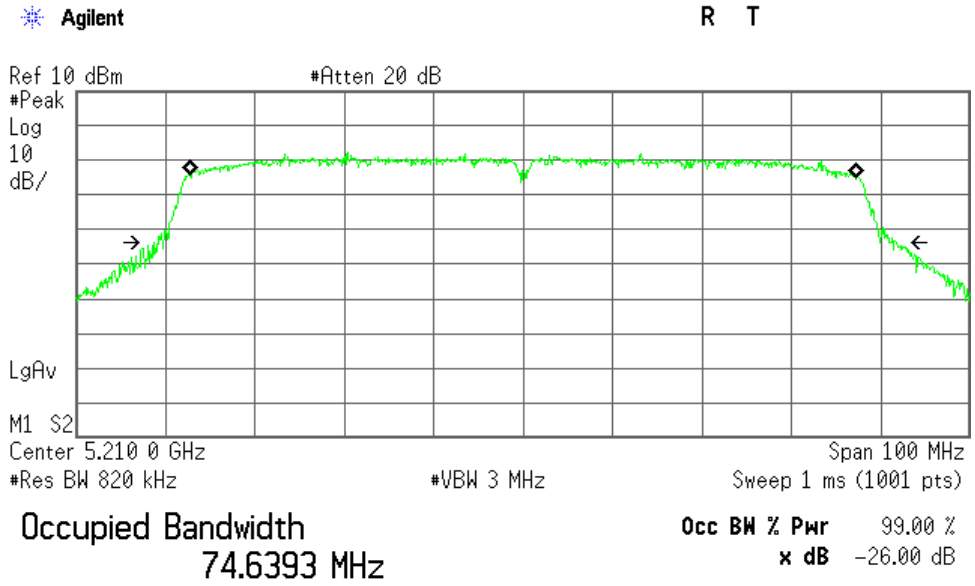
Transmit Freq Error	22.699 kHz
Occupied Bandwidth	43.060 MHz

7.1.5.4 802.11ac (80 MHz BW) 26dB/ 99% OBW

Mode of EUT: Tx 802.11ac(80 MHz)
Test Port: Temporary antenna connector

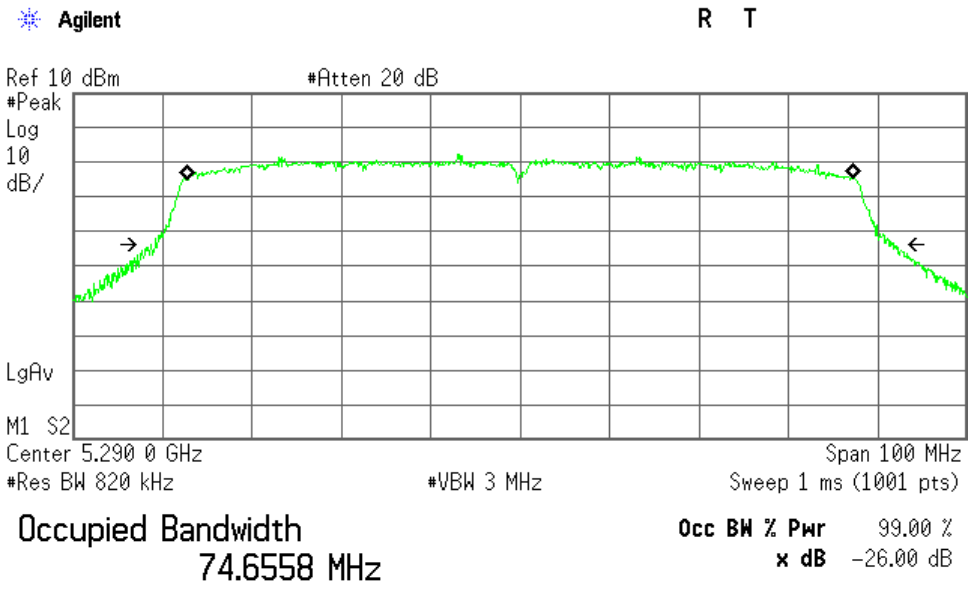
Channel	Frequency (MHz)	26dB OBW (MHz)	99% OBW (MHz)
42	5210	83.134	74.639
58	5290	83.046	74.656
106	5530	82.828	74.563
122	5610	82.833	74.624

802.11ac (80 MHz) 42ch (5210 MHz)



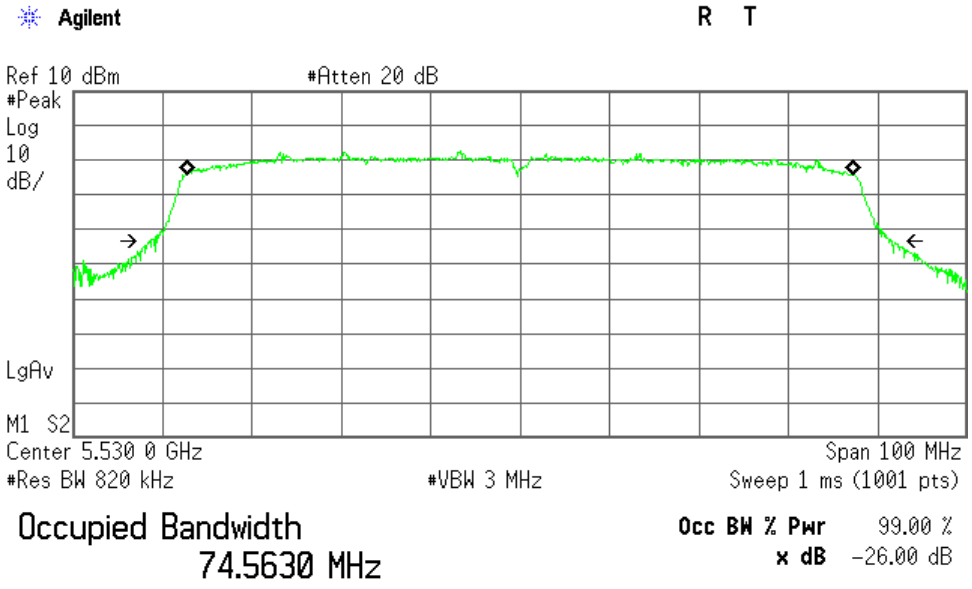
Transmit Freq Error -27.556 kHz
Occupied Bandwidth 83.134 MHz

802.11ac (80 MHz) 58ch (5290 MHz)



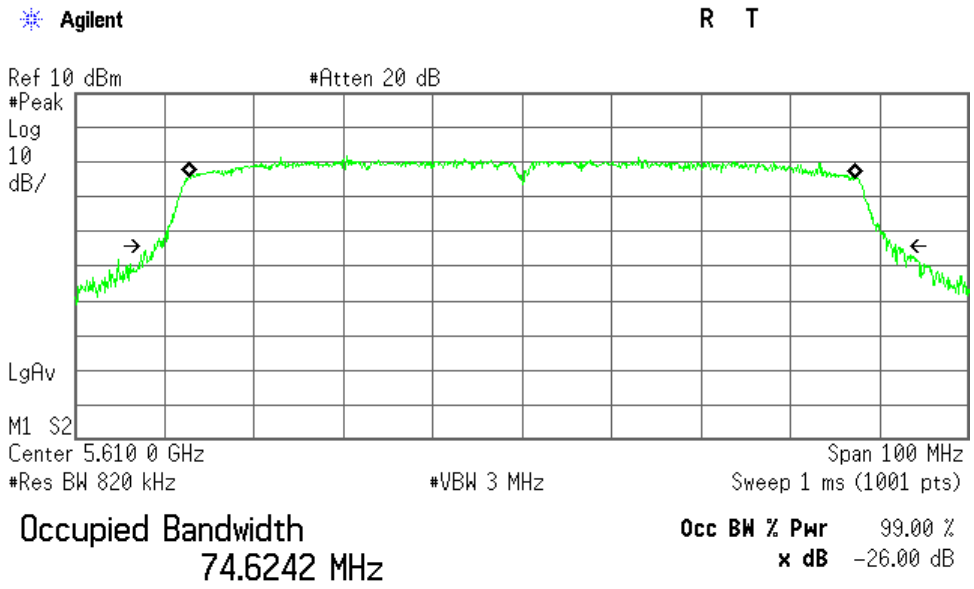
Transmit Freq Error −16.095 kHz
Occupied Bandwidth 83.046 MHz

802.11ac (80 MHz) 106ch (5530 MHz)



Transmit Freq Error −2.362 kHz
Occupied Bandwidth 82.828 MHz

802.11ac (80 MHz) 122ch (5610 MHz)



Transmit Freq Error	37.341 kHz
Occupied Bandwidth	82.833 MHz

7.2 Maximum Conducted Output Power

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

7.2.1 Worst Point and Measurement Uncertainty

Min. Limit Margin 12.16 dB at 5580.0 MHz

Remarks : Worst case is 802.11a channel 64.

Max Output Power 11.84 dBm at 5580.0 MHz

Remarks : Worst case is 802.11a channel 64.

Uncertainty of Measurement Results +/- 0.8 dB

7.2.2 Test Site and Instruments

7.2.2.1 Test Site

KITA-KANSAI Testing Center

Test site : SAITO
☐ - Anechoic chamber (A1) ☐ - Measurement room (M1)
☐ - Measurement room (M2) ☐ - Measurement room (M3)
☐ - Shielded room (S1) ☐ - Shielded room (S2)
☐ - Shielded room (S3) ☒ - Shielded room (S4)

7.2.2.2 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Mater	ML2495A	Anritsu	B-16	2014/7	1 Year
Pulse Power Sensor	MA2411B	Anritsu	B-18	2014/7	1 Year
Attenuator	54A-10	Weinschel	D-28	2014/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2014/8	1 Year
Spectrum Analyzer	E4446A	Agilent	A-39	2014/9	1 Year

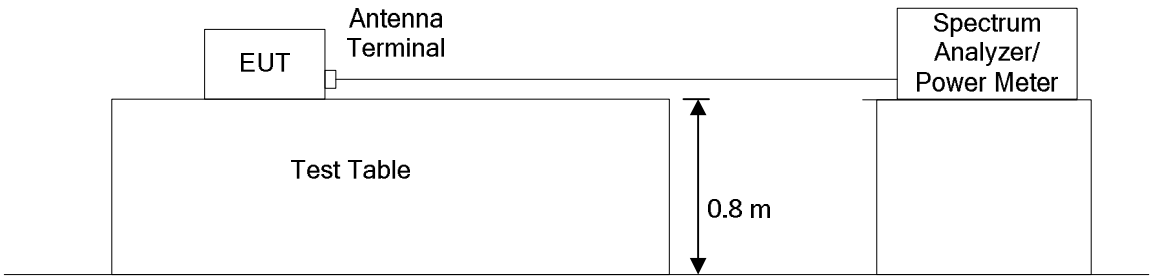
7.2.3 Test Method and Test Setup (Diagrammatic illustration)

The maximum conducted output power measurements were carried out connecting to the power meter and the pulse power sensor or spectrum analyzer listed above.

Measurement Method:
1) WLAN 20 MHz/40 MHz BW mode
   KDB 789033 D02 E.3.a) Method PM (Measurement using an RF average power meter)
2) WLAN 80 MHz BW mode
   KDB 789033 D02 E.2.d) Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction)

The EUT transmits non-continuously therefore the duty cycle measurements were performed.
The measurements of duty cycle and transmission duration were performed connecting to the spectrum analyzer in accordance with KDB 789033 D02 Method B.2. as follows;
Span: Zero/ RBW: 8 MHz/ VBW ≥ 8 MHz/ Sweep: Auto/ Detector: Peak

(referred documentation is No. G70364M)



7.2.4 Test Data

7.2.5.1 802.11a Maximum conducted output power

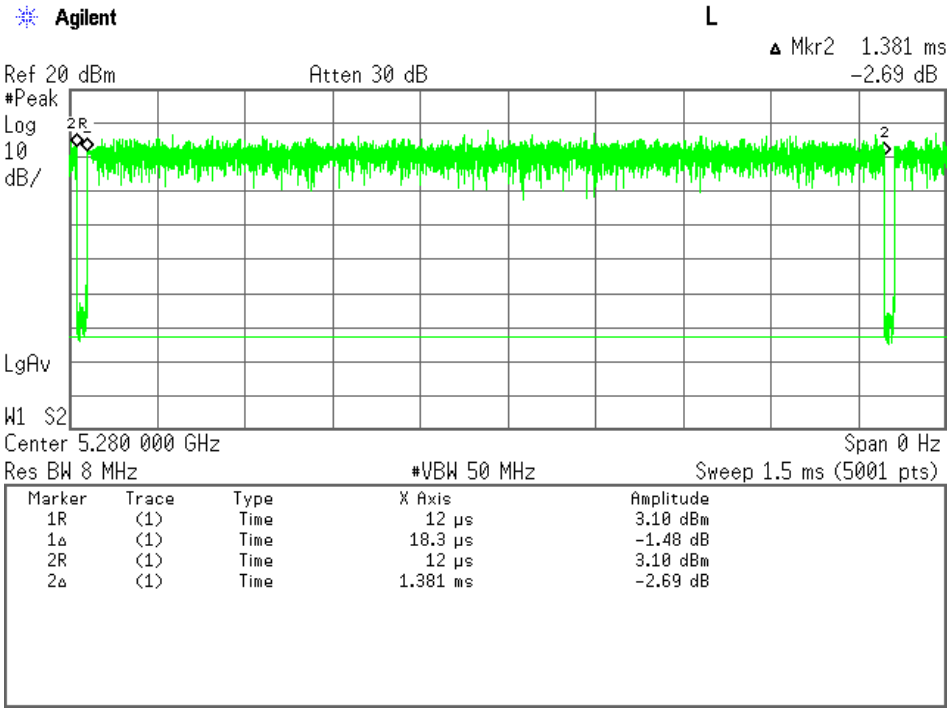
Test Date : October 3, 2014
Temp.: 26°C, Humi: 63%

Mode of EUT: Tx Mode (802.11a)
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	Power (dBm)	EBW (MHz)	Limit (dBm)	Margin (dB)
36	5180	10.37	0.44	10.81	21.643	24.00	13.19
44	5220	10.37	0.94	11.31	21.883	24.00	12.69
48	5240	10.37	0.85	11.22	21.910	24.00	12.78
52	5260	10.37	0.92	11.29	21.721	24.00	12.71
56	5280	10.37	0.90	11.27	21.302	24.00	12.73
64	5320	10.37	0.84	11.21	21.737	24.00	12.79
100	5500	10.40	1.10	11.50	21.690	24.00	12.50
116	5580	10.40	1.40	11.80	21.443	24.00	12.20
140	5700	10.42	0.86	11.28	21.453	24.00	12.72

The test results (Power) is calculated as follows;
For 36 channel (5180 MHz)
Power = Correction Factor + Meter Reading = 10.37 + (0.44) = 10.81 dBm
Correction Factor = cable loss + 10 dB attenuator + Duty Factor
Duty Factor at 802.11a/ TX rate 6 Mbps is 0.06 dB
Frequency range 5150 MHz to 5250 MHz Limitation is lesser of 24 dBm(250 mW).
Frequency range 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz Limitation is lesser of 24 dBm(250 mW) or 11 dBm + 10log EBW.

Duty Cycle Plot



Duty Factor = 10 log ((Duty Cycle)/(Burst On-period))= 10 log (1381/(1381-18.3)) = 0.06 dB

7.2.5.2 802.11n (20 MHz BW) Maximum conducted output power

Mode of EUT: Tx Mode (802.11n: 20 MHz)
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	Power (dBm)	EBW (MHz)	Limit (dBm)	Margin (dB)
36	5180	10.37	0.59	10.96	22.091	24.00	13.04
44	5220	10.37	1.23	11.60	21.995	24.00	12.40
48	5240	10.37	1.10	11.47	21.868	24.00	12.53
52	5260	10.37	1.16	11.53	22.090	24.00	12.47
56	5280	10.37	1.01	11.38	22.425	24.00	12.62
64	5320	10.37	0.70	11.07	22.051	24.00	12.93
100	5500	10.40	1.13	11.53	22.254	24.00	12.47
116	5580	10.40	1.44	11.84	21.701	24.00	12.16
140	5700	10.42	0.89	11.31	21.938	24.00	12.69

The test results (Power) is calculated as follows;
For 36 channel (5180 MHz)

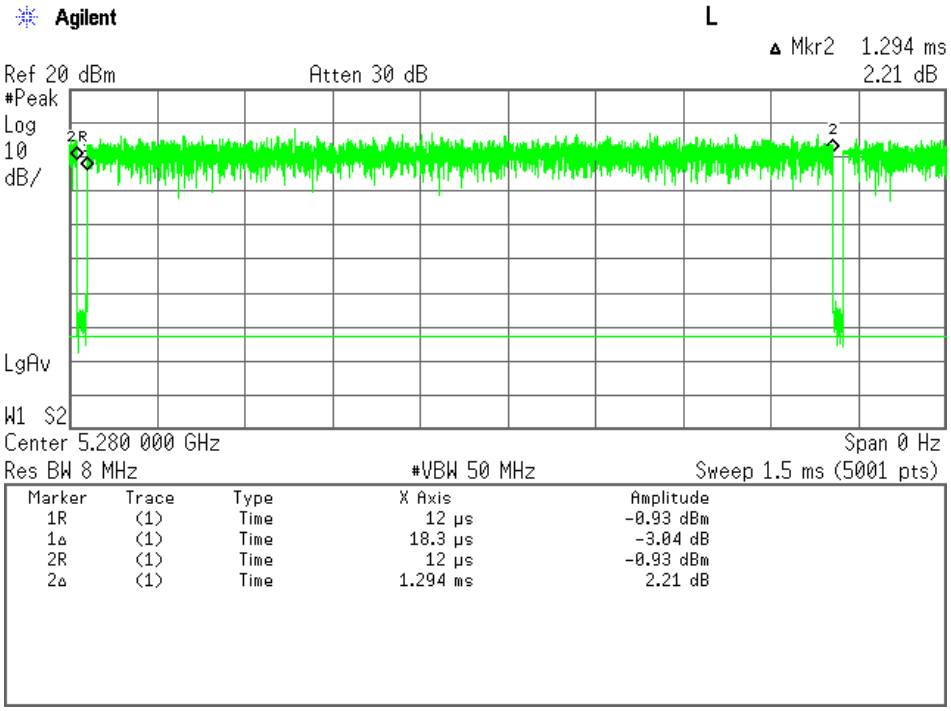
Power = Correction Factor + Meter Reading = 10.37 + (0.59) = 10.96 dBm

Correction Factor = cable loss + 10 dB attenuator + Duty Factor

Duty Factor at 802.11n(20 MHz BW) / TX rate 6.5 Mbps is 0.06 dB

Frequency range 5150 MHz to 5250 MHz Limitation is lesser of 24 dBm(250 mW).
Frequency range 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz Limitation is lesser of 24 dBm(250 mW) or 11 dBm + 10log EBW.

Duty Cycle Plot



Duty Factor = 10 log ((Duty Cycle)/(Burst On-period))= 10 log (1294/(1294-18.3)) = 0.06 dB

7.2.5.3 802.11n (40 MHz BW) Maximum conducted output power

Mode of EUT: Tx Mode (802.11n: 40 MHz)
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	Power (dBm)	EBW (MHz)	Limit (dBm)	Margin (dB)
38	5190	10.44	0.87	11.31	42.969	24.00	12.69
46	5230	10.44	0.92	11.36	42.655	24.00	12.64
54	5270	10.44	0.85	11.29	42.322	24.00	12.71
62	5310	10.44	0.60	11.04	43.993	24.00	12.96
102	5510	10.47	1.14	11.61	42.544	24.00	12.39
134	5670	10.47	0.81	11.28	43.060	24.00	12.72

The test results (Power) is calculated as follows;
For 38 channel (5190 MHz)

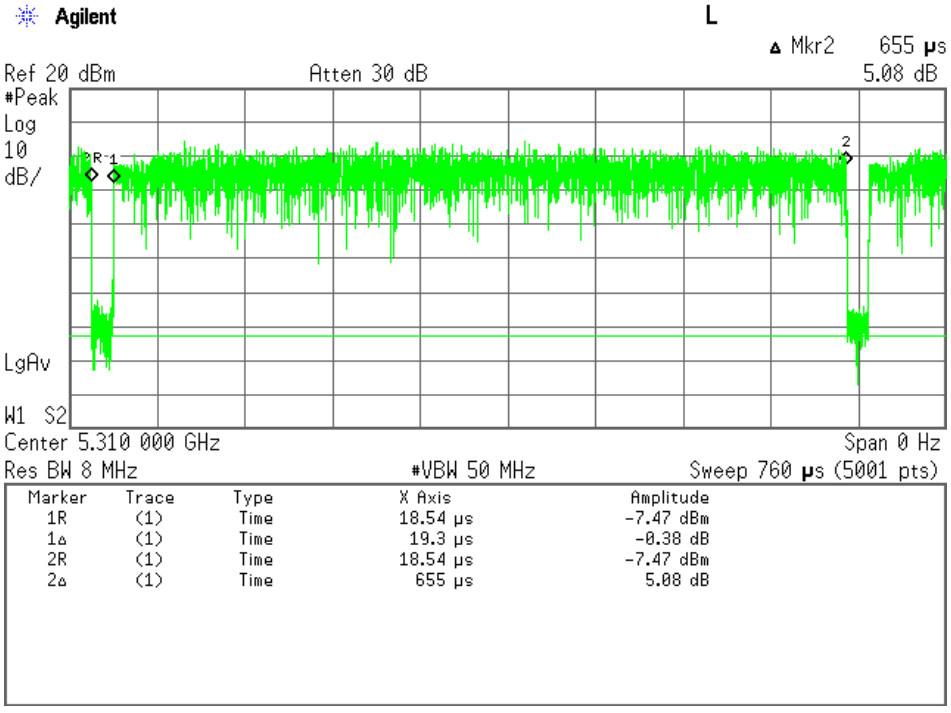
Power = Correction Factor + Meter Reading = 10.44 + (0.87) = 11.31 dBm

Correction Factor = cable loss + 10 dB attenuator + Duty Factor

Duty Factor at 802.11n(40 MHz BW) / TX rate 13.5 Mbps is 0.13 dB

Frequency range 5150 MHz to 5250 MHz Limitation is lesser of 24 dBm(250 mW).
Frequency range 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz Limitation is lesser of 24 dBm(250 mW) or 11 dBm + 10log EBW.

Duty Cycle Plot



Duty Factor = 10 log ((Duty Cycle)/(Burst On-period))= 10 log (655/(655-19.3)) = 0.13 dB

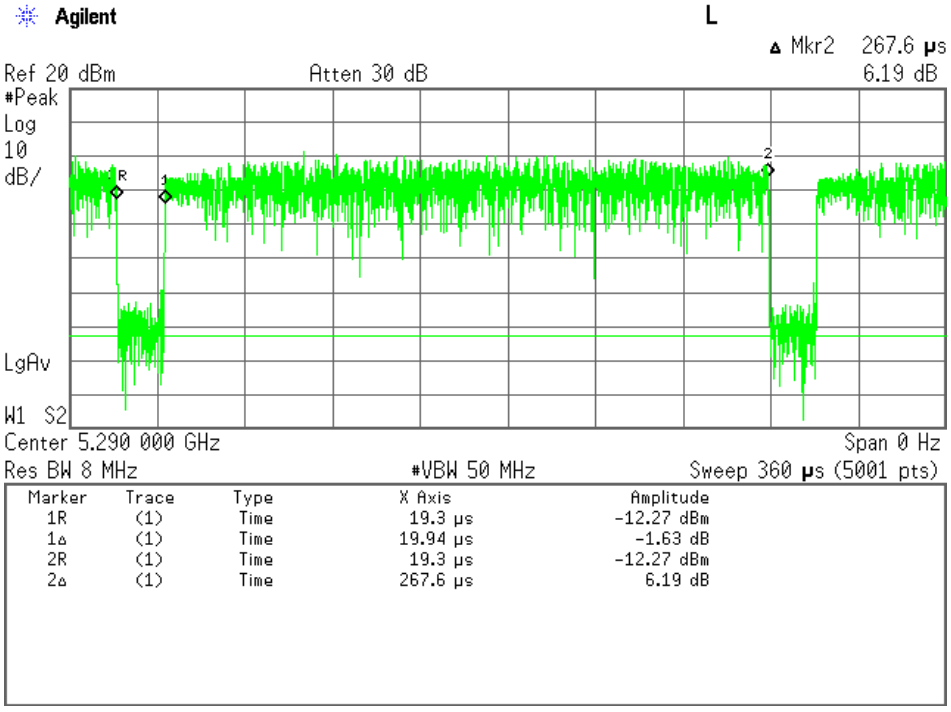
7.2.5.4 802.11ac (80 MHz BW) Maximum conducted output power

Mode of EUT: Tx Mode (802.11ac: 80 MHz)
Test Port: Temporary antenna connector

Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	Power (dBm)	EBW (MHz)	Limit (dBm)	Margin (dB)
42	5210	10.65	0.55	11.20	83.134	24.00	12.80
58	5290	10.65	0.48	11.13	83.046	24.00	12.87
106	5530	10.68	0.58	11.26	82.828	24.00	12.74
122	5610	10.68	0.56	11.24	82.833	24.00	12.76

The test results (Power) is calculated as follows;
For 38 channel (5210 MHz)
Power = Correction Factor + Meter Reading = 10.65 + (0.55) = 11.20 dBm
Correction Factor = cable loss + 10 dB attenuator + Duty Factor
Duty Factor at 802.11ac(80 MHz BW) / TX rate 29.3 Mbps is 0.34 dB
Frequency range 5150 MHz to 5250 MHz Limitation is lesser of 24 dBm(250 mW).
Frequency range 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz Limitation is lesser of 24 dBm(250 mW) or 11 dBm + 10log EBW.

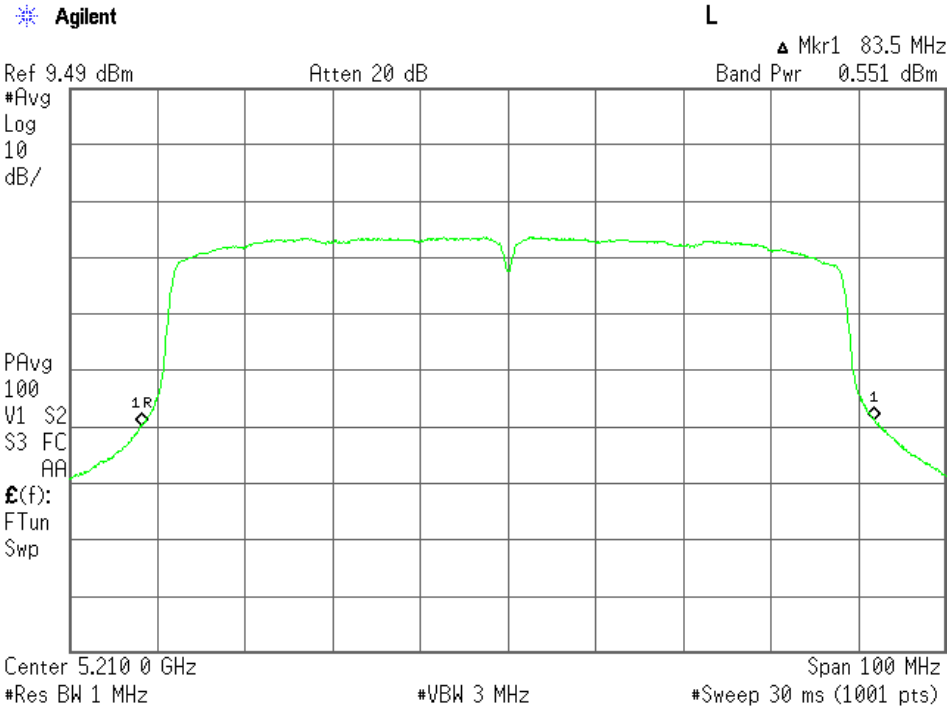
Duty Cycle Plot



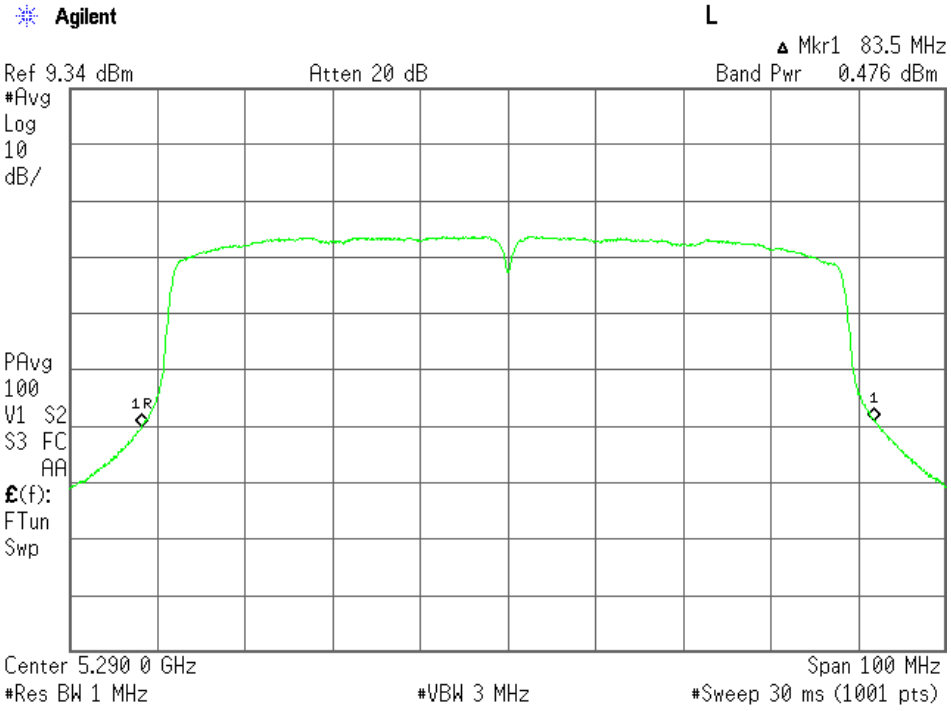
Duty Factor = 10 log ((Duty Cycle)/(Burst On-period))= 10 log (267.6/(267.6-19.94)) = 0.34 dB

Output Power Test Plot

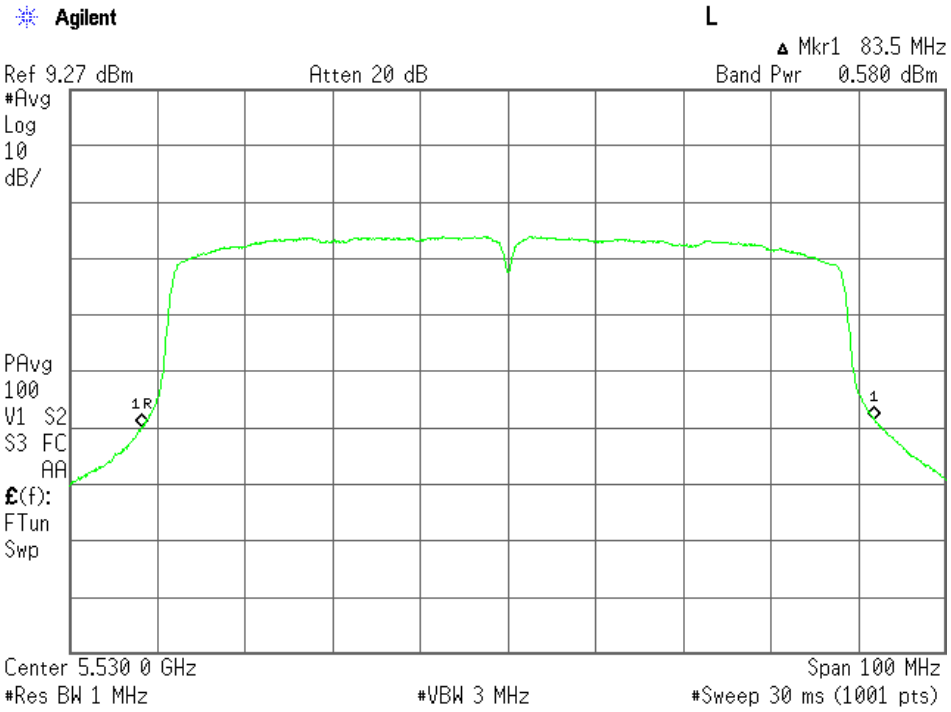
802.11ac (80 MHz BW) 42ch (5210 MHz)



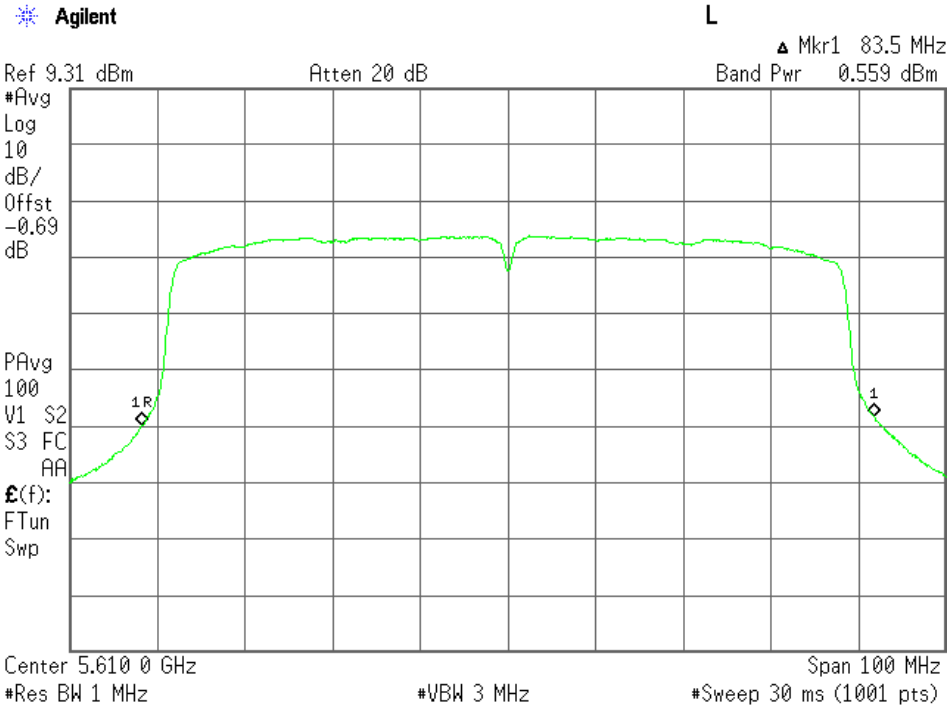
802.11ac (80 MHz BW) 58ch (5290 MHz)



802.11ac (80 MHz BW) 106ch (5530 MHz)



802.11ac (80 MHz BW) 122ch (5610 MHz)



7.3 Peak Power Spectral Density

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ **- Passed** ☐ **- Failed** ☐ **- Not judged**

7.3.1 Worst Point and Measurement Uncertainty

Min. Limit Margin 9.59 dB at 5500.0 MHz

Uncertainty of Measurement Results +/- 1.2 dB

Remarks : Worst case is 802.11a channel 100.

7.3.2 Test Site and Instruments

7.3.2.1 Test Site

KITA-KANSAI Testing Center

Test site : SAITO

☐ - Anechoic chamber (A1)
☐ - Measurement room (M1)
☐ - Measurement room (M2)
☐ - Measurement room (M3)
☐ - Shielded room (S1)
☐ - Shielded room (S2)
☐ - Shielded room (S3)
☒ - Shielded room (S4)

7.3.2.2 Test Instruments

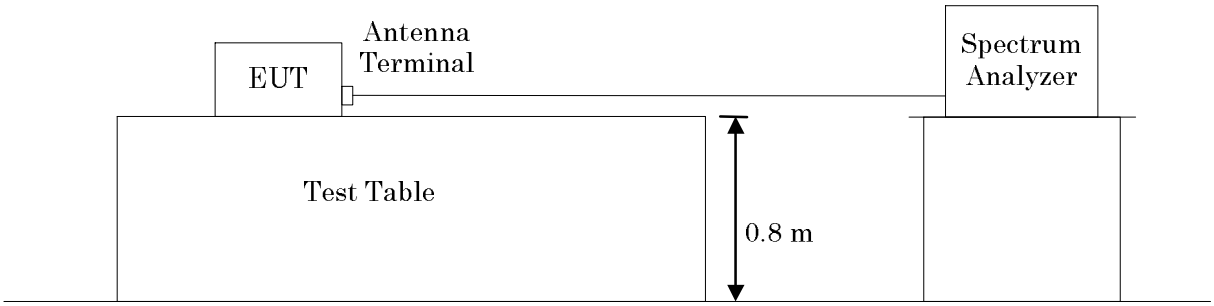
Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2014/9	1 Year
Attenuator	54A-10	Weinschel	D-28	2014/9	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2014/8	1 Year

7.3.3 Test Method and Test Setup (Diagrammatic illustration)

The peak power spectral density measurements were carried out connecting to the spectrum analyzer. The EUT transmits non-continuously therefore the spectrum analyzer was set in accordance with KDB 789033 D02 Method SA-3 as follows;.

Span: encompass the EBW/ RBW: 1 MHz/ VBW ≥ 3 MHz/ Sweep: Time: 100 msec.(enough to be short)/
Number Sweep Points: 1001 pts (≥2*Span/RBW)/
Detector: RMS(power averaging)/ Trace Mode: Max. Hold
The peak marker function in the analyzer was use for finding the peak point.

(referred documentation is No. G70364M)



7.3.4 Test Data

7.3.5.1 802.11a Peak power spectral density

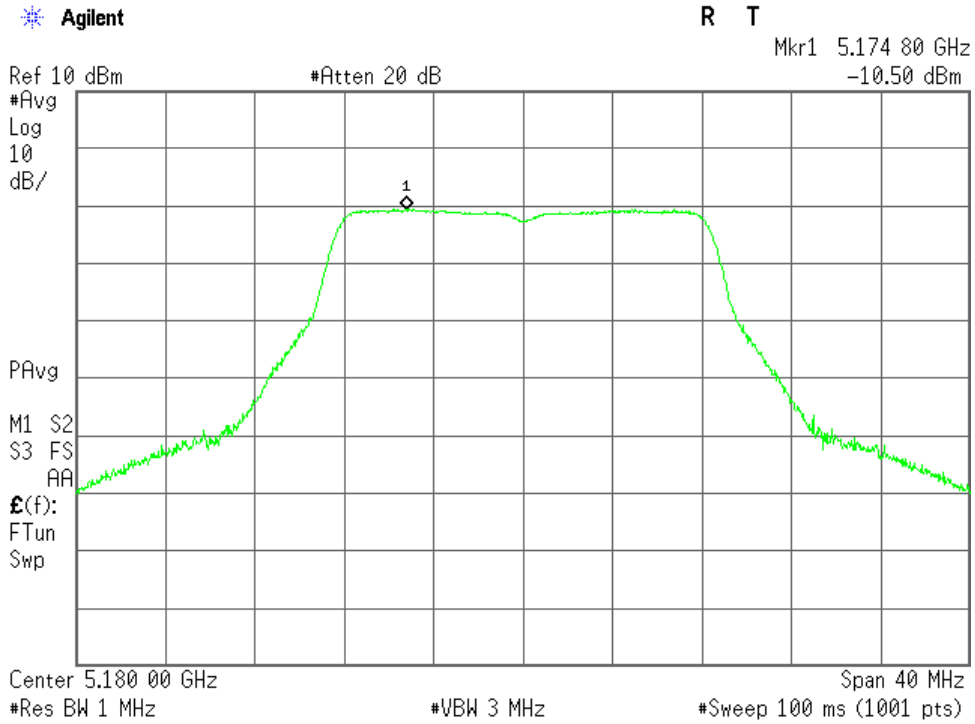
Test Date : October 3, 2014
Temp.: 26°C, Humi: 63%

Mode of EUT: Tx Mode (802.11a)
Test Port: Temporary antenna connector

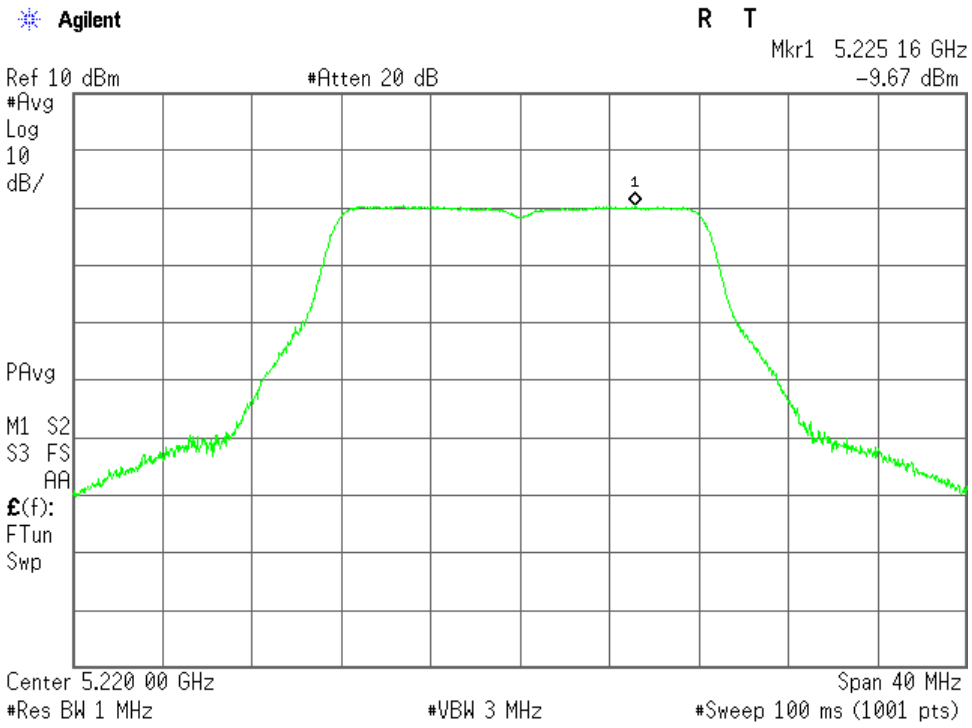
Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	PPSD (dBm)	Limit (dBm)	Margin (dB)
36	5180	10.31	-10.50	-0.19	11.00	11.19
44	5220	10.31	-9.67	0.64	11.00	10.36
48	5240	10.31	-9.15	1.16	11.00	9.84
52	5260	10.31	-9.19	1.12	11.00	9.88
56	5280	10.31	-9.06	1.25	11.00	9.75
64	5320	10.31	-9.48	0.83	11.00	10.17
100	5500	10.34	-8.93	1.41	11.00	9.59
116	5580	10.34	-9.19	1.15	11.00	9.85
140	5700	10.36	-10.31	0.05	11.00	10.95

The test results (PPSD) is calculated as follows;
For 36 channel (5180 MHz)
PPSD = Correction Factor + Meter Reading = 10.31 + (-10.50) = -0.19 dBm
Correction Factor = cable loss + 10 dB attenuator

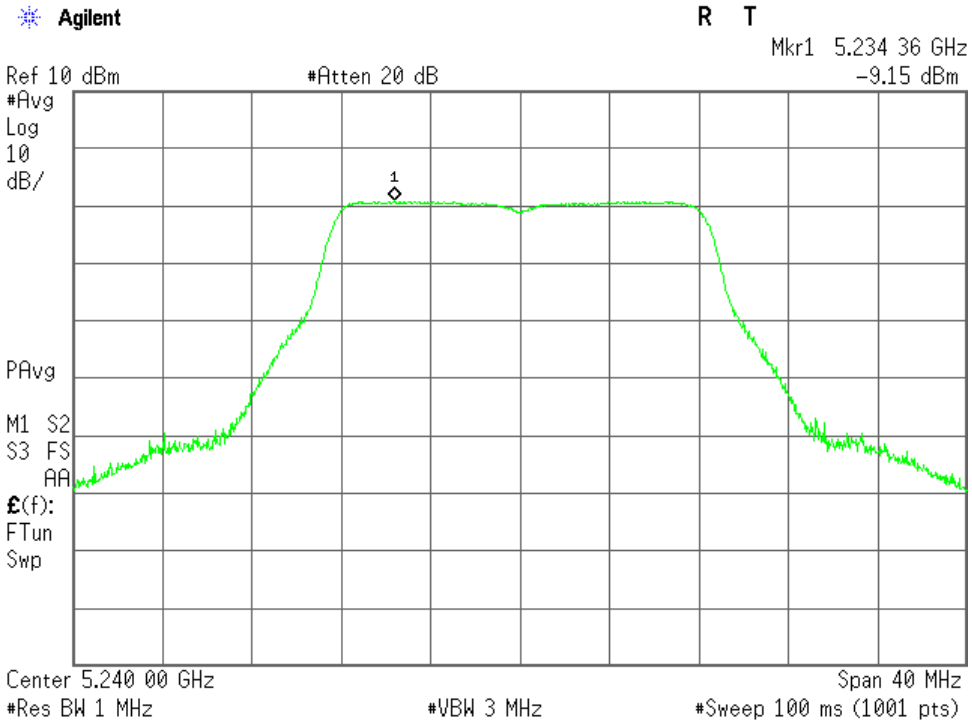
802.11a 36ch (5180 MHz)



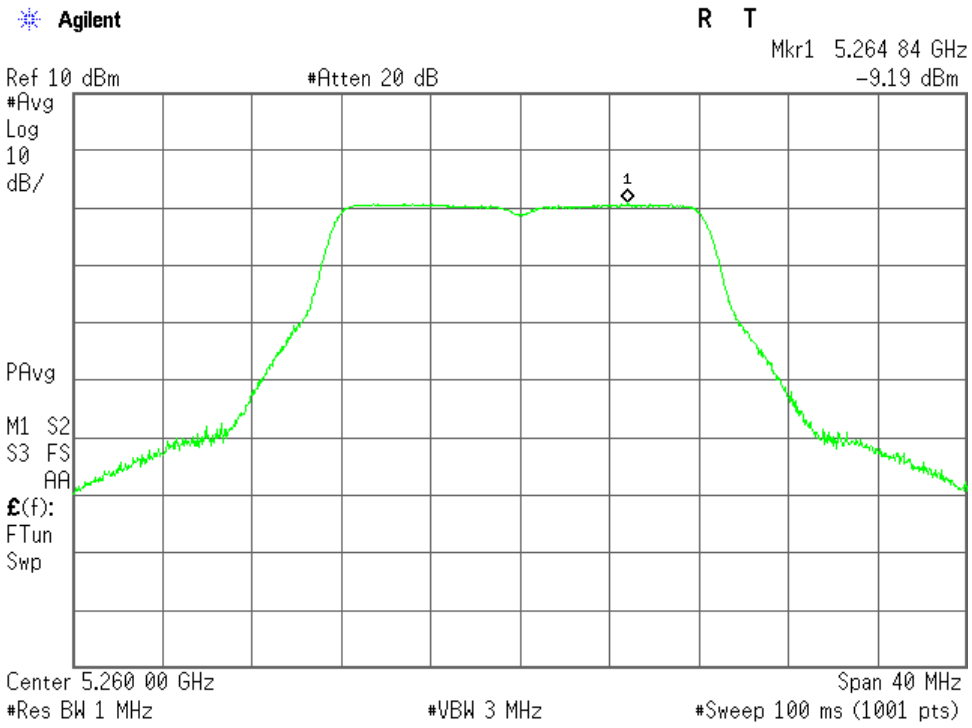
802.11a 44ch (5220 MHz)



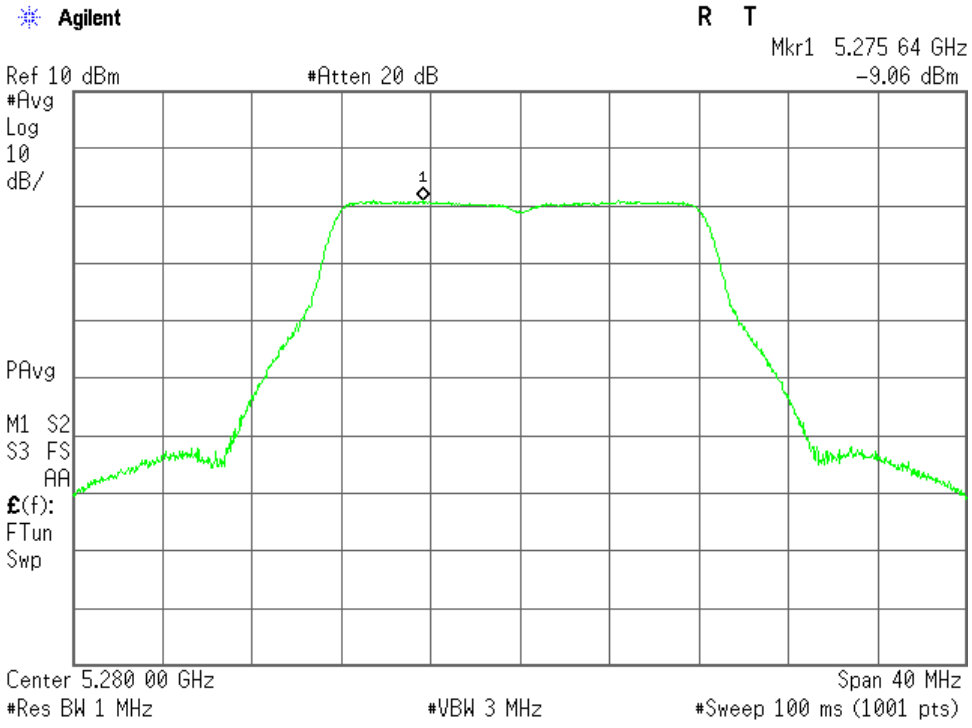
802.11a 48ch (5240 MHz)



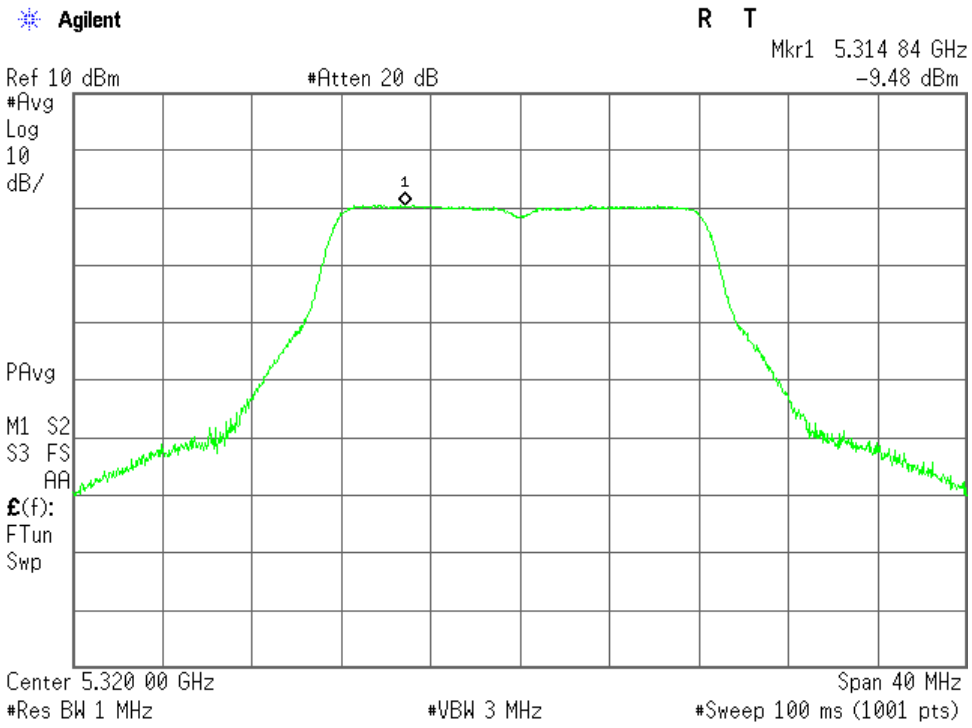
802.11a 52ch (5260 MHz)



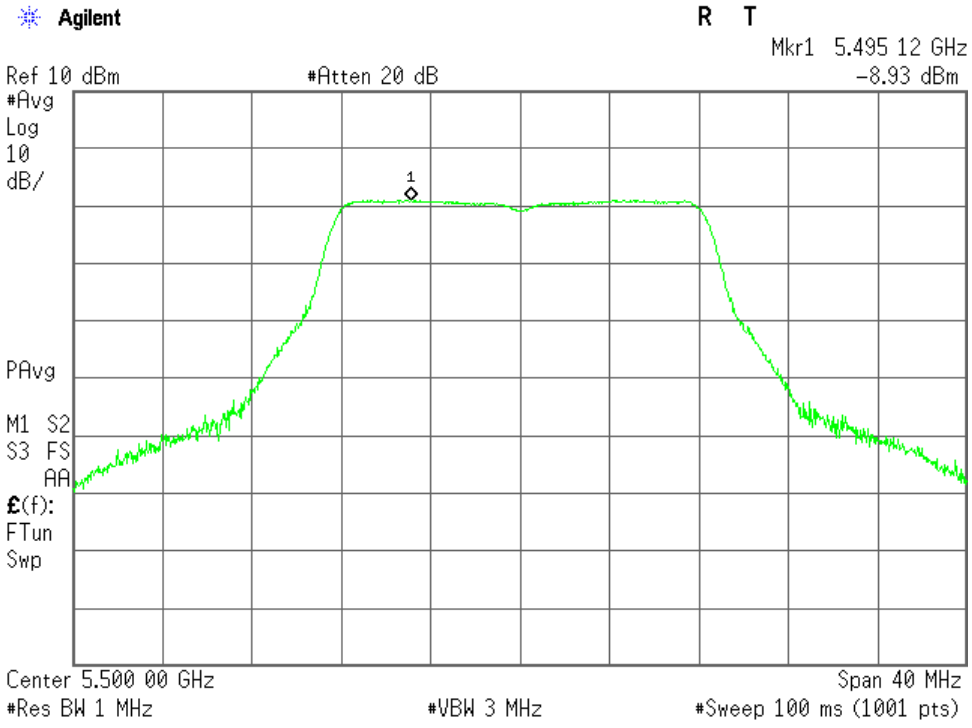
802.11a 56ch (5280 MHz)



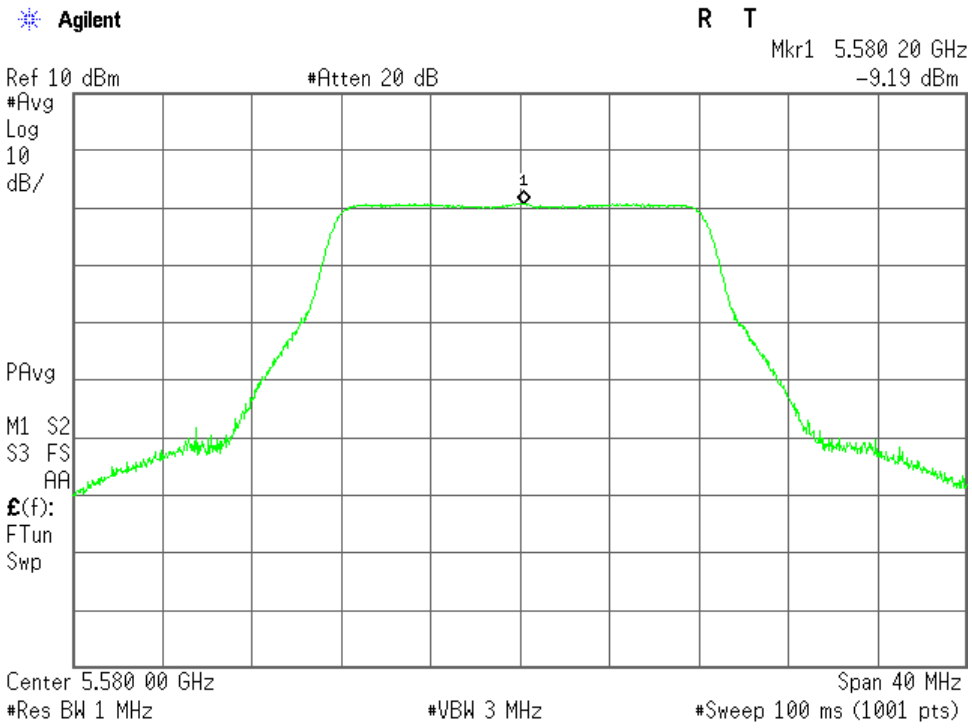
802.11a 64ch (5320 MHz)



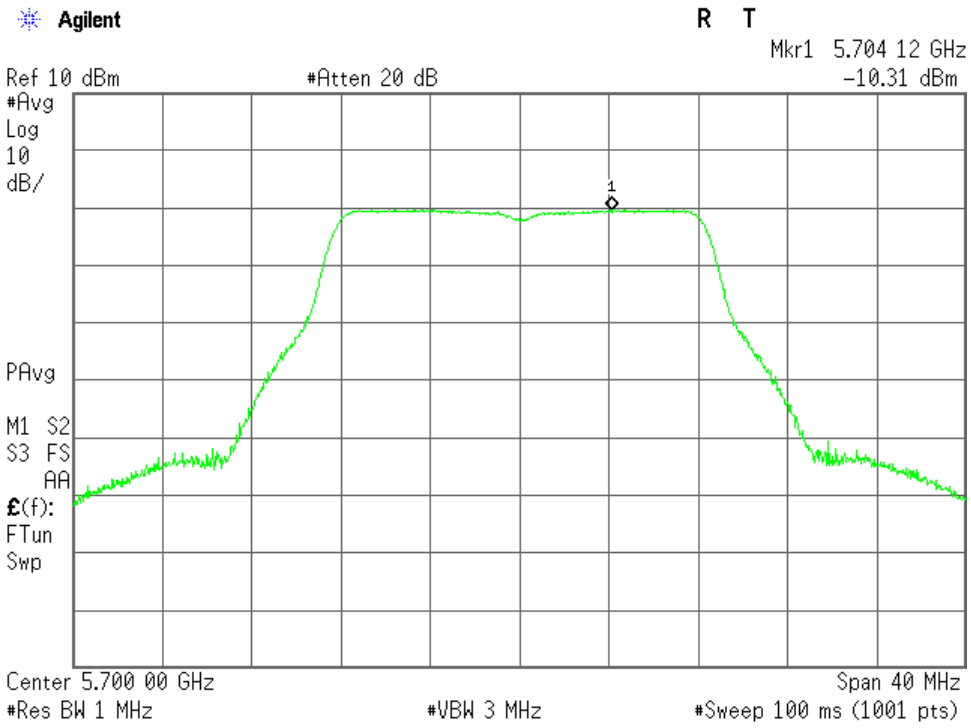
802.11a 100ch (5500 MHz)



802.11a 116ch (5580 MHz)



802.11a 140ch (5700 MHz)



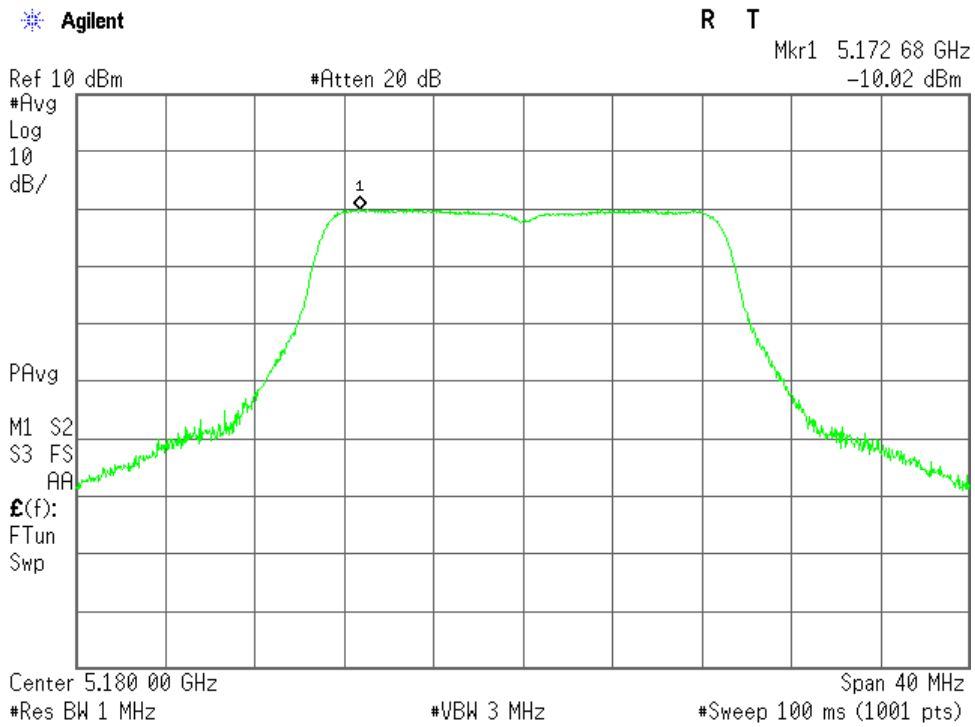
7.3.5.2 802.11n (20 MHz BW) Peak power spectral density

Mode of EUT: Tx Mode (802.11n: 20 MHz)
Test Port: Temporary antenna connector

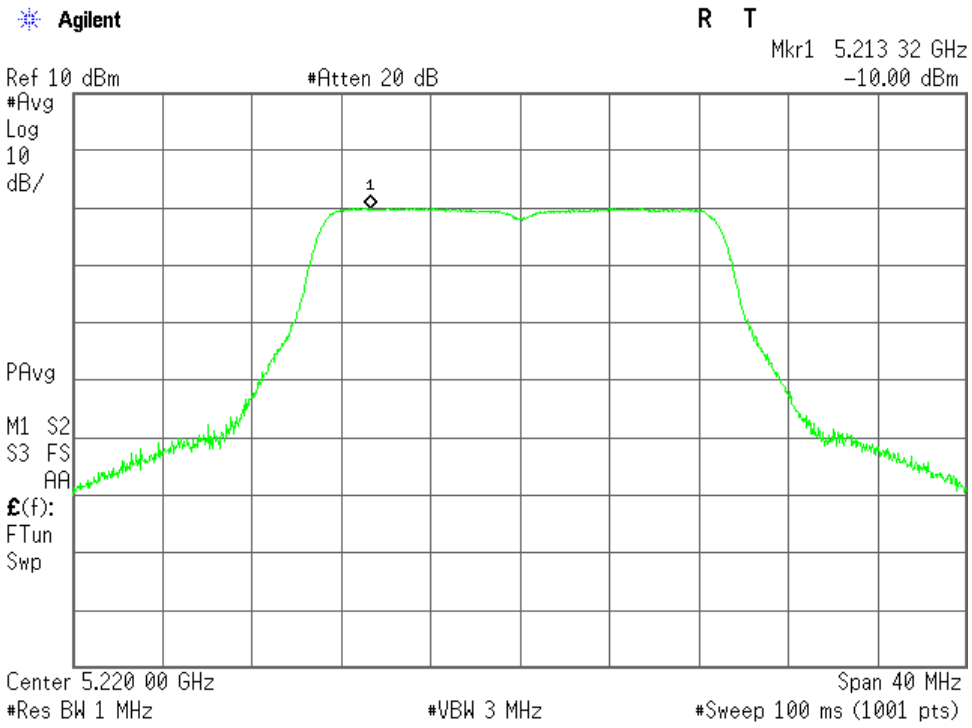
Channel	Frequency (MHz)	Correction Factor(dB)	Meter Reading(dBm)	PPSD (dBm)	Limit (dBm)	Margin (dB)
36	5180	10.31	-10.02	0.29	11.00	10.71
44	5220	10.31	-10.00	0.31	11.00	10.69
48	5240	10.31	-9.61	0.70	11.00	10.30
52	5260	10.31	-9.49	0.82	11.00	10.18
56	5280	10.31	-9.77	0.54	11.00	10.46
64	5320	10.31	-9.92	0.39	11.00	10.61
100	5500	10.34	-9.14	1.20	11.00	9.80
116	5580	10.34	-9.02	1.32	11.00	9.68
140	5700	10.36	-10.62	-0.26	11.00	11.26

The test results (PPSD) is calculated as follows;
For 36 channel (5180 MHz)
PPSD = Correction Factor + Meter Reading = 10.31 + (-10.02) = 0.29 dBm
Correction Factor = cable loss + 10 dB attenuator

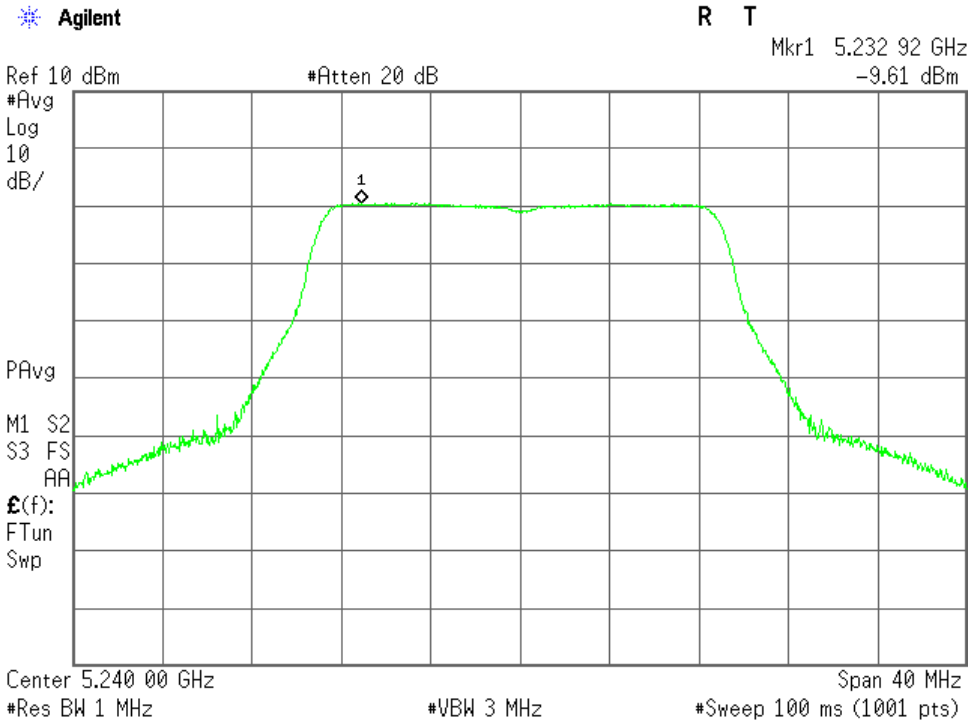
802.11n (20 MHz BW) 36ch (5180 MHz)



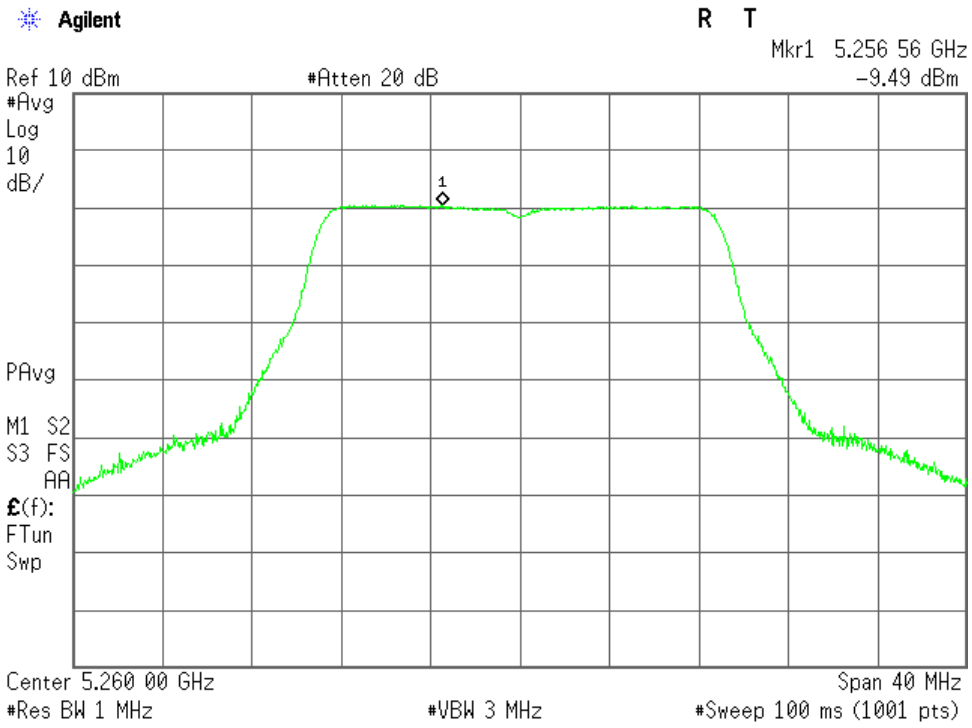
802.11n (20 MHz BW) 44ch (5220 MHz)



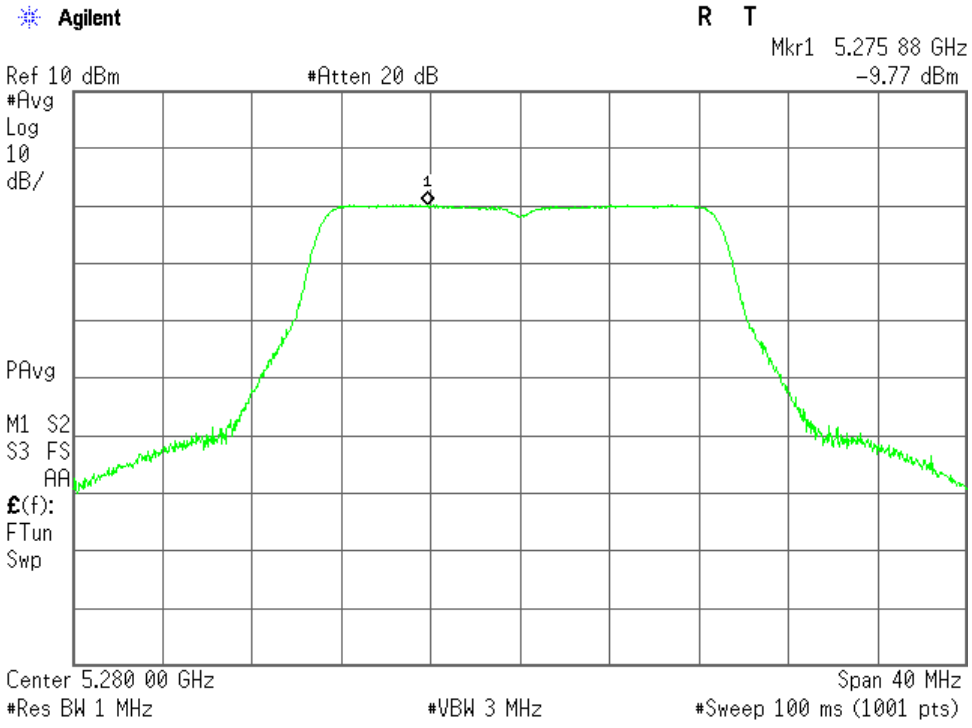
802.11n (20 MHz BW) 48ch (5240 MHz)



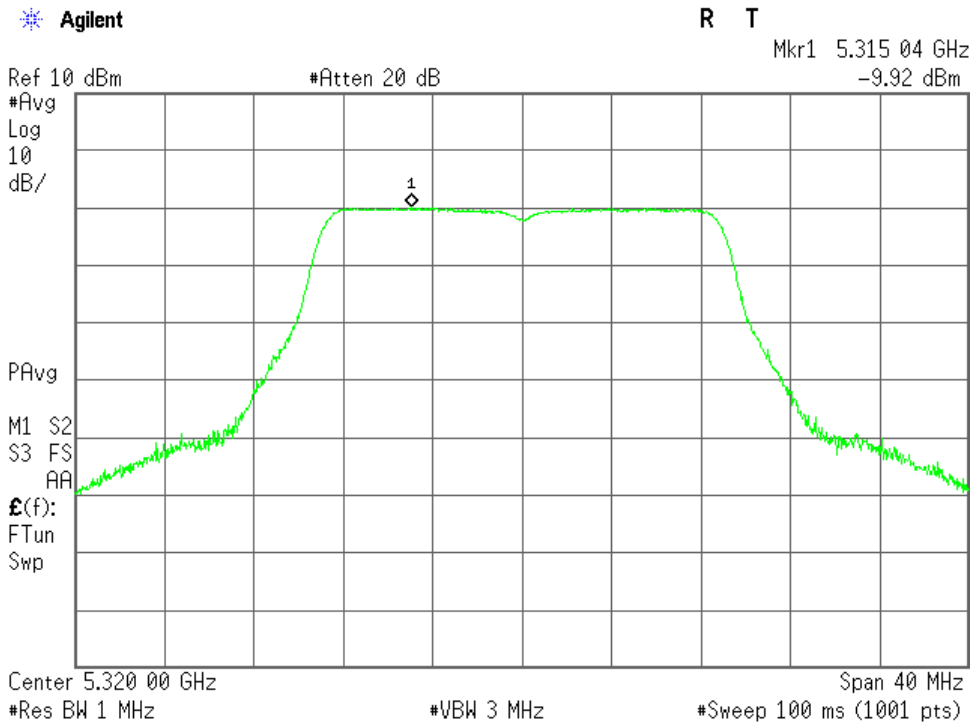
802.11n (20 MHz BW) 52ch (5260 MHz)



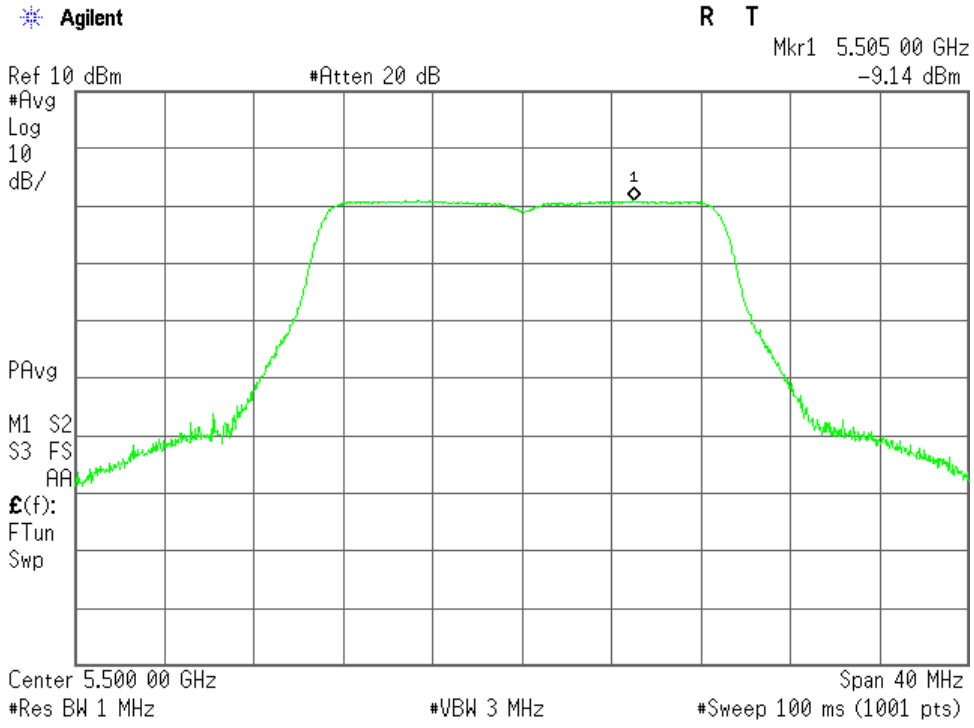
802.11n (20 MHz BW) 56ch (5280 MHz)



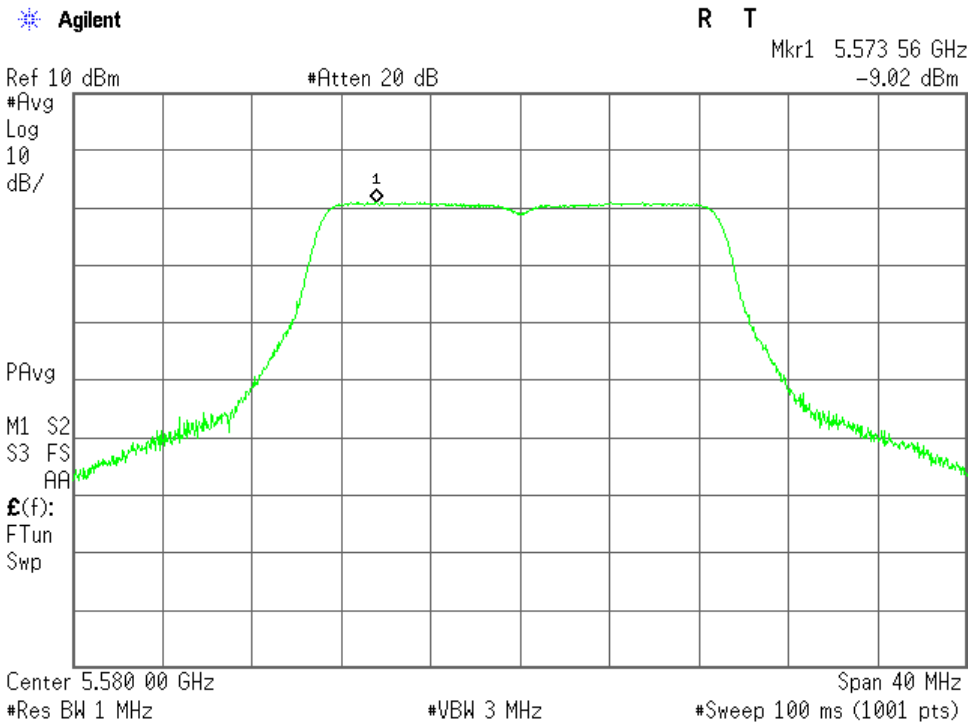
802.11n (20 MHz BW) 64ch (5320 MHz)



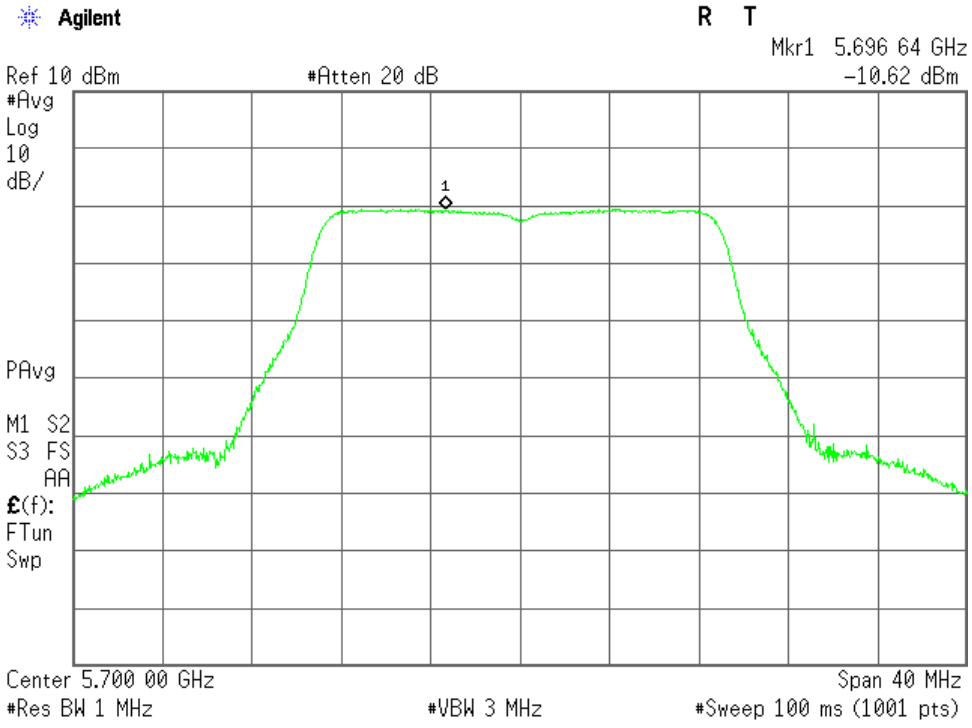
802.11n (20 MHz BW) 100ch (5500 MHz)



802.11n (20 MHz BW) 116ch (5580 MHz)



802.11n (20 MHz) 140ch (5700 MHz)



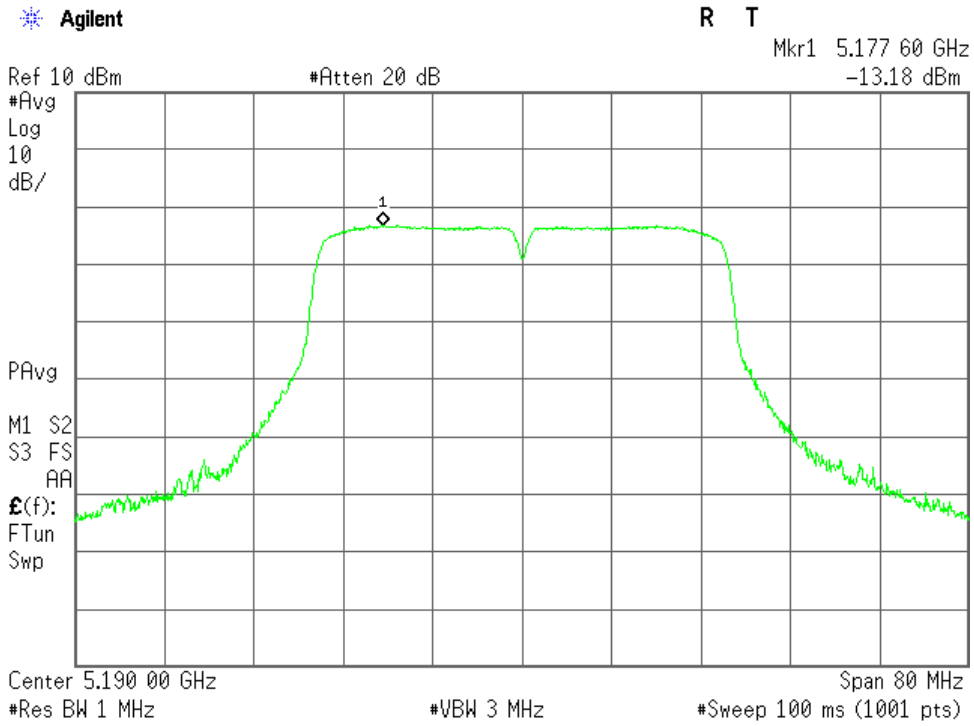
7.3.5.3 802.11n (40 MHz BW) Peak power spectral density

Mode of EUT: Tx Mode (802.11n: 40 MHz)
Test Port: Temporary antenna connector

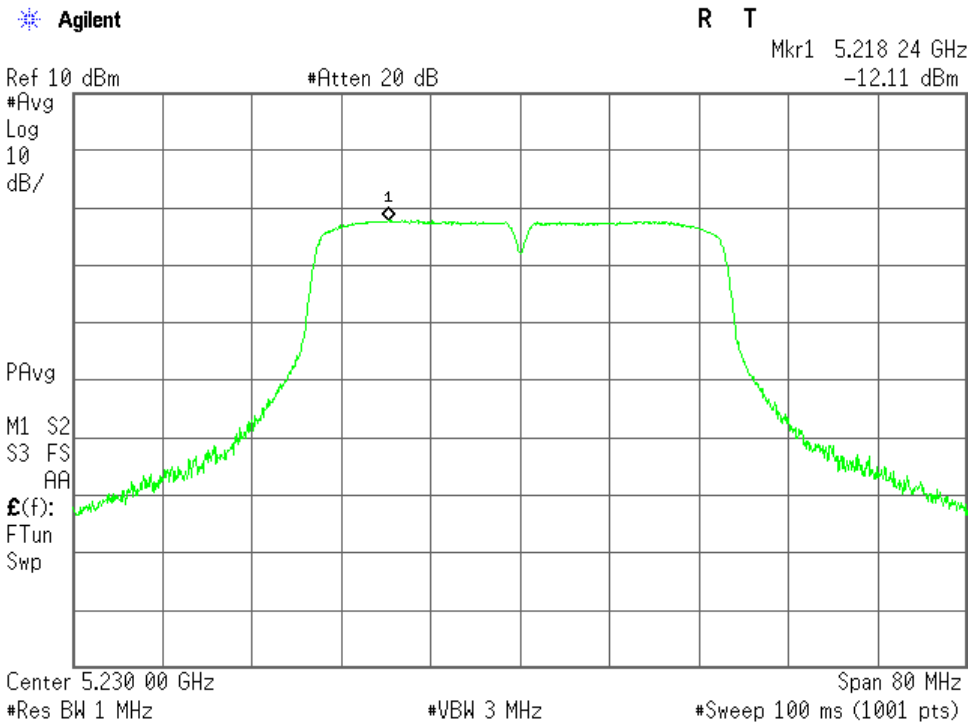
Channel	Frequency	Correction	Meter	PPSD	Limit	Margin
	(MHz)	Factor(dB)	Reading(dBm)	(dBm)	(dBm)	(dB)
38	5190	10.31	-13.18	-2.87	11.00	13.87
46	5230	10.31	-12.11	-1.80	11.00	12.80
54	5270	10.31	-12.42	-2.11	11.00	13.11
62	5310	10.31	-12.47	-2.16	11.00	13.16
102	5510	10.34	-12.23	-1.89	11.00	12.89
134	5670	10.34	-13.42	-3.08	11.00	14.08

The test results (PPSD) is calculated as follows;
For 38 channel (5190 MHz)
PPSD = Correction Factor + Meter Reading = 10.31 + (-13.18) = -2.87 dBm
Correction Factor = cable loss + 10 dB attenuator

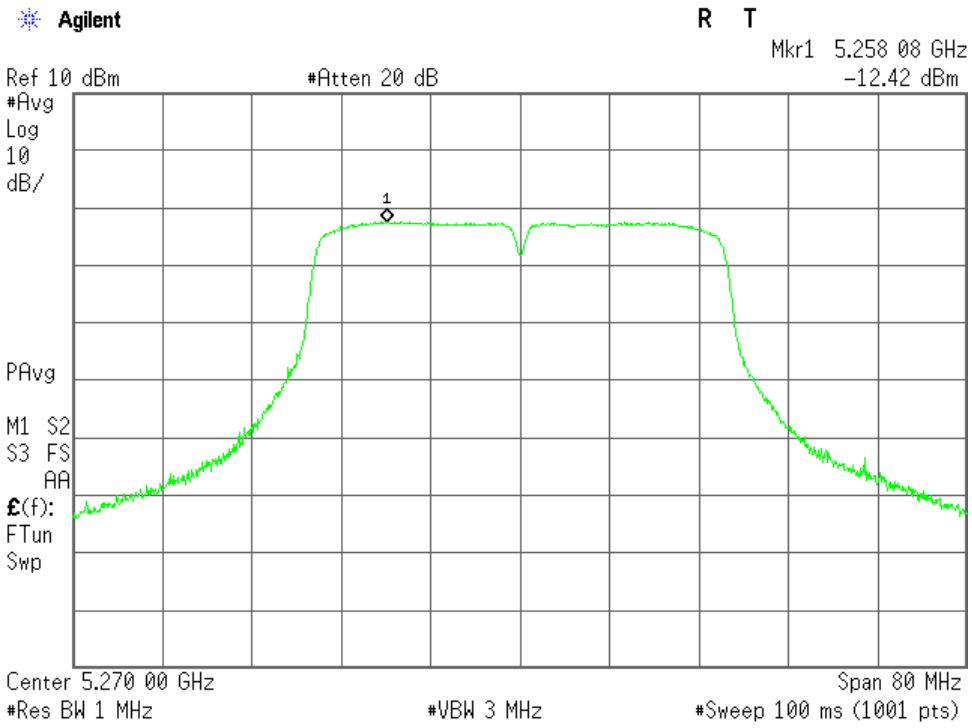
802.11n (40 MHz BW) 38ch (5190 MHz)



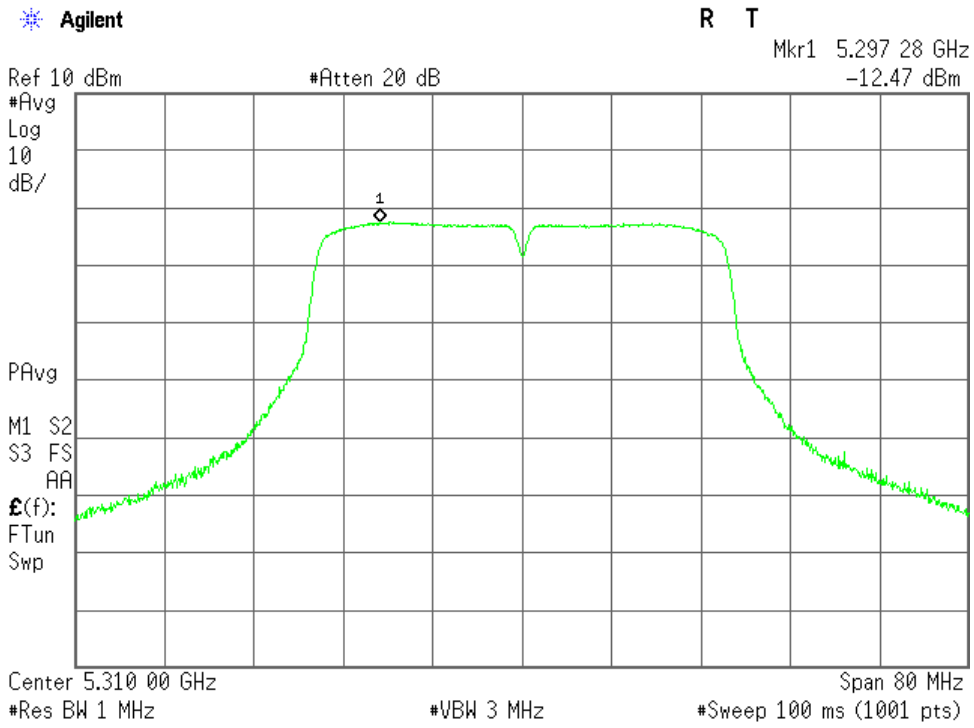
802.11n (40 MHz BW) 46ch (5230 MHz)



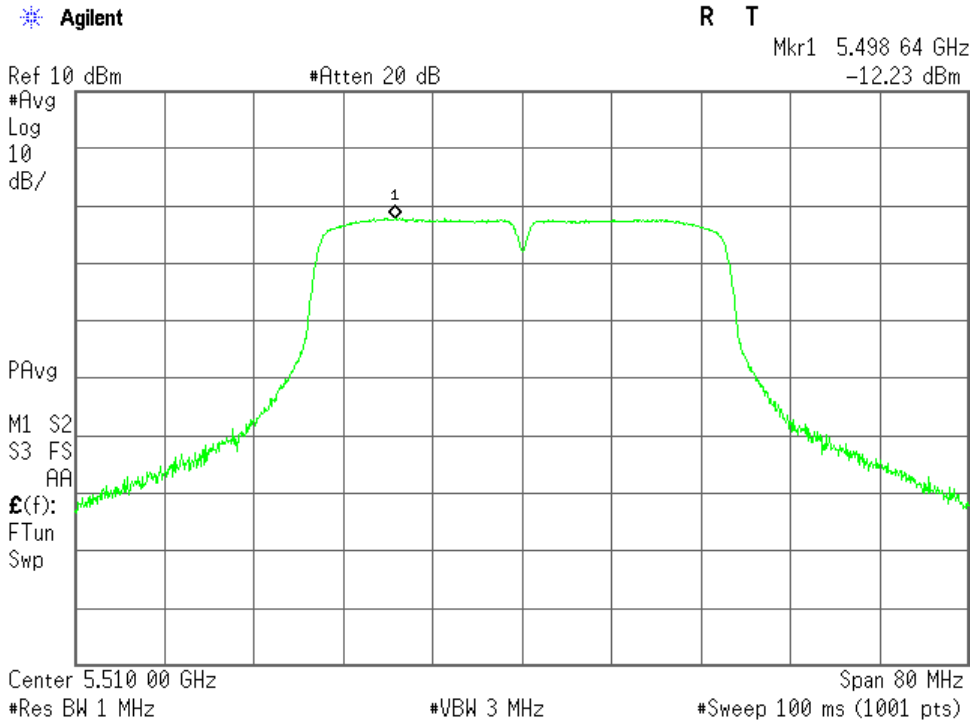
802.11n (40 MHz BW) 54ch (5270 MHz)



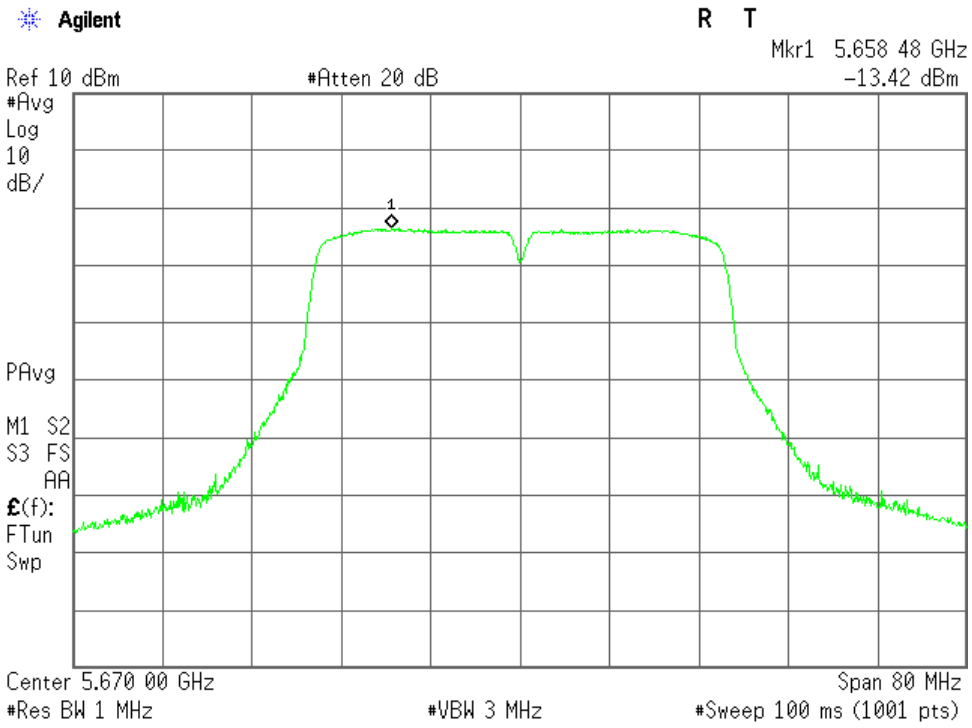
802.11n (40 MHz BW) 62ch (5310 MHz)



802.11n (40 MHz BW) 102ch (5510 MHz)



802.11n (40 MHz BW) 134ch (5670 MHz)



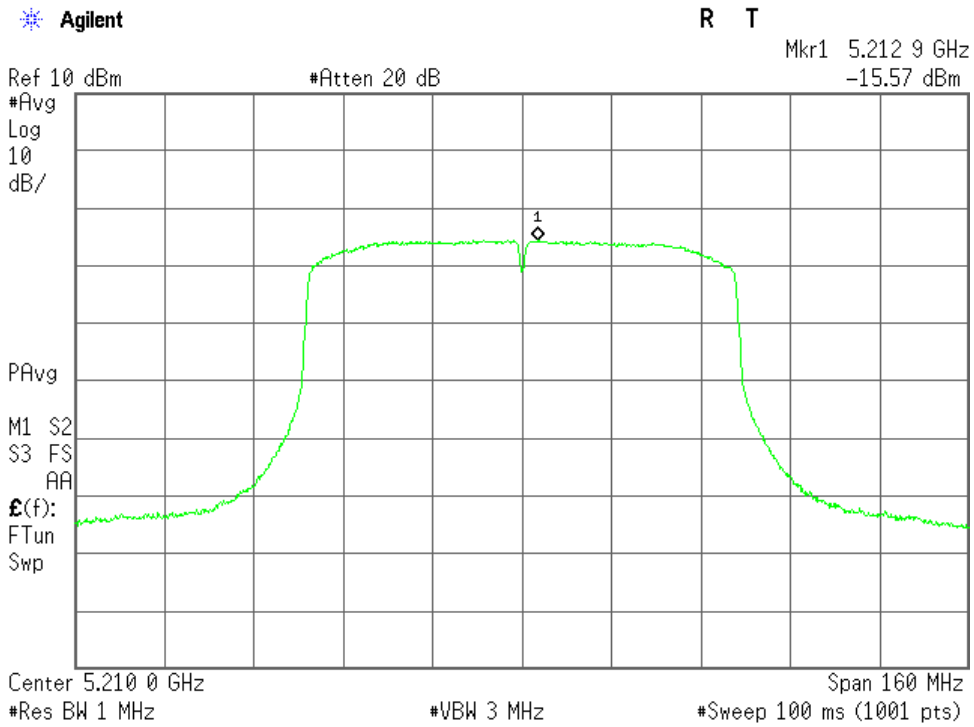
7.3.5.4 802.11ac (80 MHz BW) Peak power spectral density

Mode of EUT: Tx Mode (802.11ac: 80 MHz)
Test Port: Temporary antenna connector

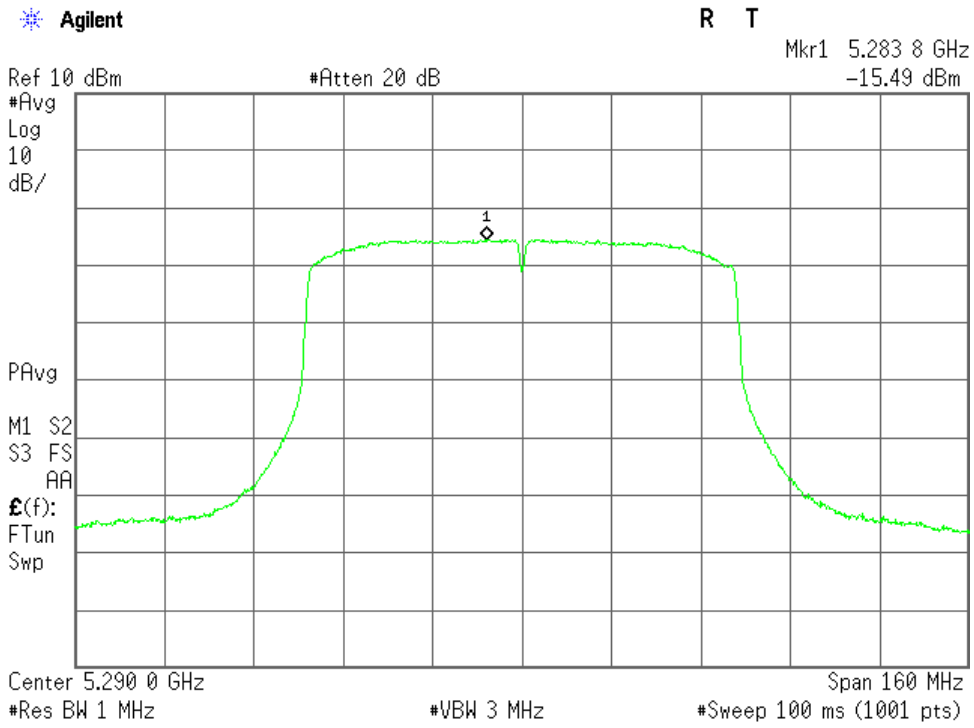
Channel	Frequency	Correction	Meter	PPSD	Limit	Margin
	(MHz)	Factor(dB)	Reading(dBm)	(dBm)	(dBm)	(dB)
42	5210	10.31	-15.57	-5.26	11.00	16.26
58	5290	10.31	-15.49	-5.18	11.00	16.18
106	5530	10.34	-15.15	-4.81	11.00	15.81
122	5610	10.34	-15.74	-5.40	11.00	16.40

The test results (PPSD) is calculated as follows;
For 38 channel (5210 MHz)
PPSD = Correction Factor + Meter Reading = 10.31 + (-15.57) = -5.26 dBm
Correction Factor = cable loss + 10 dB attenuator

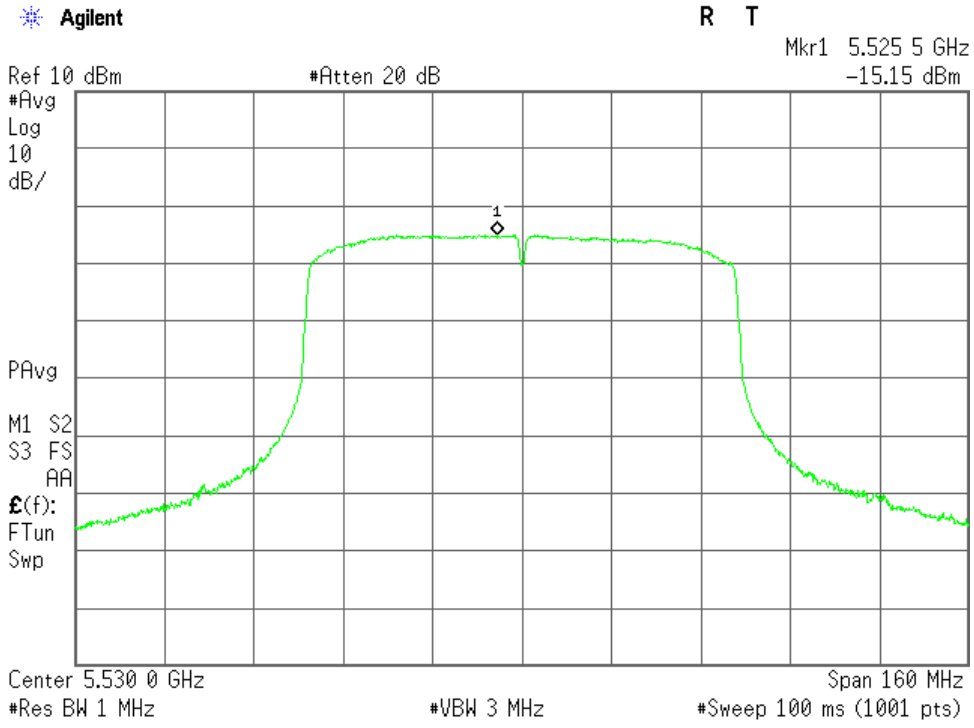
802.11ac (80 MHz BW) 42ch (5210 MHz)



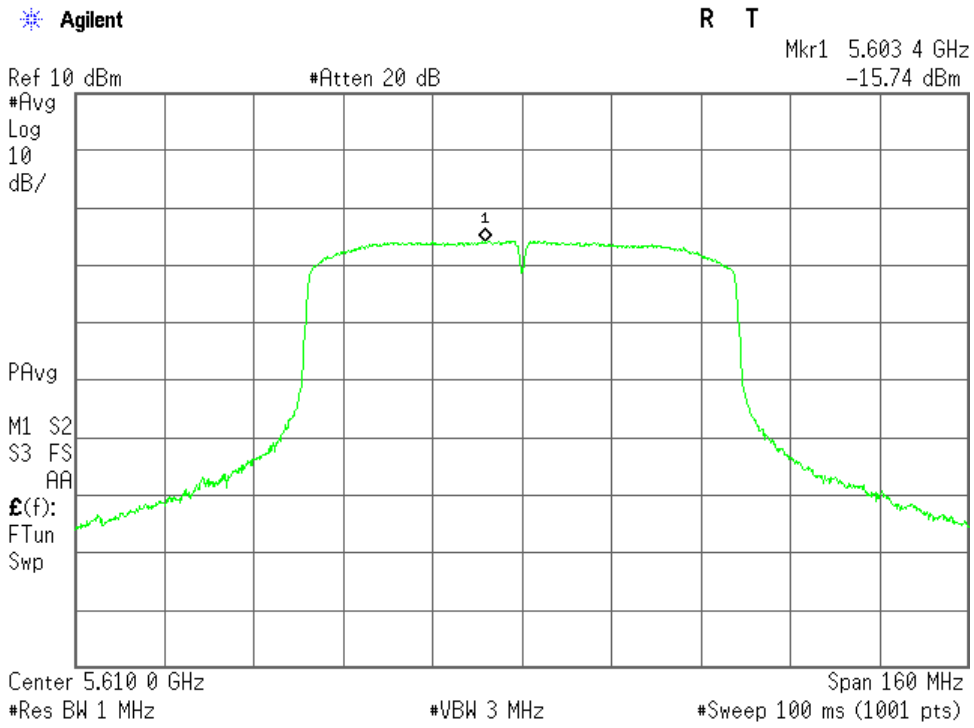
802.11ac (80 MHz BW) 58ch (5290 MHz)



802.11ac (80 MHz BW) 106ch (5530 MHz)



802.11ac (80 MHz BW) 122ch (5610 MHz)



7.4 Peak Excursion

For the requirements, ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

For the limits, ☐ - **Passed** ☐ - **Failed** ☐ - **Not judged**

7.5 AC Powerline Conducted Emission

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

7.5.1 Worst Point and Measurement Uncertainty

Min. Limit Margin (Quasi-Peak) 5.7 dB at 1.41 MHz

Uncertainty of Measurement Results +/-2.7 dB(2σ)

Remarks : _____

7.5.2 Test Site and Instruments

7.5.2.1 Test Site

KITA-KANSAI Testing Center SAITO EMC Branch

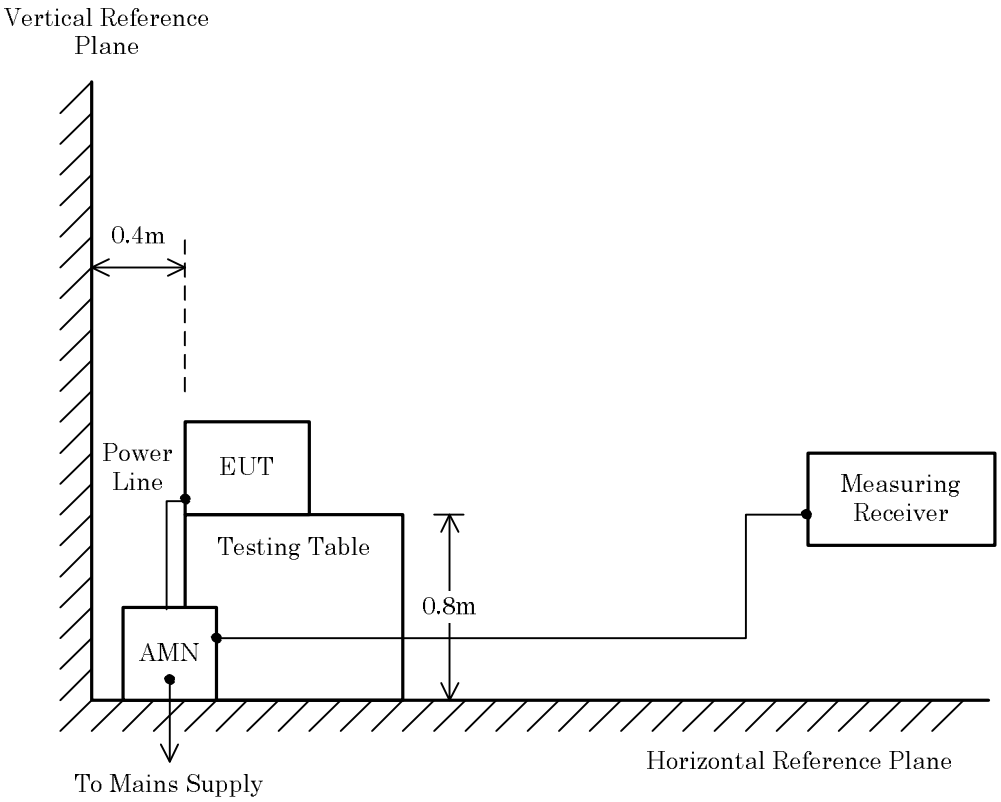
☐ - Anechoic chamber A1
☒ - Measurement room M2
☐ - Shielded room S1
☐ - KITA-KANSAI Shielded room
☐ - Measurement room M1
☐ - Measurement room M3
☐ - Shielded room S2
☐ - KITA-KANSAI Anechoic chamber

7.5.2.2 Test Instruments

Measurement Room M2					
Type	**Model**	**Manufacturer**	**ID No.**	**Last Cal.**	**Interval**
Test Receiver	ESU 26	Rohde & Schwarz	A-6	2014/5	1 Year
AMN (main)	KNW-407FR	Kyoritsu	D-103	2014/10	1 Year
RF Cable	RG223/U	SUHNER	H-34	2014/6	1 Year

7.5.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for final tests.
(Reference divisional instruction No. G703649)



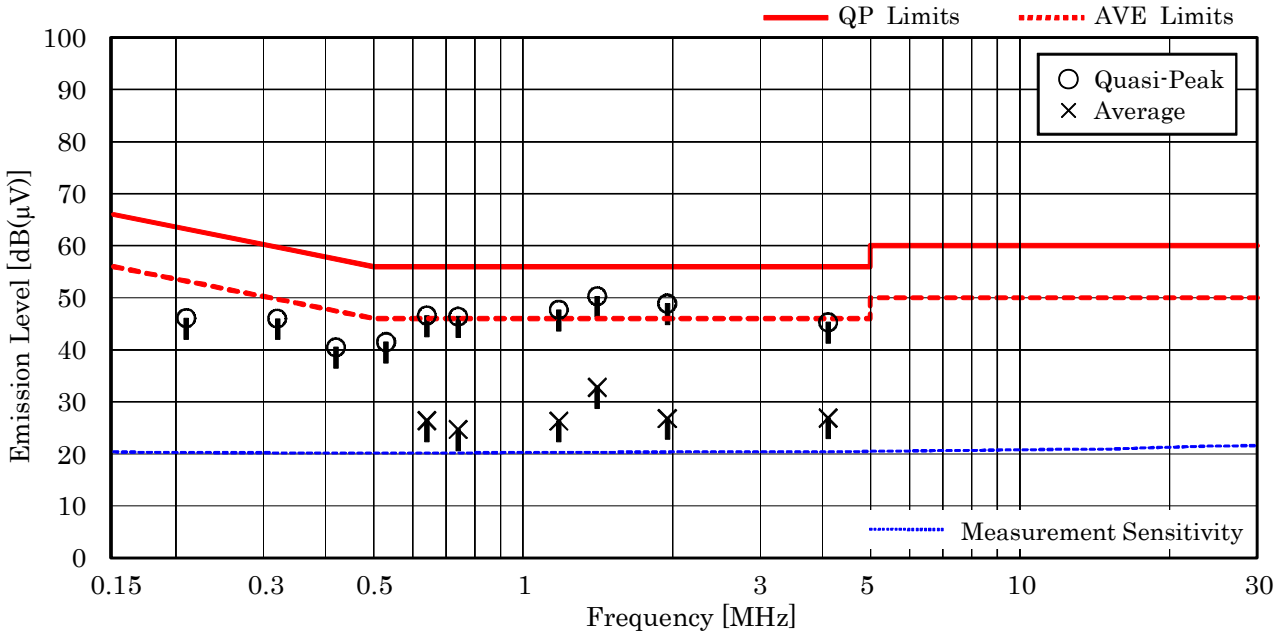
NOTE
AMN : Artificial Mains Network

7.5.4 Test Data

Mode of EUT : All modes have been investigated and the worst case mode for channel (36ch: 5180MHz / IEEE 802.11a) has been listed.

Test Date: October 11, 2014
Temp.: 26 °C, Humi.: 51 %

Frequency	Corr. Factor	Meter Readings [dB(μV)] VA		VB		Limits [dB(μV)]		Results [dB(μV)]		Margin	Remarks
[MHz]	[dB]	QP	AVE	QP	AVE	QP	AVE	QP	AVE	[dB]	
0.21	10.3	35.6	--	35.8	--	63.2	53.2	46.1	--	+17.1	-
0.32	10.2	31.2	--	35.8	--	59.7	49.7	46.0	--	+13.7	-
0.42	10.2	28.0	--	30.3	--	57.4	47.4	40.5	--	+16.9	-
0.53	10.2	28.6	--	31.3	--	56.0	46.0	41.5	--	+14.5	-
0.64	10.2	29.3	--	36.4	16.2	56.0	46.0	46.6	26.4	+ 9.4	-
0.74	10.2	29.4	--	36.2	14.5	56.0	46.0	46.4	24.7	+ 9.6	-
1.18	10.3	37.4	16.0	37.0	14.1	56.0	46.0	47.7	26.3	+ 8.3	-
1.41	10.3	40.0	22.5	36.5	18.4	56.0	46.0	50.3	32.8	+ 5.7	-
1.95	10.3	26.1	--	38.6	16.5	56.0	46.0	48.9	26.8	+ 7.1	-
4.11	10.4	18.0	--	34.9	16.5	56.0	46.0	45.3	26.9	+10.7	-



NOTES
1. The spectrum was checked from 0.15 MHz to 30 MHz.
2. The correction factor includes the AMN insertion loss and the cable loss.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. The symbol of "--" means "not applicable".
6. Calculated result at 1.41 MHz, as the worst point shown on underline:
   Correction Factor + Meter Reading = 10.3 + 40.0 = 50.3 dB(μV)
7. QP : Quasi-Peak Detector / AVE : Average Detector
8. Test receiver setting(s) : CISPR QP 9 kHz / Average 9 kHz

7.6 Unwanted Radiated Emission

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ **- Passed** ☐ **- Failed** ☐ **- Not judged**

7.6.1 Worst Point and Measurement Uncertainty

Min. Limit Margin (Average)	7.0	dB	at 5150.0	MHz
Uncertainty of Measurement Results	9 kHz – 30 MHz		+/-1.9	dB(2σ)
	30 MHz – 300 MHz		+/-4.3	dB(2σ)
	300 MHz – 1000 MHz		+/-5.4	dB(2σ)
	1 GHz – 6 GHz		+/-4.6	dB(2σ)
	6 GHz – 18 GHz		+/-5.2	dB(2σ)
	18 GHz – 40 GHz		+/-5.4	dB(2σ)
Test Distance	9 kHz – 26.5 GHz		3	m
Test Distance	26.5 GHz – 40 GHz		1	m

Remarks : Worst case is 802.11ac(80 MHz BW) channel 42. X axis position.

7.6.2 Test Site and Instruments

7.6.2.1 Test Site

KITA-KANSAI Testing Center SAITO EMC Branch

☐ - Anechoic chamber A1 ☒ - Anechoic chamber A2

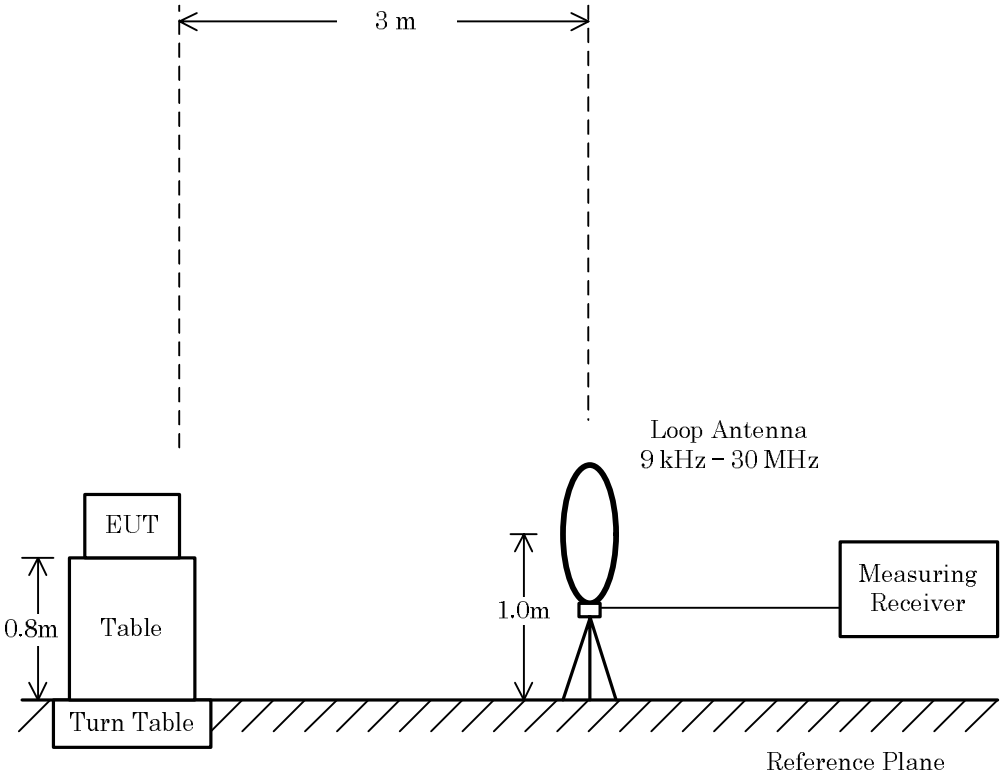
7.6.2.2 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESU 26	Rohde & Schwarz	A-6	2014/5	1 Year
Spectrum Analyzer	E4446A	Agilent	A-39	2014/9	1 Year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	C-2	2014/8	1 Year
RF Cable	RG213/U	SUHNER	H-28	2014/8	1 Year
Biconical Antenna	VHA9103/BBA9106	Schwarzbeck	C-30	2014/5	1 Year
Log-periodic Antenna	UHALP9108-A1	Schwarzbeck	C-31	2014/5	1 Year
RF Cable	S 10162 B-11 etc.	SUHNER	H-4	2014/4	1 Year
Site Attenuation	--	----	H-15	2014/1	1 Year
Pre-Amplifier	TPA0118-36	TOYO	A-37	2014/5	1 Year
Pre-Amplifier	RP1826G-45H	EMCS	A-53	2014/3	1 Year
Pre-Amplifier	RP2640G-ERZ	EMCS	A-54	2014/3	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2014/7	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2014/7	1 Year
Horn Antenna	3160-04	EMCO	C-55	2014/6	1 Year
Horn Antenna	3160-05	EMCO	C-56	2014/6	1 Year
Horn Antenna	3160-06	EMCO	C-57	2014/6	1 Year
Horn Antenna	3160-07	EMCO	C-58	2014/6	1 Year
Horn Antenna	3160-08	EMCO	C-59	2014/6	1 Year
Horn Antenna	3160-09	EMCO	C-48	2014/7	1 Year
Horn Antenna	3160-10	EMCO	C-49	2014/7	1 Year
Attenuator	54A-10	Weinschel	D-29	2014/9	1 Year
Attenuator	2-10	Weinschel	D-79	2013/11	1 Year
RF Cable	SUCOFLEX102E	SUHNER	C-75	2014/2	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-66	2014/1	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-67	2014/1	1 Year
RF Cable	SUCOFLEX102EA	SUHNER	C-69	2014/2	1 Year
SVSWR	--	----	H-19	2014/2	1 Year
Band Rejection Filter	BRM50716	MICRO-TRONICS	D-53	2014/6	1 Year
Pre-Amplifier	310N	SONOMA	A-17	2014/4	1 Year

7.6.3 Test Method and Test Setup (Diagrammatic illustration)

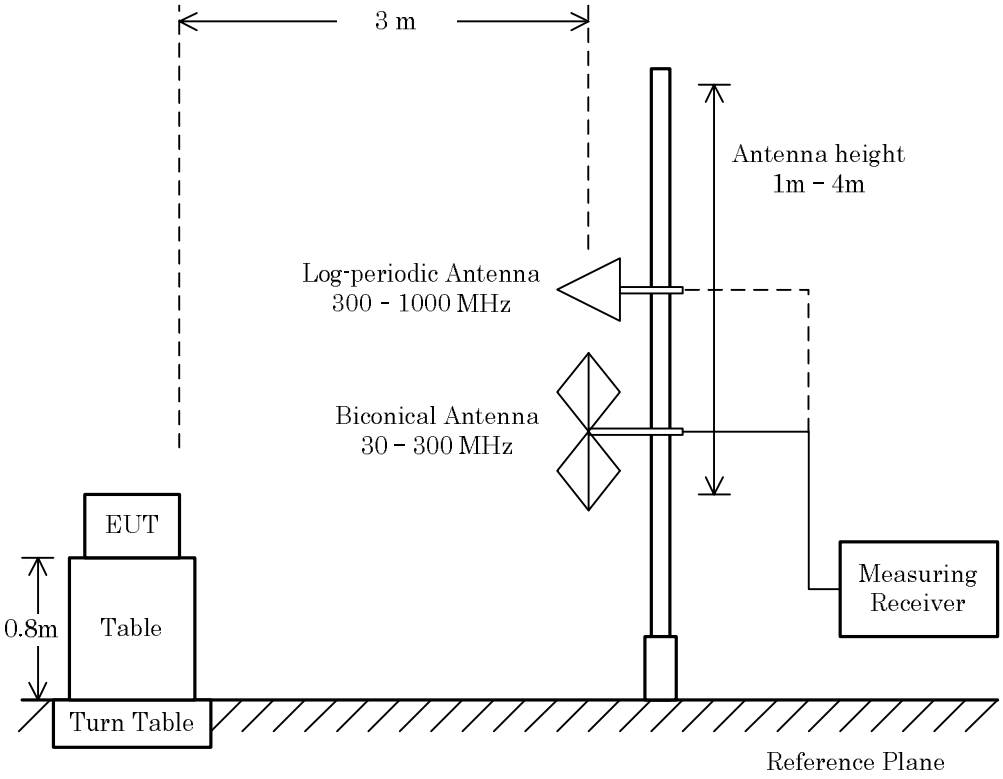
7.6.3.1 Radiated Emission 9 kHz – 30 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for the final tests.
(Reference divisional instruction No. G70364B)



7.6.3.2 Radiated Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for the final tests.
(Reference divisional instruction No. G70364B)



7.6.3.3 Radiated Emission Above 1000 MHz

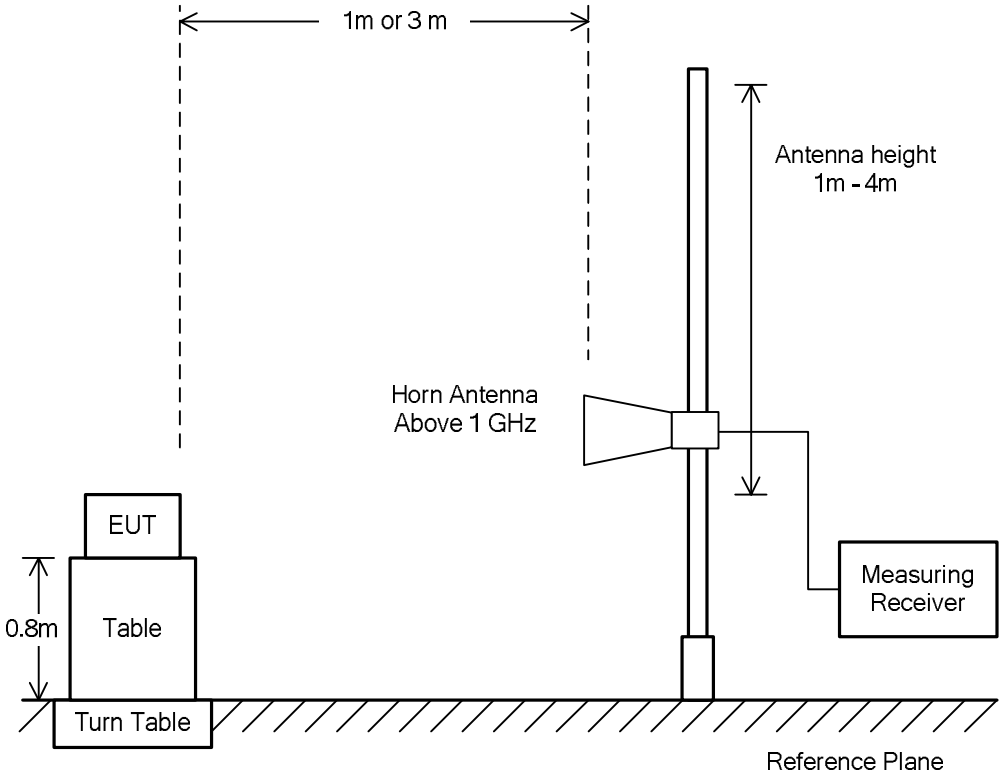
The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for the final tests.
The average unwanted emissions measurements were performed in accordance with KDB 789033 D02 Method VB described in G.6.d) in this document.

The setting of the measuring instruments are shown as follows:

Type	Peak	Average
Detector Function	Peak	Peak
Res. Bandwidth	1 MHz	1 MHz
Video Bandwidth	3 MHz	≥ 1/T *1)
Video Filtering	Linear Voltage	Linear Voltage
Sweep Time	AUTO	AUTO
Trace	Max Hold	Max Hold

Note: 1. T: Minimum transmission duration

(Reference divisional instruction No. G70364C)



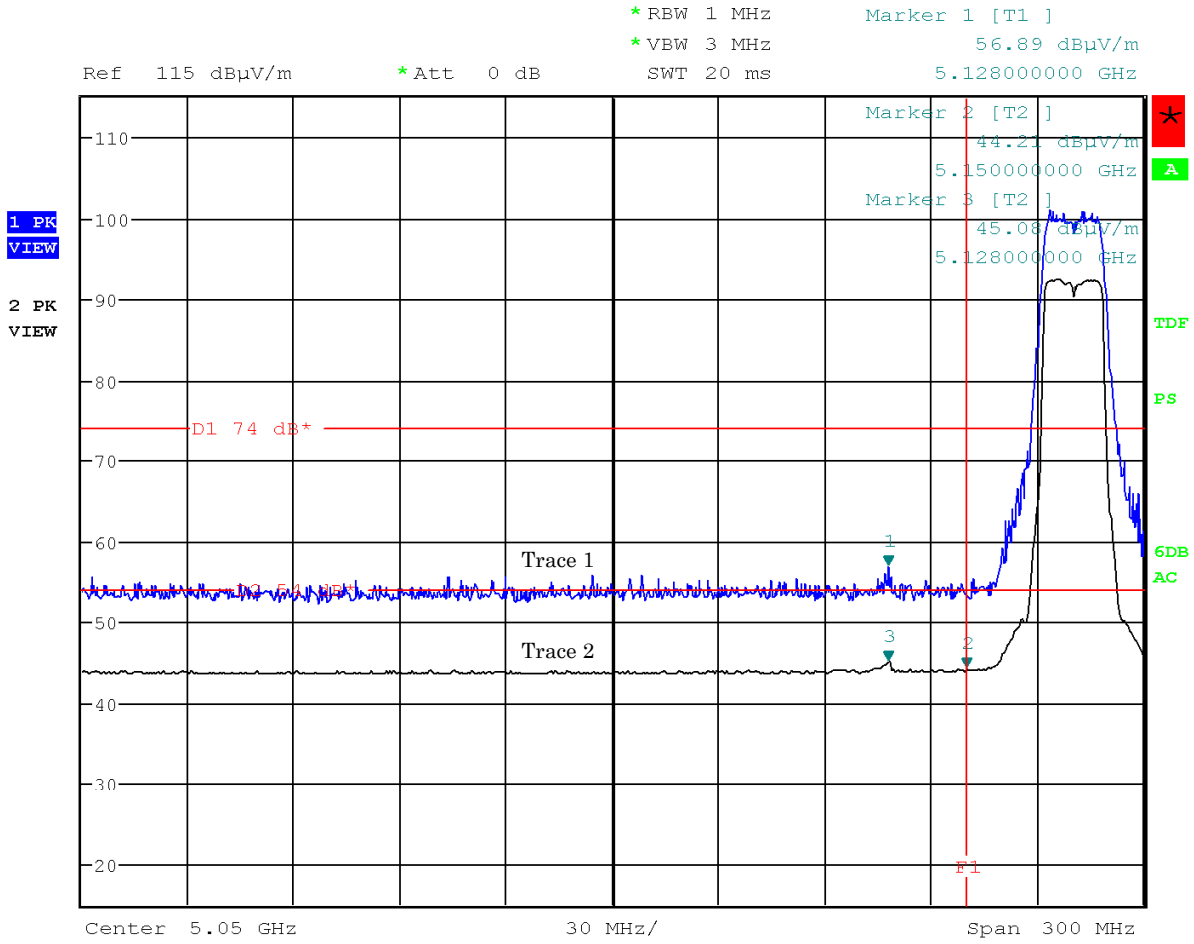
NOTE
The antenna height is scanned depending on the EUT's size and mounting height.

7.6.4 Test Data

7.6.4.1 Radiated Band Edge

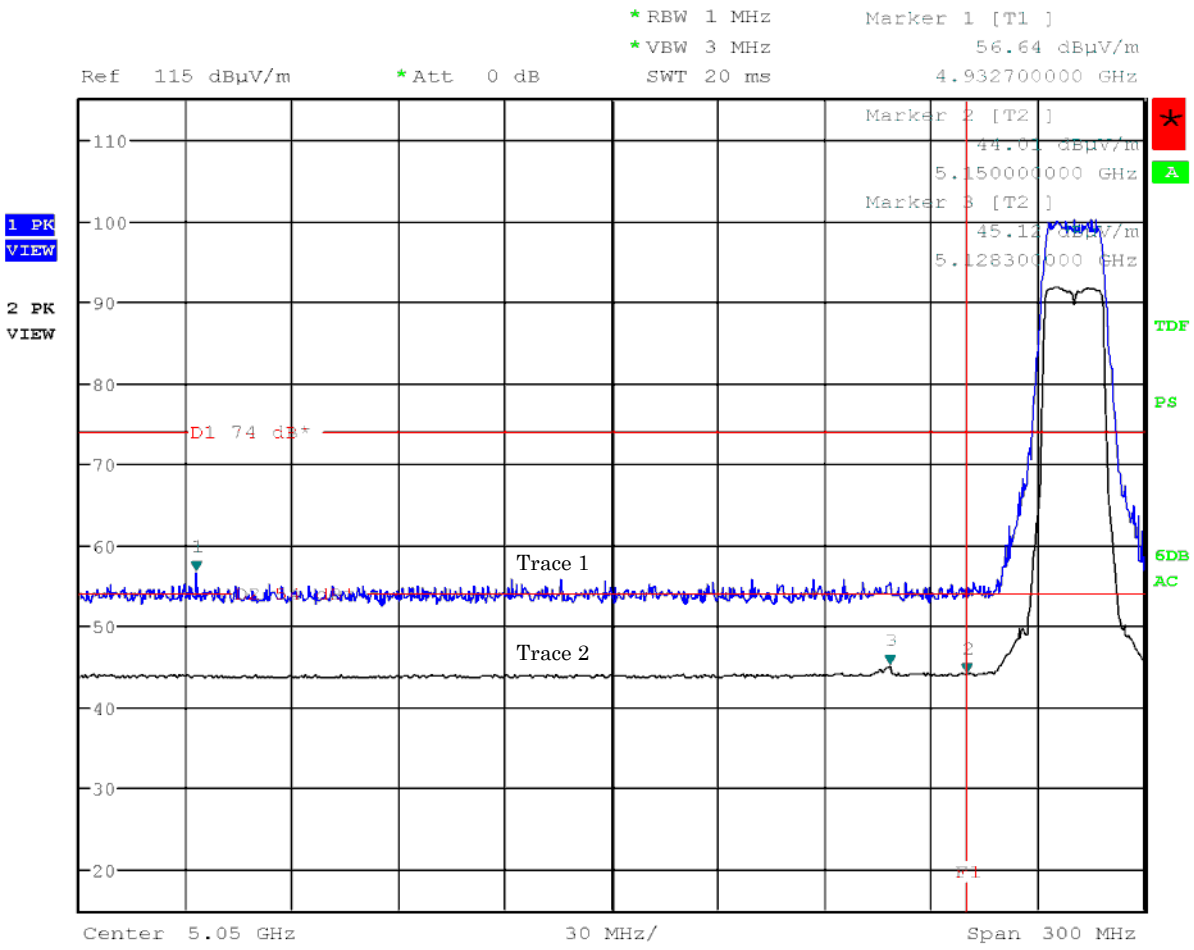
Test Date : October 7, 2014
Temp.:23°C, Humi:48%

Mode of EUT : TX mode (802.11a, 36ch: 5180 MHz)
Antenna Polarization : Horizontal



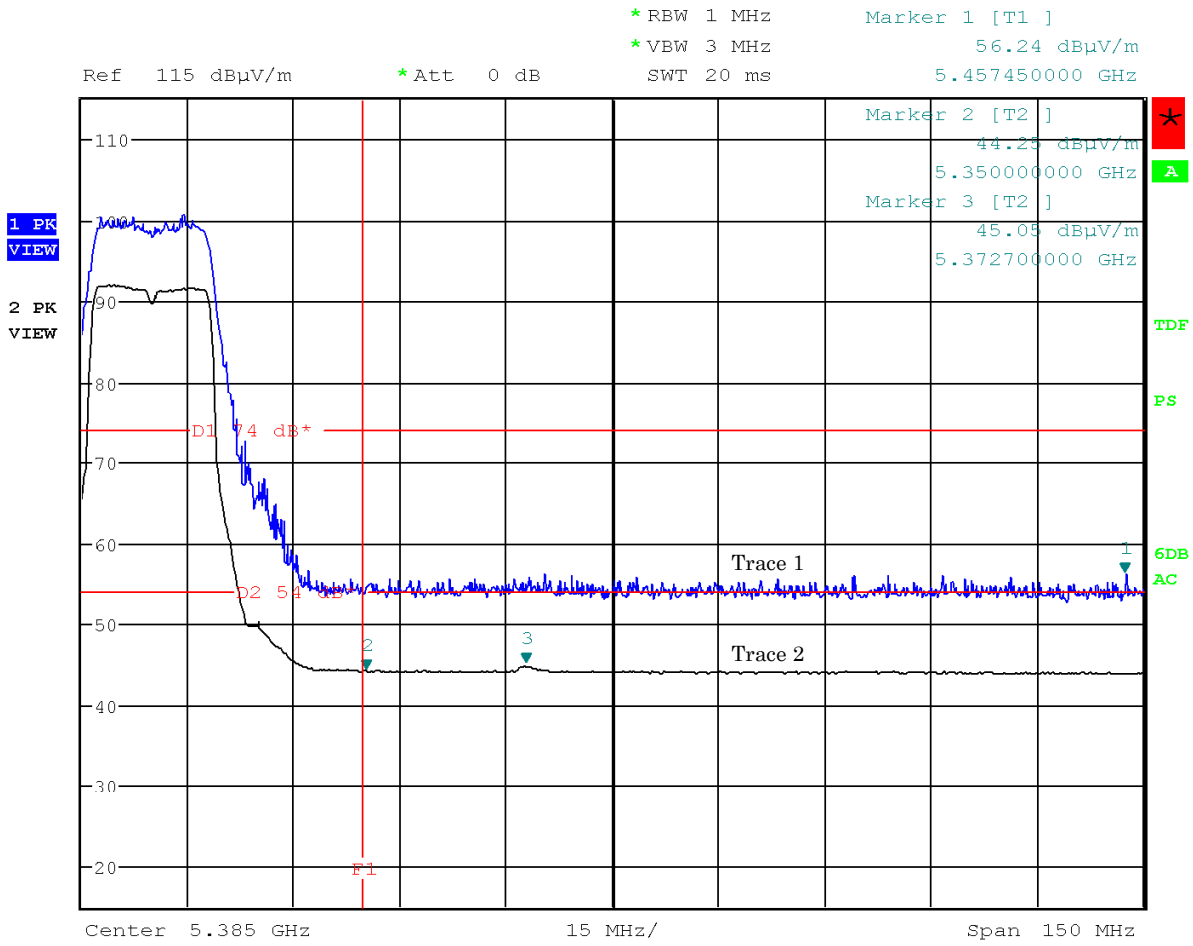
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 36ch: 5180 MHz)
Antenna Polarization : Vertical



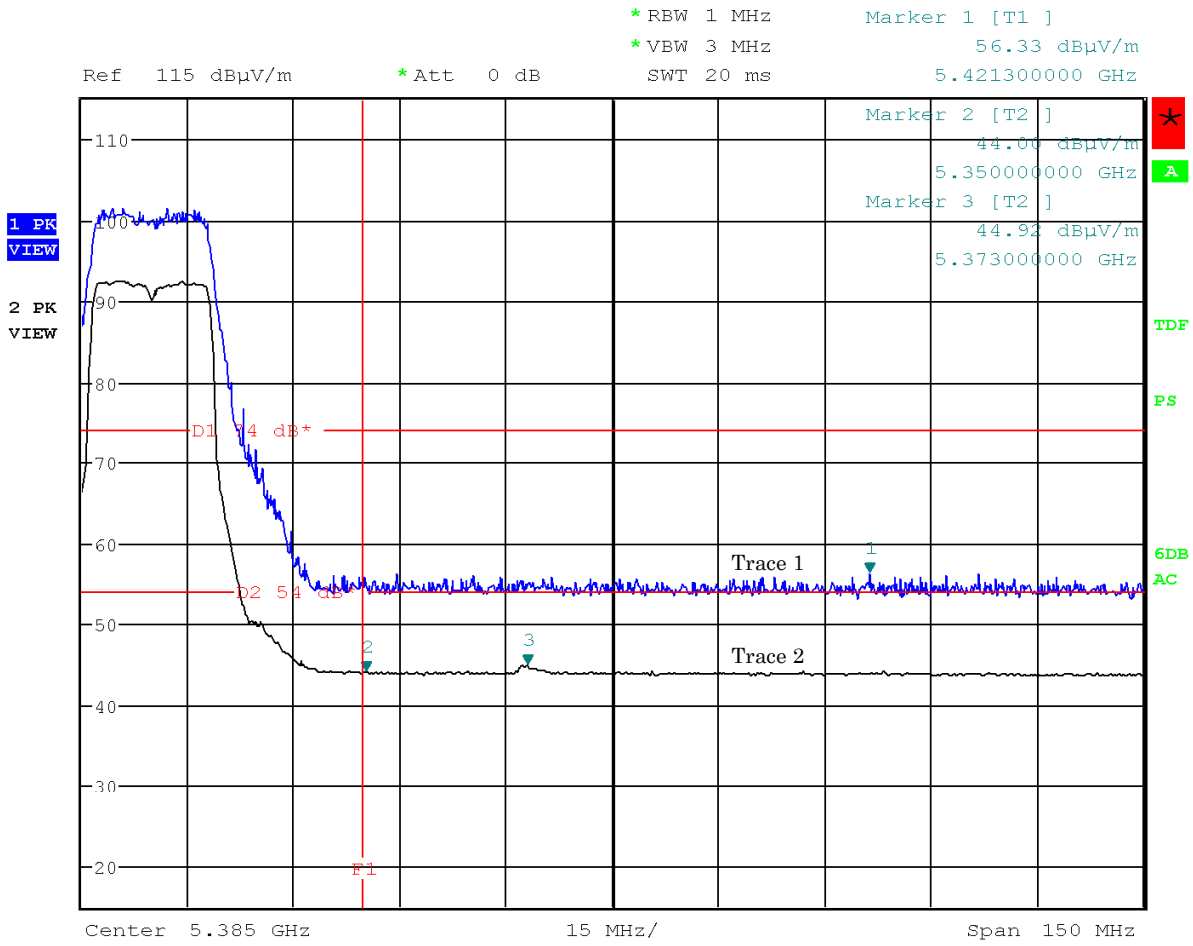
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 64ch: 5320 MHz)
Antenna Polarization : Horizontal



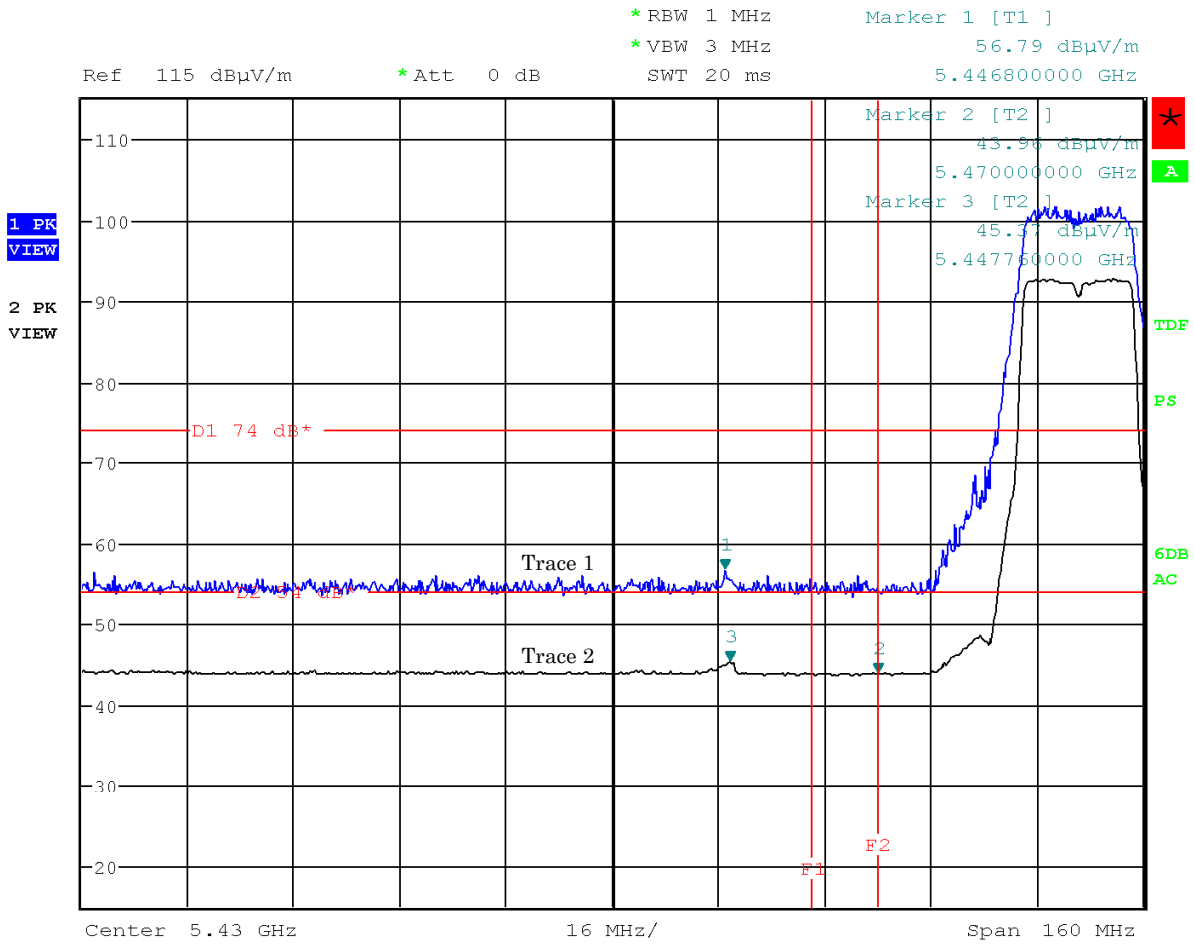
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 64ch: 5320 MHz)
Antenna Polarization : Vertical



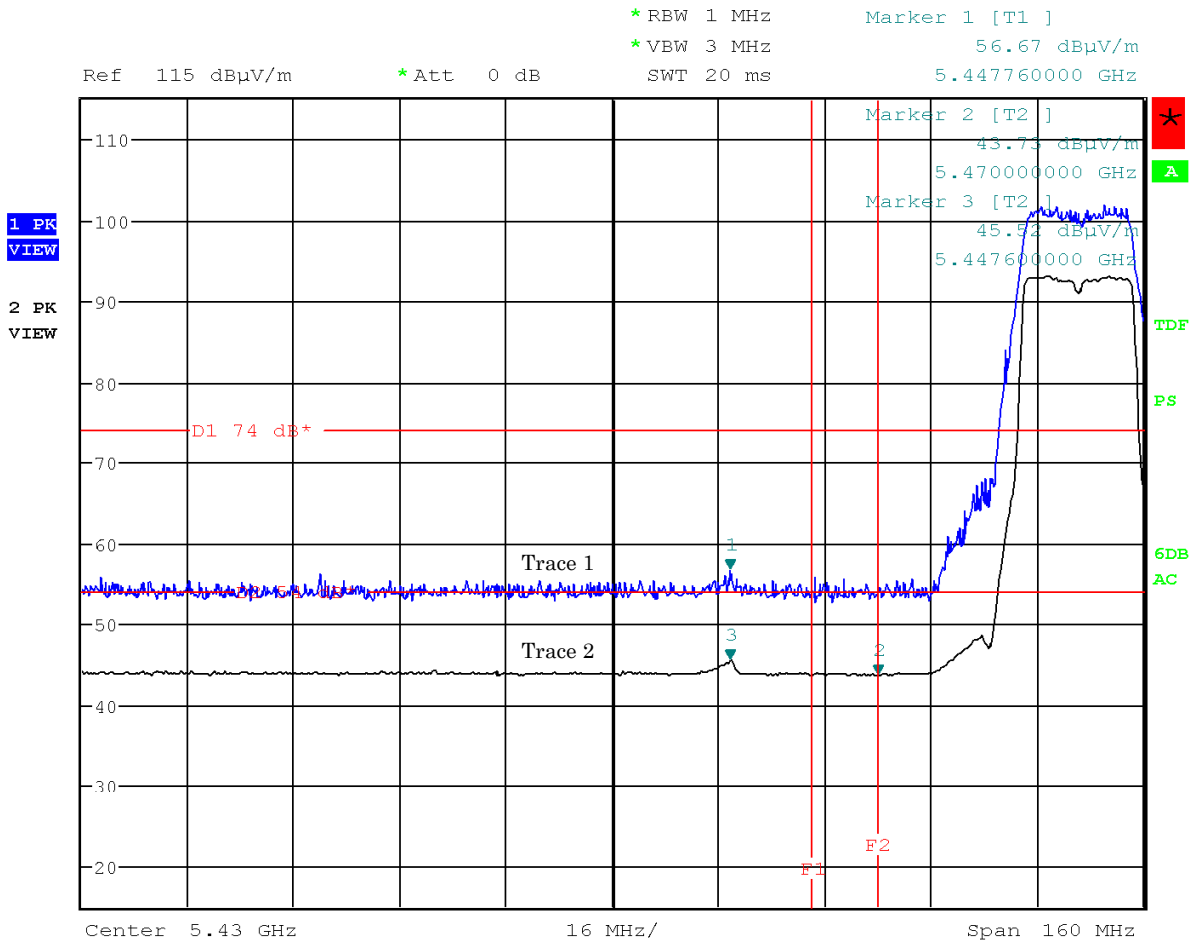
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 100ch: 5500 MHz)
Antenna Polarization : Horizontal



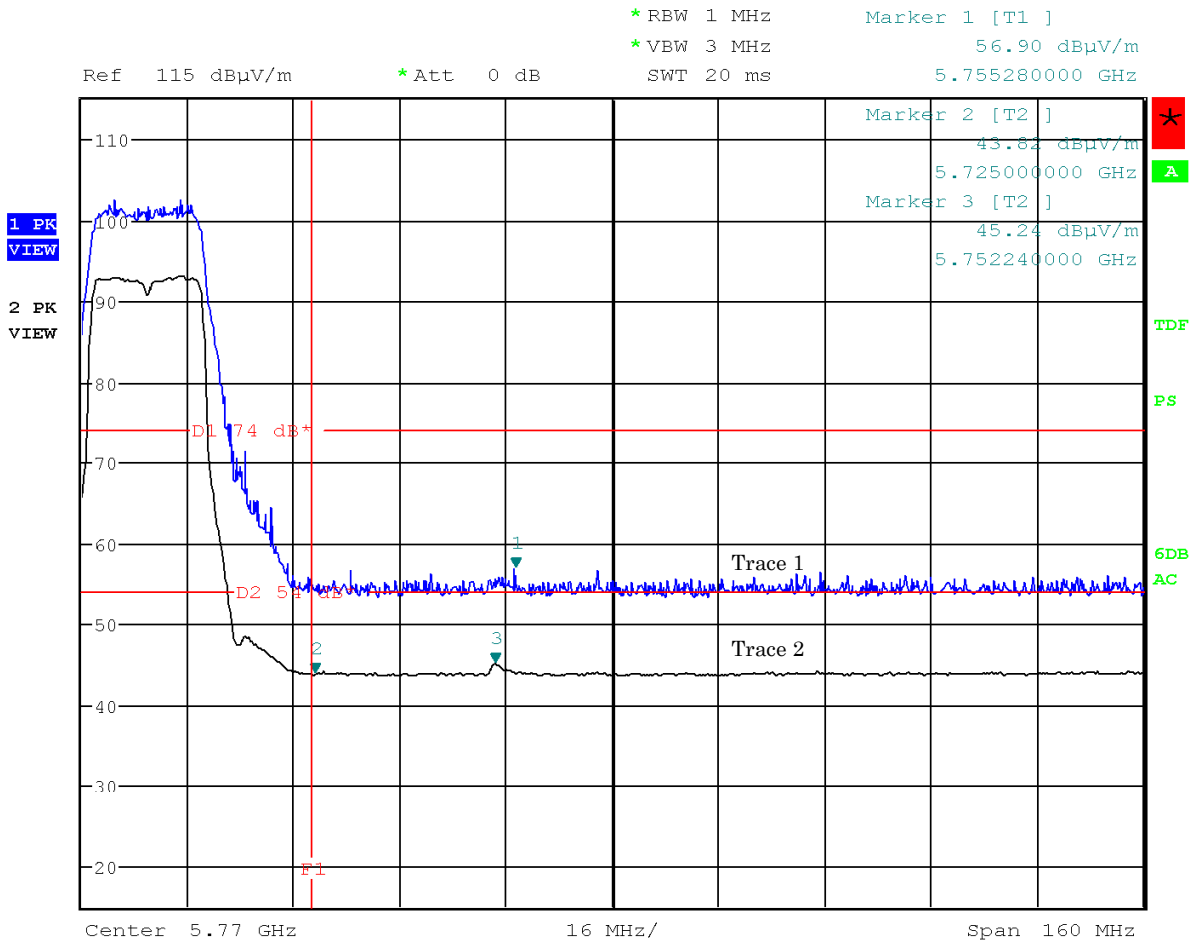
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 100ch: 5500 MHz)
Antenna Polarization : Vertical



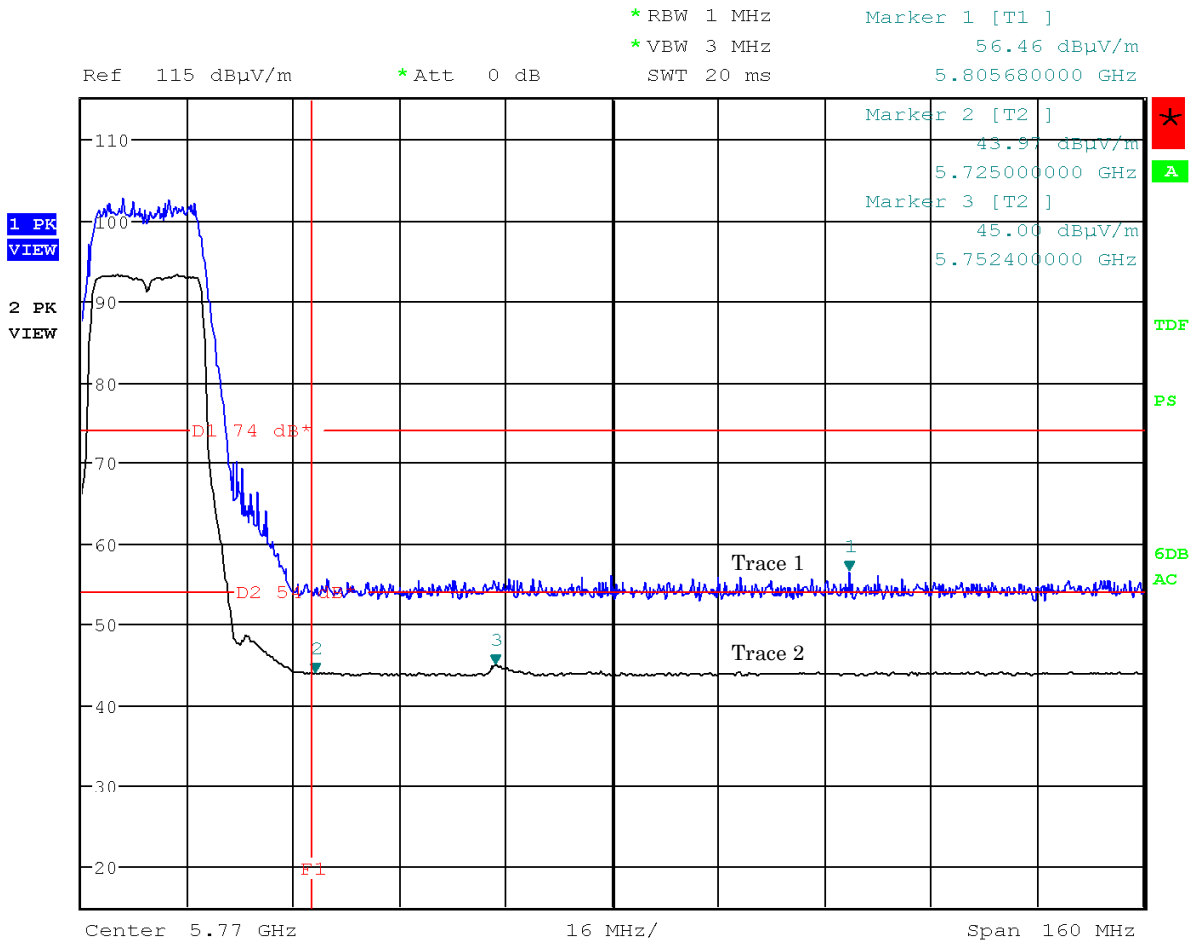
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 140ch: 5700 MHz)
Antenna Polarization : Horizontal



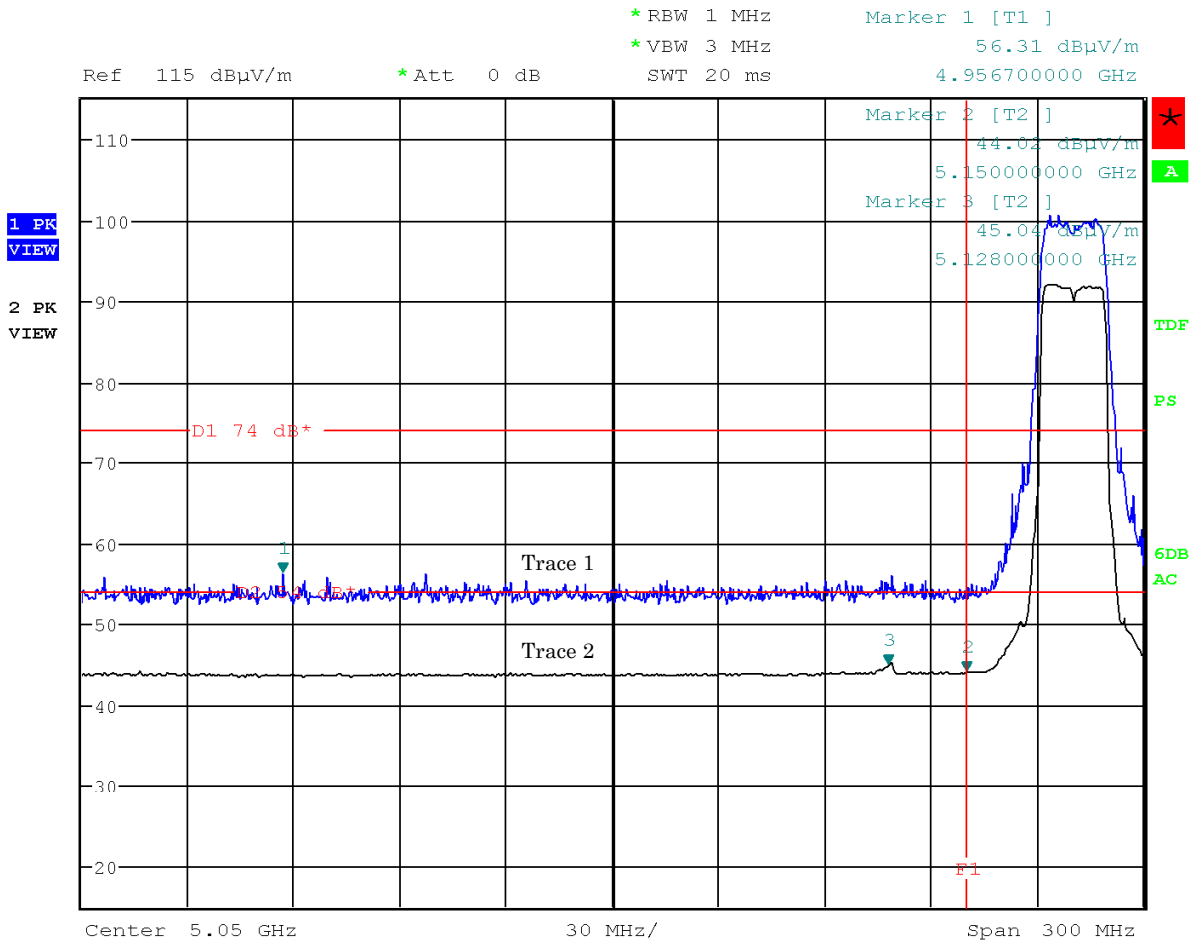
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11a, 140ch: 5700 MHz)
Antenna Polarization : Vertical



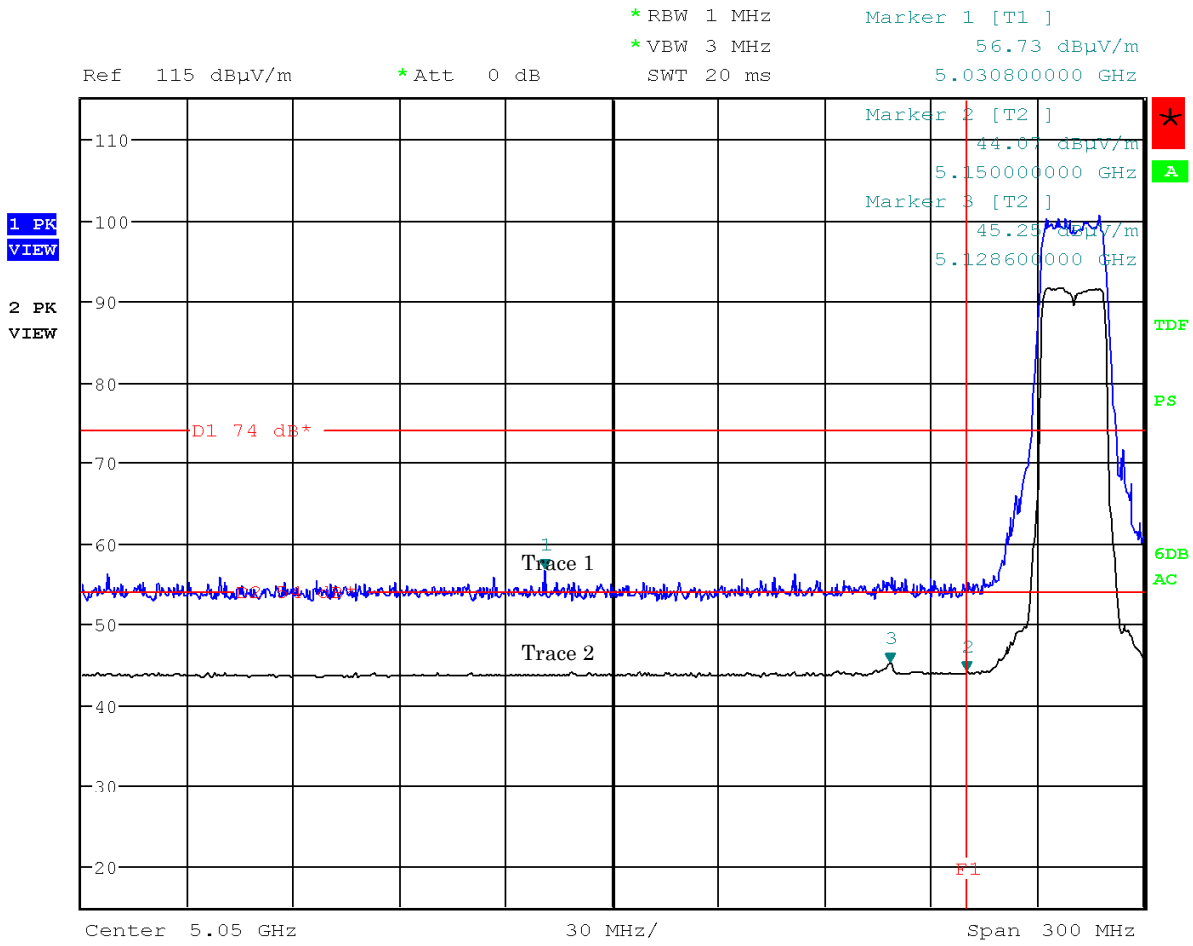
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 36ch: 5180 MHz)
Antenna Polarization : Horizontal



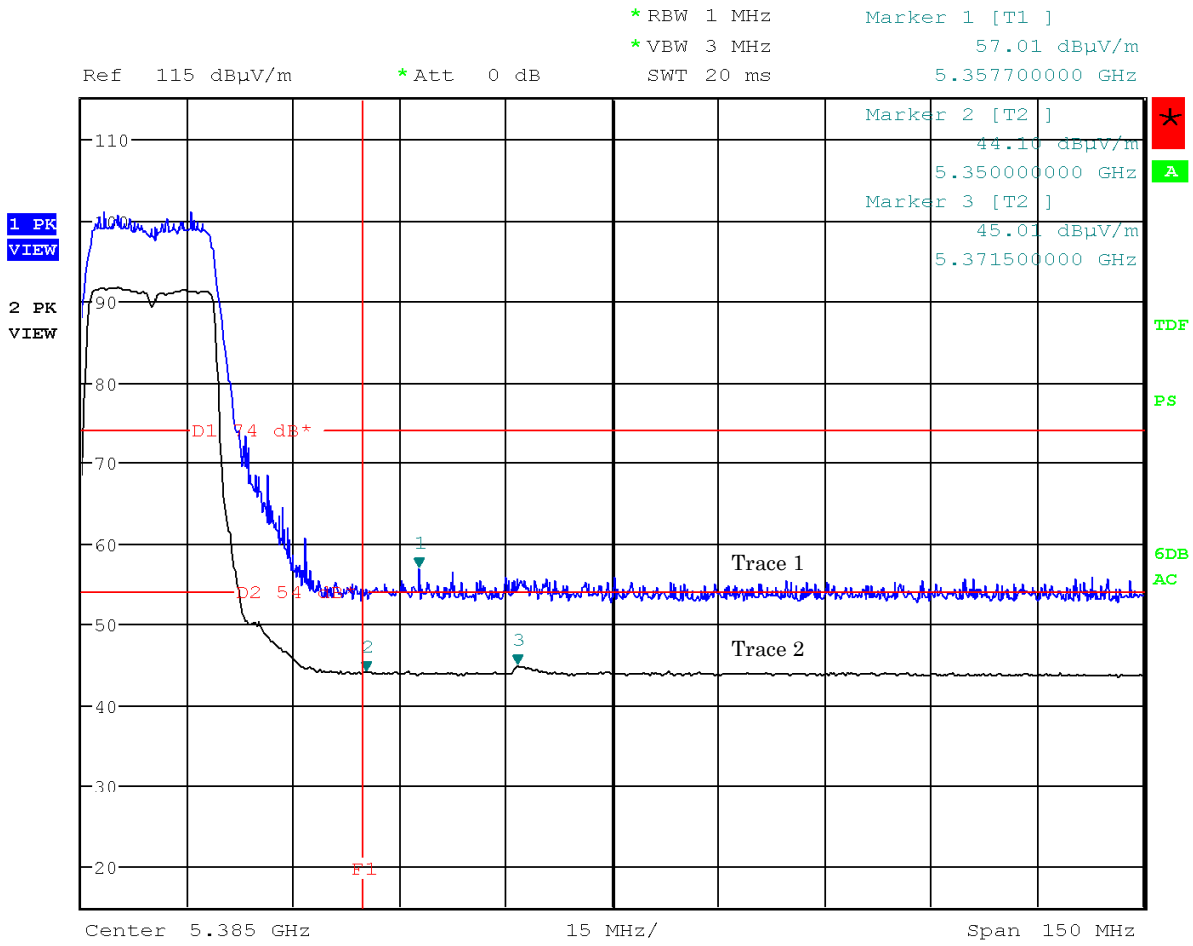
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 36ch: 5180 MHz)
Antenna Polarization : Vertical



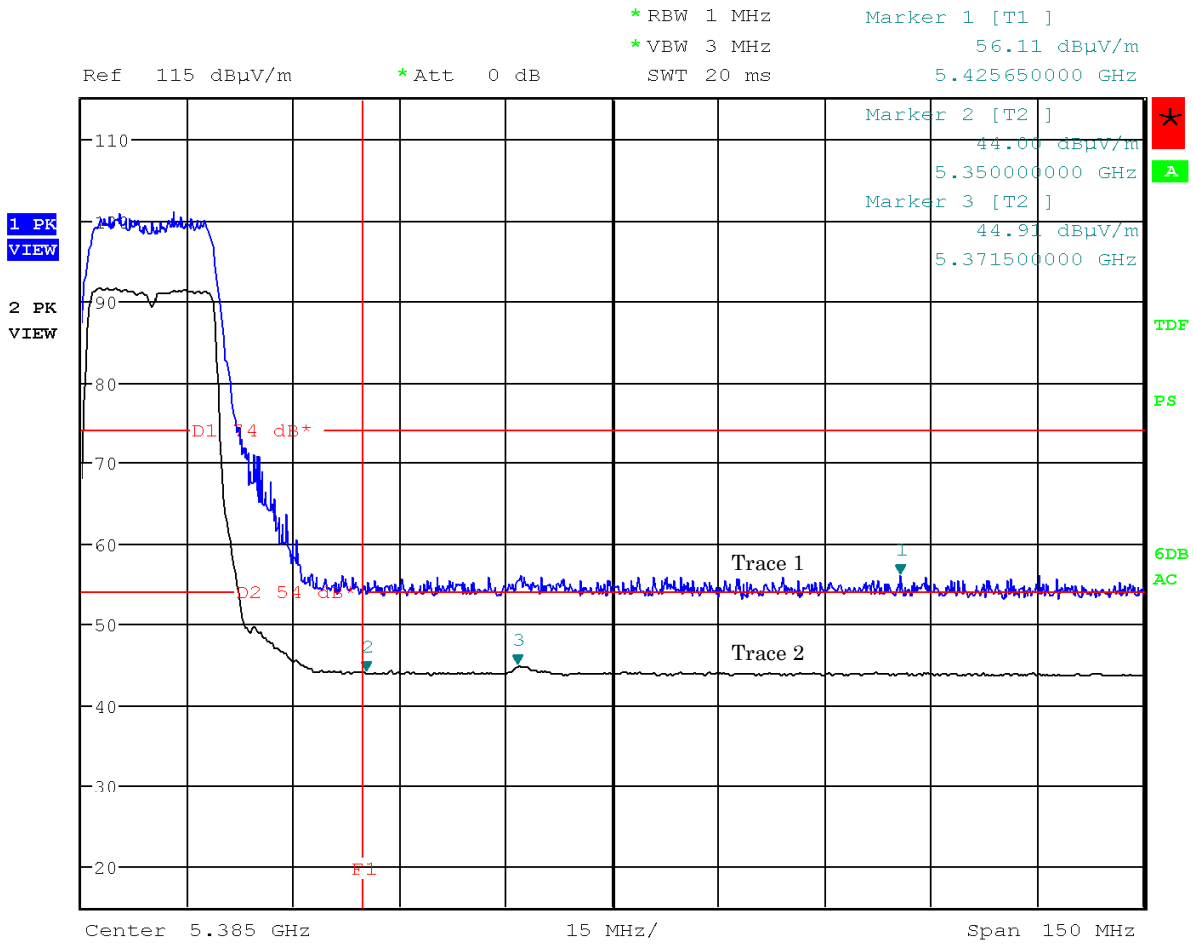
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 64ch: 5320 MHz)
Antenna Polarization : Horizontal



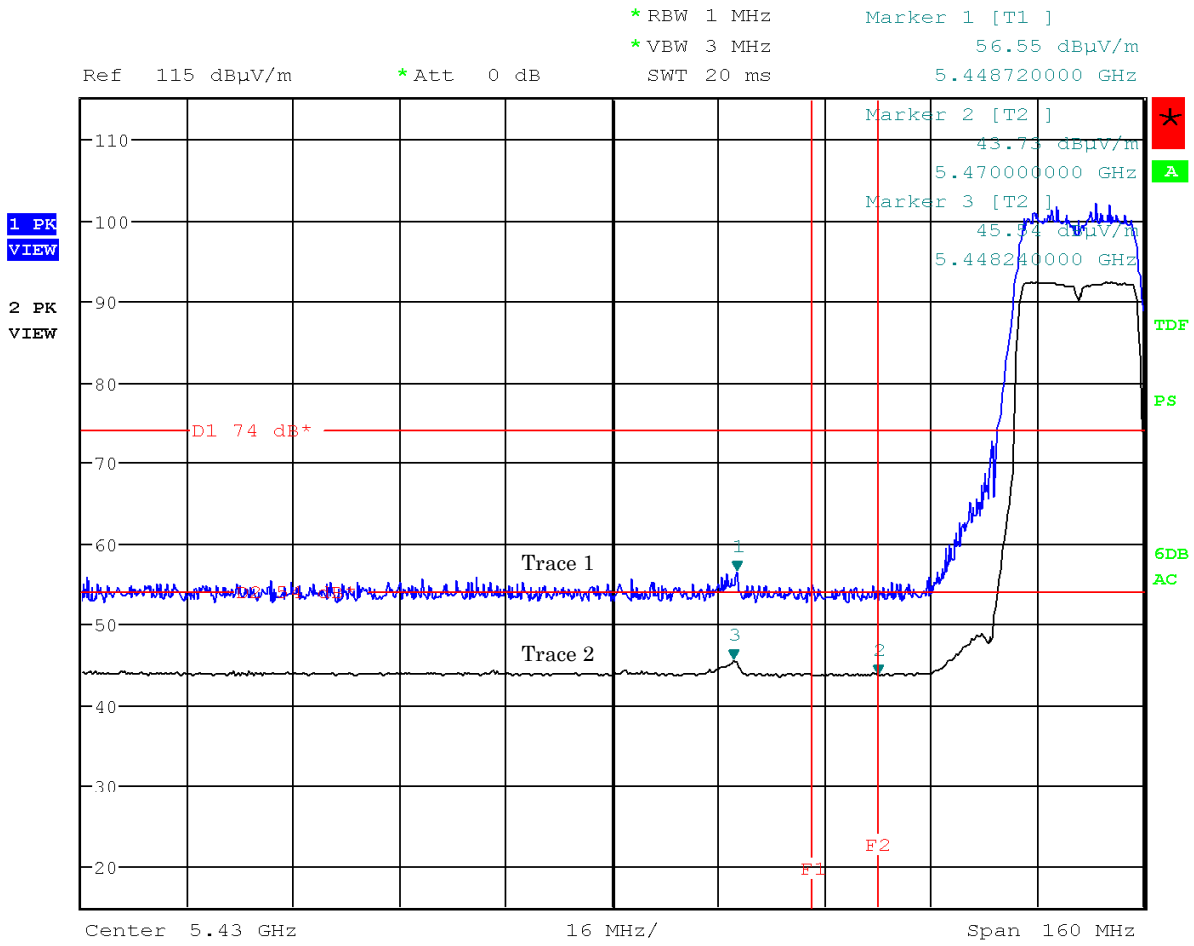
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 64ch: 5320 MHz)
Antenna Polarization : Vertical



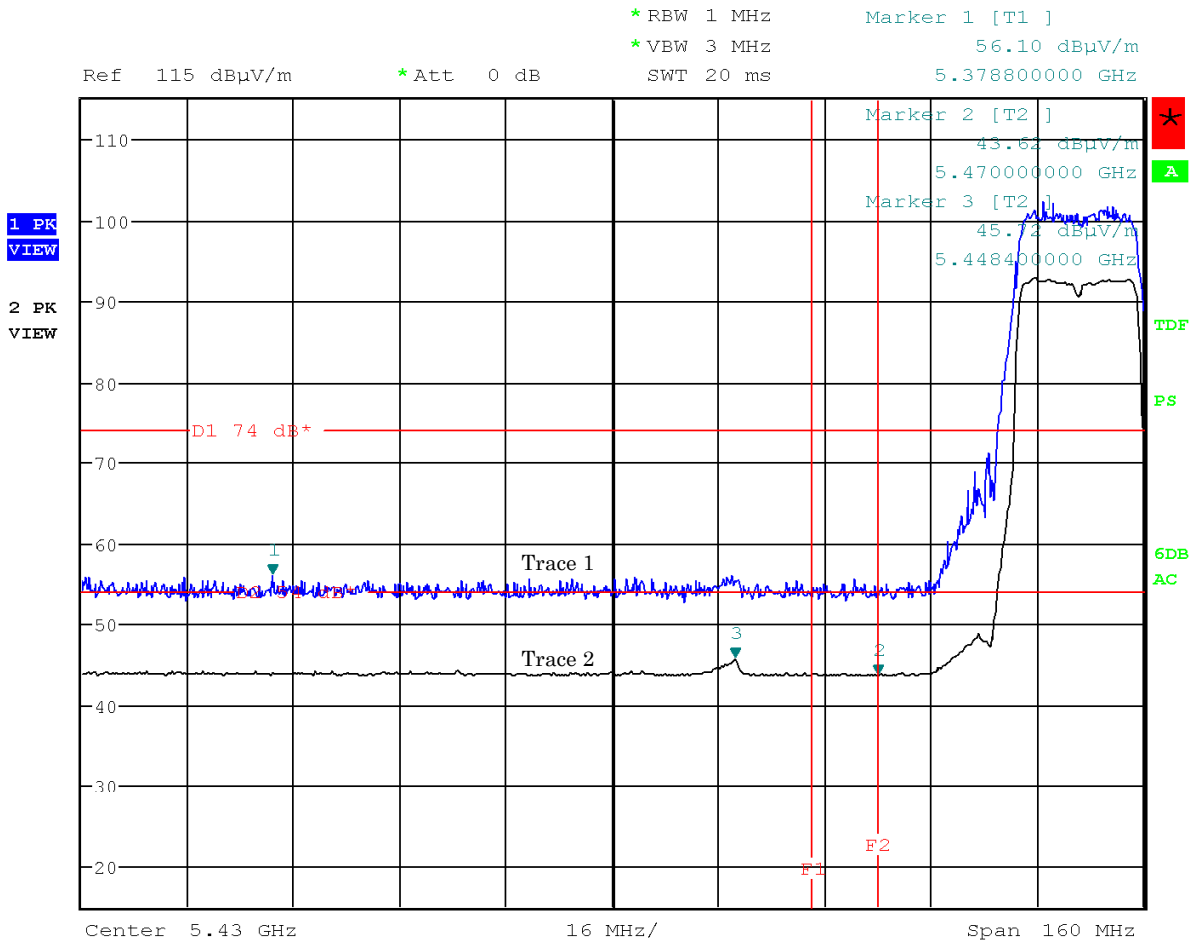
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 100ch: 5500 MHz)
Antenna Polarization : Horizontal



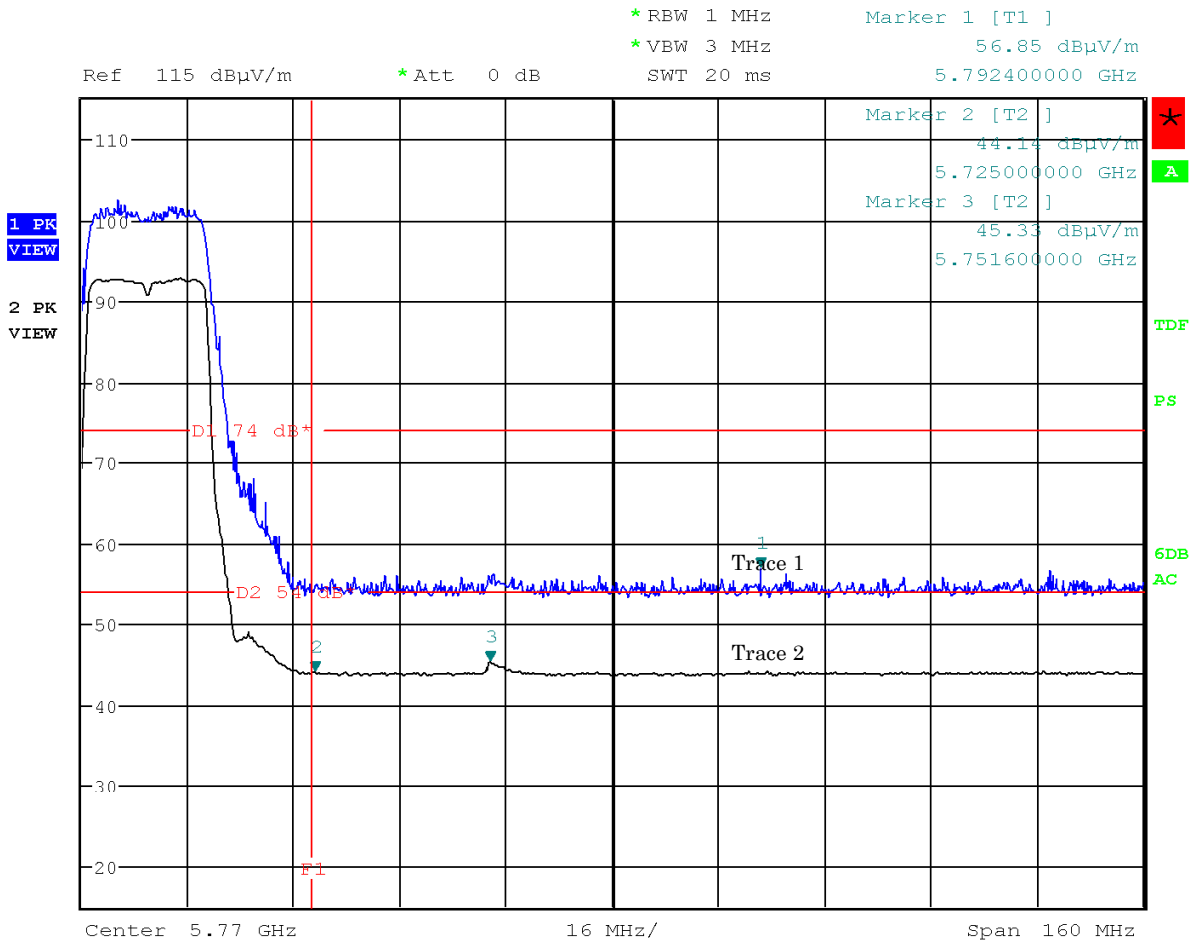
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 100ch: 5500 MHz)
Antenna Polarization : Vertical



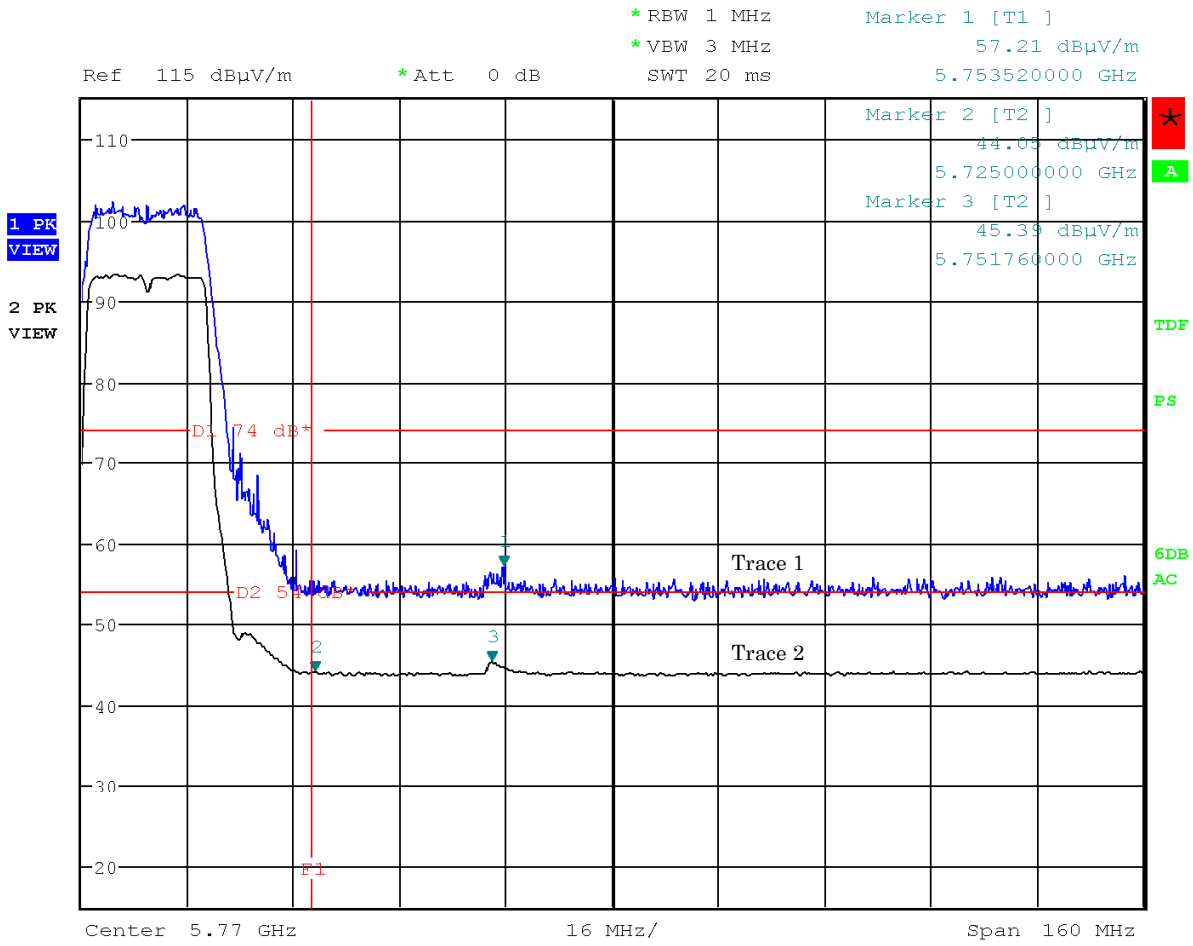
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 140ch: 5700 MHz)
Antenna Polarization : Horizontal



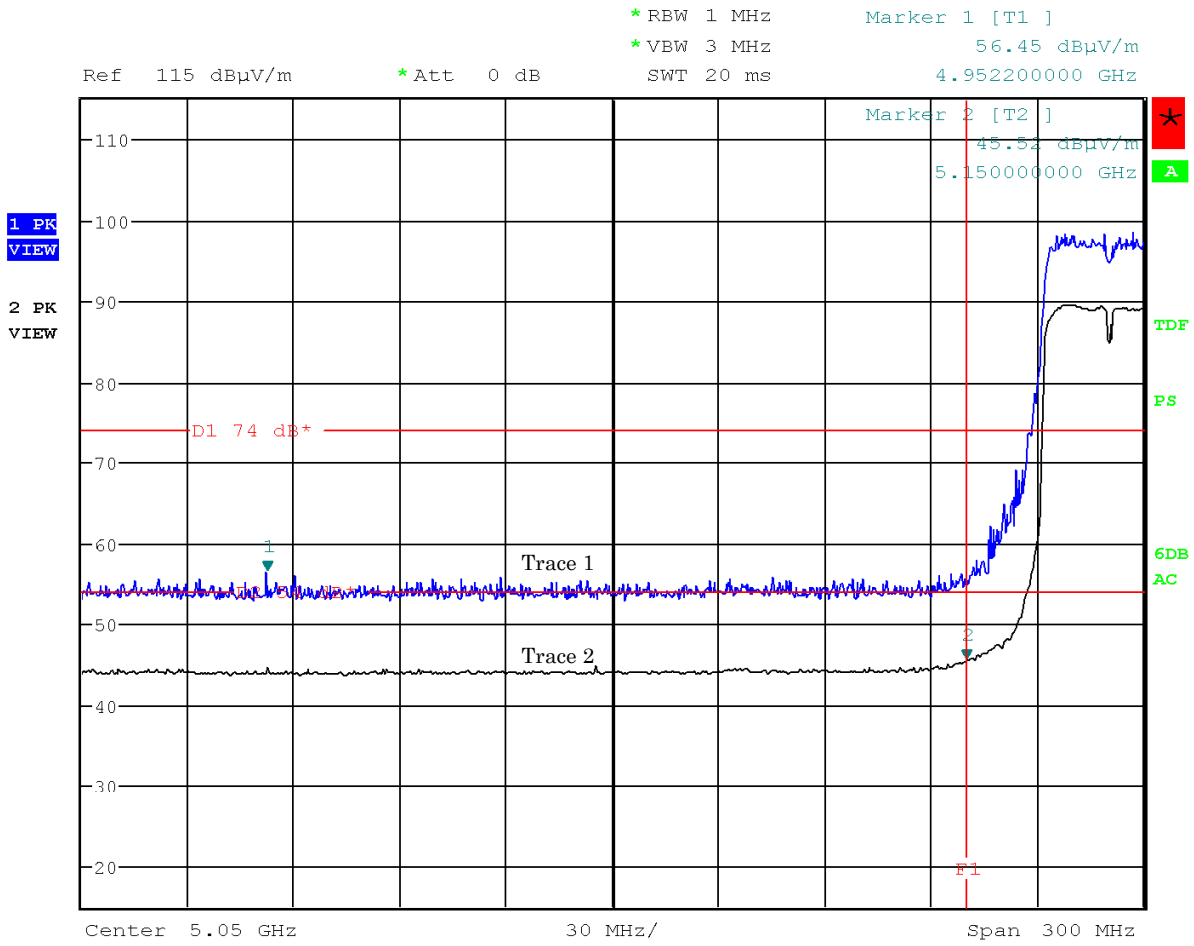
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 20 MHz BW, 140ch: 5700 MHz)
Antenna Polarization : Vertical



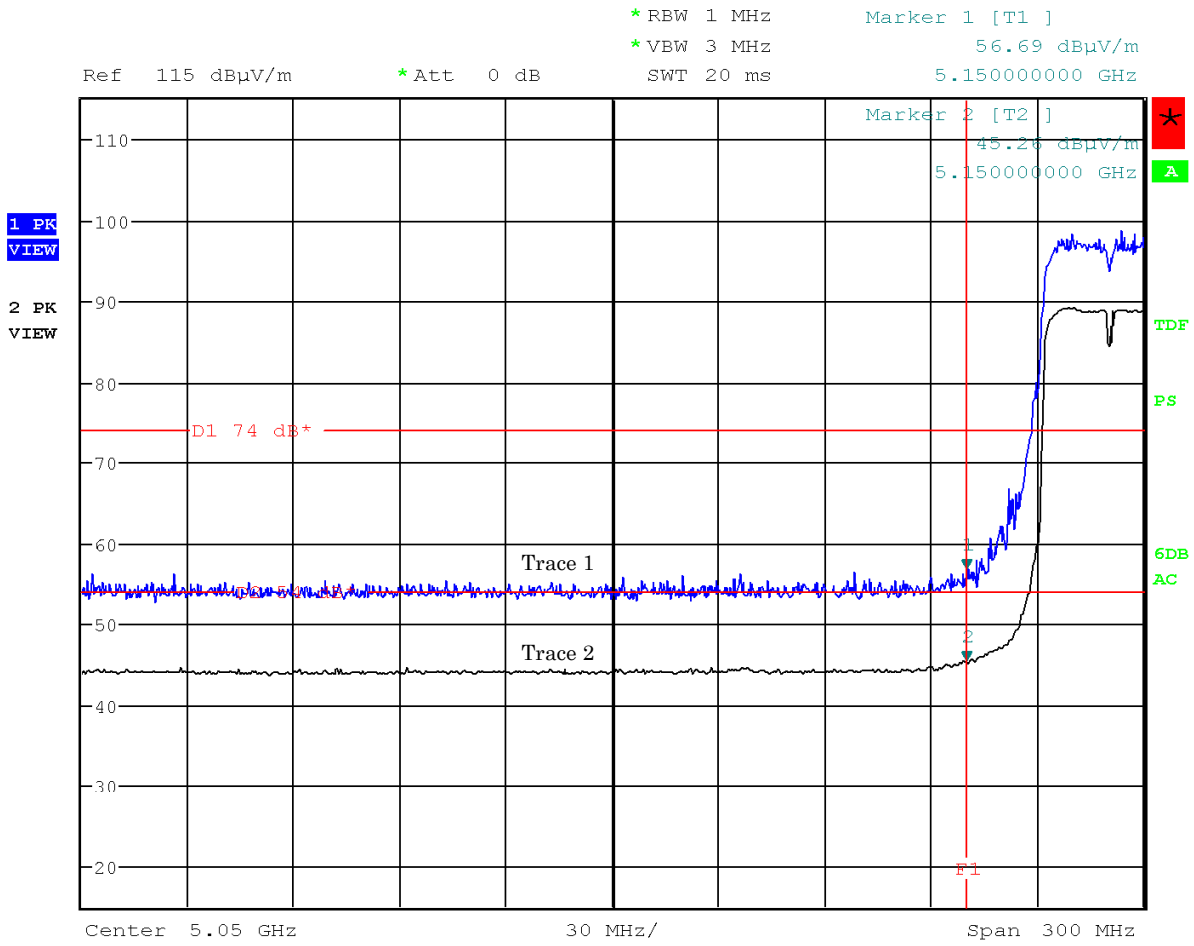
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 38ch: 5190 MHz)
Antenna Polarization : Horizontal



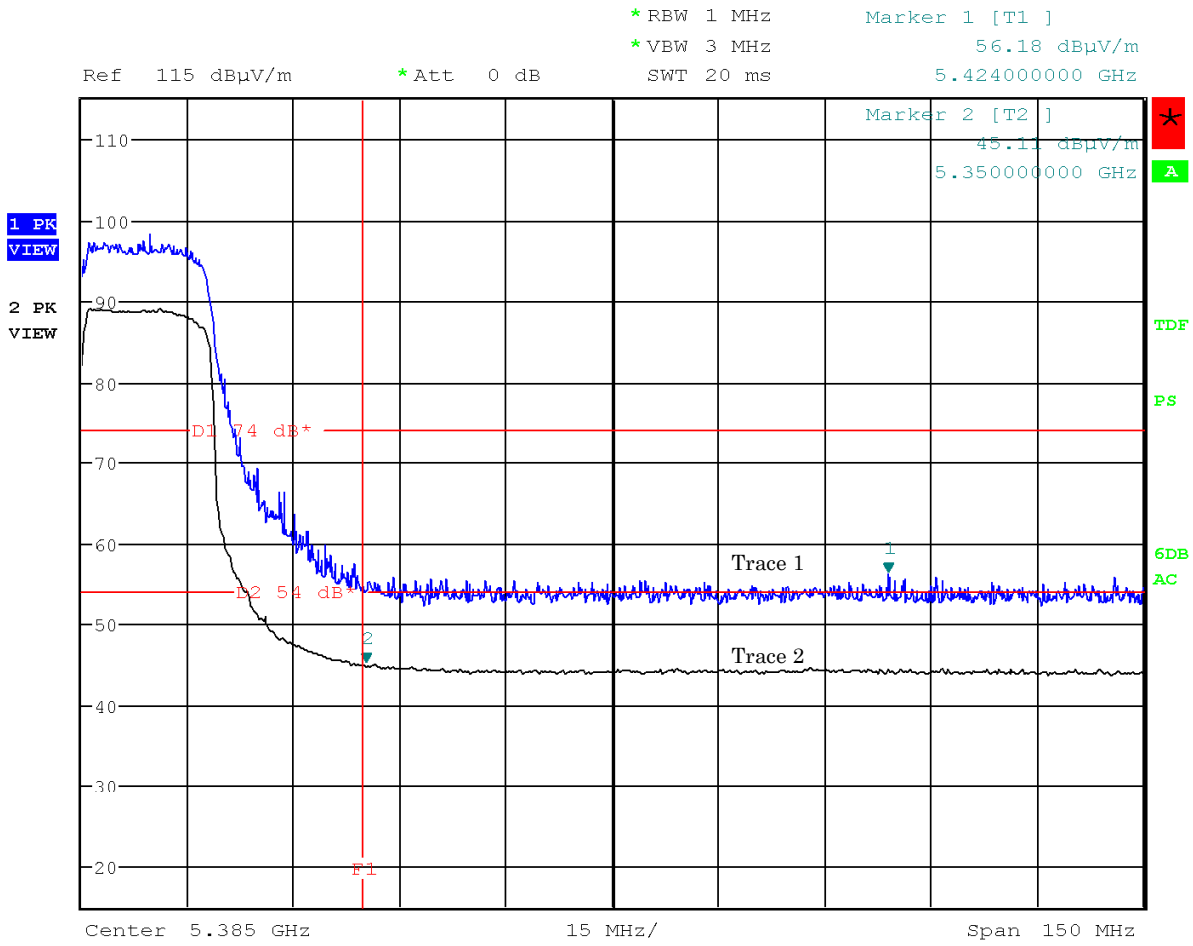
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 38ch: 5190 MHz)
Antenna Polarization : Vertical



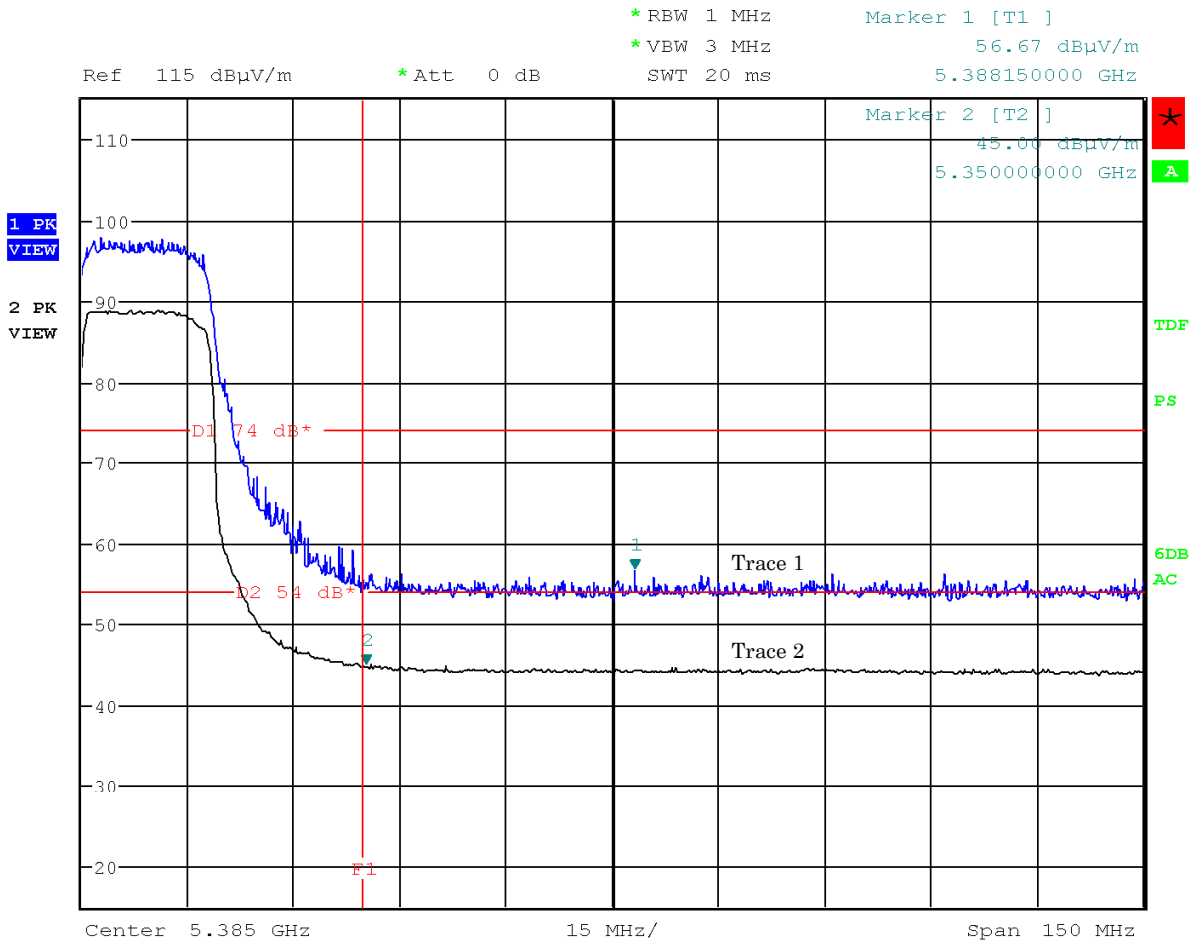
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 62ch: 5310 MHz)
Antenna Polarization : Horizontal



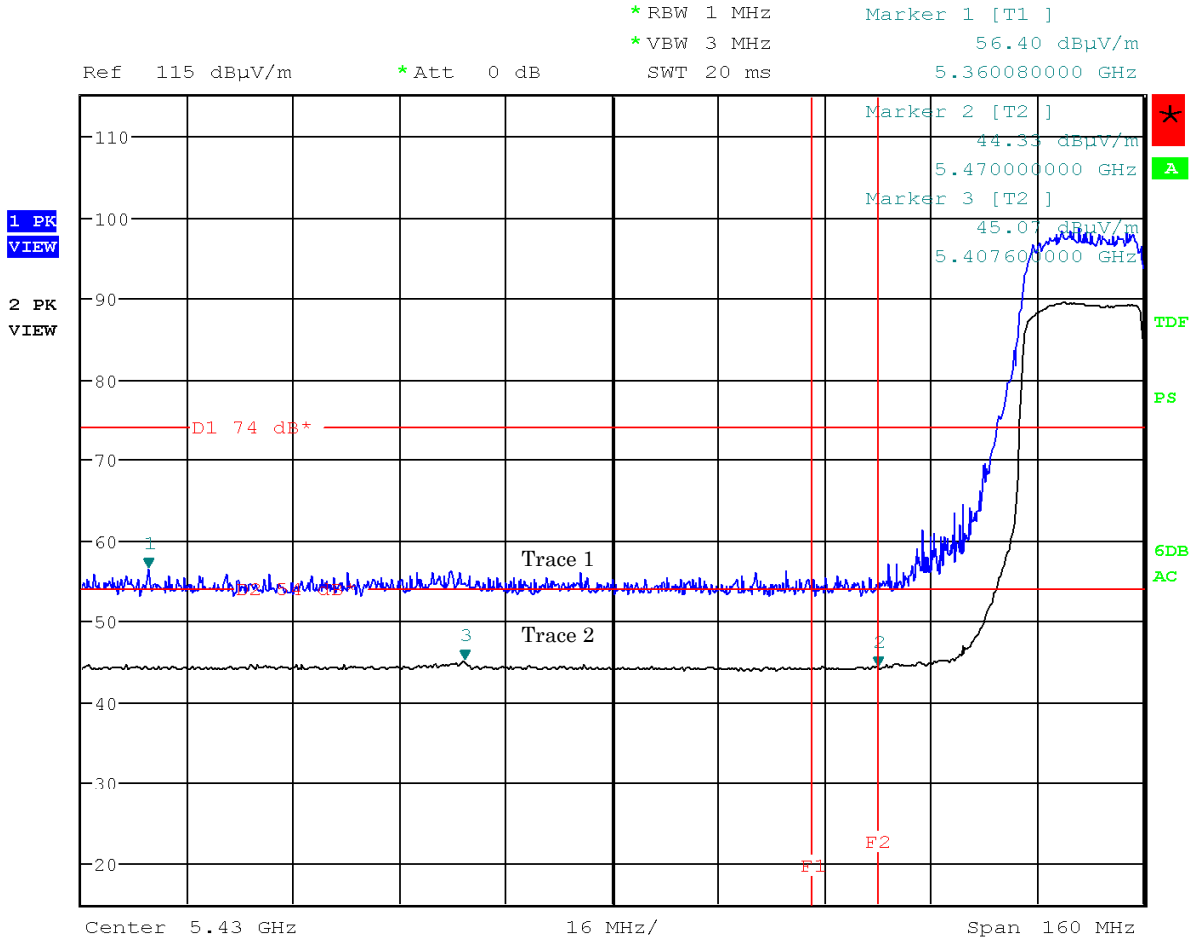
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 62ch: 5310 MHz)
Antenna Polarization : Vertical



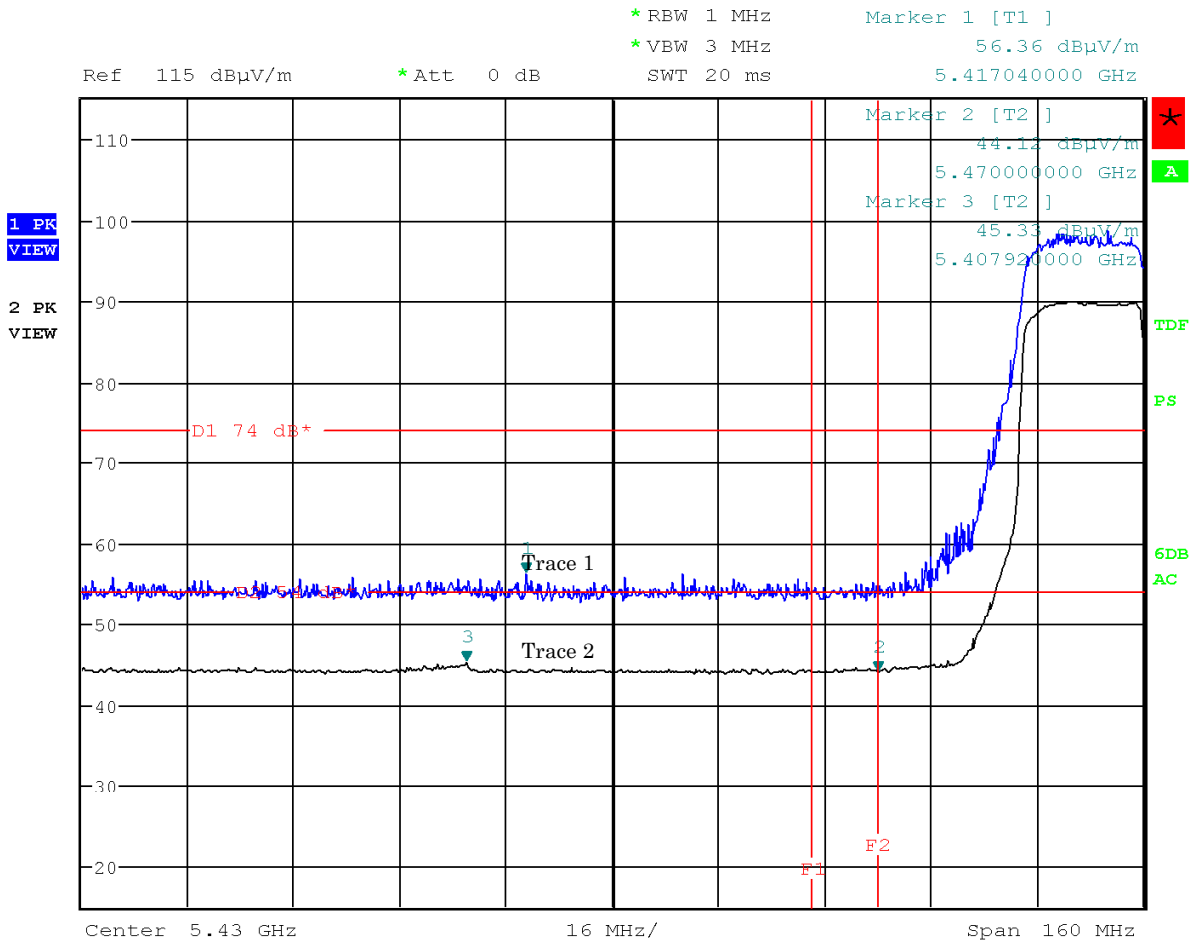
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 102ch: 5510 MHz)
Antenna Polarization : Horizontal



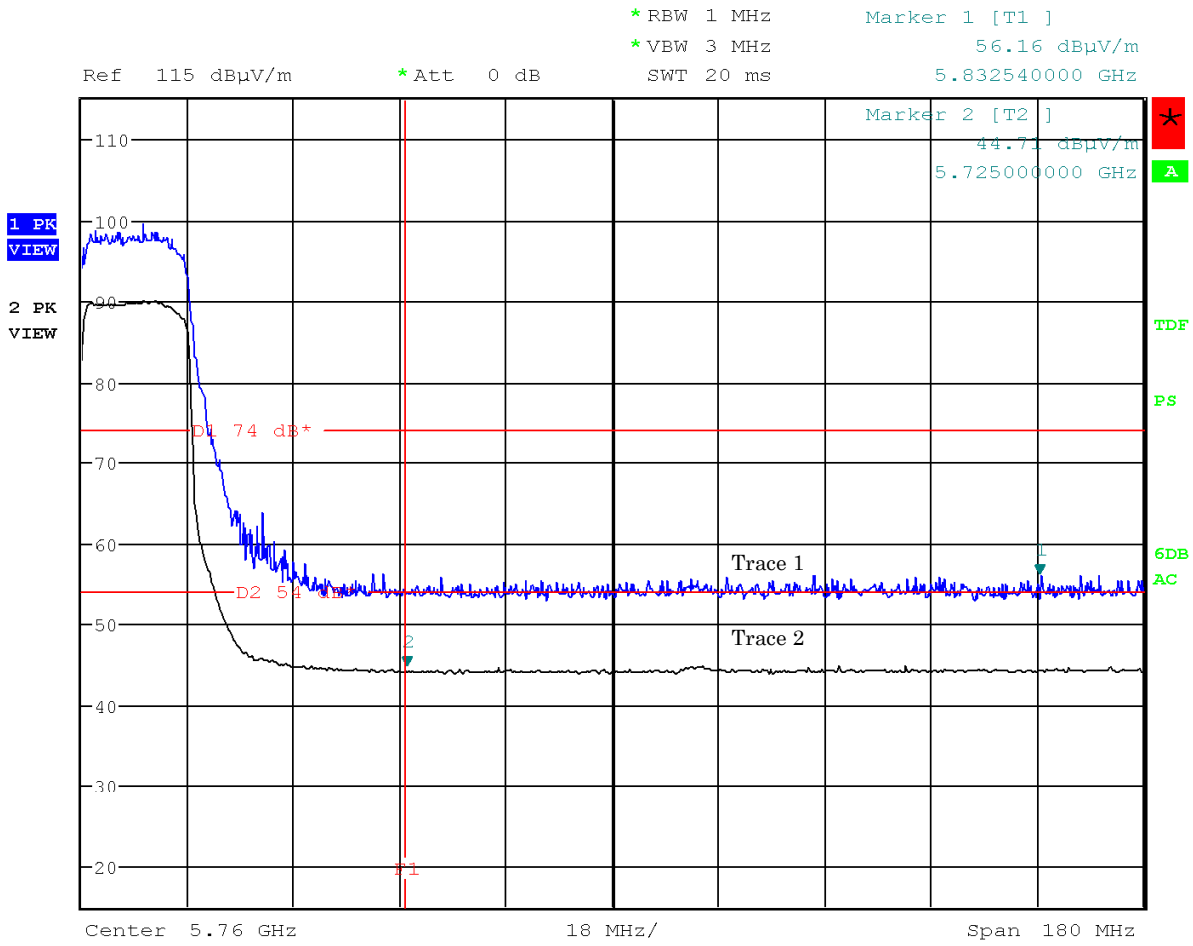
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 102ch: 5510 MHz)
Antenna Polarization : Vertical



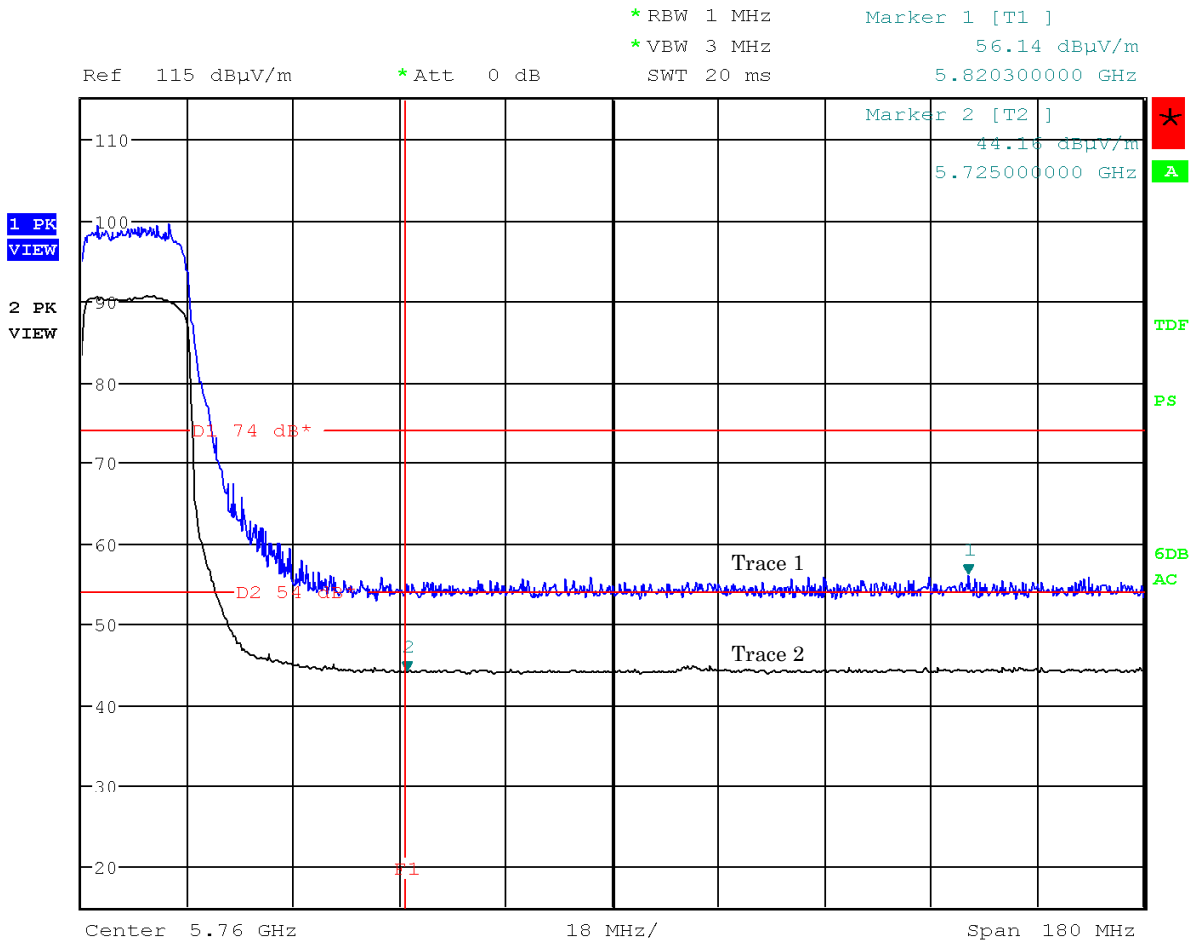
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 134ch: 5670 MHz)
Antenna Polarization : Horizontal



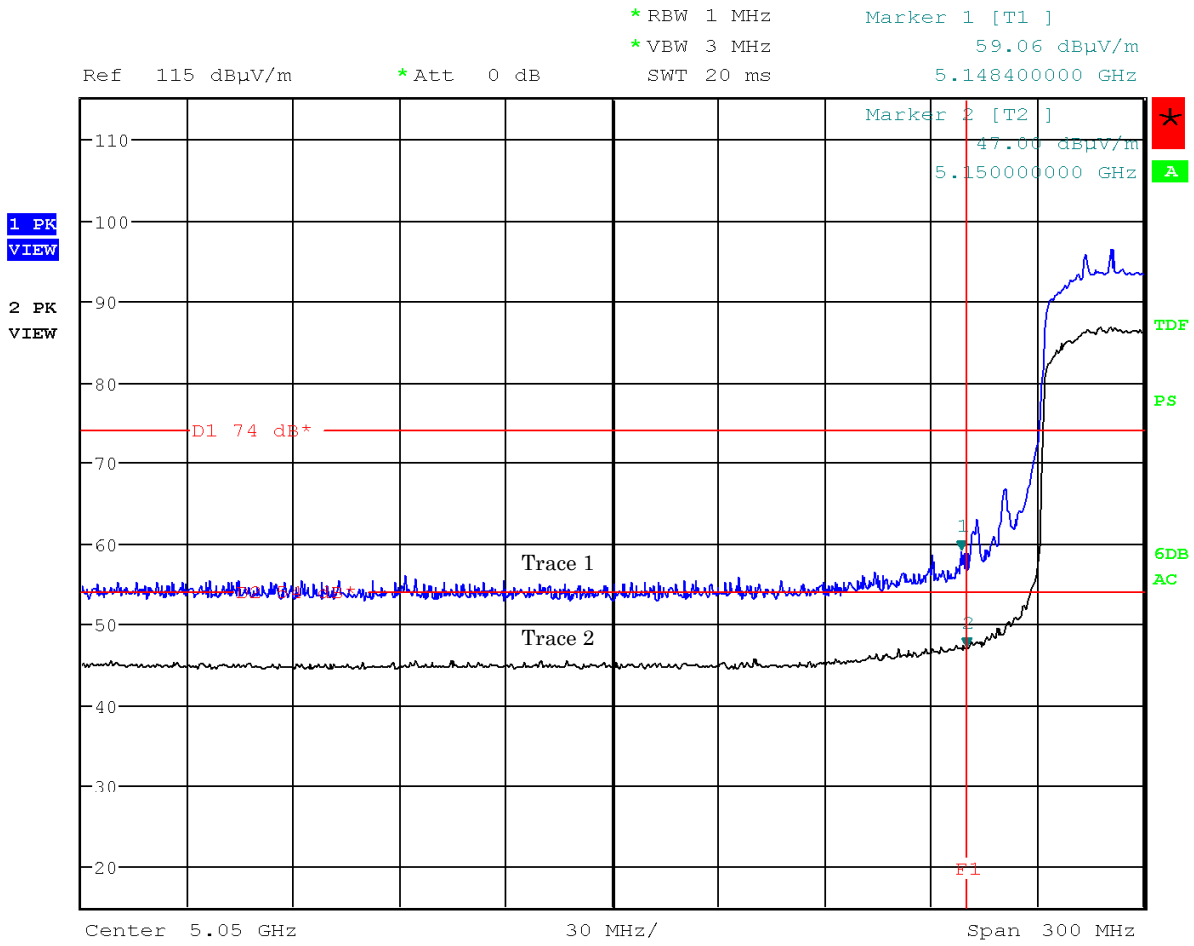
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11n: 40 MHz BW, 134ch: 5670 MHz)
Antenna Polarization : Vertical



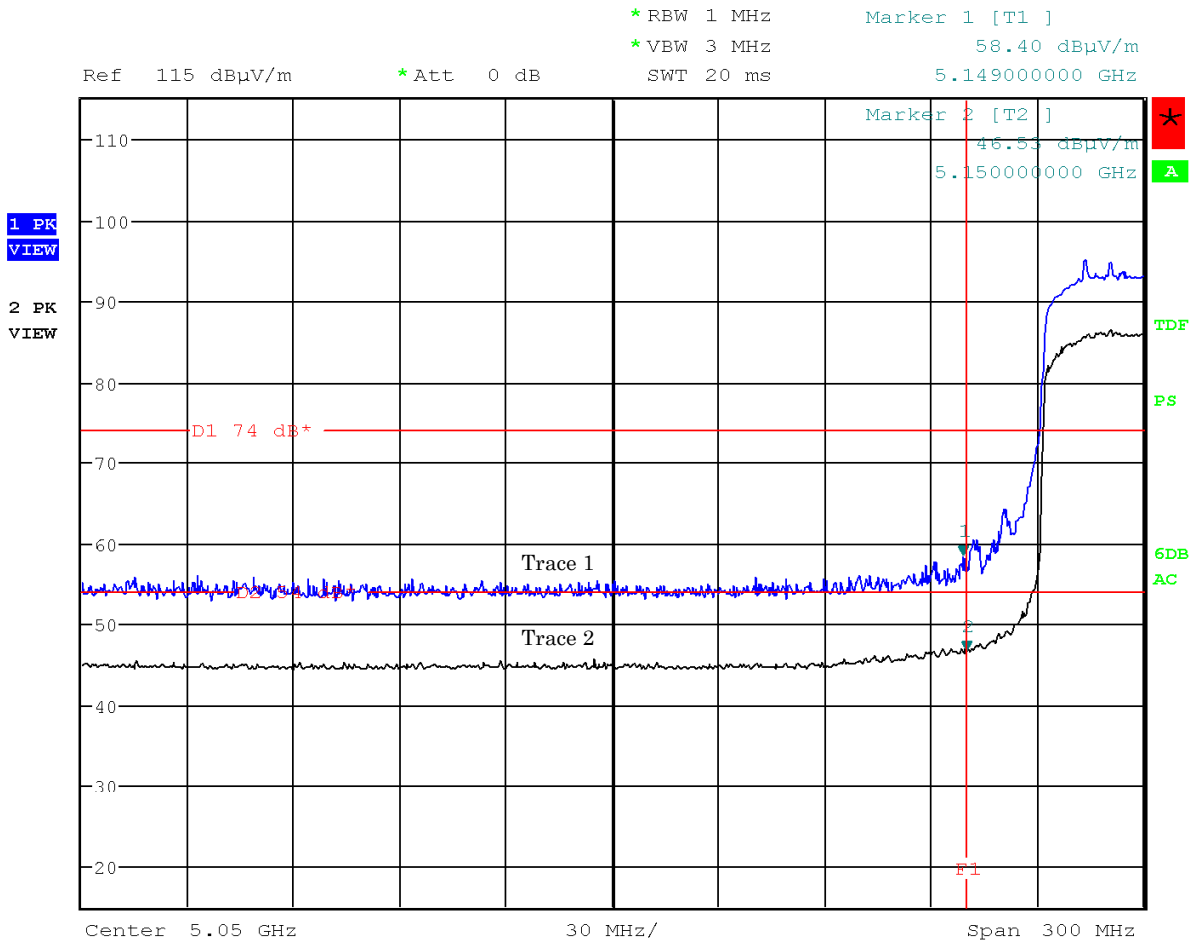
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 42ch: 5210 MHz)
Antenna Polarization : Horizontal



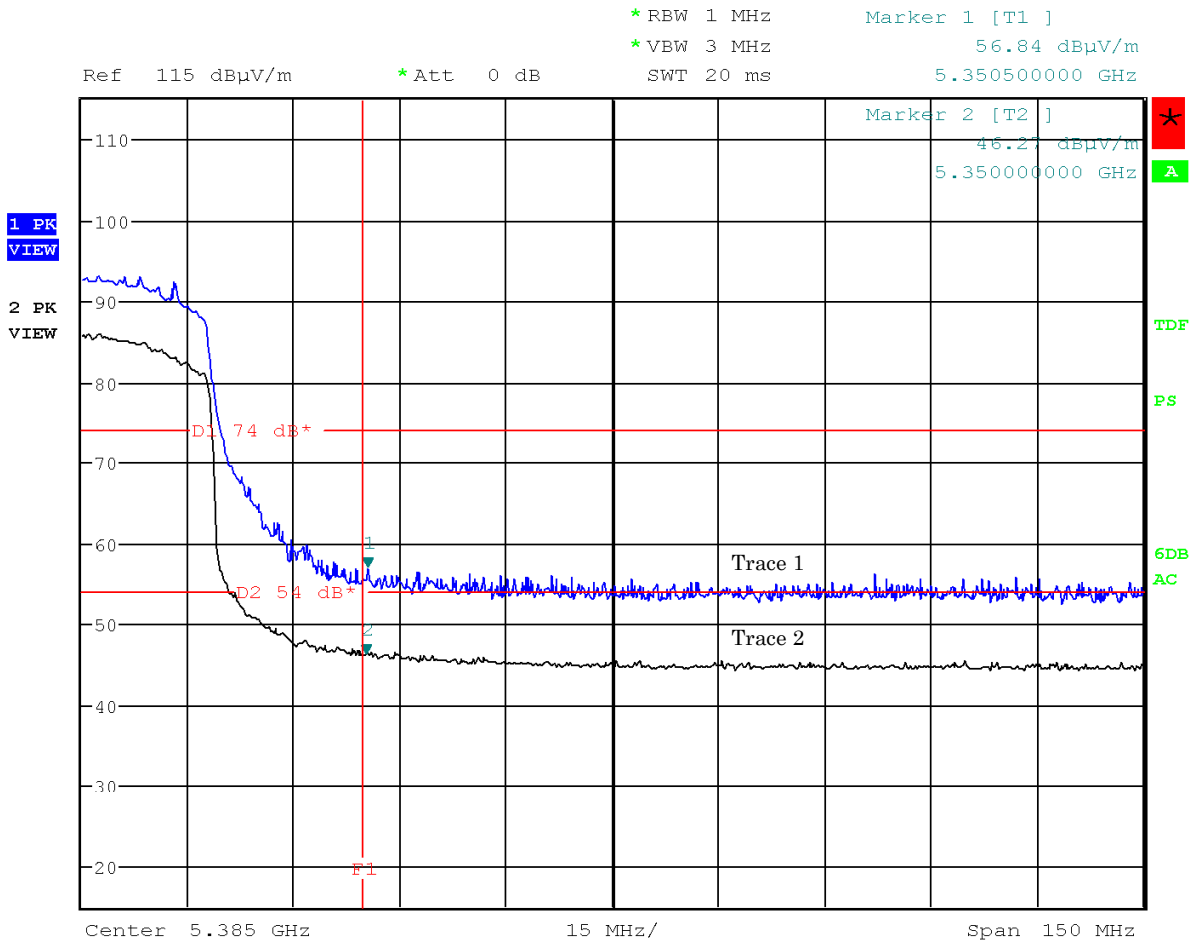
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 42ch: 5210 MHz)
Antenna Polarization : Vertical



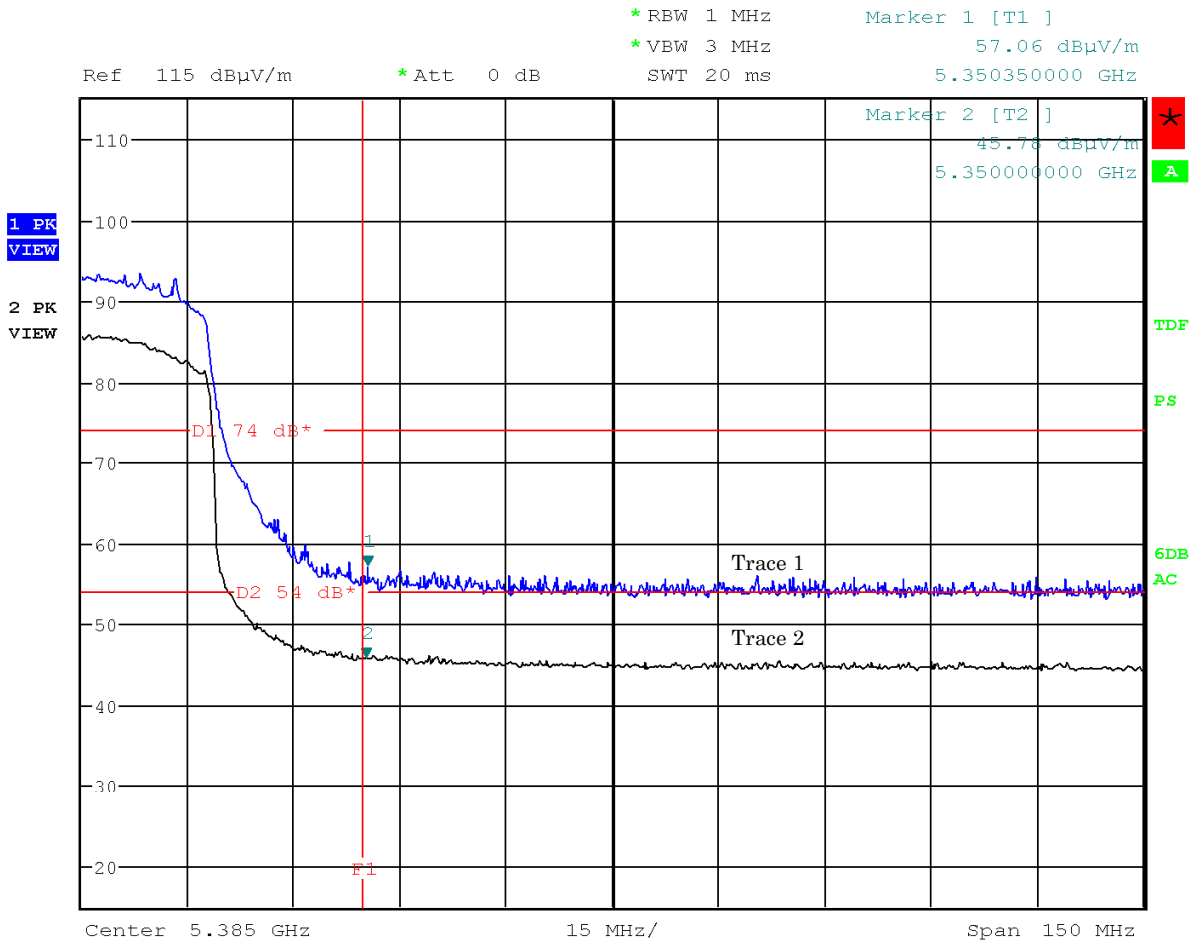
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 58ch: 5290 MHz)
Antenna Polarization : Horizontal



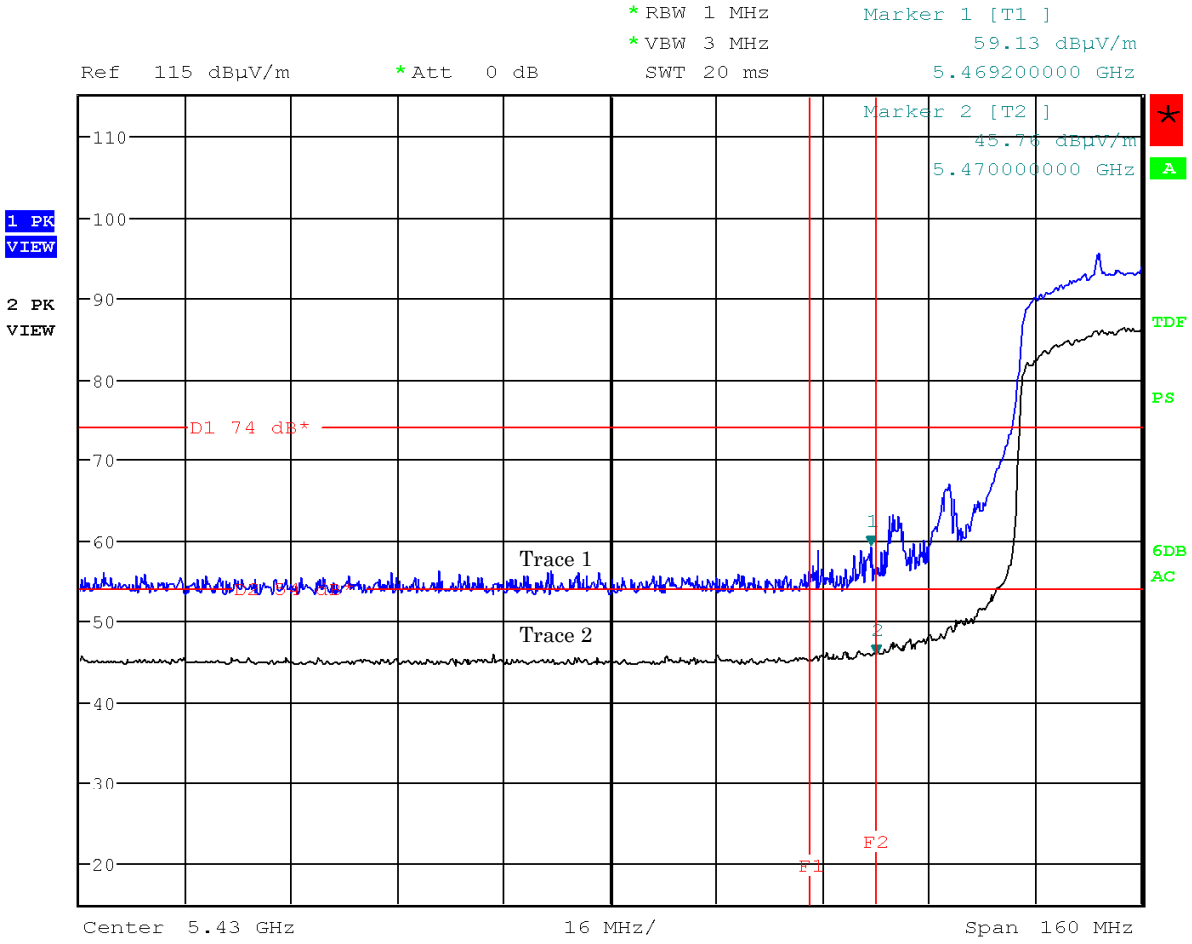
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 58ch: 5290 MHz)
Antenna Polarization : Vertical



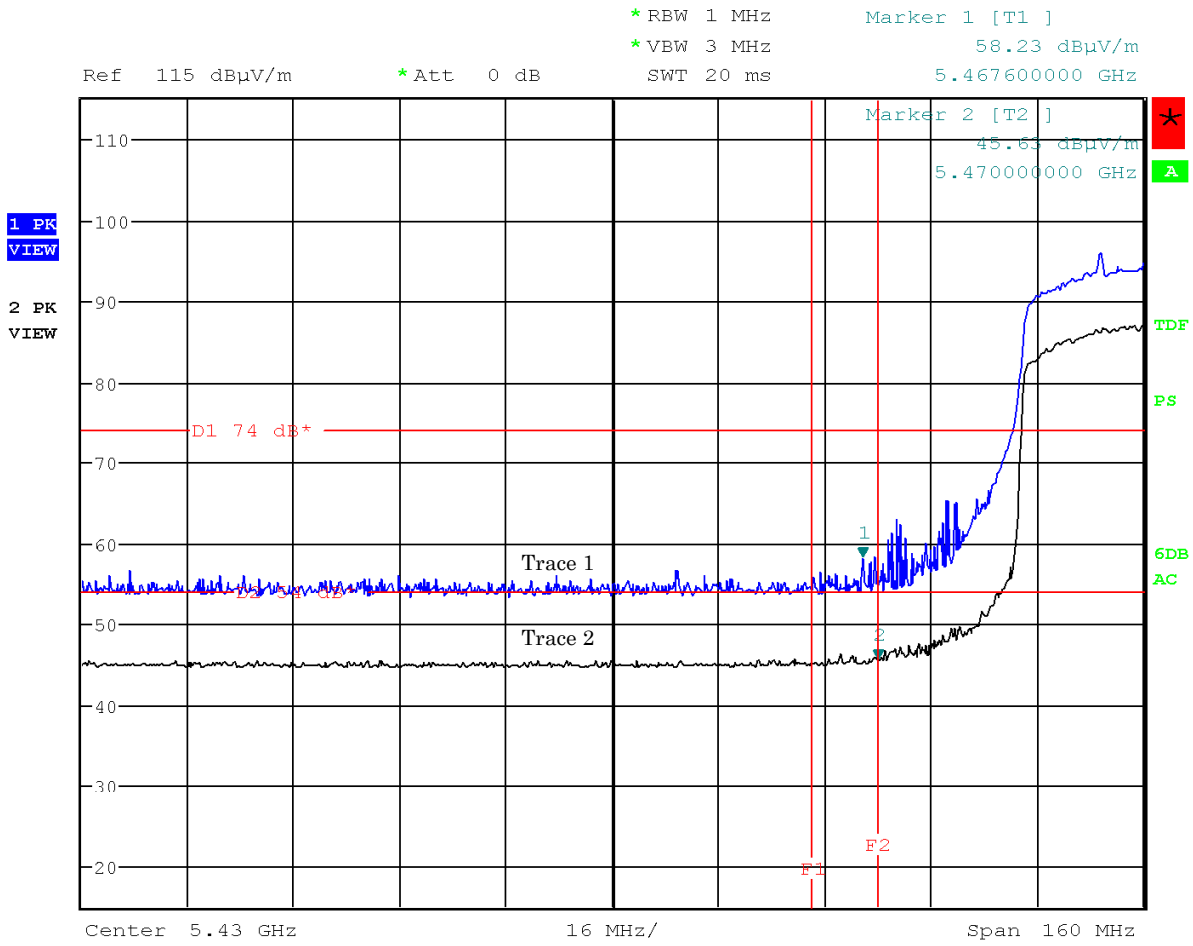
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 106ch: 5530 MHz)
Antenna Polarization : Horizontal



Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 106ch: 5530 MHz)
Antenna Polarization : Vertical



Note: The trace 1 is Peak . The trace 2 is Average.

7.6.4.2 Unwanted Radiated Emission 9 kHz – 30 MHz

Test Date : October 11, 2014
Temp.:25°C, Humi:51%

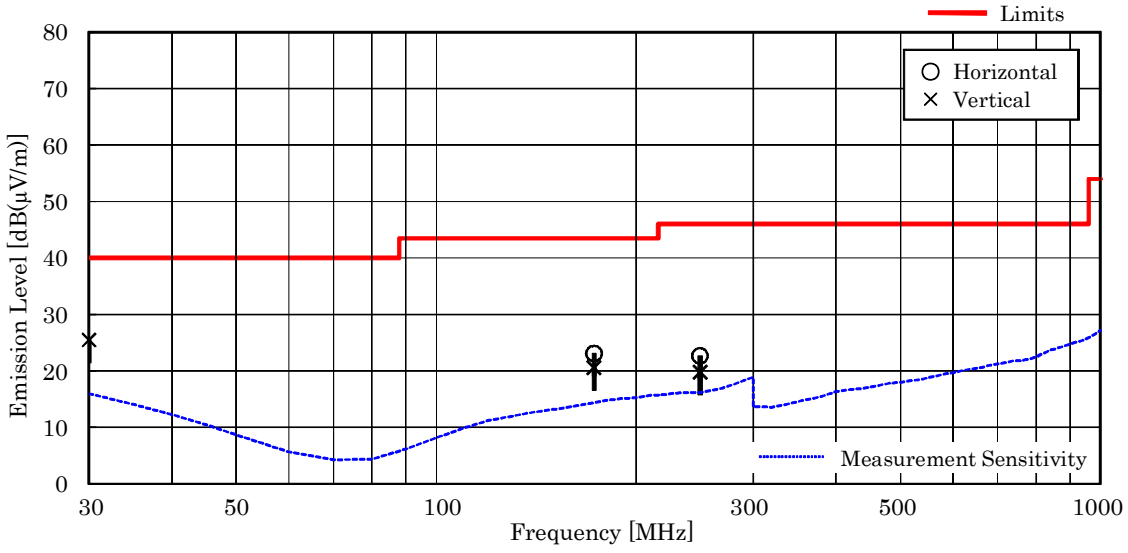
Mode of EUT : All mode have been investigated in accordance with clause 6.4 in this report.
Results : No spurious emissions in the range 20dB below the limit.

7.6.4.3 Unwanted Radiated Emission 30 MHz – 1000 MHz

Mode of EUT : All modes have been investigated and the worst case mode for channel (36ch: 5180MHz / IEEE802.11a) has been listed.

Test Date: October 11, 2014
Temp.: 25 °C, Humi: 51 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings [dB(μV)] Hori.	Meter Readings [dB(μV)] Vert.	Limits [dB(μV/m)]	Results [dB(μV/m)] Hori.	Results [dB(μV/m)] Vert.	Margin [dB]	Remarks
30.0	18.8	-27.8	< 25.0	34.5	40.0	< 16.0	25.5	+14.5	-
172.8	15.6	-26.3	33.8	31.3	43.5	23.1	20.6	+20.4	-
249.6	17.0	-25.8	31.5	28.6	46.0	22.7	19.8	+23.3	-



NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Calculated result at 30.0 MHz, as the worst point shown on underline:
   Antenna Factor + Cable Loss + Meter Reading = 18.8 + -27.8 + 34.5 = 25.5 dB(μV/m)
6. Test receiver setting(s) : CISPR QP 120 kHz (QP : Quasi-Peak)

7.6.4.4 Unwanted Radiated Emission(Above 1 GHz)

7.6.4.4.1 Mode of TX

7.6.4.4.1.1 802.11a Radiated Emission Above 1 GHz

Mode of EUT : TX mode (802.11a, 5150 - 5250 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 36 Ch												
10360.0	33.4	-25.3	40.0	32.0	39.7	31.6	74.0	54.0	48.1	40.1	+13.9	
15540.0	37.3	-26.7	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.6	< 38.6	> +15.4	
20720.0	-6.9	3.6	51.1	44.1	< 50.0	40.5	74.0	54.0	47.8	40.8	+13.2	
25900.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31080.0	-5.9	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.9	< 28.9	> +25.1	
36260.0	0.1	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 45.5	< 35.5	> +18.5	
Test condition : Tx 44 Ch												
10440.0	33.4	-25.3	39.6	31.6	39.4	32.1	74.0	54.0	47.7	40.2	+13.8	
15660.0	37.4	-26.6	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.8	< 38.8	> +15.2	
20880.0	-6.9	3.6	51.6	45.2	50.9	42.1	74.0	54.0	48.3	41.9	+12.1	
26100.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31320.0	-6.0	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36540.0	0.6	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.0	< 36.0	> +18.0	
Test condition : Tx 48 Ch												
10480.0	33.4	-25.3	38.8	30.8	38.9	31.3	74.0	54.0	47.0	39.4	+14.6	
15720.0	37.4	-26.4	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.0	< 39.0	> +15.0	
20960.0	-6.9	3.6	51.4	44.9	51.2	43.6	74.0	54.0	48.1	41.6	+12.4	
26200.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31440.0	-6.1	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.7	< 28.7	> +25.3	
36680.0	0.7	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.1	< 36.1	> +17.9	

Calculated result at 20880.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.2 dB(μV)
	Result	=	41.9 dB(μV/m)

Minimum Margin: 54.0 - 41.9 = 12.1 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11a, 5250 – 5350 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 52 Ch												
10520.0	33.4	-25.2	39.1	30.8	39.6	31.6	74.0	54.0	47.8	39.8	+14.2	
15780.0	37.4	-26.4	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.0	< 39.0	> +15.0	
21040.0	-7.0	3.6	51.4	45.3	50.9	44.2	74.0	54.0	48.0	41.9	+12.1	
26300.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31560.0	-6.1	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36820.0	0.7	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.1	< 36.1	> +17.9	
Test condition : Tx 56 Ch												
10560.0	33.4	-25.2	39.4	31.3	39.9	31.8	74.0	54.0	48.1	40.0	+14.0	
15840.0	37.4	-26.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.1	< 39.1	> +14.9	
21120.0	-6.9	3.6	51.4	45.2	51.2	44.4	74.0	54.0	48.1	41.9	+12.1	
26400.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31680.0	-6.0	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.9	< 28.9	> +25.1	
36960.0	0.9	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.4	< 36.4	> +17.6	
Test condition : Tx 64 Ch												
10640.0	33.4	-25.2	39.6	31.1	39.4	31.7	74.0	54.0	47.8	39.9	+14.1	
15960.0	37.4	-26.2	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	
21280.0	-6.9	3.6	51.7	45.6	51.3	44.3	74.0	54.0	48.4	42.3	+11.7	
26600.0	-11.6	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 41.0	< 31.0	> +23.0	
31920.0	-5.9	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 39.0	< 29.0	> +25.0	
37240.0	1.2	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.7	< 36.7	> +17.3	

Calculated result at 21280.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.6 dB(μV)
	Result	=	42.3 dB(μV/m)

Minimum Margin: 54.0 - 42.3 = 11.7 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11a, 5470 – 5725 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 100 Ch												
11000.0	33.5	-24.9	40.8	33.8	40.6	33.6	74.0	54.0	49.4	42.4	+11.6	A/B
16500.0	37.4	-26.2	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	A/B
22000.0	-6.7	3.6	52.2	45.7	50.8	43.9	74.0	54.0	49.1	42.6	+11.4	A/B
27500.0	-9.9	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 42.7	< 32.7	> +21.3	A/B
33000.0	-5.0	-5.0	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.0	< 30.0	> +24.0	A/B
38500.0	4.7	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 50.3	< 40.3	> +13.7	A/B
Test condition : Tx 116 Ch												
11160.0	33.4	-24.8	41.6	35.3	41.8	35.7	74.0	54.0	50.4	44.3	+ 9.7	A/B
16740.0	37.5	-25.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 50.2	< 40.2	> +13.8	A/B
22320.0	-6.7	3.7	52.1	45.9	51.0	44.5	74.0	54.0	49.1	42.9	+11.1	A/B
27900.0	-8.8	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 43.8	< 33.8	> +20.2	A/B
33480.0	-4.4	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.7	< 30.7	> +23.3	A/B
39060.0	6.6	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 52.2	< 42.2	> +11.8	A/B
Test condition : Tx 140 Ch												
11400.0	33.3	-24.8	42.6	38.0	42.0	36.5	74.0	54.0	51.1	46.5	+ 7.5	A/B
17100.0	37.6	-24.0	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 51.6	< 41.6	> +12.4	A/B
22800.0	-7.2	3.7	52.3	46.8	51.5	45.2	74.0	54.0	48.8	43.3	+10.7	A/B
28500.0	-7.6	-5.3	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 45.1	< 35.1	> +18.9	A/B
34200.0	-3.1	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 42.0	< 32.0	> +22.0	A/B
39900.0	7.6	-4.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 53.4	< 43.4	> +10.6	A/B

Calculated result at 11400.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.3 dB(1/m)
	Corr. Factor	=	-24.8 dB
+)	Meter Reading	=	38.0 dB(μV)
	Result	=	46.5 dB(μV/m)

Minimum Margin: 54.0 - 46.5 = 7.5 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

7.6.4.4.1.2 802.11n (20 MHz) Radiated Emission Above 1 GHz

Mode of EUT : TX mode (802.11n: 20 MHz BW, 5150 - 5250 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Meter Readings [dB(μV)] Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 36 Ch												
10360.0	33.4	-25.3	40.0	32.0	39.7	31.6	74.0	54.0	48.1	40.1	+13.9	
15540.0	37.3	-26.7	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.6	< 38.6	> +15.4	
20720.0	-6.9	3.6	51.1	44.1	< 50.0	40.5	74.0	54.0	47.8	40.8	+13.2	
25900.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31080.0	-5.9	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.9	< 28.9	> +25.1	
36260.0	0.1	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 45.5	< 35.5	> +18.5	
Test condition : Tx 44 Ch												
10440.0	33.4	-25.3	39.6	31.6	39.4	32.1	74.0	54.0	47.7	40.2	+13.8	
15660.0	37.4	-26.6	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.8	< 38.8	> +15.2	
20880.0	-6.9	3.6	51.6	45.2	50.9	42.1	74.0	54.0	48.3	41.9	+12.1	
26100.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31320.0	-6.0	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36540.0	0.6	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.0	< 36.0	> +18.0	
Test condition : Tx 48 Ch												
10480.0	33.4	-25.3	38.8	30.8	38.9	31.3	74.0	54.0	47.0	39.4	+14.6	
15720.0	37.4	-26.4	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.0	< 39.0	> +15.0	
20960.0	-6.9	3.6	51.4	44.9	51.2	43.6	74.0	54.0	48.1	41.6	+12.4	
26200.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31440.0	-6.1	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.7	< 28.7	> +25.3	
36680.0	0.7	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.1	< 36.1	> +17.9	

Calculated result at 20880.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.2 dB(μV)
	Result	=	41.9 dB(μV/m)

Minimum Margin: 54.0 - 41.9 = 12.1 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11n: 20 MHz BW, 5250 – 5350 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 52 Ch												
10520.0	33.4	-25.2	39.1	30.8	39.6	31.6	74.0	54.0	47.8	39.8	+14.2	
15780.0	37.4	-26.4	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.0	< 39.0	> +15.0	
21040.0	-7.0	3.6	51.4	45.3	50.9	44.2	74.0	54.0	48.0	41.9	+12.1	
26300.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31560.0	-6.1	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36820.0	0.7	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.1	< 36.1	> +17.9	
Test condition : Tx 56 Ch												
10560.0	33.4	-25.2	39.4	31.3	39.9	31.8	74.0	54.0	48.1	40.0	+14.0	
15840.0	37.4	-26.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.1	< 39.1	> +14.9	
21120.0	-6.9	3.6	51.4	45.2	51.2	44.4	74.0	54.0	48.1	41.9	+12.1	
26400.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31680.0	-6.0	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.9	< 28.9	> +25.1	
36960.0	0.9	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.4	< 36.4	> +17.6	
Test condition : Tx 64 Ch												
10640.0	33.4	-25.2	39.6	31.1	39.4	31.7	74.0	54.0	47.8	39.9	+14.1	
15960.0	37.4	-26.2	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	
21280.0	-6.9	3.6	51.7	45.6	51.3	44.3	74.0	54.0	48.4	42.3	+11.7	
26600.0	-11.6	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 41.0	< 31.0	> +23.0	
31920.0	-5.9	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 39.0	< 29.0	> +25.0	
37240.0	1.2	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.7	< 36.7	> +17.3	

Calculated result at 21280.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.6 dB(μV)
	Result	=	42.3 dB(μV/m)

Minimum Margin: 54.0 - 42.3 = 11.7 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11n: 20 MHz BW, 5470 – 5725 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)] Horizontal PK	Horizontal AVE	Vertical PK	Vertical AVE	Limits [dB(μV/m)] PK	Limits AVE	Results [dB(μV/m)] PK	Results AVE	Margin [dB]	Remarks
Test condition : Tx 100 Ch												
11000.0	33.5	-24.9	40.8	33.8	40.6	33.6	74.0	54.0	49.4	42.4	+11.6	A/B
16500.0	37.4	-26.2	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	A/B
22000.0	-6.7	3.6	52.2	45.7	50.8	43.9	74.0	54.0	49.1	42.6	+11.4	A/B
27500.0	-9.9	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 42.7	< 32.7	> +21.3	A/B
33000.0	-5.0	-5.0	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.0	< 30.0	> +24.0	A/B
38500.0	4.7	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 50.3	< 40.3	> +13.7	A/B
Test condition : Tx 116 Ch												
11160.0	33.4	-24.8	41.6	35.3	41.8	35.7	74.0	54.0	50.4	44.3	+ 9.7	A/B
16740.0	37.5	-25.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 50.2	< 40.2	> +13.8	A/B
22320.0	-6.7	3.7	52.1	45.9	51.0	44.5	74.0	54.0	49.1	42.9	+11.1	A/B
27900.0	-8.8	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 43.8	< 33.8	> +20.2	A/B
33480.0	-4.4	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.7	< 30.7	> +23.3	A/B
39060.0	6.6	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 52.2	< 42.2	> +11.8	A/B
Test condition : Tx 140 Ch												
11400.0	33.3	-24.8	42.6	38.0	42.0	36.5	74.0	54.0	51.1	46.5	+ 7.5	A/B
17100.0	37.6	-24.0	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 51.6	< 41.6	> +12.4	A/B
22800.0	-7.2	3.7	52.3	46.8	51.5	45.2	74.0	54.0	48.8	43.3	+10.7	A/B
28500.0	-7.6	-5.3	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 45.1	< 35.1	> +18.9	A/B
34200.0	-3.1	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 42.0	< 32.0	> +22.0	A/B
39900.0	7.6	-4.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 53.4	< 43.4	> +10.6	A/B

Calculated result at 11400.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.3 dB(1/m)
	Corr. Factor	=	-24.8 dB
+)	Meter Reading	=	38.0 dB(μV)
	Result	=	46.5 dB(μV/m)

Minimum Margin: 54.0 - 46.5 = 7.5 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

7.6.4.4.1.3 802.11n (40 MHz) Radiated Emission Above 1 GHz

Mode of EUT : TX mode (802.11n: 40 MHz BW, 5150 - 5250 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Meter Readings [dB(μV)] Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 38 Ch												
10380.0	33.4	-25.3	39.9	32.5	39.2	31.8	74.0	54.0	48.0	40.6	+13.4	
15570.0	37.4	-26.7	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.7	< 38.7	> +15.3	
20760.0	-6.9	3.6	51.6	45.1	< 50.0	41.1	74.0	54.0	48.3	41.8	+12.2	
25950.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31140.0	-6.0	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36330.0	0.2	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 45.6	< 35.6	> +18.4	
Test condition : Tx 46 Ch												
10460.0	33.4	-25.3	39.6	32.8	39.8	31.9	74.0	54.0	47.9	40.9	+13.1	
15690.0	37.4	-26.4	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.0	< 39.0	> +15.0	
20920.0	-6.9	3.6	51.5	45.0	50.7	43.5	74.0	54.0	48.2	41.7	+12.3	
26150.0	-5.6	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.5	< 38.5	> +15.5	
31380.0	-6.1	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.7	< 28.7	> +25.3	
36610.0	0.7	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.1	< 36.1	> +17.9	

Calculated result at 20760.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.1 dB(μV)
	Result	=	41.8 dB(μV/m)

Minimum Margin: 54.0 - 41.8 = 12.2 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11n: 40 MHz BW, 5250 – 5350 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Meter Readings [dB(μV)] Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 54 Ch												
10540.0	33.4	-25.2	39.4	31.2	39.5	31.9	74.0	54.0	47.7	40.1	+13.9	
15810.0	37.5	-26.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	
21080.0	-7.0	3.6	52.0	46.0	50.9	44.6	74.0	54.0	48.6	42.6	+11.4	
26350.0	-5.5	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.6	< 38.6	> +15.4	
31620.0	-6.0	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.9	< 28.9	> +25.1	
36890.0	0.8	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.3	< 36.3	> +17.7	
Test condition : Tx 62 Ch												
10620.0	33.5	-25.2	39.8	32.1	39.8	32.2	74.0	54.0	48.1	40.5	+13.5	
15930.0	37.4	-26.2	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.2	< 39.2	> +14.8	
21240.0	-6.9	3.6	51.7	46.1	51.0	44.5	74.0	54.0	48.4	42.8	+11.2	
26550.0	-11.8	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 40.8	< 30.8	> +23.2	
31860.0	-5.9	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 39.0	< 29.0	> +25.0	
37170.0	1.1	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.6	< 36.6	> +17.4	

Calculated result at 21240.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	46.1 dB(μV)
	Result	=	42.8 dB(μV/m)

Minimum Margin: 54.0 - 42.8 = 11.2 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11n: 40 MHz BW, 5470 – 5725 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 102 Ch												
11020.0	33.5	-24.9	40.7	34.3	40.5	34.7	74.0	54.0	49.3	43.3	+10.7	A/B
16530.0	37.4	-26.1	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.3	< 39.3	> +14.7	A/B
22040.0	-6.7	3.6	51.5	45.8	50.9	44.1	74.0	54.0	48.4	42.7	+11.3	A/B
27550.0	-9.8	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 42.8	< 32.8	> +21.2	A/B
33060.0	-5.0	-5.0	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.0	< 30.0	> +24.0	A/B
38570.0	5.2	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 50.8	< 40.8	> +13.2	A/B
Test condition : Tx 134 Ch												
11340.0	33.3	-24.8	42.5	38.2	42.2	37.3	74.0	54.0	51.0	46.7	+ 7.3	A/B
17010.0	37.6	-24.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 51.3	< 41.3	> +12.7	A/B
22680.0	-7.0	3.7	52.0	46.9	51.4	45.0	74.0	54.0	48.7	43.6	+10.4	A/B
28350.0	-7.8	-5.3	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 44.9	< 34.9	> +19.1	A/B
34020.0	-3.5	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 41.6	< 31.6	> +22.4	A/B
39690.0	7.5	-4.3	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 53.2	< 43.2	> +10.8	A/B

Calculated result at 11340.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.3 dB(1/m)
	Corr. Factor	=	-24.8 dB
+)	Meter Reading	=	38.2 dB(μV)
	Result	=	46.7 dB(μV/m)

Minimum Margin: 54.0 - 46.7 = 7.3 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

7.6.4.4.1.4 802.11ac (80 MHz) Radiated Emission Above 1 GHz

Mode of EUT : TX mode (802.11ac: 80 MHz BW, 5150 - 5250 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Meter Readings [dB(μV)] Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 42 Ch												
10420.0	33.4	-25.3	39.3	32.7	39.5	32.6	74.0	54.0	47.6	40.8	+13.2	
15630.0	37.4	-26.6	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 48.8	< 38.8	> +15.2	
20840.0	-6.9	3.6	51.1	45.0	50.5	42.9	74.0	54.0	47.8	41.7	+12.3	
26050.0	-5.7	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.4	< 38.4	> +15.6	
31260.0	-6.0	-5.2	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 38.8	< 28.8	> +25.2	
36470.0	0.4	-4.6	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 45.8	< 35.8	> +18.2	

Calculated result at 20840.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.0 dB(μV)
	Result	=	41.7 dB(μV/m)

Minimum Margin: 54.0 - 41.7 = 12.3 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11ac: 80 MHz, 5250 – 5350 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Meter Readings [dB(μV)] Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 58 Ch												
10580.0	33.5	-25.2	39.2	31.6	39.9	32.5	74.0	54.0	48.2	40.8	+13.2	
15870.0	37.4	-26.3	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.1	< 39.1	> +14.9	
21160.0	-6.9	3.6	51.8	45.7	51.0	45.2	74.0	54.0	48.5	42.4	+11.6	
26450.0	-5.5	4.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.6	< 38.6	> +15.4	
31740.0	-5.9	-5.1	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 39.0	< 29.0	> +25.0	
37030.0	0.9	-4.5	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 46.4	< 36.4	> +17.6	

Calculated result at 21160.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	-6.9 dB(1/m)
	Corr. Factor	=	3.6 dB
+)	Meter Reading	=	45.7 dB(μV)
	Result	=	42.4 dB(μV/m)

Minimum Margin: 54.0 - 42.4 = 11.6 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (18 - 26.5GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain - Distance Factor [dB] (over 26.5GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

Mode of EUT : TX mode (802.11ac: 80 MHz, 5470 – 5725 MHz Band)

Test Date: October 10, 2014
Temp.: 26 °C, Humi: 61 %

Frequency	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)] Horizontal		Vertical		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]	Remarks
[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE		
Test condition : Tx 106 Ch												
11060.0	33.4	-24.9	40.5	35.3	40.4	34.8	74.0	54.0	49.0	43.8	+10.2	A/B
16590.0	37.5	-25.9	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 49.6	< 39.6	> +14.4	A/B
22120.0	-6.7	3.6	51.6	46.1	51.2	44.8	74.0	54.0	48.5	43.0	+11.0	A/B
27650.0	-9.6	-5.4	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 43.0	< 33.0	> +21.0	A/B
33180.0	-4.7	-5.0	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 40.3	< 30.3	> +23.7	A/B
38710.0	5.6	-4.4	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 51.2	< 41.2	> +12.8	A/B
Test condition : Tx 122 Ch												
11220.0	33.3	-24.8	41.4	36.3	41.1	36.5	74.0	54.0	49.9	45.0	+ 9.0	A/B
16830.0	37.6	-24.9	< 38.0	< 28.0	< 38.0	< 28.0	74.0	54.0	< 50.7	< 40.7	> +13.3	A/B
22440.0	-6.8	3.7	52.4	47.3	51.5	45.9	74.0	54.0	49.3	44.2	+ 9.8	A/B
28050.0	-8.4	-5.3	< 58.0	< 48.0	< 58.0	< 48.0	74.0	54.0	< 44.3	< 34.3	> +19.7	A/B
33660.0	-4.1	-4.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 41.0	< 31.0	> +23.0	A/B
39270.0	7.1	-4.3	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 52.8	< 42.8	> +11.2	A/B

Calculated result at 11220.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.3 dB(1/m)
	Corr. Factor	=	-24.8 dB
+)	Meter Reading	=	36.5 dB(μV)
	Result	=	45.0 dB(μV/m)

Minimum Margin: 54.0 - 45.0 = 9.0 (dB)

NOTES
1. Test Distance : 3 m (1 GHz to 26.5 GHz) / 1m (26.5 GHz to 40 GHz)
2. The spectrum was checked from 1 GHz to 40 GHz.
3. The correction factor is shown as follows:
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)

7.7 Dynamic Frequency Selection

For the requirements, ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

For the limits, ☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

7.7.1 Test Result and Measurement Uncertainty

7.7.1.1 Channel Moving Time (Limit : < 10 sec.)

802.11n 20 MHz	0.000	sec.	at	5500 MHz
802.11n 40 MHz	0.048	sec.	at	5510 MHz

7.7.1.2 Channel Closing Transmission Time (Limit : < 60 msec.)

802.11n 20 MHz	0.000	msec.	at	5500 MHz
802.11n 40 MHz	0.000	msec.	at	5510 MHz

7.7.1.3 Non-occupancy Period (Limit : ≥ 30 min.)

802.11n 20 MHz	> 30	min.	at	5500 MHz
802.11n 40 MHz	> 30	min.	at	5510 MHz

Uncertainty of Measurement Results +/- 0.6 %

Remarks : The EUT is a client without radar detection therefore applicable requirements are only the above. Test was performed using a radar type 0. The Master device does not have capability of operating at 80MHz Channel BW, therefore tests were performed with the operating mode of 20MHz/40MHz BW. (Refer to the KDB publication 848637.)

7.7.2 Test Site

KITA-KANSAI Testing Center

Test site : SAITO

☐ - Anechoic chamber (A1) ☐ - Measurement room (M1)
☐ - Measurement room (M2) ☐ - Measurement room (M3)
☐ - Shielded room (S1) ☐ - Shielded room (S2)
☐ - Shielded room (S3) ☒ - Shielded room (S4)

7.7.3 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2014/9	1 Year
Vector Signal Generator	MG3710A	Anritsu	B-41	2014/8	1 Year
Horn Antenna(*1)	3160-05	EMCO	C-56	2014/6	1 Year
Double-Ridge Guide Horn Antenna(*2)	TR17206	ADVANTEST	C-29	2014/6	1 Year
RF Cable(*1)	SUCOFLEX104	SUHNER	C-67	2014/1	1 Year
RF Cable(*2)	SUCOFLEX102E	SUHNER	C-70	2013/11	1 Year

(*1) Radar Antenna and the cable
(*2) Monitor Antenna and the cable

7.7.4 Test Method and Test Setup (Diagrammatic illustration)

The Dynamic Frequency Selection(DFS) measurements were carried out in accordance with FCC Part 15.407(h) and KDB905462 D02 UNII DFS Compliance Procedures New Rules " COMPLIANCE MEASUREMENT PROCEDURES FOR UNII DEVICES OPERATIONG IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

7.7.4.1 DFS Detection Threshold and DFS Response Requirement

DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2 and 3)
≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 4: DFS Response Requirement Values

Parameter	Value
Non-Occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1.)
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. (See Notes 1 and 2.)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3.)
Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the U-NII Detection Bandwidth detection test, radar type 0 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

7.7.4.2 Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note1	See Note1
1	1	See KDB905462 D02		60%	40
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. For Short Pulse Radar Type 0, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4.

Long Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms. Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

Frequency Hopping Radar Test Waveform

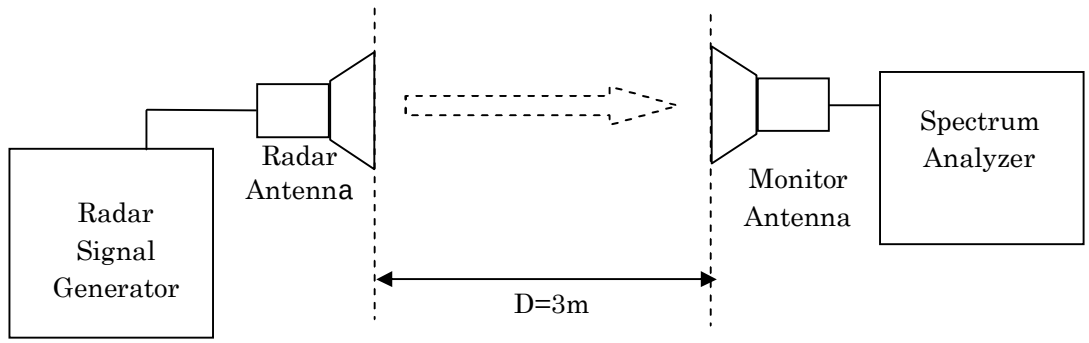
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

7.7.4.3 Rader Waveform Calibration

Radiated Calibration Setup Diagram

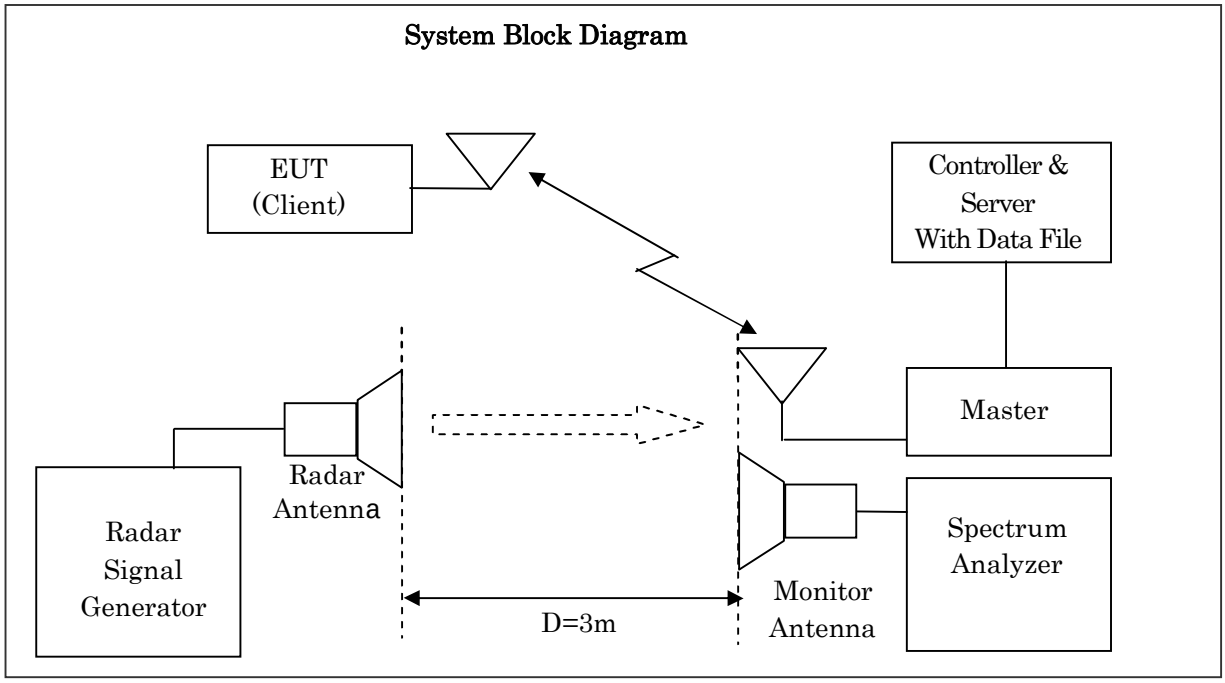


The EUT is the client device without radar detection, then master device is a RDD. Therefore the radar test signal level is set at the Radar Detection Threshold Level of master device.
The Radar Detection Threshold Level is employed -64dBm + 1dB = -63 dBm at the antenna port.
Where the antenna gain of master device is X dBi then the threshold level is corrected as
"-63 – X" dBm (Rated output power and Antenna Gain of the master device is described in EUT Description).
The spectrum analyzer is connected to the monitor antenna via a coaxial cable. The antenna is set vertical polarization for testing. The reference level offset of a spectrum analyzer set to "Monitoring Antenna Gain – Cable loss". The Radar Signal Generator is set to CW output mode and the signal level is adjusted to "-63 – X" dBm on the spectrum analyze setting as below;

Frequency: Radar Signal Frequency
Span: Zero Span(Time Domain)
RBW/VBW: 3 MHz
Detection: Peak

The spectrum analyzer plots of the calibrated radar waveform on the Channel frequency is attached in clause 7.7.5.1 in this report.

7.7.4.4 Test Setup and Operation Radiated Method



Support Equipment: The following support equipment was used for in this DFS testing

Item	Manufacturer	Model No.	Serial No.	FCC ID
Wireless Access Point	Cisco	AIR-AP1042N-A-K9	FTX1637E2NC	LDK102070
AC Adaptor for AP	Cisco	AA2548L	ALD0516GFDA	N/A
PC(Controller/Server)	HP Compaq	D330 uT	JPA42500TB	DoC

Used Test File and Displayed Traffic Level Adjustment:

The test is performed with the designated MPEG test file that is streamed from the access point to the client in full motion video mode using the media player with the V2.61 Codec package. This file is used by IP and Frame based systems for loading the test channel during the In-service compliance testing of the U-NII device.

By control PC, the radio link is established between the master and slave and the test file in saver(PC) is streamed via master(access point) to generate WLAN traffic.

The monitoring antenna is adjusted so that the WLAN traffic level on the spectrum analyzer is lower than the radar detection threshold level.

The spectrum analyzer plots of the slave(EUT) data traffic plot is attached in clause 7.7.5.2 and tne nominal noise floor plots is attached in clause 7.7.5.3 in this report.

7.7.4.5 Description of EUT

Item	Specification
Operating Frequency(MHz)	5150 to 5250 / 5250 to 5350 / 5470 to 5725
Operating Mode of EUT	Client(Slave) Device without Radar Detection
FCC ID for Master Device(*1)	LDK102070 (Antenna Gain: 3.0 dBi)
Antenna Type of EUT	Inverted-L Type Antenna
Highest Power Level(EIRP)/ Antenna Gain of EUT	802.11a/n/ac 12.0 dBm Max. 802.11n/ac(40 MHz BW) 12.0 dBm Max. 802.11ac(80 MHz) 12.0 dBm Max. Antenna Gain: 0 dBi
System Architecture	IEEE802.11 a/n/ac, IP based system
TPC Description	N/A(Not Required EIRP below 500 mW)
Data Rate/ Channel Bandwidth	Refer below table.
Power-on Cycle	N/A(No Channel Availability Check Function)

(*1) The rated output power of the master device is greater than 20dBm(EIRP), then the interference threshold level is employed -64 dBm. After correction for procedural adjustments, the radiated threshold level at the master device is -64 + 1 – 3 dBi(Master antenna Gain) = -66 dBm.

Data Rate/ Channel Bandwidth

IEEE802.11 a			IEEE802.11 n		
Modulation	Data Rate (Mbps)	Channel Bandwidth (MHz)	Modulation	Data Rate(Mbps) Channel Bandwidth(MHz) 20	40
BPSK	6	20	BPSK	6.5	13.5
BPSK	9	20	QPSK	13.0	27.0
QPSK	12	20	QPSK	19.5	40.5
QPSK	18	20	16-QAM	26.0	54.0
16-QAM	24	20	16-QAM	39.0	81.0
16-QAM	36	20	64-QAM	52.0	108.0
64-QAM	48	20	64-QAM	58.5	121.5
64-QAM	54	20	64-QAM	65.0	135.0

IEEE802.11 ac			
Modulation	Data Rate(Mbps) Channel Bandwidth(MHz) 20	40	80
BPSK	6.5	13.5	29.3
QPSK	13.0	27.0	58.5
QPSK	19.5	40.5	87.8
16-QAM	26.0	54.0	117.0
16-QAM	39.0	81.0	175.5
64-QAM	52.0	108.0	234.0
64-QAM	58.5	121.5	263.3
64-QAM	65.0	135.0	292.5
256-QAM	78.0	162.0	351.0
256-QAM	N/A	180.0	390.0

7.7.4.6 Deviation to the procedures and equipment from the standards:

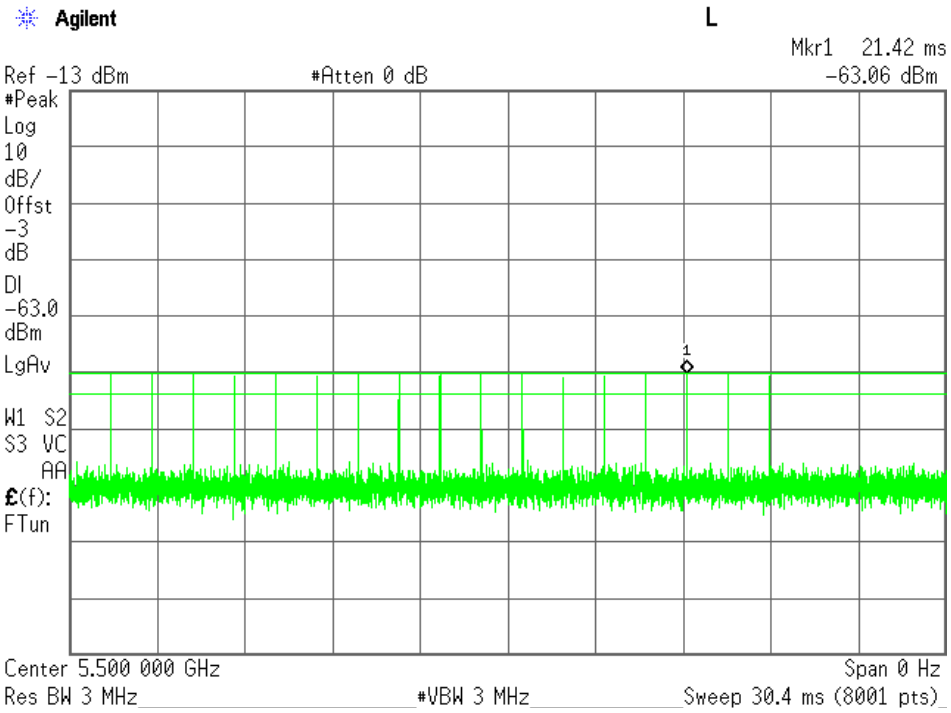
There is no deviation from FCC Rule and KDB905462 D02.

7.7.5 Test Data

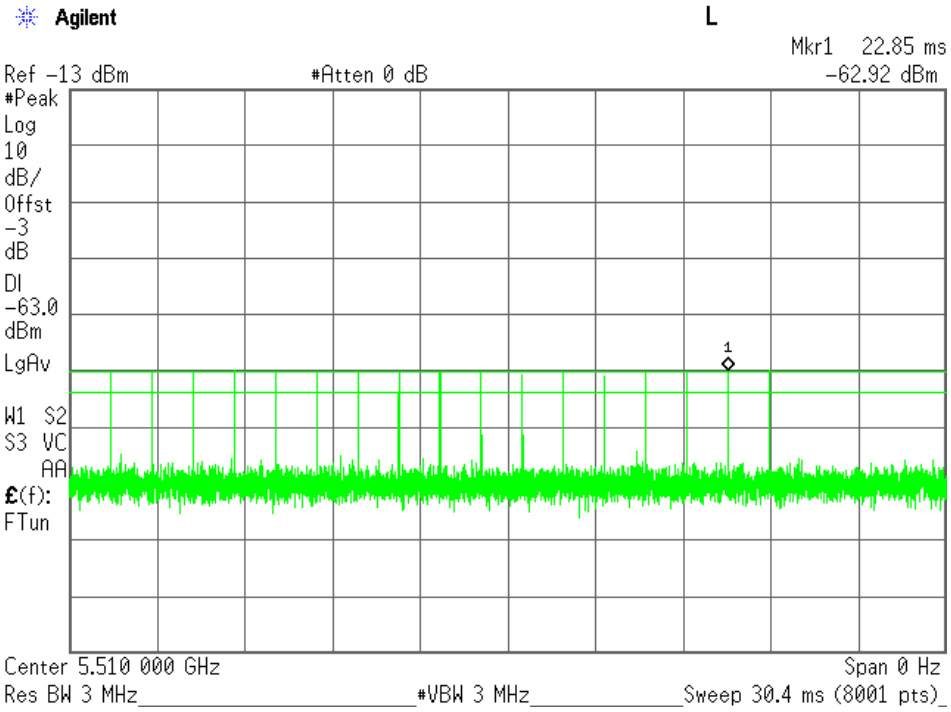
Test Date : October 4, 2014
Temp.: 26°C, Humi: 50%

7.7.5.1 Radar Waveform Calibration Results (Type 0 Short Pulse)

5500 MHz

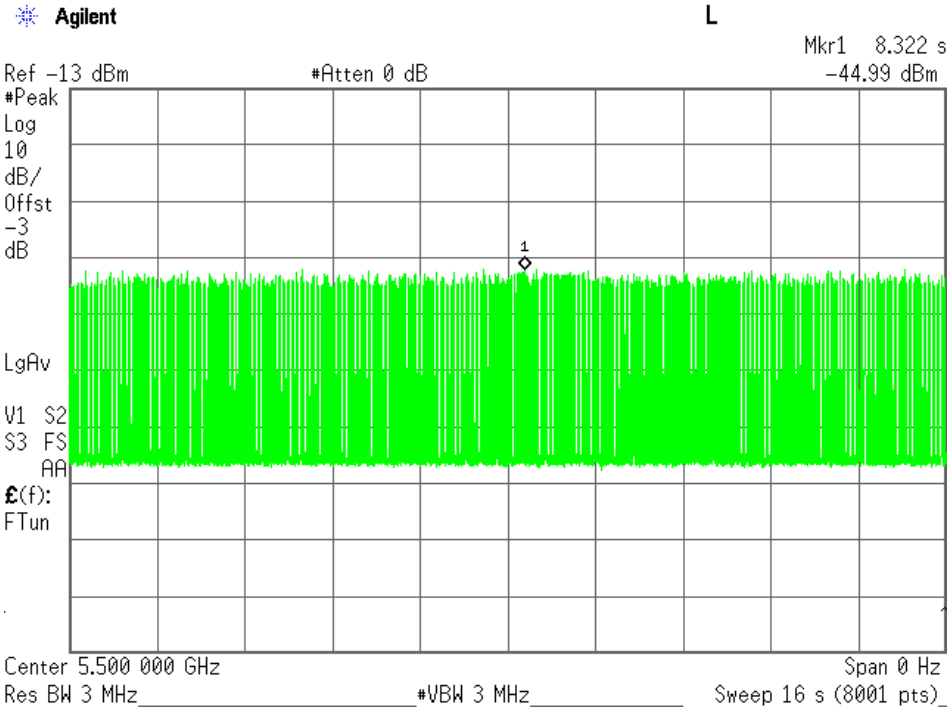


5510 MHz

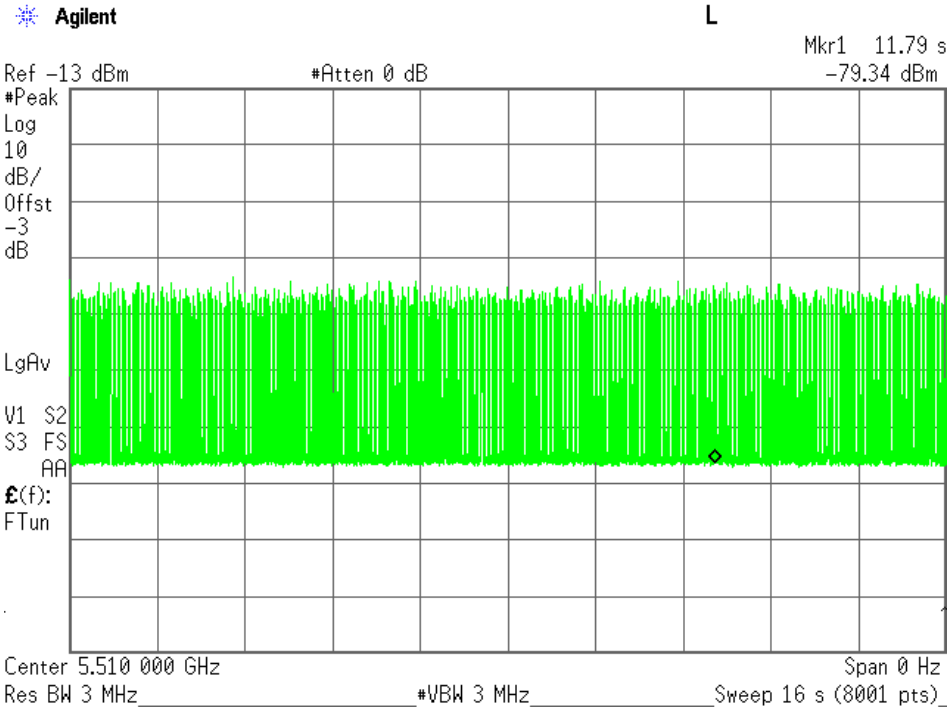


7.7.5.2 EUT (Slave) Traffic Plots

20 MHz BW, 5500 MHz

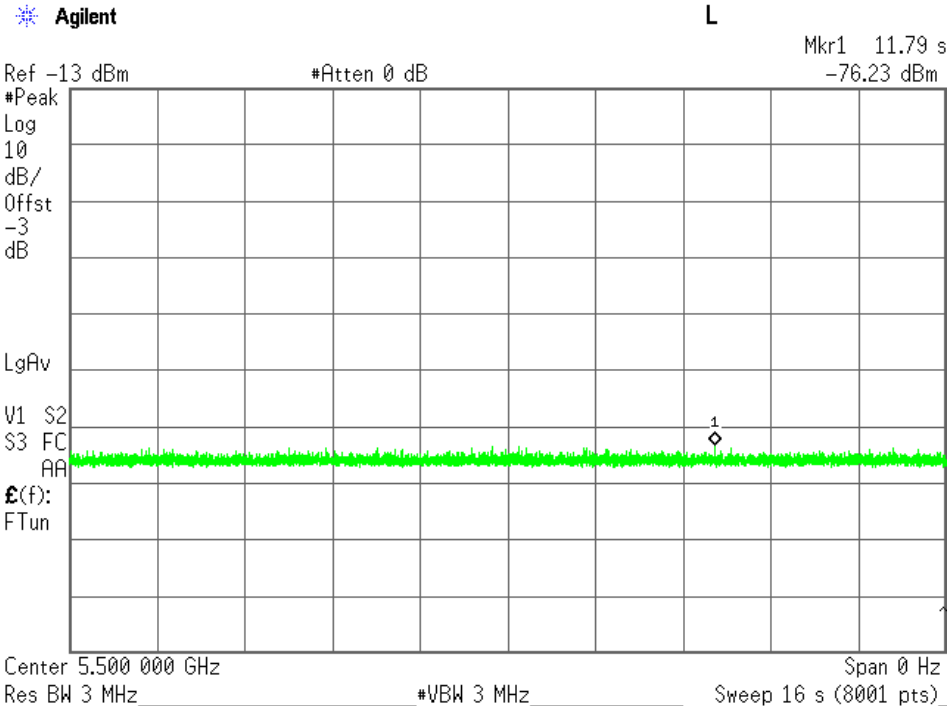


40 MHz BW, 5510 MHz

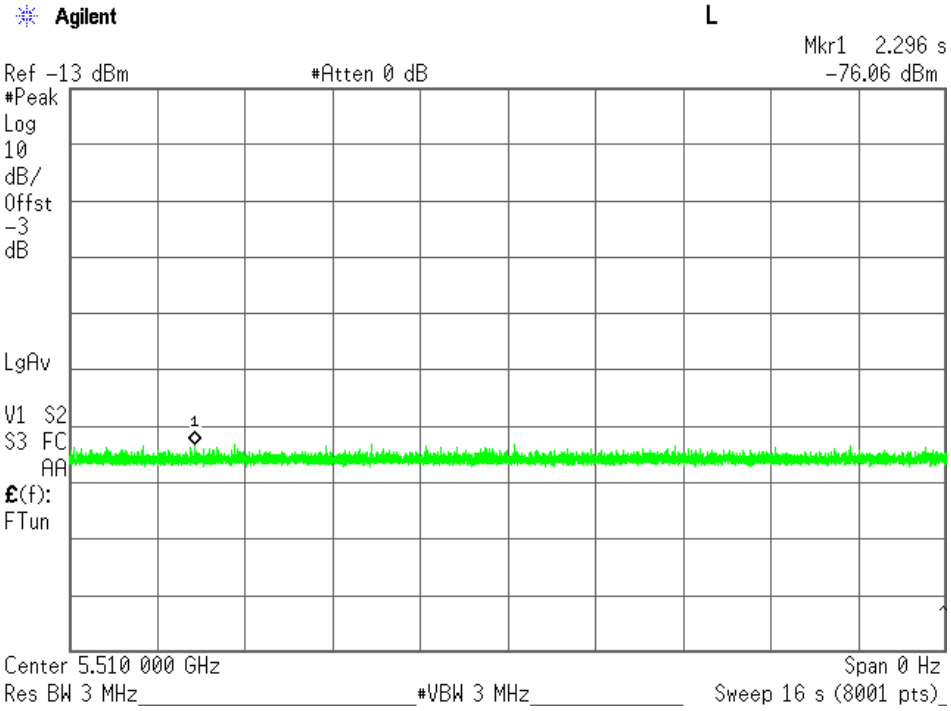


7.7.5.3 No Traffic (Noise Floor) Plots

5500 MHz



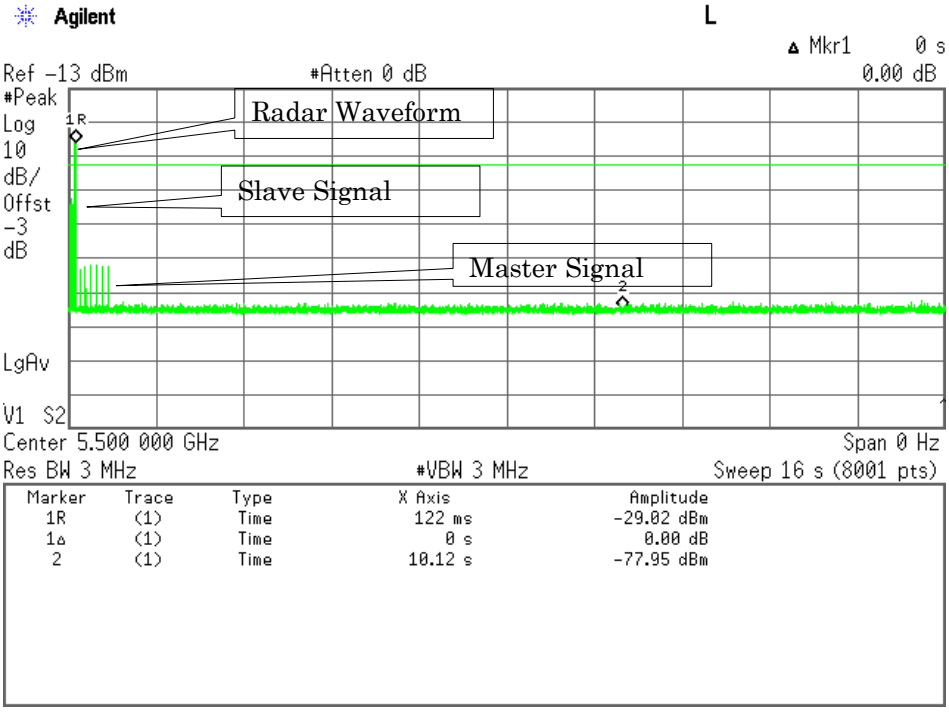
5510 MHz



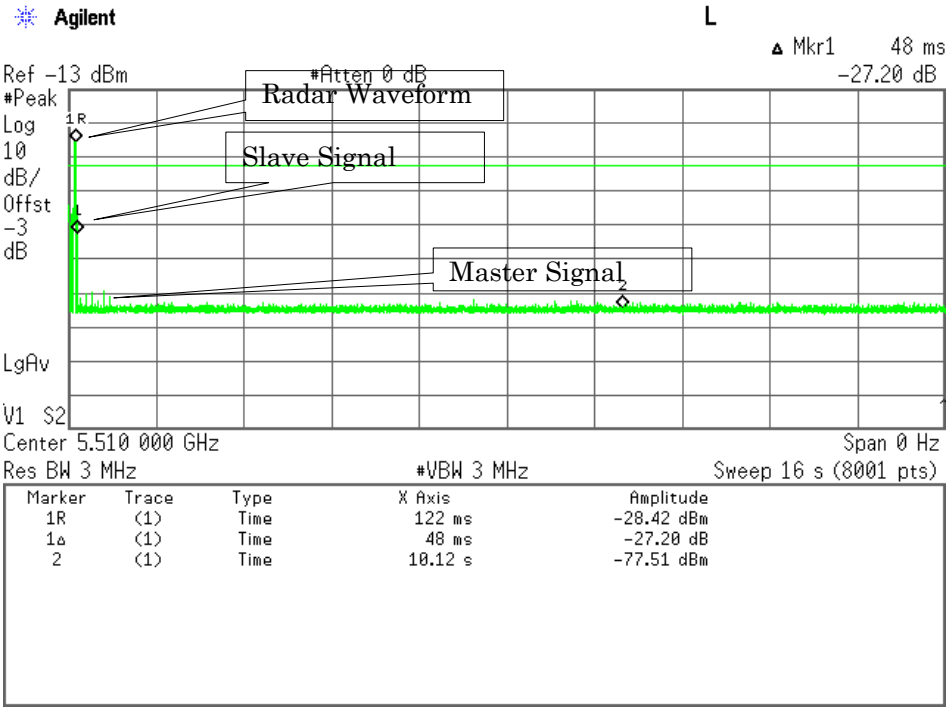
7.7.5.4 Channel Move Time

The channel move time is measured using delta-marker function of the spectrum analyzer. The reference marker is adjusted at the end of radar pulse and the delta marker is adjusted at the end the WLAN transmission. The displayed delta value is the result of move time. It shall be within the 10 seconds.
The measurements are carried out 802.11 n CH.100 (5500MHz)/ 20 MHz and CH.102(5510 MHz)/ 40 MHz.

Channel Move Time Plots for 20 MHz BW, 5500 MHz



Channel Move Time Plots for 40 MHz BW, 5510 MHz



7.7.5.5 Channel Closing Transmission Time

The aggregate channel closing transmission time is calculated as follows;
D is the dwell time per spectrum analyzer sampling bin.
S is the sweep time.
B is the number of spectrum analyzer sampling bin.
N is the number of spectrum analyzer sampling bins showing a UNII transmission(intermittent control signal).

Channel Closing Time = D * N = S / B * N

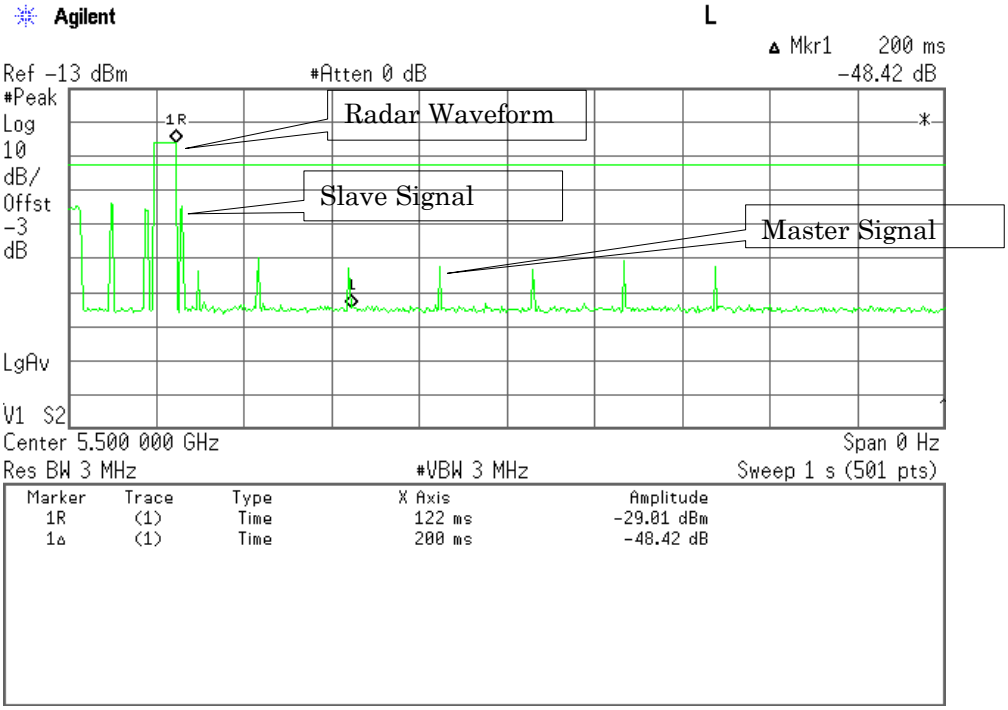
The observation period over which the aggregate transmission time is calculated begins at (the reference marker + 200 msec.) and end on earlier than (the reference marker + 10 sec.).
The measurements are carried out 802.11 n CH.100 (5500MHz)/ 20 MHz BW and CH.102(5510 MHz)/ 40 MHz BW.

Test Results

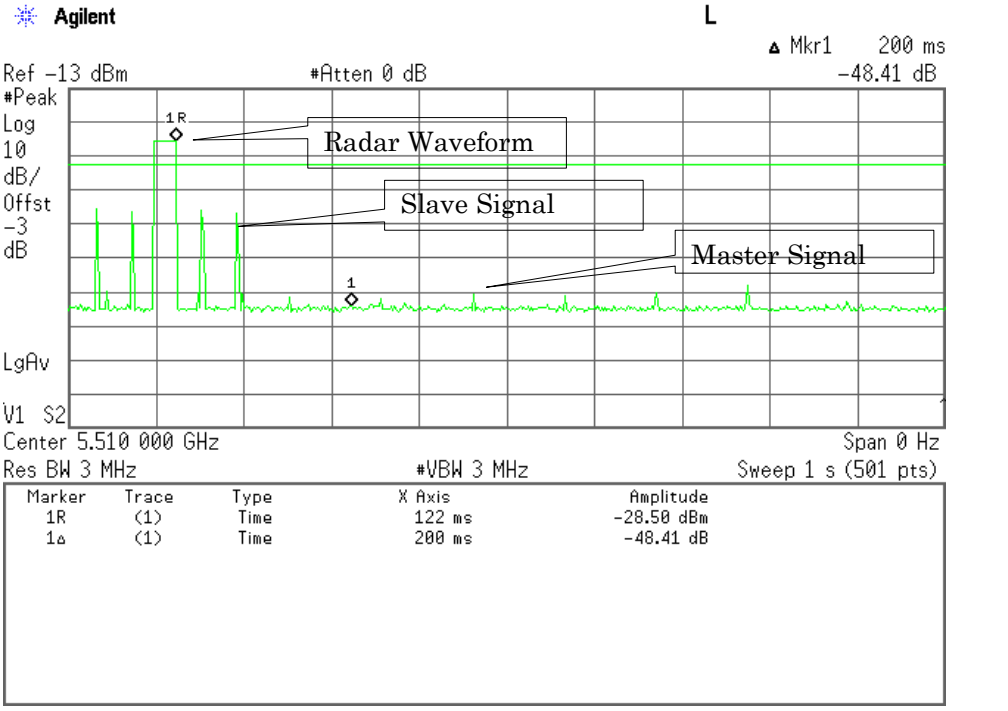
Channel	Frequency (MHz)	Mode	Sweep Time(**S**) (msec)	(**B**)	(**N**)	Channel Closing Time (msec)
100	5500	20 MHz BW	1000	500	0	0
140	5510	40 MHz BW	1000	500	0	0

The test result (Channel Closing Time) is calculated as follows;
For 100 channel (5500 MHz)
Channel Closing Time = **D** * **N** = **S** / **B** * **N** = 1000 / 500 * 0 = 0 msec

Channel Closing Transmission Time Plots for 20 MHz, 5500 MHz



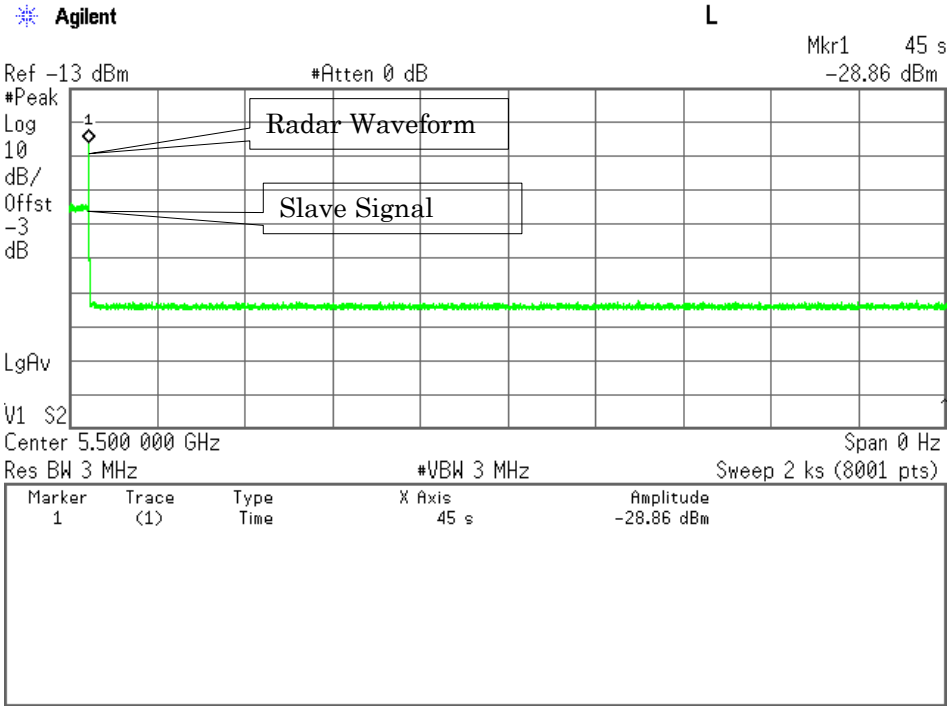
Channel Closing Transmission Time Plots for 40 MHz, 5510 MHz



7.7.5.6 Non-Occupancy Period

During the 30 minutes observation time, EUT did not make any transmissions on a channel.
The measurements are carried out 802.11 n CH.100 (5500MHz)/ 20 MHz and CH.102(5510 MHz)/ 40 MHz.

Non-Occupancy Period Plots for
20 MHz, 5500 MHz



40 MHz, 5510 MHz