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FCC TEST REPORT

Report No: STS1501010F02

Issued for

HUARUI TECHNICAL INNOVATION CO.,LIMITED
Room 1708 Nan Fung Tower.,173 Des voeux Road C.,
Hong Kong.

Product Name:	2.4G & 5G WiFi module
Brand Name:	N/A
Model No.:	HR8811AUU3
Series Model:	N/A
FCC ID:	2ADV3-HR8811AUU3
Test Standard:	FCC Part 15.407

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Shenzhen STS Test Services Co., Ltd.

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TEST RESULT CERTIFICATION

Applicant's name : HUARUI TECHNICAL INNOVATION CO.,LIMITED
Address : Room 1708 Nan Fung Tower.,173 Des voeux Road C.,Hong Kong.
Manufacture's Name..... : HUARUI TECHNICAL INNOVATION CO.,LIMITED
Address : Room 1708 Nan Fung Tower.,173 Des voeux Road C.,Hong Kong.

Product description

Product name : 2.4G & 5G WiFi module
Model and/or type reference : HR8811AUU3
Serial Model : N/A

Standards : FCC Part15.407

Test procedure ANSI C63.10-2009

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC&IC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test :
Date (s) of performance of tests : 03 Jan. 2015 ~10 Jan. 2015
Date of Issue : 12 Jan. 2015
Test Result : **Pass**

Testing Engineer :

(Tony Liu)

Technical Manager :

(Vita Li)

Authorized Signatory :

(Bovey Yang)





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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407)		
FCC standard	Test Item	Judgment
15.207	AC Conducted Emission	PASS
§ 15.407 (2) (26 dB) / § 15.407 (e) (6 dB) / § 15.407 (a) (99%)	26dB/6dB &99% Bandwidth	PASS
15.407(a) (1).(2).(3).(4).(5)	Maximum Conducted Output Power	PASS
15.407(b)	Peak Excursion Ratio	PASS
15.407(b)& 15.209	Radiated Emission And (Unwanted Emissions) Measurement	PASS
15.407(a) (1).(2).(3).(4).(5)	Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203/15.204	Antenna Requirement	PASS

NOTE:

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



1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	2.4G & 5G WiFi module	
Trade Name	N/A	
Model Name	HR8811AUU3	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a 2.4G & 5G WiFi module	
	Operation Frequency:	5745 MHz ~ 5825 MHz
	Modulation Type:	OFDM (QPSK / 16QAM / 64QAM)
	Bit Rate of Transmitter	802.11a:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz):150/144.44/130/117/115.56/104/86.67/78/52/6.5 Mbps
	Antenna Designation:	See Note 3
	Max.Output Power(Conducted):	11.67dBm
	The duty cycle of WLAN 802.11a/n were 95 %	
More details of EUT technical specification, please refer to the User's Manual.		
Test Channel	Please refer to the Note 2.	
Adapter	N/A	
Battery	N/A	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2. Carrier Frequency Channel
5GHz:

802.11a Carrier Frequency Channel							
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825						

802.11n (BW 20MHz) Carrier Frequency Channel							
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	HR8811AUU3	PIFA Antenna	Input Connector	0	WIFI Antenna



2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	802.11a
Mode 2	802.11n(20)
Mode 3	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 3	Link Mode

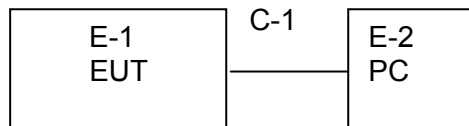
For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a
Mode 2	802.11n(20)

Note:

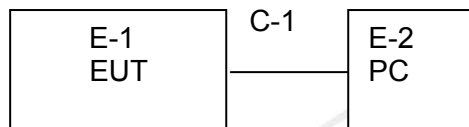
- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
- (3) The EUT 's duty cycle is set to 100%

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test





2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	2.4G & 5G WiFi module	N/A	HR8811AUU3	N/A	EUT
E-2	Notebook	Lenovo	B460	WB03928113	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.6M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.27	2015.10.26
Horn Antenna	R&S	9120D	152265	2014.10.27	2015.10.26
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Amplifier	Agilent	8449B	60538	2014.10.25	2015.10.24
Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07
Power Meter	Anritsu	ML2495A	1204003	2014.10.25	2015.10.24
Power Sensor	Anritsu	MA2411B	100309	2014.10.25	2015.10.24
Low frequency cable	N/A	R01	N/A	2014.10.25	2015.10.24
High frequency cable	N/A	R02	N/A	2014.10.25	2015.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
Conduction Cable	HUBER+SU HNER	C01	N/A	2014.10.25	2015.10.24



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

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

The following table is the setting of the receiver

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

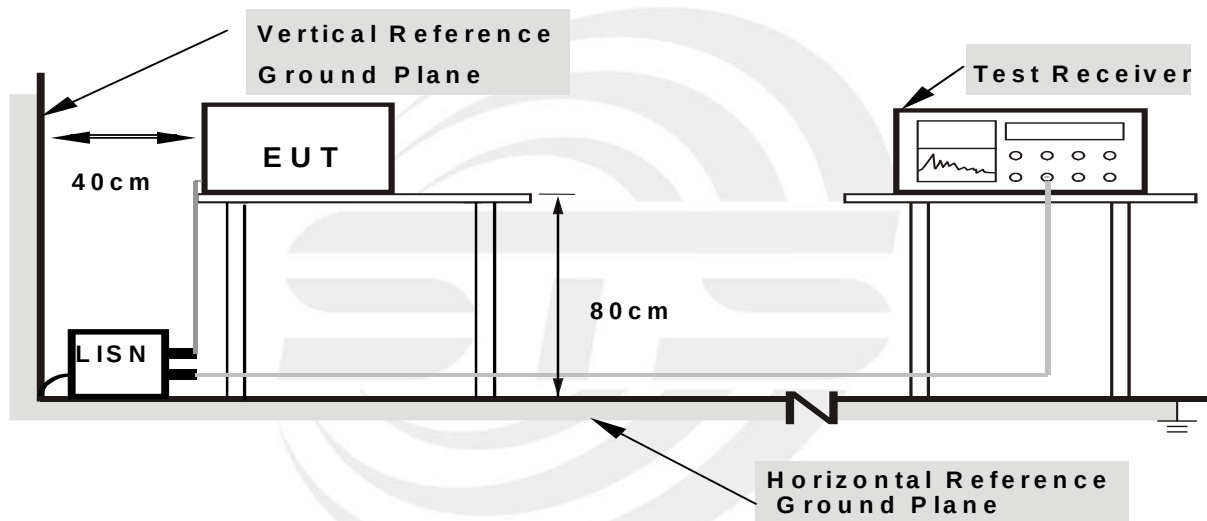
3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



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

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

3.1.5 EUT OPERATING CONDITIONS

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



3.1.6 TEST RESULTS

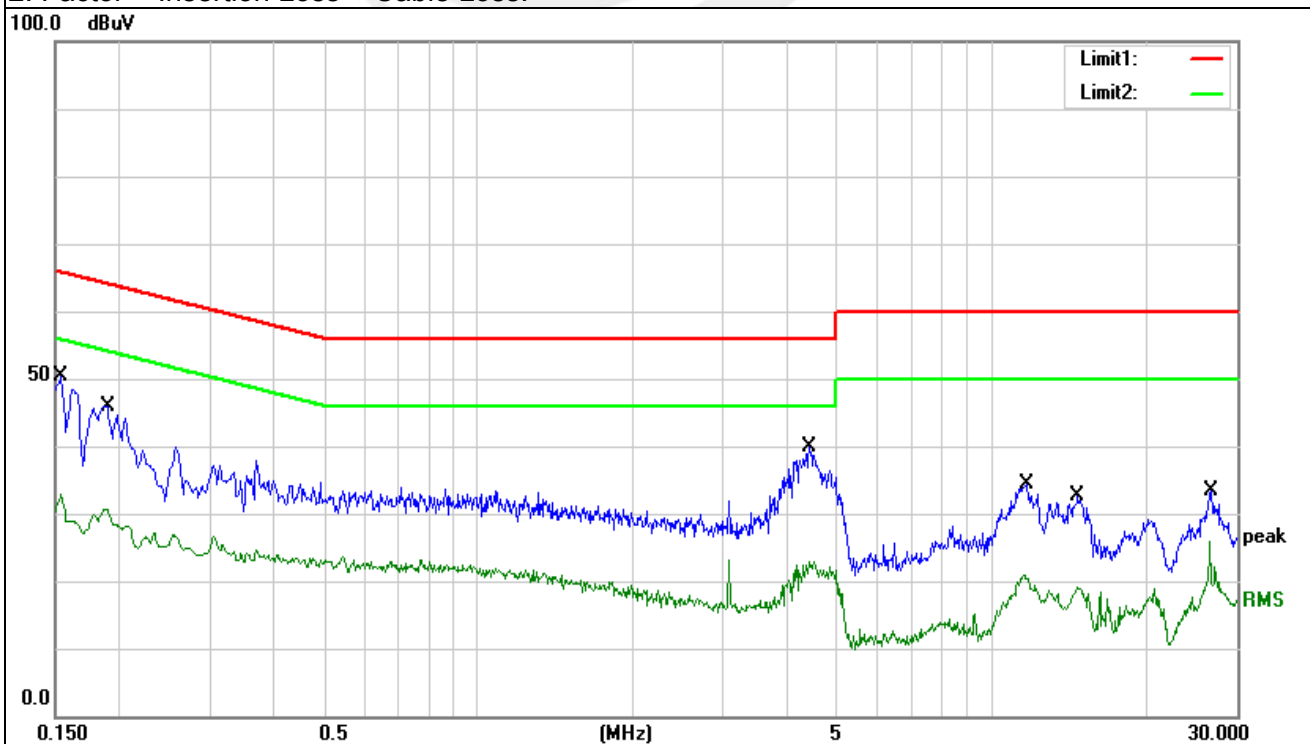
EUT :	2.4G & 5G WiFi module	Model Name. :	HR8811AUU3
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC 120V/50Hz	Test Mode :	Mode 3

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1540	23.93	11.59	35.52	65.78	-30.26	QP
0.1540	15.17	11.59	26.76	55.78	-29.02	AVG
0.1882	30.51	10.85	41.36	64.12	-22.76	QP
0.1882	18.73	10.85	29.58	54.12	-24.54	AVG
4.4180	19.67	11.12	30.79	56.00	-25.21	QP
4.4180	6.56	11.12	17.68	46.00	-28.32	AVG
11.7153	14.10	11.54	25.64	60.00	-34.36	QP
11.7153	5.28	11.54	16.82	50.00	-33.18	AVG
14.6837	11.18	11.55	22.73	60.00	-37.27	QP
14.6837	3.76	11.55	15.31	50.00	-34.69	AVG
26.8050	12.06	12.48	24.54	60.00	-35.46	QP
26.8050	5.99	12.48	18.47	50.00	-31.53	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.



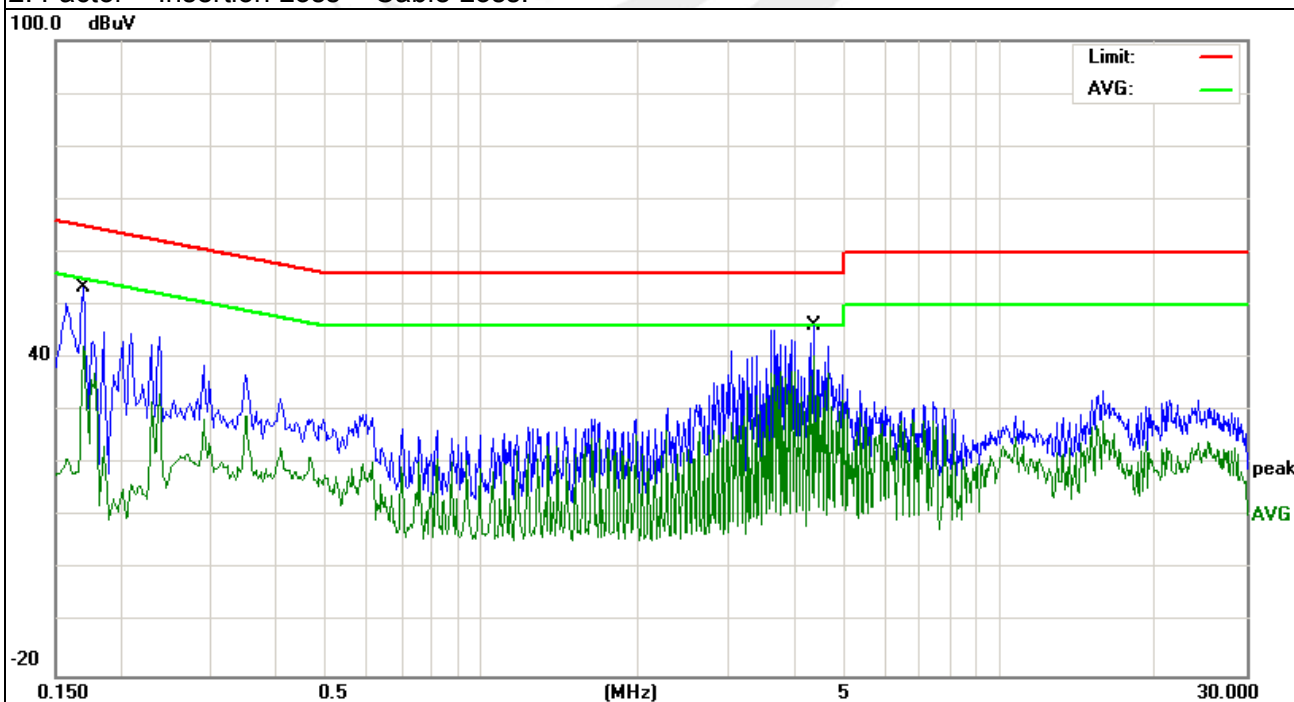


EUT :	2.4G & 5G WiFi module	Model Name. :	HR8811AUU3
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC 120V/50Hz	Test Mode :	Mode 3

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1800	35.10	10.85	45.95	64.49	-18.54	QP
0.1800	21.18	10.85	32.03	54.49	-22.46	AVG
0.2587	29.73	10.84	40.57	61.47	-20.90	QP
0.2587	16.21	10.84	27.05	51.47	-24.42	AVG
0.2986	25.41	10.84	36.25	60.28	-24.03	QP
0.2986	15.61	10.84	26.45	50.28	-23.83	AVG
11.4161	18.43	11.58	30.01	60.00	-29.99	QP
11.4161	9.89	11.58	21.47	50.00	-28.53	AVG
19.7777	12.60	11.97	24.57	60.00	-35.43	QP
19.7777	6.34	11.97	18.31	50.00	-31.69	AVG
26.5434	13.70	12.70	26.40	60.00	-33.60	QP
26.5434	7.92	12.70	20.62	50.00	-29.38	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.





3.2 RADIATED EMISSION AND (UNWANTED EMISSIONS) MEASUREMENT

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

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.407(b)& 15.205/209(a), then the (a); limit in the table below has to be followed.

KDB 789033 D02 General UNII Test Procedures New Rules v01

As specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

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

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz / 10Hz



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

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

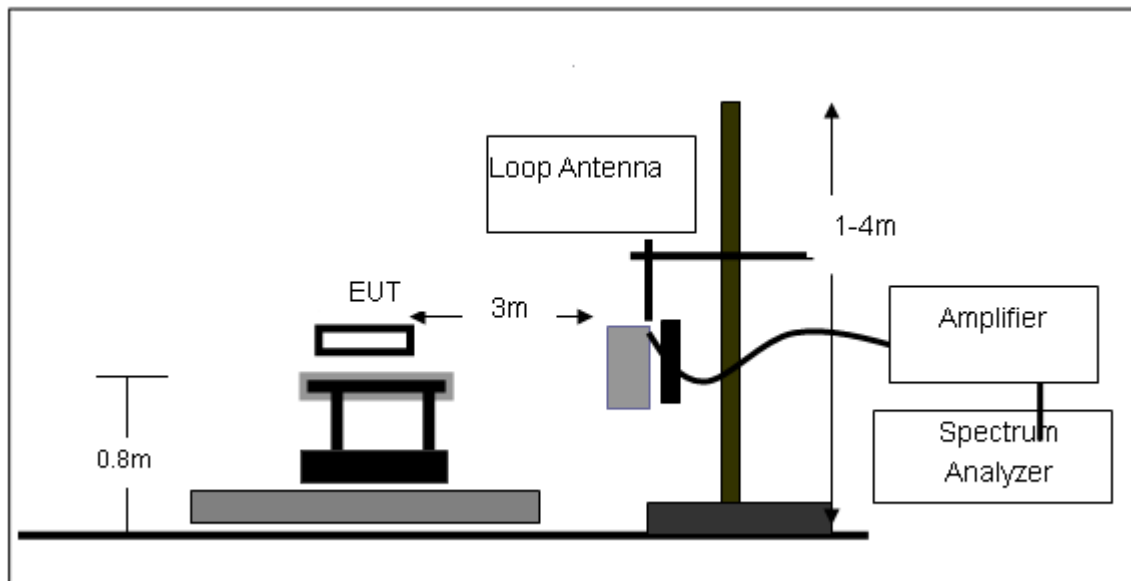
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

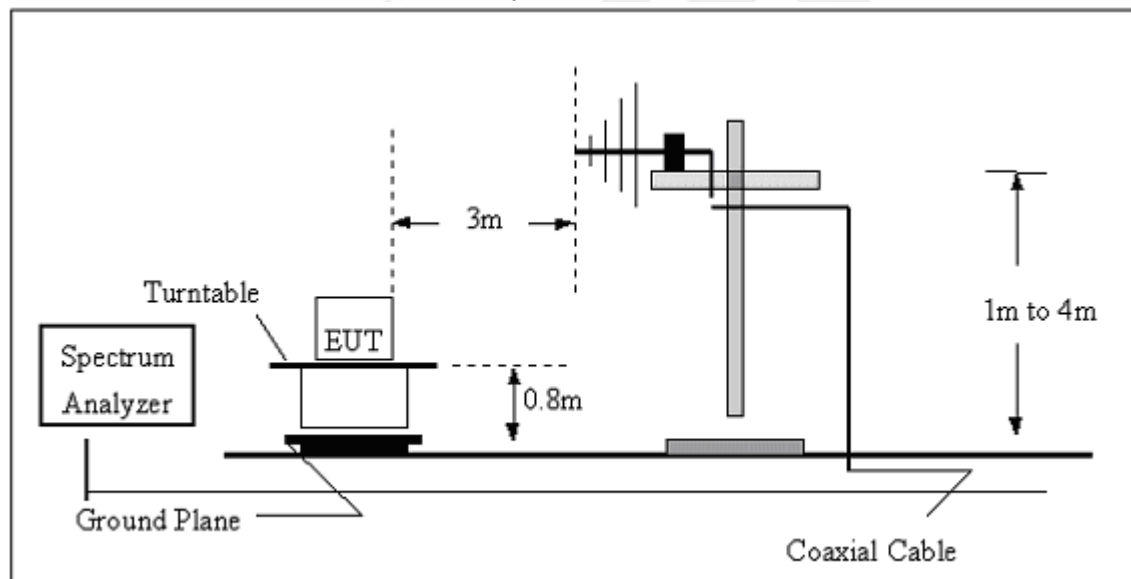
No deviation

3.2.4 TEST SETUP

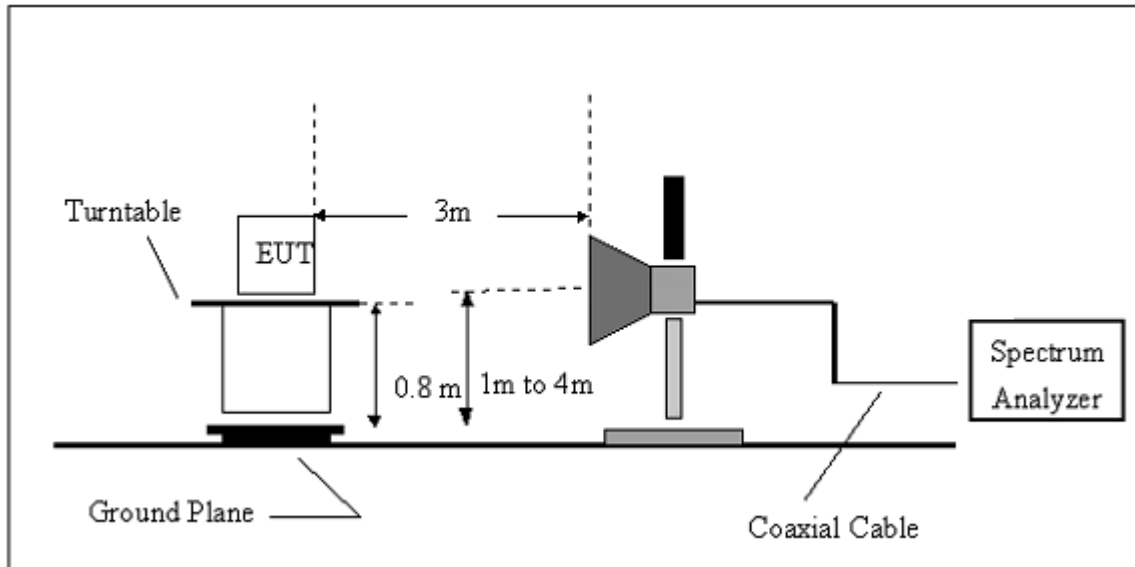
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 EUT OPERATING CONDITIONS

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

**3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)**

EUT:	2.4G & 5G WiFi module	Model Name. :	HR8811AUU3
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.3V from PC
Test Mode :	TX	Polarization :	--

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

NOTE:

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

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

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



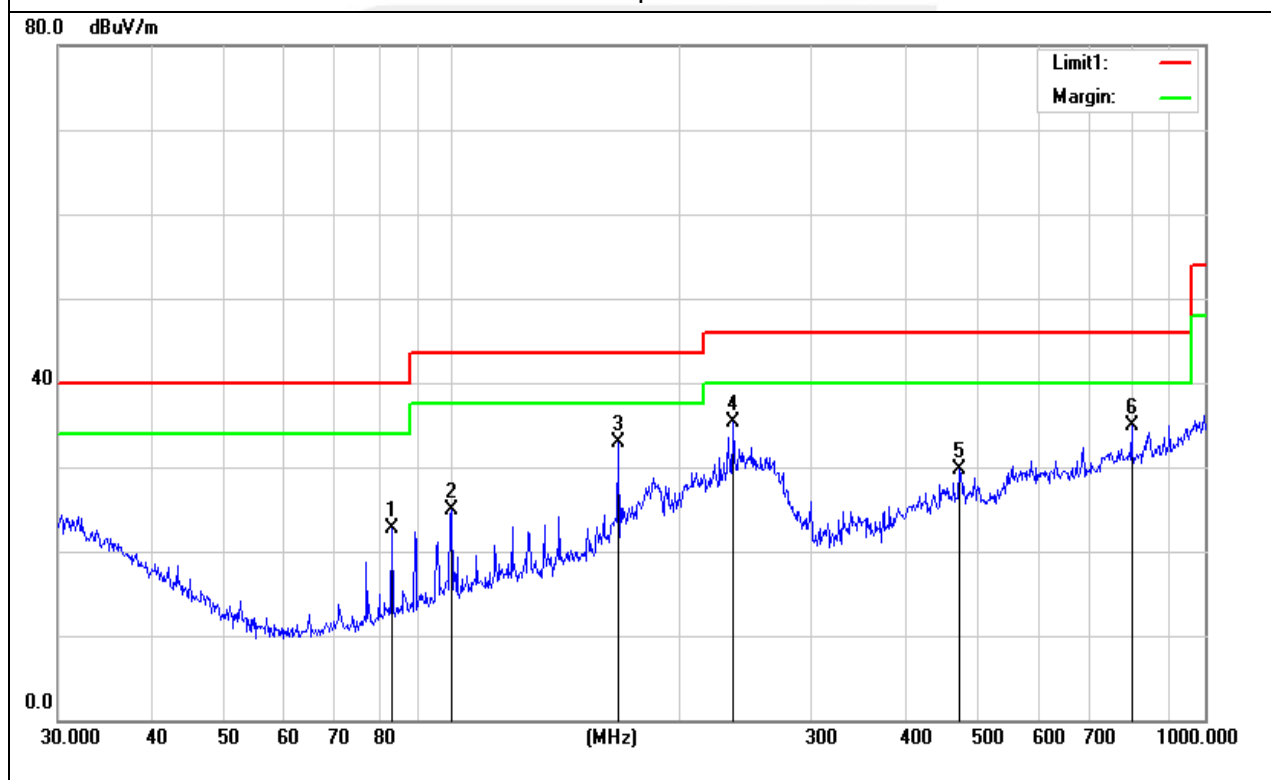
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Mode 3	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
83.2298	14.00	8.62	22.62	40.00	-17.38	QP
99.8777	14.00	10.90	24.90	43.50	-18.60	QP
166.0680	21.64	11.24	32.88	43.50	-10.62	QP
236.6447	23.50	11.74	35.24	46.00	-10.76	QP
472.1760	9.42	20.24	29.66	46.00	-16.34	QP
798.9797	8.84	26.10	34.94	46.00	-11.06	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



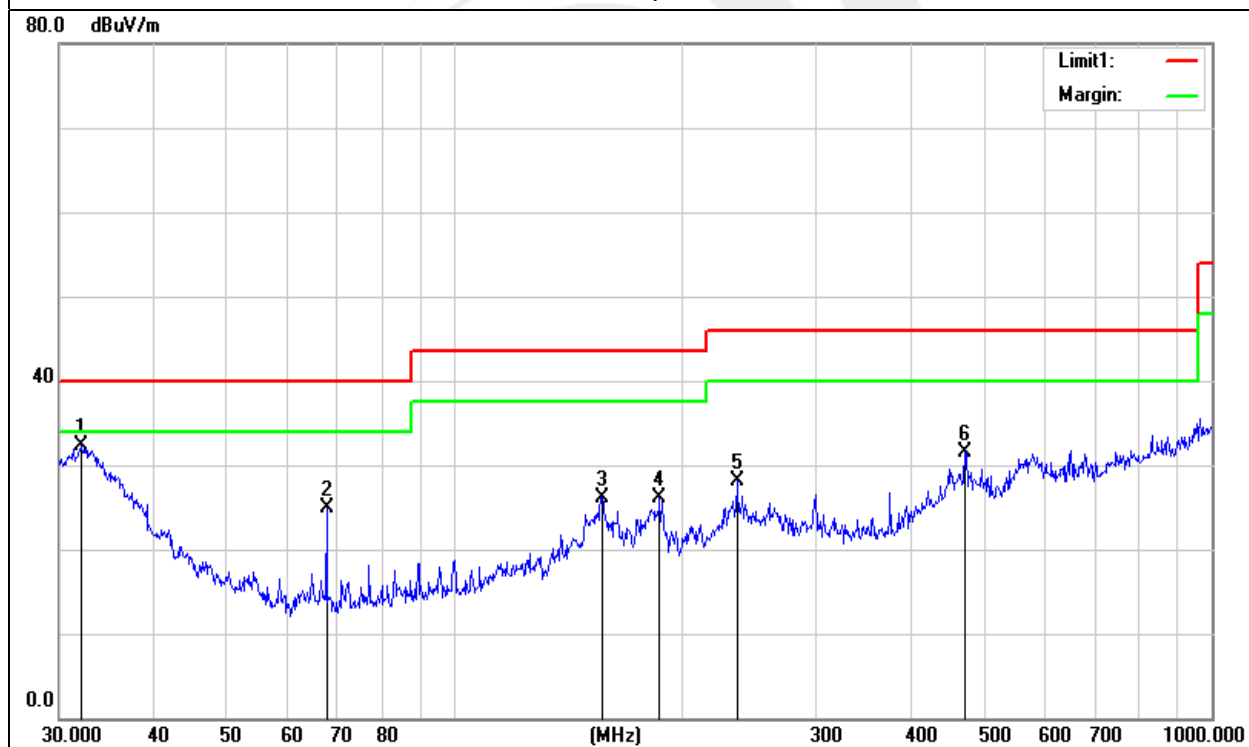


EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Mode 3	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
32.0667	14.41	17.89	32.30	40.00	-7.70	QP
67.6751	18.82	6.09	24.91	40.00	-15.09	QP
156.4578	13.98	12.10	26.08	43.50	-17.42	QP
186.4410	16.21	9.93	26.14	43.50	-17.36	QP
235.8164	16.41	11.63	28.04	46.00	-17.96	QP
472.1760	11.34	20.24	31.58	46.00	-14.42	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



**3.2.8 TEST RESULTS (ABOVE 1000 MHZ)**

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5745MHz/Channel/149	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.143	39.83	17.86	57.69	74	-16.31	peak
11490.149	27.26	17.86	45.12	54	-8.88	AVG
17235.197	30.41	22.93	53.34	74	-20.66	peak
17235.254	18.43	22.93	41.36	54	-12.64	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5745MHz/Channel/149	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.059	40.32	17.86	58.18	74	-15.82	peak
11490.090	28.45	17.86	46.31	54	-7.69	AVG
17235.230	30.25	22.93	53.18	74	-20.82	peak
17235.237	18.23	22.93	41.16	54	-12.84	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5785MHz/Channel/157	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11570.059	40.65	18.25	58.9	74	-15.1	peak
11570.055	27.34	18.25	45.59	54	-8.41	AVG
17355.184	30.42	23.35	53.77	74	-20.23	peak
17355.222	18.43	23.35	41.78	54	-12.22	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5785MHz/Channel/157	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
11570.110	40.25	18.25	58.5	74	-15.5	peak
11570.166	27.82	18.25	46.07	54	-7.93	AVG
17355.184	30.42	23.35	53.77	74	-20.23	peak
17355.220	18.25	23.35	41.6	54	-12.4	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5825MHz/Channel/165	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11650.109	39.8	18.75	58.55	74	-15.45	peak
11650.155	27.26	18.75	46.01	54	-7.99	AVG
17475.184	29.77	23.85	53.62	74	-20.38	peak
17475.171	18.11	23.85	41.96	54	-12.04	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/5825MHz/Channel/165	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11650.152	39.25	18.75	58	74	-16	peak
11650.085	27.25	18.75	46	54	-8	AVG
17475.174	29.26	23.85	53.11	74	-20.89	peak
17475.186	18.26	23.85	42.11	54	-11.89	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5745MHz/Channel/149	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.105	39.87	17.86	57.73	74	-16.27	peak
11490.143	27.24	17.86	45.1	54	-8.9	AVG
17235.250	30.33	22.93	53.26	74	-20.74	peak
17235.175	18.56	22.93	41.49	54	-12.51	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5745MHz/Channel/149	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.065	39.8	17.86	57.66	74	-16.34	peak
11490.138	27.26	17.86	45.12	54	-8.88	AVG
17235.232	30.42	22.93	53.35	74	-20.65	peak
17235.193	18.76	22.93	41.69	54	-12.31	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5785MHz/Channel/157	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11570.144	40.47	18.25	58.72	74	-15.28	peak
11570.053	27.86	18.25	46.11	54	-7.89	AVG
17355.212	30.42	23.35	53.77	74	-20.23	peak
17355.190	18.83	23.35	42.18	54	-11.82	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5785MHz/Channel/157	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11570.089	40.43	18.25	58.68	74	-15.32	peak
11570.181	27.86	18.25	46.11	54	-7.89	AVG
17355.187	30.49	23.35	53.84	74	-20.16	peak
17355.243	18.83	23.35	42.18	54	-11.82	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5825MHz/Channel/165	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11650.104	39.8	18.75	58.55	74	-15.45	peak
11650.131	27.26	18.75	46.01	54	-7.99	AVG
17475.222	29.77	23.85	53.62	74	-20.38	peak
17475.247	18.11	23.85	41.96	54	-12.04	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11n20/5825MHz/Channel/165	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11650.111	39.8	18.75	58.55	74	-15.45	peak
11650.113	27.26	18.75	46.01	54	-7.99	AVG
17475.241	29.77	23.85	53.62	74	-20.38	peak
17475.173	18.11	23.85	41.96	54	-12.04	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 149/802.11a	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5725	43.21	10.65	53.86	74.00	-20.14	peak
5725	33.21	10.65	43.86	54.00	-10.14	AV

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 165/802.11a	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5850	41.12	12.98	54.1	74.00	-19.9	peak
5850	32.23	12.98	45.21	54.00	-8.79	AV



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 149/802.11a	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5725	42.54	10.65	53.19	74.00	-20.81	peak
5725	33.54	10.65	44.19	54.00	-9.81	AV

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 165/802.11a	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5850	42.31	12.98	55.29	74.00	-18.71	peak
5850	30.24	12.98	43.22	54.00	-10.78	AV



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 149/802.11n	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5725	46.23	10.65	56.88	74.00	-17.12	peak
5725	33.16	10.65	43.81	54.00	-10.19	AV

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 165/802.11n	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5850	42.43	12.98	55.41	74.00	-18.59	peak
5850	33.15	12.98	46.13	54.00	-7.87	AV



EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 149/802.11n	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5725	45.34	10.65	55.99	74.00	-18.01	peak
5725	33.27	10.65	43.92	54.00	-10.08	AV

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.3V
Test Mode :	Channel 165/802.11n	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/M)	(dB)	(dBuV/M)	(dBuV/M)	(dB)	
5850	42.64	12.98	55.62	74.00	-18.38	peak
5850	33.13	12.98	46.11	54.00	-7.89	AV



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.1.1 TEST PROCEDURE

1. The setting follows Method SA-1 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 .

For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (*i.e.*, 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3$ RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

4.1.2 DEVIATION FROM STANDARD

No deviation.



4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

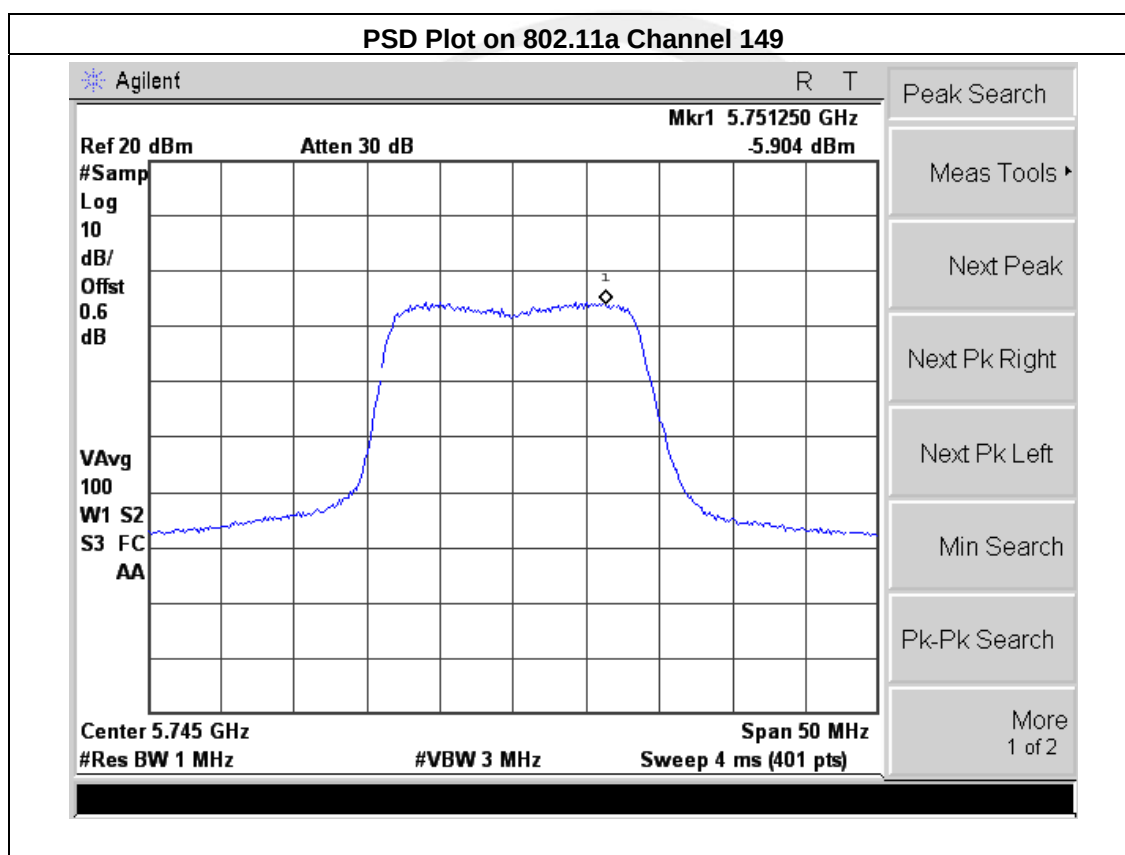




4.1.5 TEST RESULTS

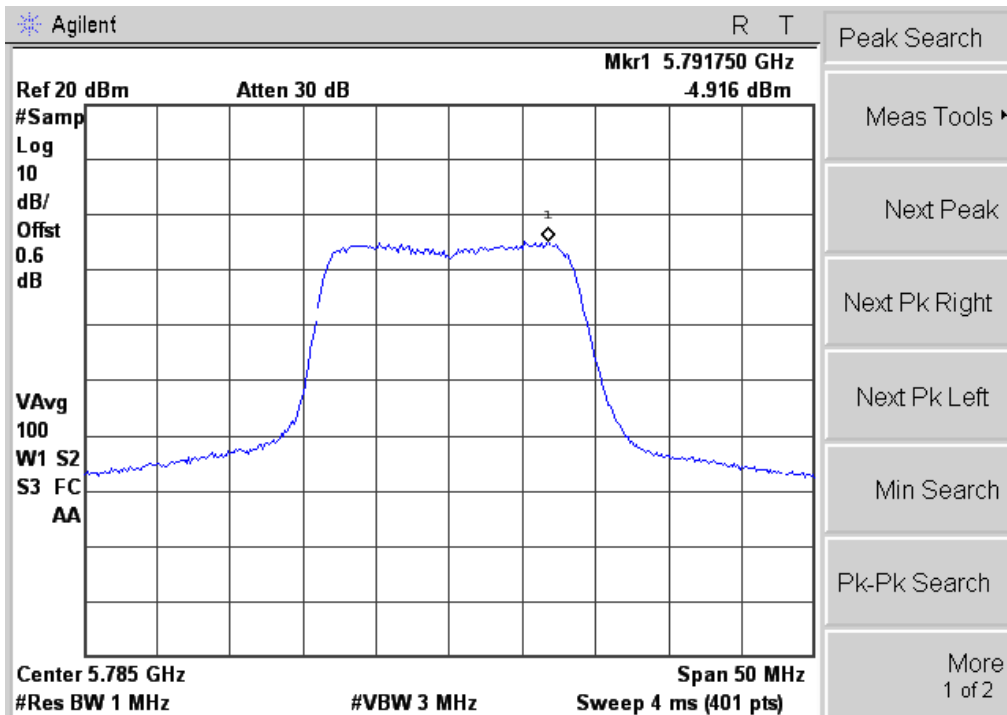
EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX a Mode		

Channel	Frequency	802.11a Measured PSD	Limit (dBm)	Result
149	5745	-5.904	30	PASS
157	5785	-4.916	30	PASS
165	5825	-4.539	30	PASS

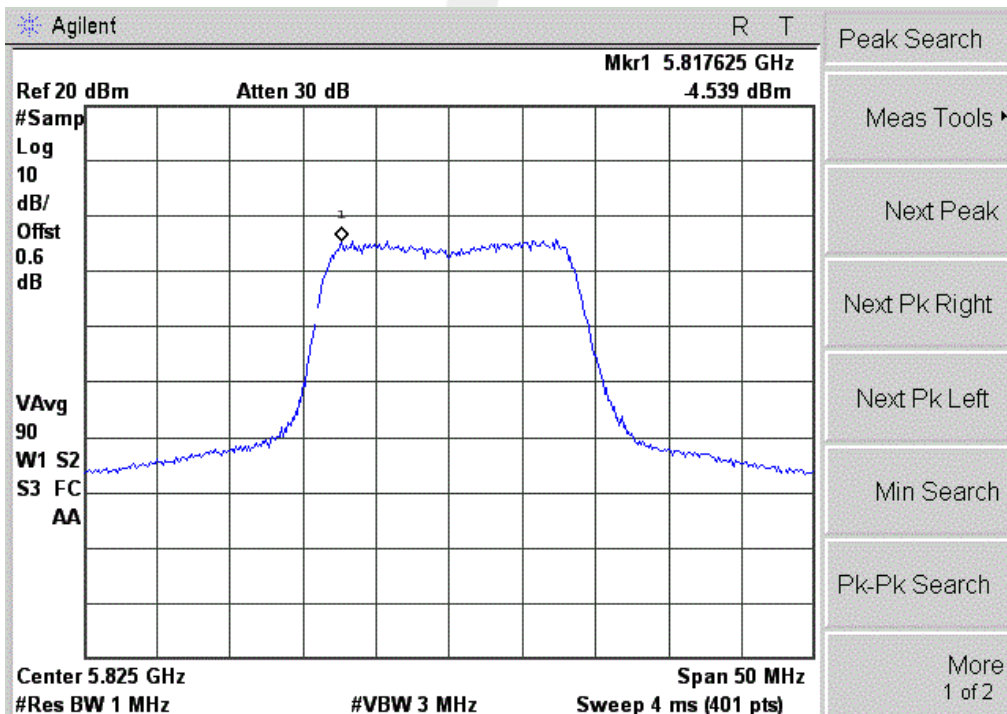




PSD Plot on 802.11a Channel 157



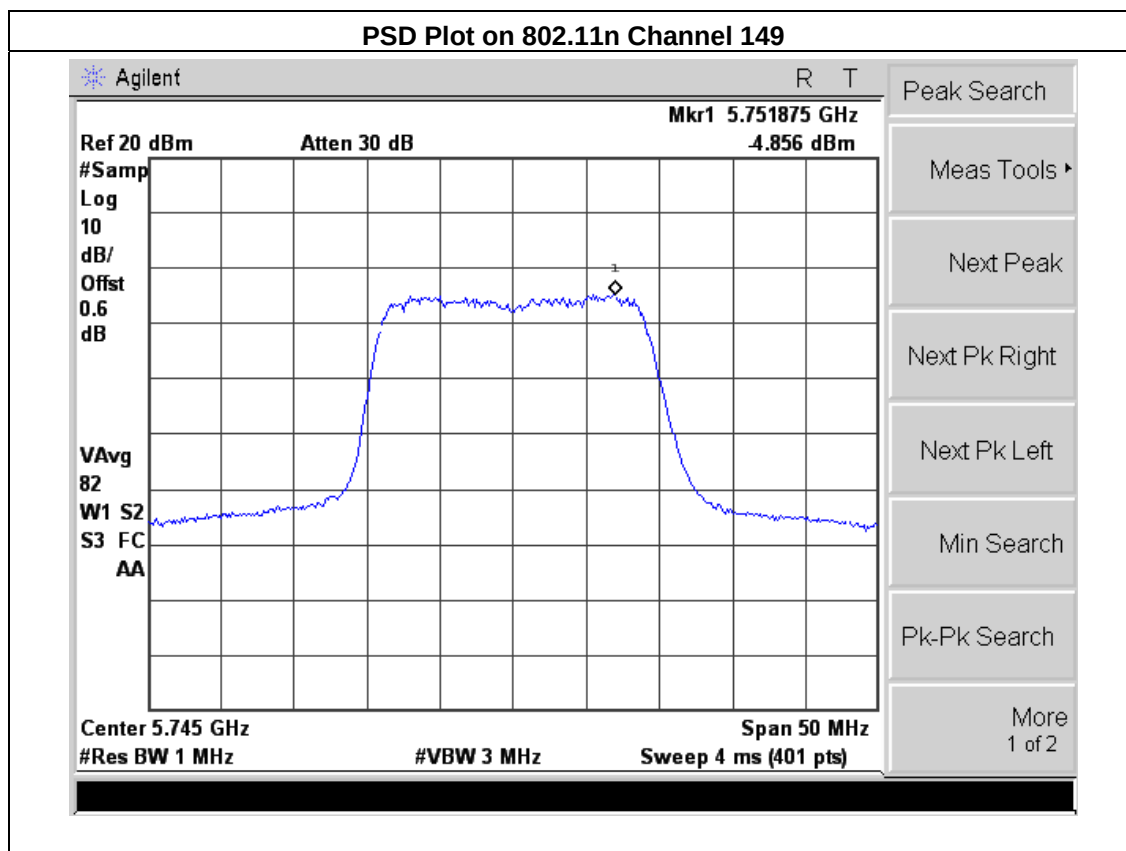
PSD Plot on 802.11a Channel 165





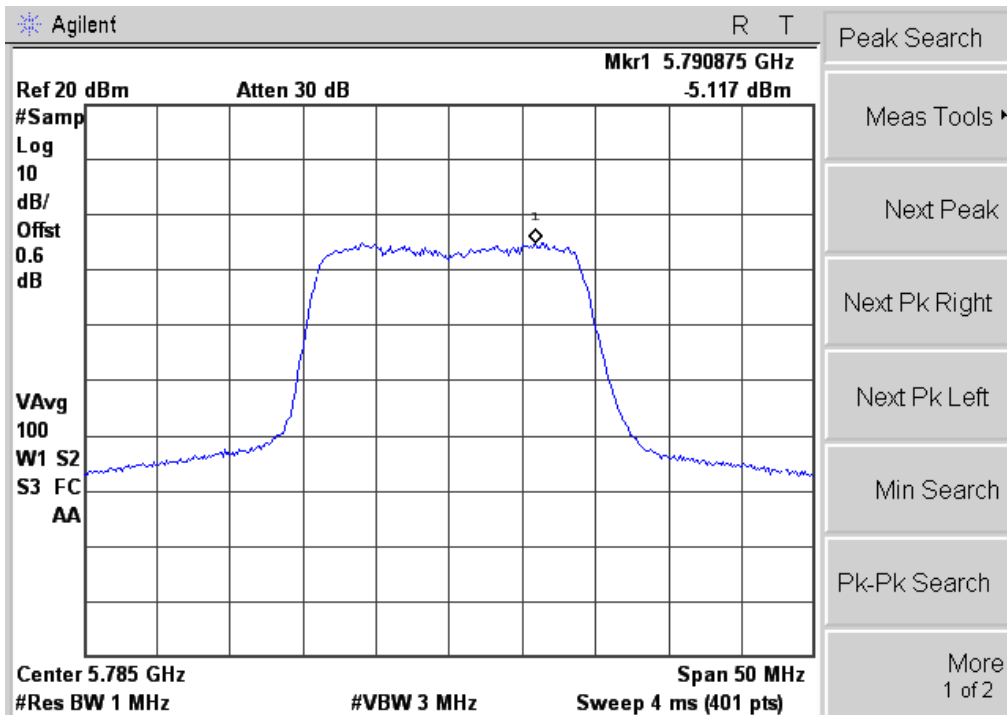
EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX n Mode(20)		

Channel	Frequency	802.11n Measured PSD	Limit (dBm)	Result
149	5745	-4.856	30	PASS
157	5785	-5.117	30	PASS
165	5825	-4.742	30	PASS

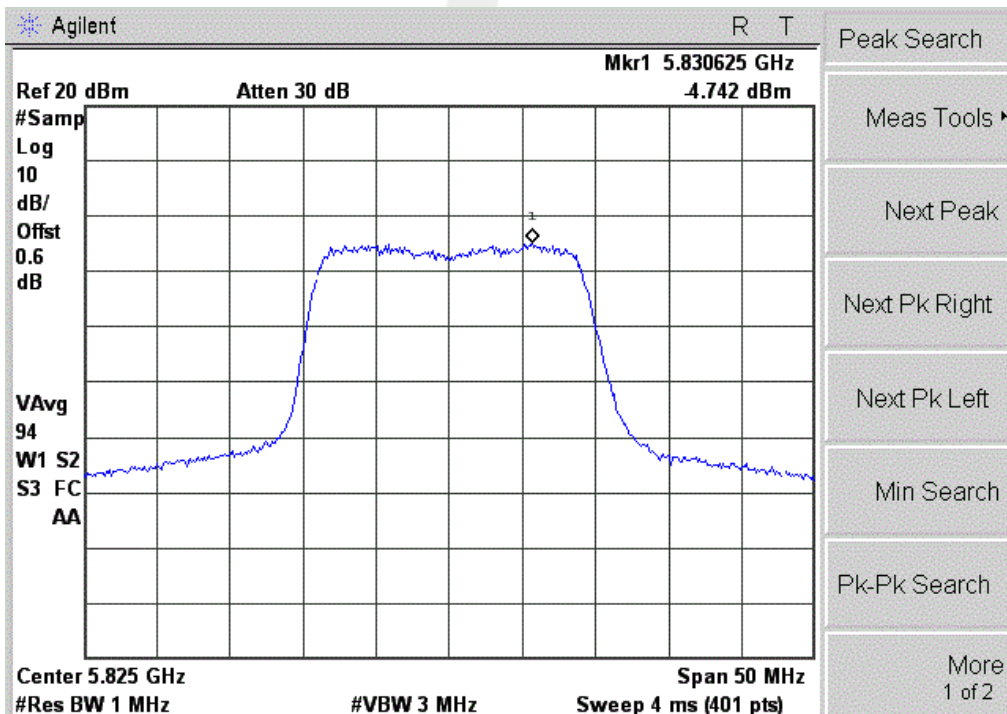




PSD Plot on 802.11n Channel 157



PSD Plot on 802.11n Channel 165



5. BANDWIDTH MEASUREMENT

5.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

See list of measuring instruments of this test report.

5.1.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW $\geq$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

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



5.1.5 TEST RESULTS

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX a Mode		

Frequency (MHz)	802.11a 26dB Bandwidth (MHz)	Pass/Fail
5745	21.66	N/A
5785	21.40	N/A
5825	21.83	N/A

Note: N/A, 26 db bandwidth measurement limit only embodied in the report.

Frequency (MHz)	802.11n 26dB Bandwidth (MHz)	Pass/Fail
5745	22.08	N/A
5785	22.78	N/A
5825	21.65	N/A

Note: N/A, 26 db bandwidth measurement limit only embodied in the report.

5.2 OCCUPIED BANDWIDTH (99%) TEST APPLIED PROCEDURES / LIMIT

The following procedure shall be used for measuring (99 %) power bandwidth:

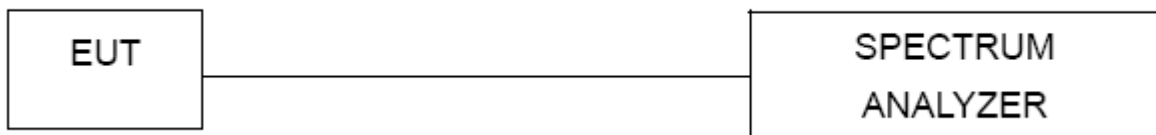
5.2.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5 % of the OBW
5. Set VBW $\geq 3 \cdot$ RBW
6. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
7. Use the 99 % power bandwidth function of the instrument (if available).

5.2.2 DEVIATION FROM STANDARD

No deviation.

5.2.3 TEST SETUP



5.2.4 EUT OPERATION CONDITIONS

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



5.2.5 TEST RESULTS

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX a Mode		

Frequency (MHz)	802.11a 99% Bandwidth (MHz)	Pass/Fail
5745	16.96	N/A
5785	16.93	N/A
5825	16.90	N/A

Note: N/A, 99% bandwidth measurement limit only embodied in the report.

Frequency (MHz)	802.11n 99% Bandwidth (MHz)	Pass/Fail
5745	17.91	N/A
5785	18.00	N/A
5825	17.85	N/A

Note: N/A, 99% bandwidth measurement limit only embodied in the report.

5.3 MINIMUM EMISSION BANDWIDTH(6 DB) PROCEDURES / LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

5.3.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v01.
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3.2 DEVIATION FROM STANDARD

No deviation.

5.2.6 TEST SETUP



5.3.4 EUT OPERATION CONDITIONS

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



5.3.5 TEST RESULTS

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	TX a Mode		

Frequency (MHz)	802.11a 6dB Bandwidth (MHz)	Pass/Fail
5745	16.58	N/A
5785	16.57	N/A
5825	16.56	N/A

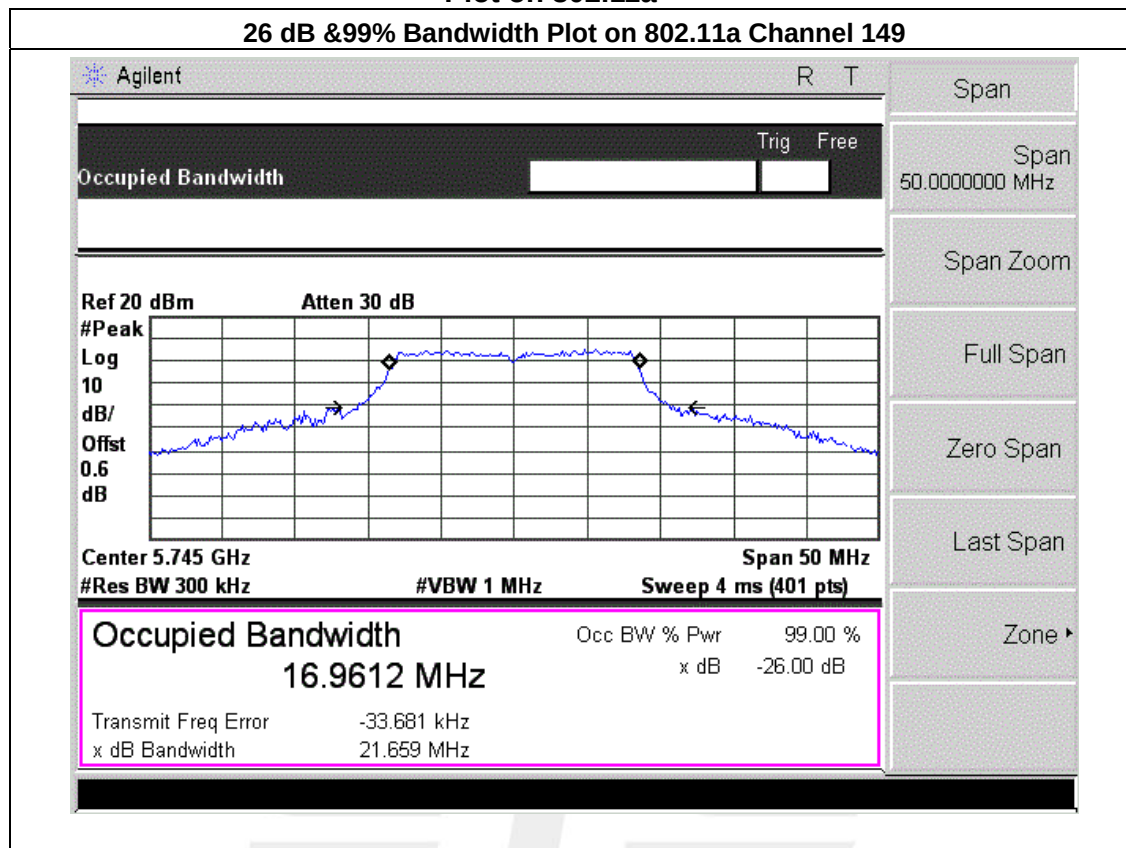
Note: N/A, 6 db bandwidth measurement limit only embodied in the report.

Frequency (MHz)	802.11n 6dB Bandwidth (MHz)	Pass/Fail
5745	17.78	N/A
5785	17.84	N/A
5825	17.82	N/A

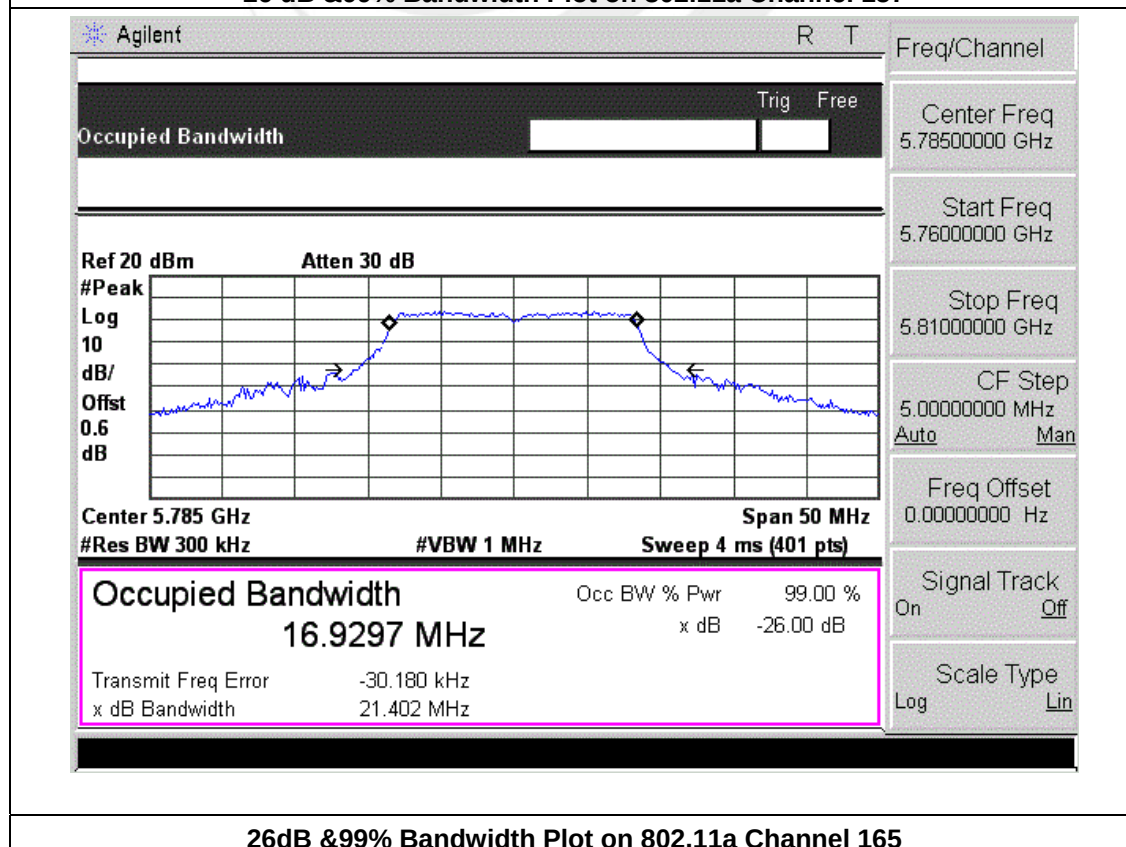
Note: N/A, 6 db bandwidth measurement limit only embodied in the report.

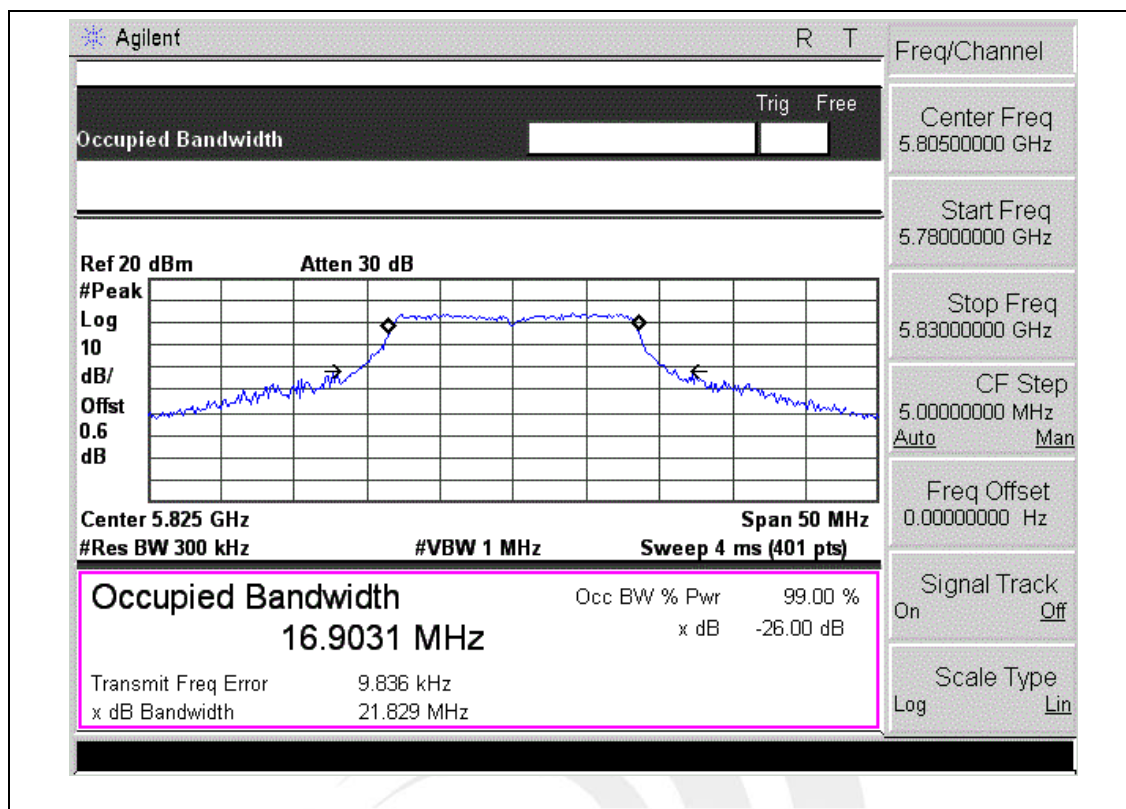
5.4 BANDWIDTH TEST POLT

Plot on 802.11a

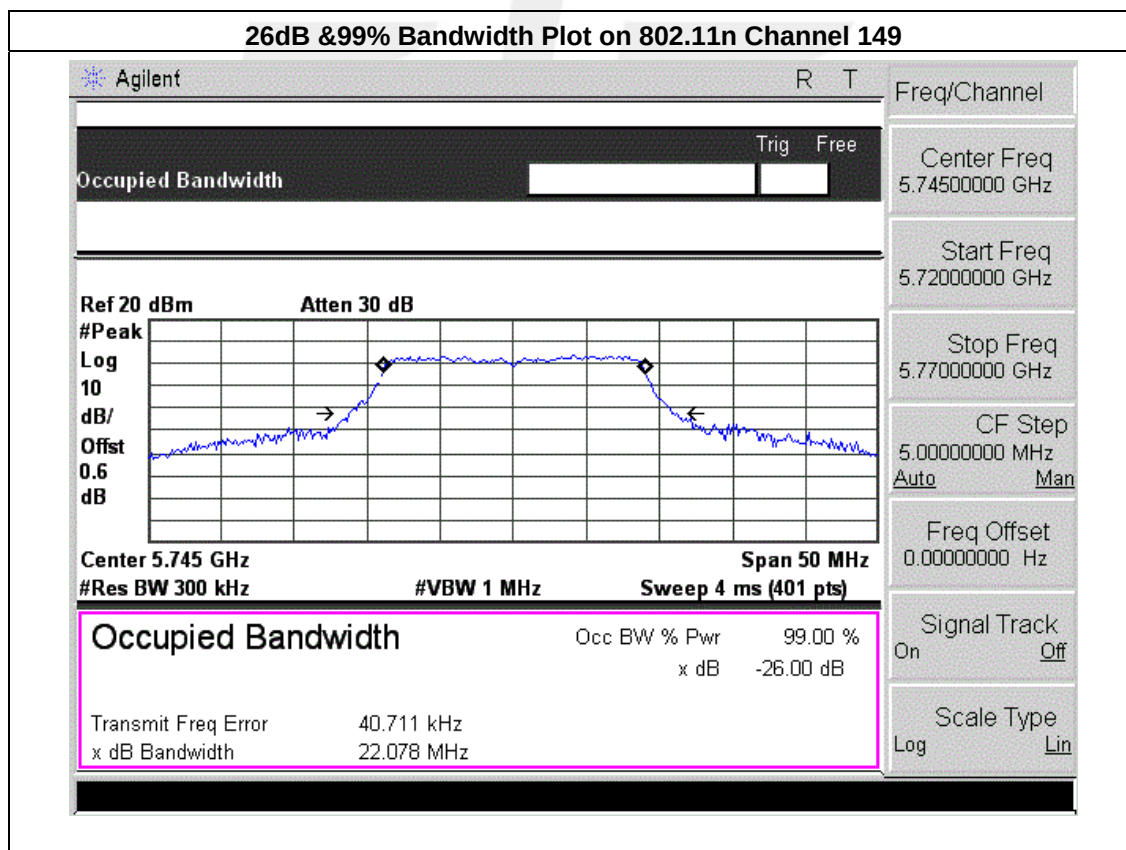


26 dB & 99% Bandwidth Plot on 802.11a Channel 157

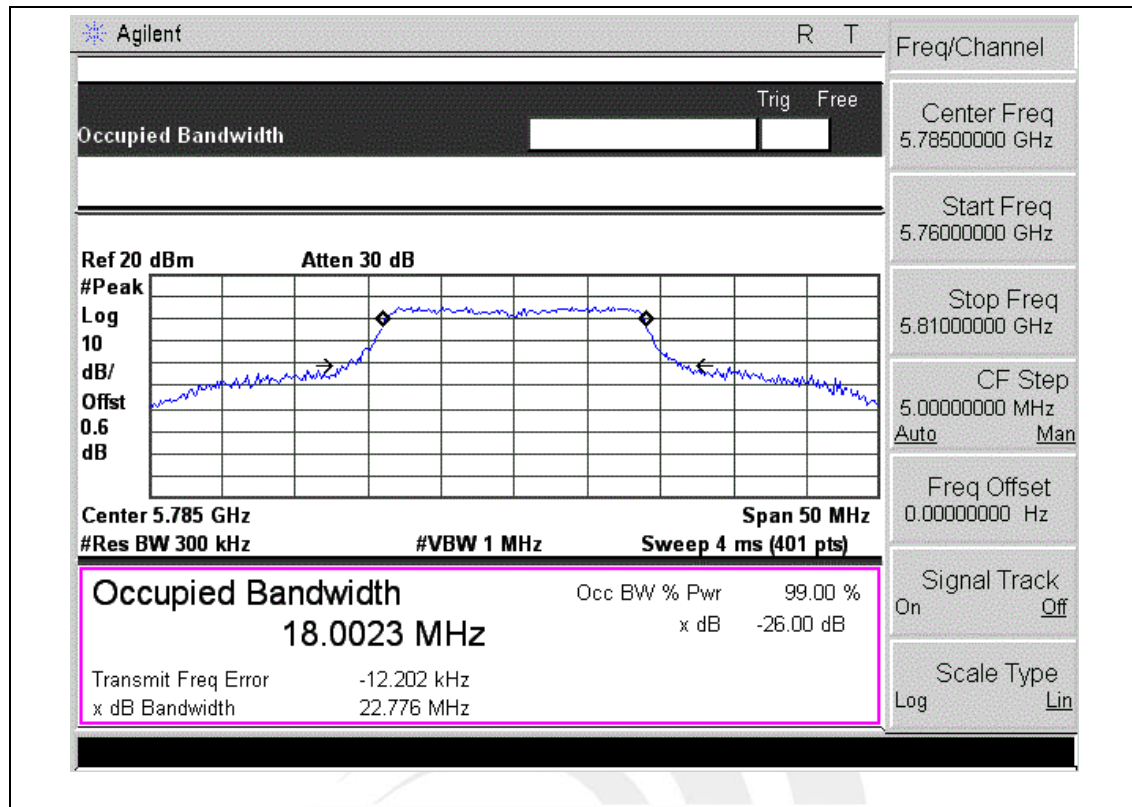
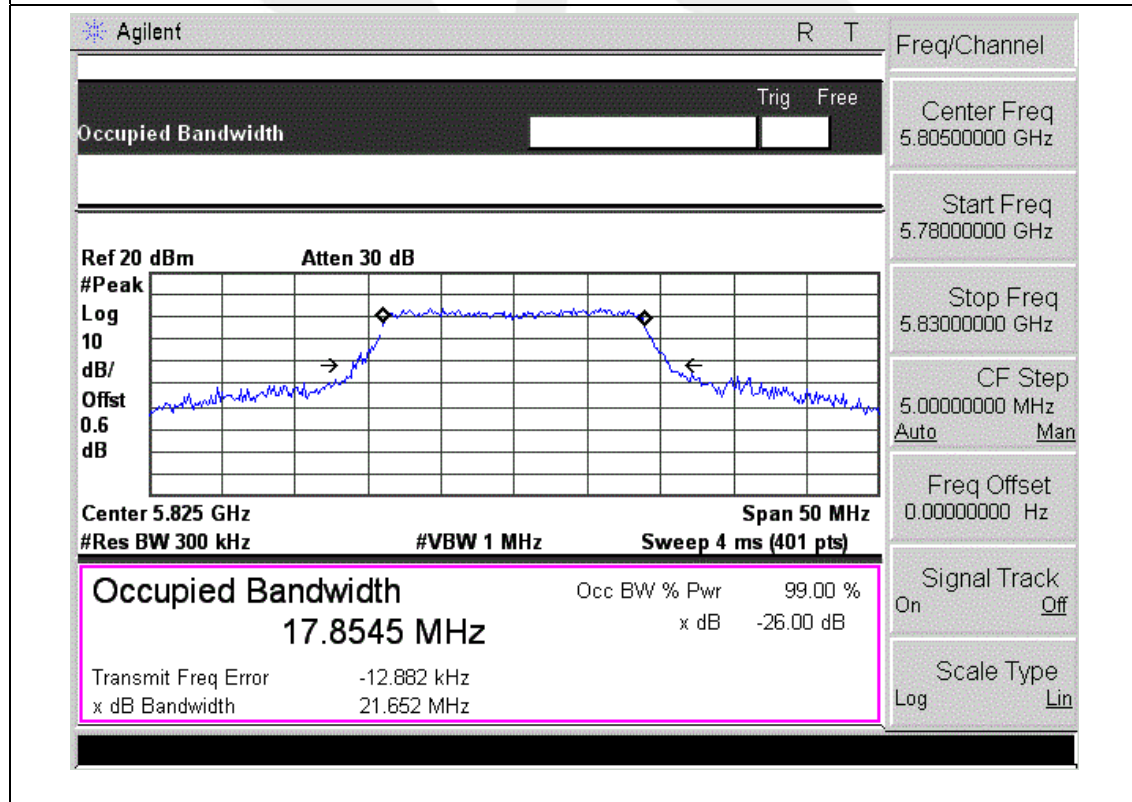




Plot on 802.11n



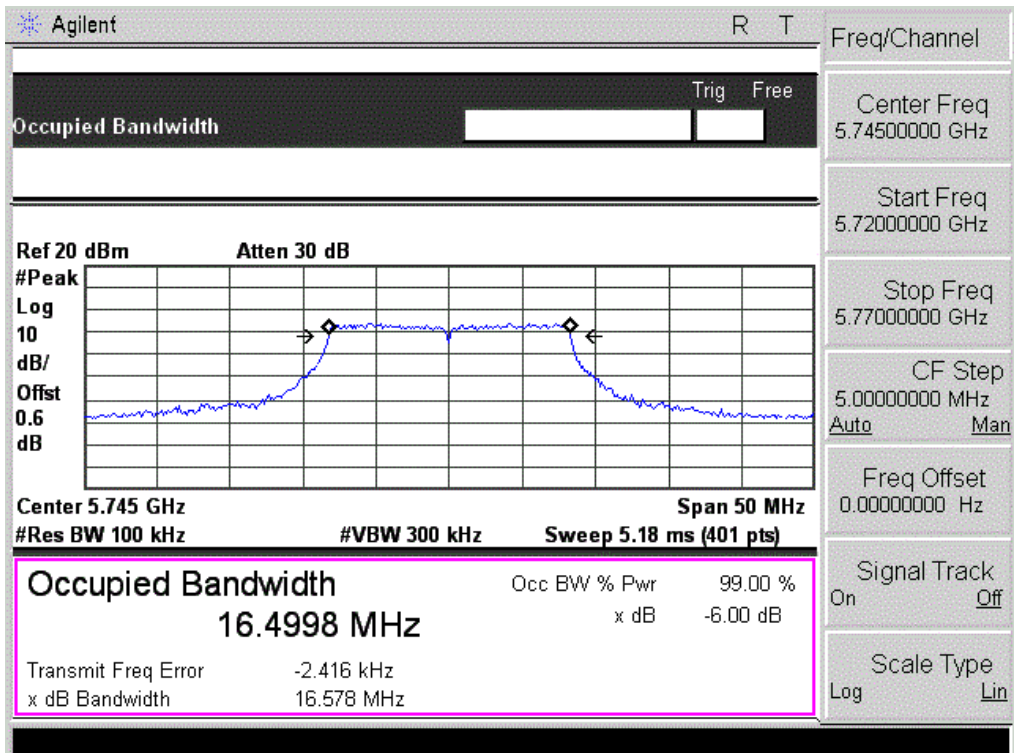
26dB &99% Bandwidth Plot on 802.11n Channel 157

**26dB & 99% Bandwidth Plot on 802.11n Channel 165**

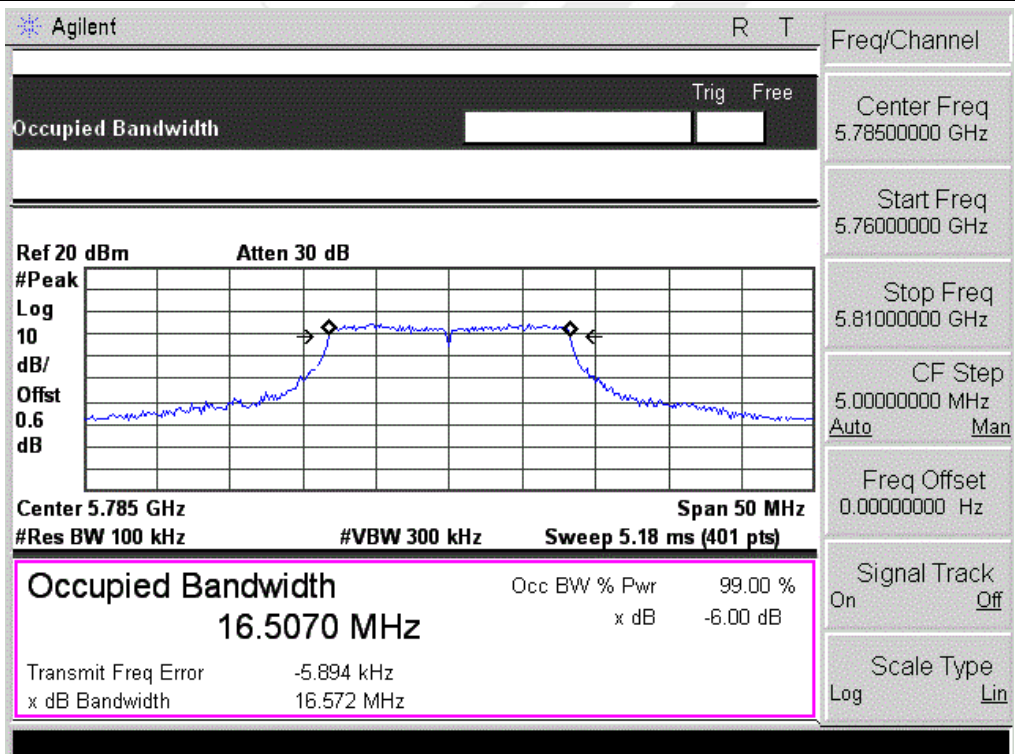


Plot on 802.11a

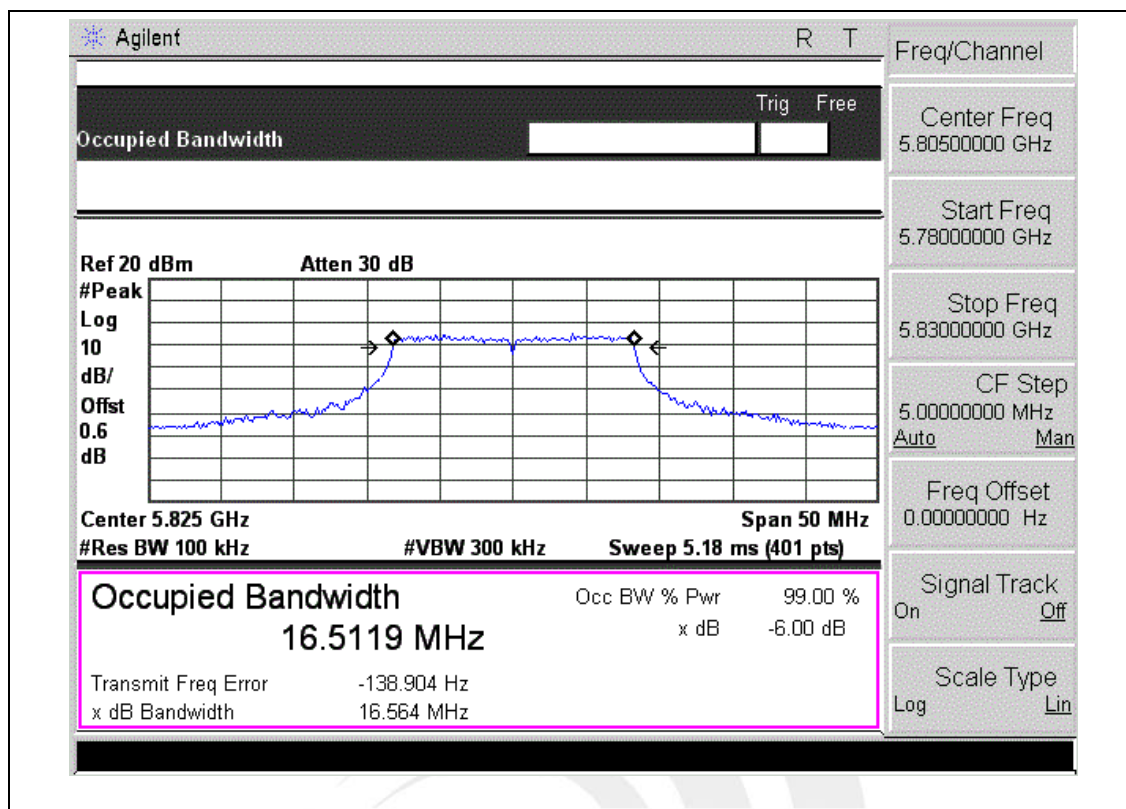
6dB Bandwidth Plot on 802.11a Channel 149



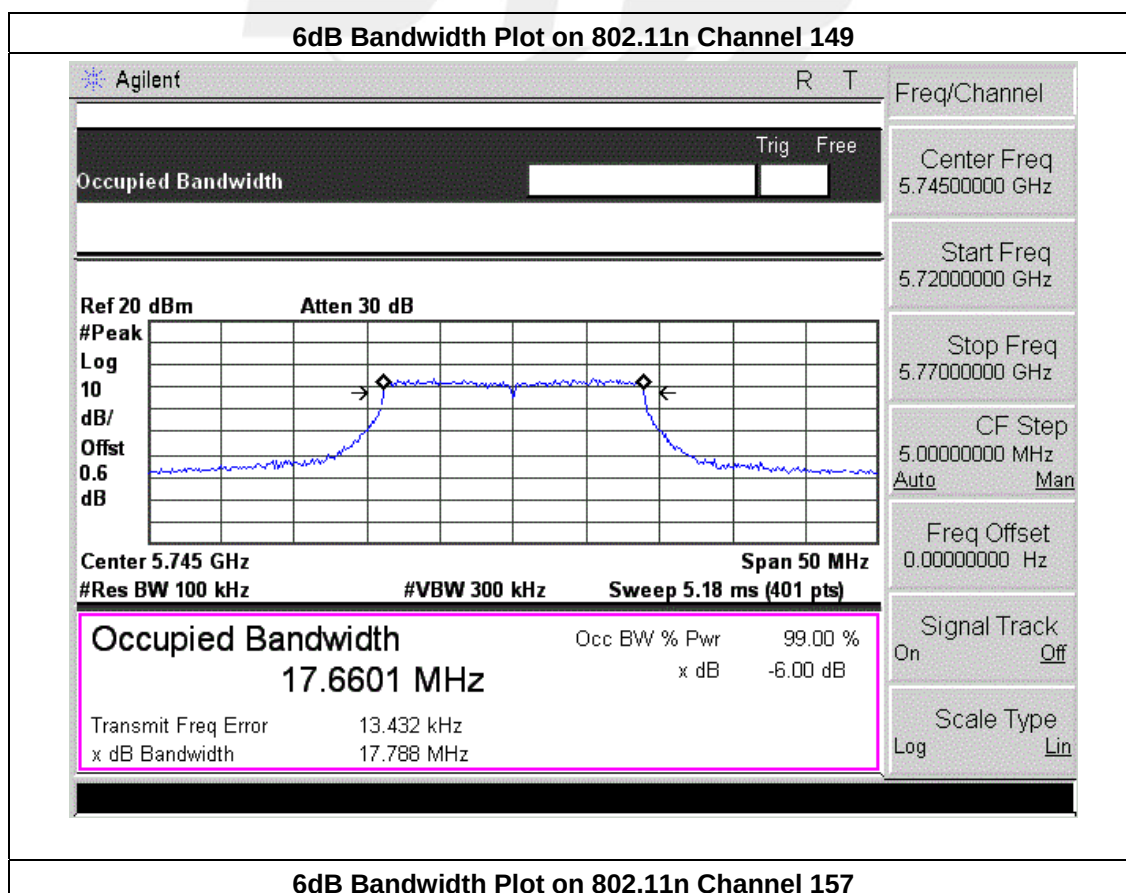
6dB Bandwidth Plot on 802.11a Channel 157



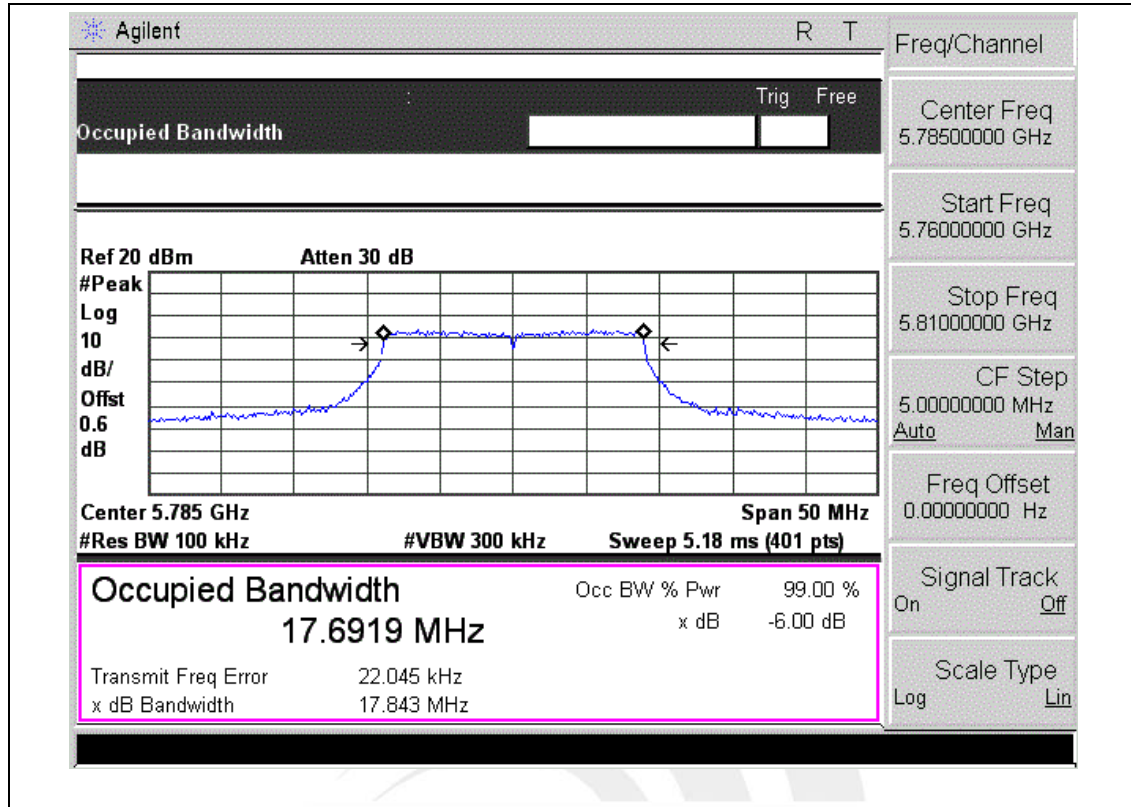
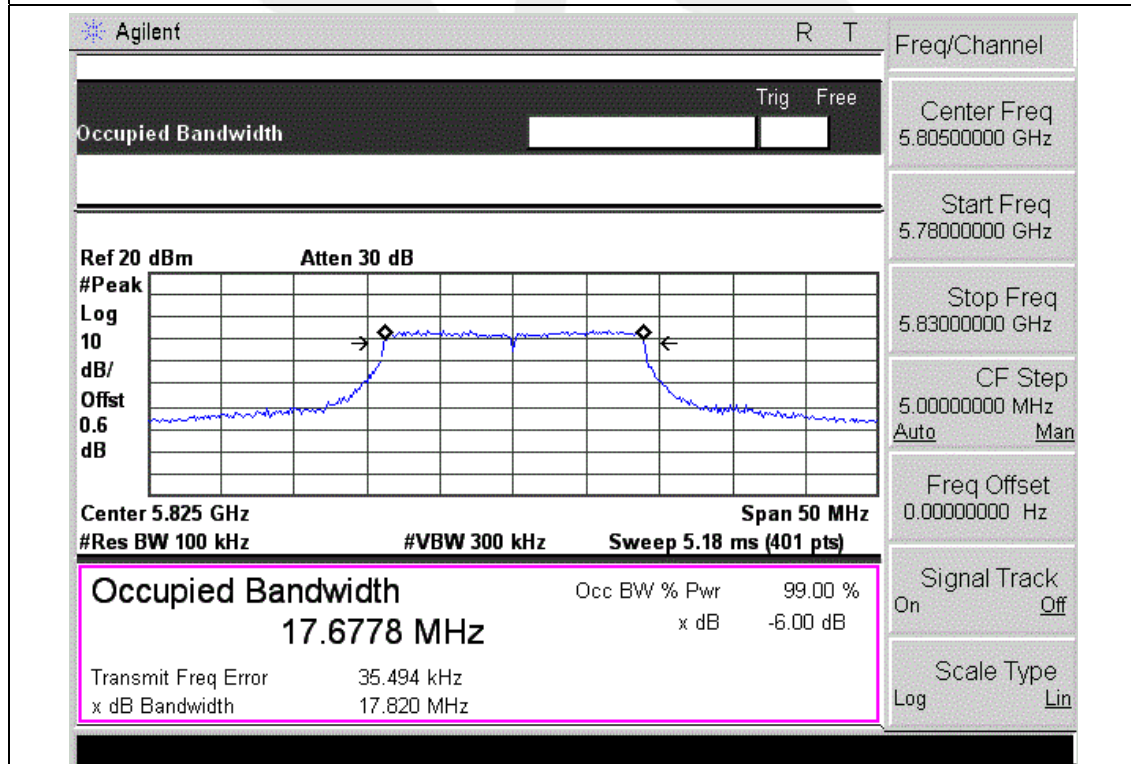
6dB Bandwidth Plot on 802.11a Channel 165



Plot on 802.11n



6dB Bandwidth Plot on 802.11n Channel 157

**6dB Bandwidth Plot on 802.11n Channel 165**



6. MAXIMUM CONDUCTED OUTPUT POWER

6.1 APPLIED PROCEDURES / LIMIT

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

FCC Part15 (15.407) , Subpart E

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(E)(3)	Peak Output Power	1 watt or 30dBm	5725-5825	PASS

6.1.1 TEST PROCEDURE

The EUT was directly connected to the Power Sensor&Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.



6.1.5 TEST RESULTS

EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/n		

Test Channe	Frequency	Total Output Power	LIMIT
	(MHz)	dBm	dBm
802.11a			
149	5745	11.47	30
157	5785	11.30	30
165	5825	11.67	30
802.11n			
149	5745	10.78	30
157	5785	10.44	30
165	5825	10.30	30

Note:

1. For the band 5.745-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W

7. PEAK EXCURSION RATIO MEASUREMENT

7.1 STANDARD REQUIREMENT

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

7.2 MEASURING INSTRUMENTS

See list of measuring instruments of this test report.

7.3 TEST PROCEDURES

1. The transmitter output is connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
 - * Set RBW = 1 MHz.
 - *Set VBW $\leq$ 3 MHz.
 - *Detector = peak.
 - *Trace mode = max-hold.
 - *Allow the sweeps to continue until the trace stabilizes.
 - *Use the peak search function to find the peak of the spectrum.
4. Use the procedure found under section 3.3 to measure the PPSD.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

7.4 TEST SETUP



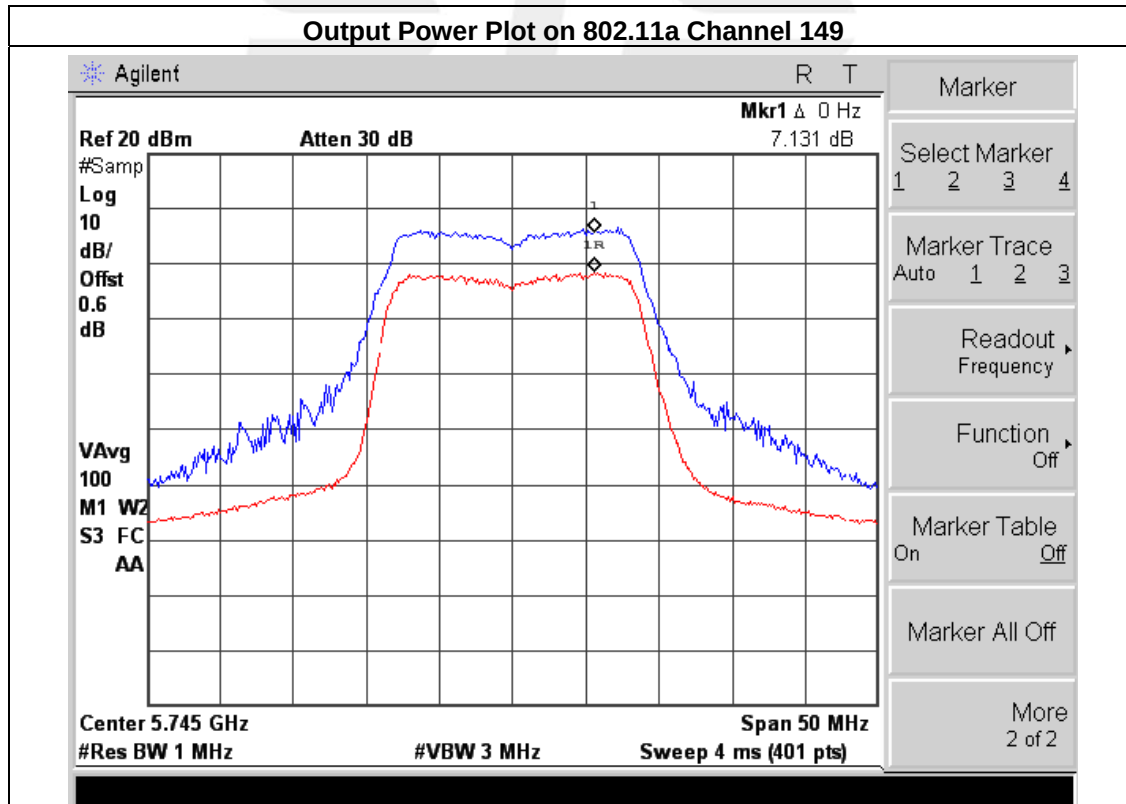


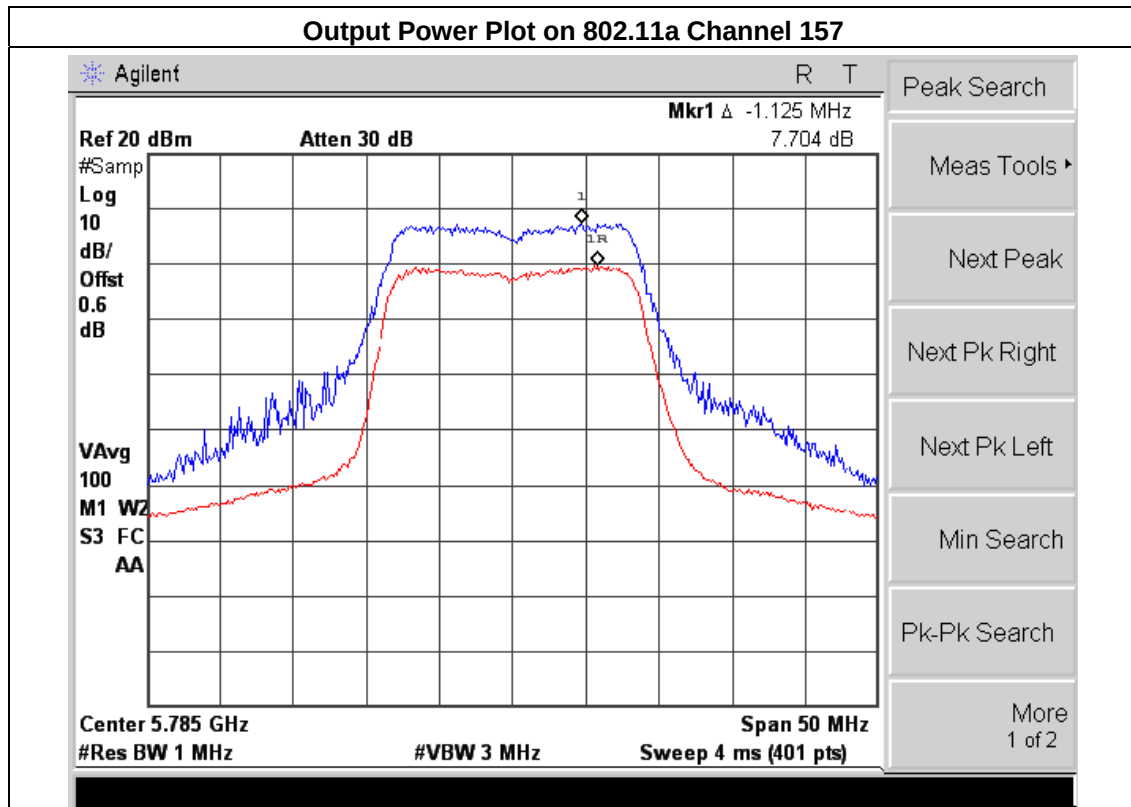
7.5 TEST RESULT OF PEAK EXCURSION RATIO

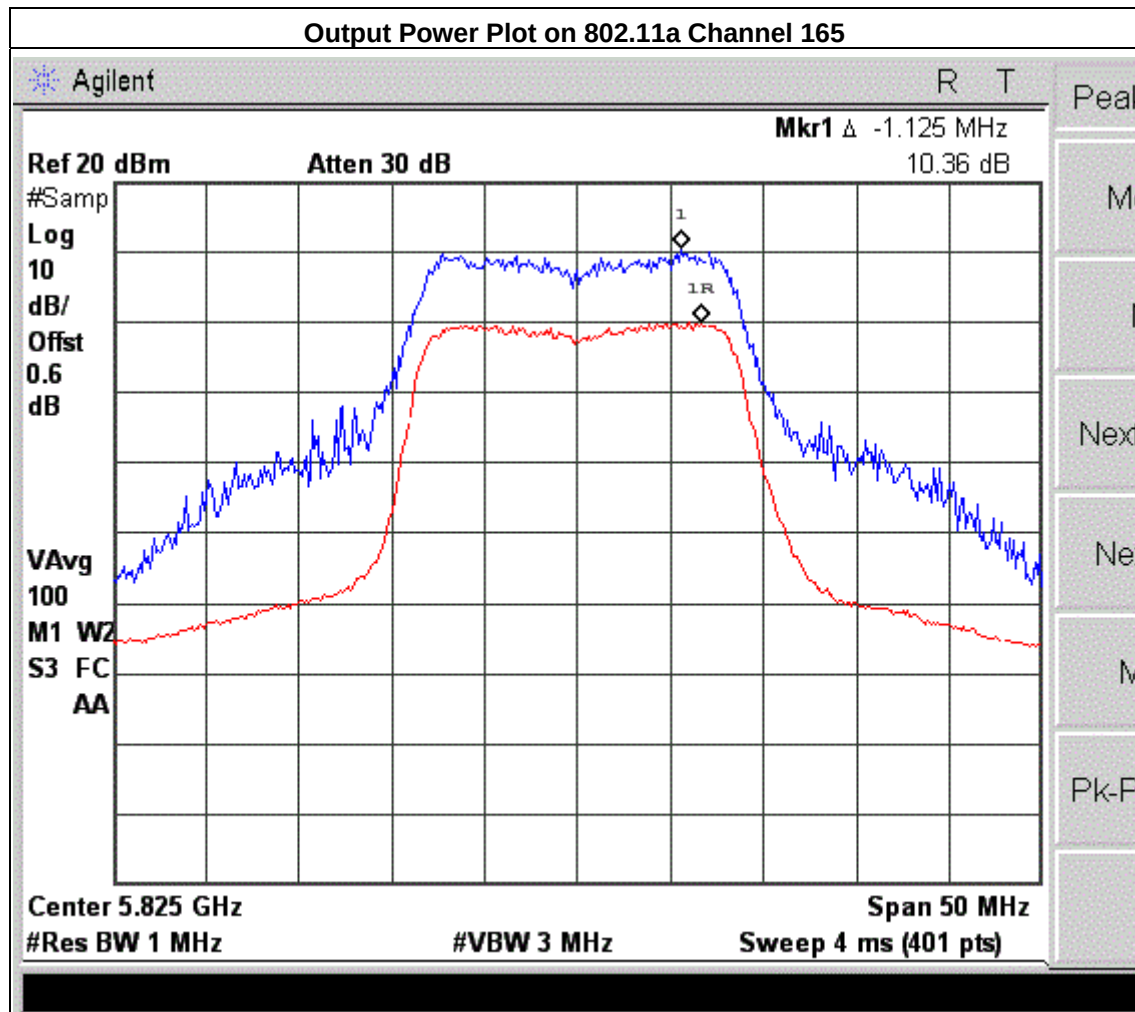
EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/n		

802.11a Mode					
Test Channe	Frequency	Peak	AV	Excursion Ratio	LIMIT
	(MHz)	dB		dB	
149	5745	7.131	-1.231	8.362	13
157	5785	7.704	-0.342	8.046	13
165	5825	7.360	-1.542	8.902	13
802.11n(20) Mode					
149	5745	7.889	-1.212	6.677	13
157	5785	7.772	-0.452	7.320	13
165	5825	7.553	-0.121	7.432	13

Plot on 802.11a



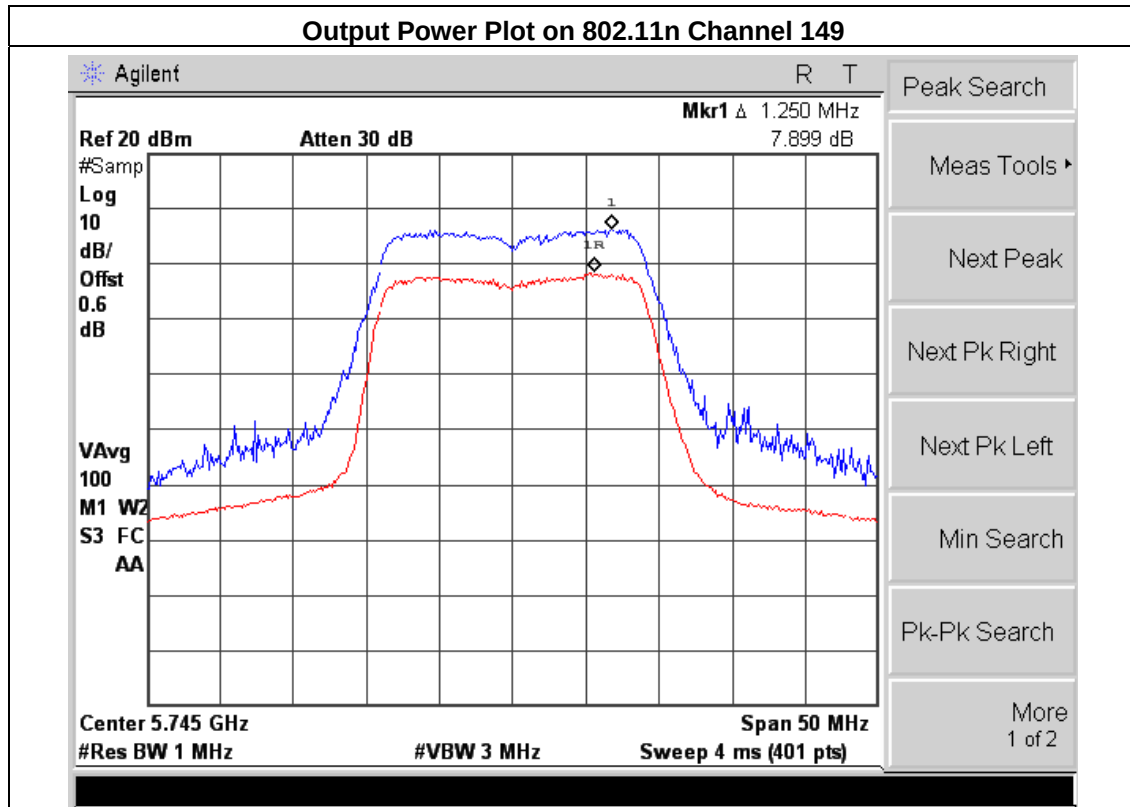




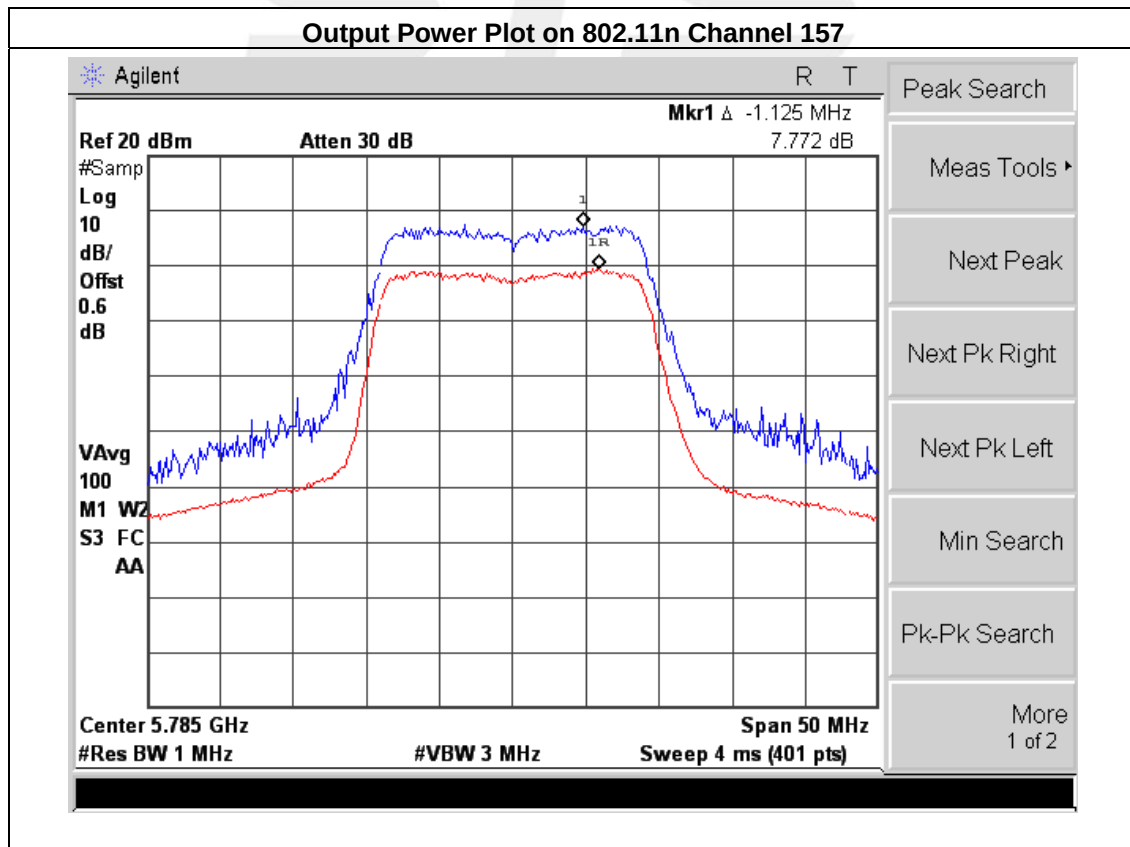


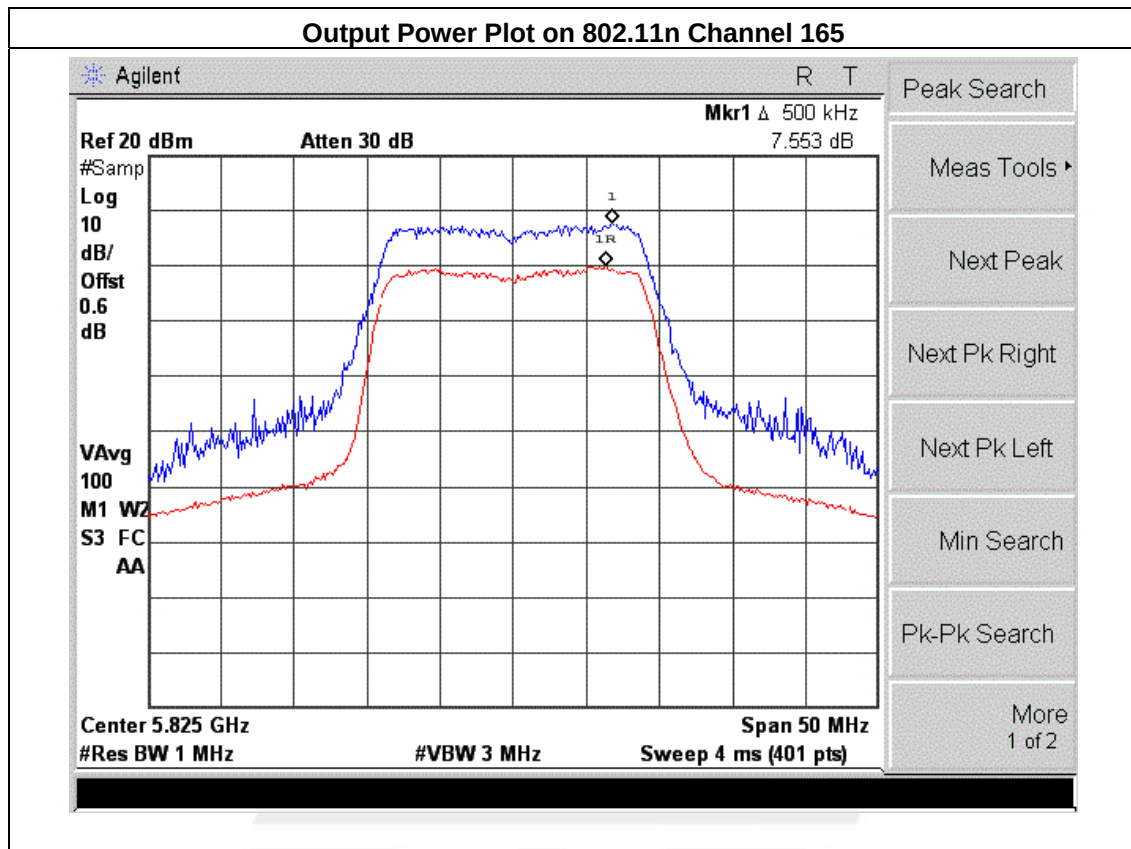
Plot On 802.11n

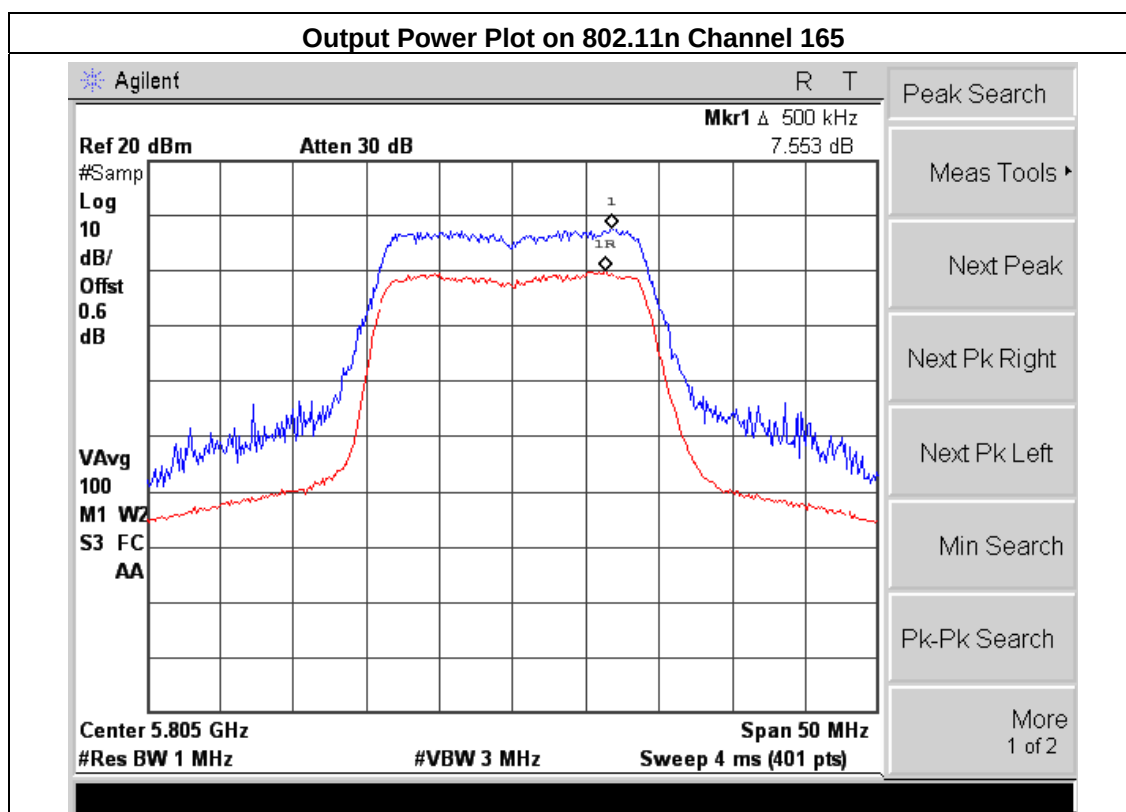
Output Power Plot on 802.11n Channel 149



Output Power Plot on 802.11n Channel 157







7. FREQUENCY STABILITY MEASUREMENT

7.1 LIMIT OF FREQUENCY STABILITY

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an Emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

7.2 MEASURING INSTRUMENTS

See list of measuring instruments of this test report.

7.3 TEST PROCEDURES

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

8.4 TEST SETUP





EUT :	2.4G & 5G WiFi module	Model Name :	HR8811AUU3
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.3V
Test Mode :	802.11a/n		

Voltage Vs. Frequency Stability:

Voltage	Measurement Frequency(MHz)
(V)	5785
126.50	5784.9647
110.00	5784.9646
93.50	5784.9641
Max.Deviation(MHz)	0.035900
Max.Deviation(ppm)	6.90

Temperature Vs. Frequency Stability:

Temperature	Measurement Frequency(MHz)
(°C)	5785
-30	5785.9656
-20	5785.9648
-10	5785.9660
0	5785.9646
10	5785.9675
20	5785.9645
30	5785.9668
40	5785.9664
50	5785.9666
Max.Deviation(MHz)	0.035500
Max.Deviation(ppm)	6.82



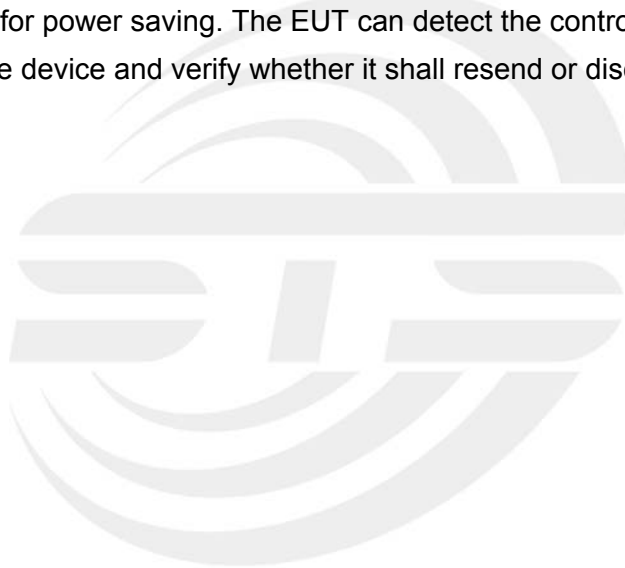
8. AUTOMATICALLY DISCONTINUE TRANSMISSION

8.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

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

8.2 TEST RESULT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission





9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

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

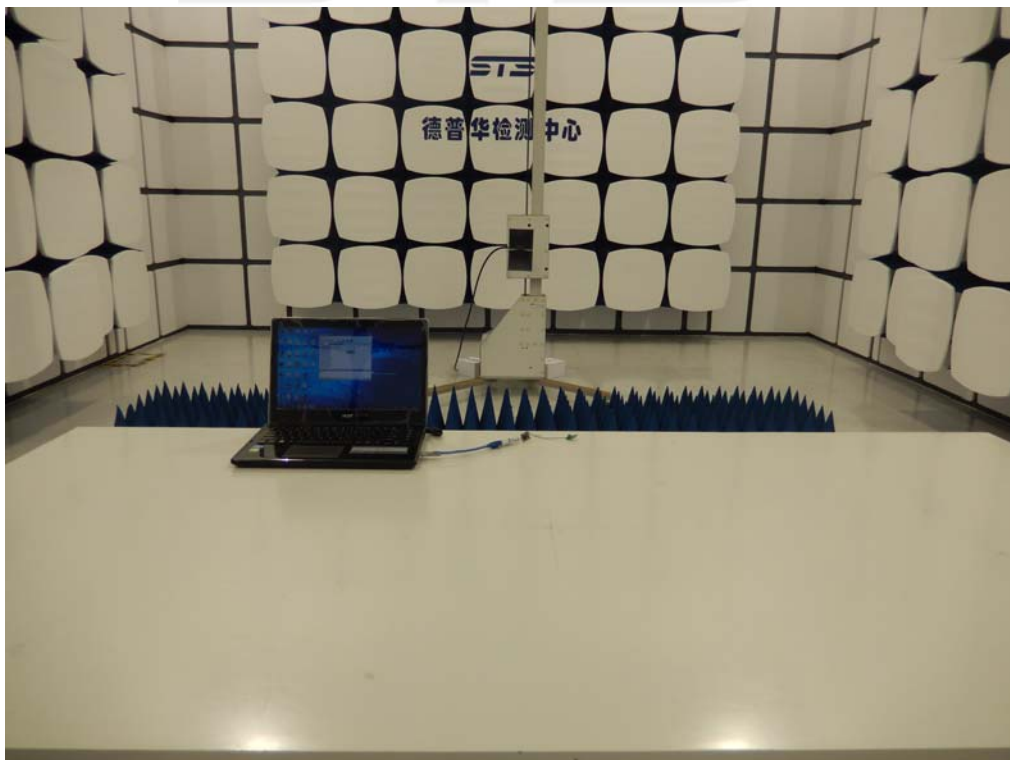
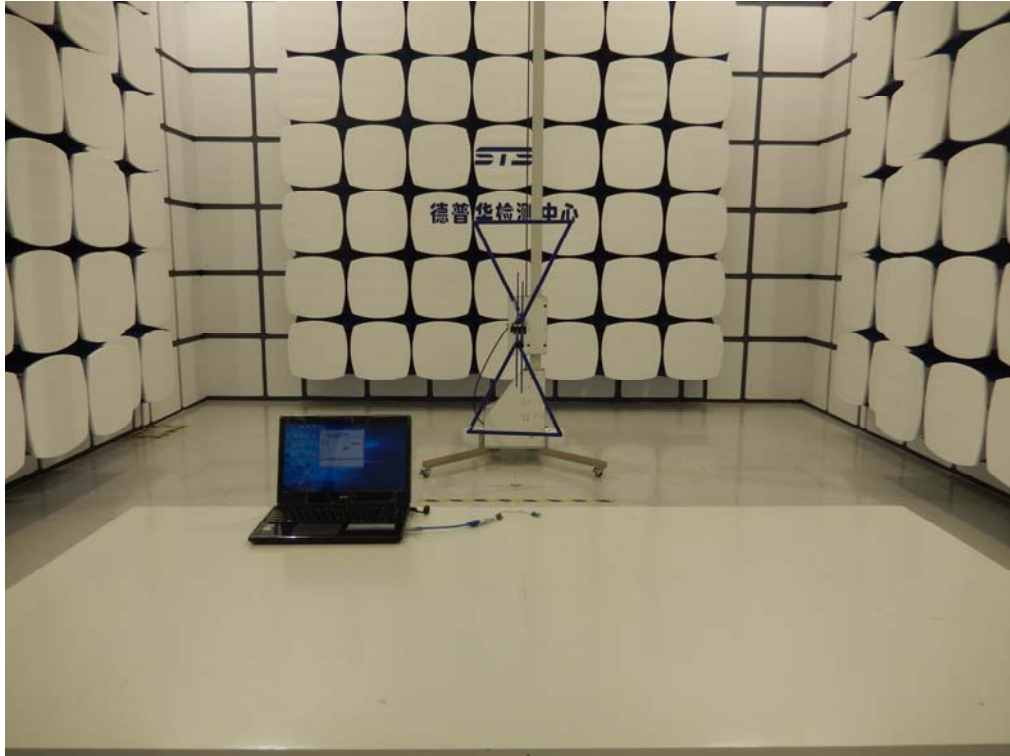
9.2 EUT ANTENNA

The EUT antenna is unique connector antenna. It comply with the standard requirement.

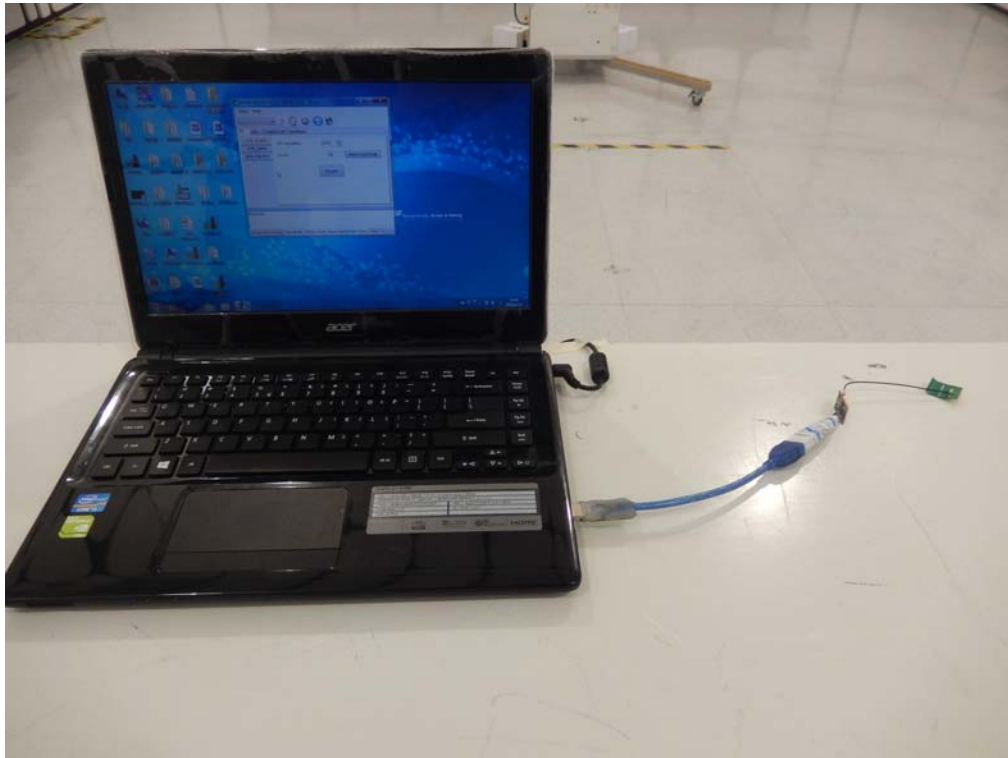


10. EUT TEST PHOTO

Radiated Measurement Photos



Radiation from close range



Conducted Measurement Photos



Conducted from close range

