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ТЕ	ST REPORT			
Report Reference No.    :      Project No.    :      FCC ID.    :      Applicant's name.    :      Address.    :	CHTEW18120061 Report vo SQ201811044401EW 2ALAVU800B Haier International Business Corpo Room 1602, 16th Floor, Tower A, No. Lao Shan District, Qingdao, Shandong	1 Ke Yuan Wei Yi Road, g, China		
Manufacturer Address <b>Test item description</b> Trade Mark	Haier International Business Corporation Limited Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China <b>Tablet PC</b>			
Model/Type reference: Listed Model(s):	Ceibal U800B -	Section 45 407		
Standard: Date of receipt of test sample: Date of testing Date of issue	FCC CFR Title 47 Part 15 Subpart E Dec 04, 2018 Dec 05, 2018- Dec13, 2018 Dec 14, 2018	Section 15.407		
Result         Compiled by         ( position+printedname+signature):         Supervised by	PASS File administrators Silvia Li	Silvia Li Acces Econo		
(position+printedname+signature): Approved by (position+printedname+signature):	Project Engineer Aaron Fang RF Manager Hans Hu	Aaron.Fang Homsty		
Testing Laboratory Name       :         Address       :	Shenzhen Huatongwei Internationa 1/F, Bldg 3, Hongfa Hi-tech Industrial Tianliao, Gongming, Shenzhen, China	Park, Genyu Road,		

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The test report merely correspond to the test sample.

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# 1. TEST STANDARDS AND REPORT VERSION

# 1.1. Test Standards

The tests were performed according to following standards: <u>FCC Rules Part 15.407</u>: General technical requirements.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

KDB789033 D02 v02r01: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

# 1.2. Report Version

Revision No.	Date of issue	Description
N/A	2018-12-14	Original

# 2. TEST DESCRIPTION

Test Item	FCC Rule	Result	Test Engineer
Antenna Requirement	15.203	PASS	Xiaokang Tan
Line Conducted Emissions (AC Main)	15.207	PASS	Tony Duan
Maximum Conducted Output Power	15.407(a)	PASS	Xiaokang Tan
Maximum Power Spectral Density	15.407(a)	PASS	Xiaokang Tan
26dB Bandwidth and 99% Ocuppy bandwith	15 407(3)		Xiaokang Tan
6dB Bandwidth	15.407(a)	PASS	Xiaokang Tan
Band edge	15.407(b)	PASS	Xiaokang Tan
Radiated Spurious Emissions	15.209	PASS	Shower Dai
Frequency Stability	15.407(g)	PASS	Shower Dai

Remark: The measurement uncertainty is not included in the test result.

# 3. SUMMARY

# 3.1. Client Information

Applicant:	Haier International Business Corporation Limited	
Address:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China	
Manufacturer: Haier International Business Corporation Limited		
Address:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China	

# 3.2. Product Description

Name of EUT	Tablet PC				
Trade Mark:	Ceibal				
Model No.:	U800B				
Listed Model(s):	-				
Power supply:	DC 3.7V				
Adapter information :	Model:BSY01J3050200UU Input:100-240Va.c. 50/60Hz 0.3A Output:5.0Vd.c. 2.0A				
5G WIFI	5G WIFI				
Supported type:	🖾 802.11a	🛛 802.11n(HT20)	🛛 802.11n(HT40)		
Function:	Outdoor AP	Indoor AP Fixed P2P			
	⊠ Client				
DFS type:	master devices	Slave devices with radar detection	Slave devices without radar detection		
Modulation:	BPSK, QPSK, 16QAM, 6	64QAM			
Operation frequency:	Band I:	5150MHz~5250MHz			
	Band II:	5250MHz~5350MHz			
	Band III:	5470MHz~5725MHz			
	Band IV:	5725MHz~5850MHz			
Supported Bandwidth	20MHz:	802.11n, 802.11a			
	40MHz:	802.11n			
Antenna type:	FTP Antenna				
Antenna gain:	2.3dBi				

# 3.3. Operation state

# Frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

		201	ЛНz	40MHz		
Band	Test Channel	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
	CH∟	36	5180	38	5190	
I	СН <sub>м</sub>	44	5220	-	-	
	СН <sub>Н</sub>	48	5240	46	5230	
	CH∟	52	5260	54	5270	
II	CH <sub>M</sub>	56	5280	-	-	
	СН <sub>Н</sub>	64	5320	62	5310	
	CH∟	100	5500	102	5510	
Ш	CH <sub>M</sub>	120	5600	118	5590	
	CH <sub>H</sub>	140	5700	134	5670	
	CH∟	149	5745	151	5755	
IV	CH <sub>M</sub>	157	5785	-	-	
	CH <sub>H</sub>	165	5825	159	5795	

# Data Rated

Preliminary tests were performed in different data rate, and found which the below bit rate is worst case mode, so only show data which it is a worst case mode.

Mode	Data rate (worst mode)
802.11a	6Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0

# Test mode

#### For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).

For AC power line conducted emissions:

The EUT was set to connect with the WLAN AP under large package sizes transmission.

For Radiated suprious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

# 3.4. EUT configuration

#### The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- supplied by the lab

<ul> <li>N/A</li> </ul>	Manufacturer :	N/A	
0		Model No. :	N/A
0	• N/A	Manufacturer :	N/A
0		Model No. :	N/A

# 3.5. Modifications

No modifications were implemented to meet testing criteria.

# 4. TEST ENVIRONMENT

# 4.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd. Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China Phone: 86-755-26748019 Fax: 86-755-26748089

# 4.2. Test Facility

#### CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

#### IC-Registration No.:5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377B-1.

# ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

# 4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

# 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.63 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.63 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.35 dB	(1)
Radiated Emissions below 1GHz	4.28 dB	(1)
Radiated Emissions above 1GHz	5.16 dB	(1)
Occupied Bandwidth	69 Hz	(1)
Frequency error	69 Hz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

# 4.5. Equipments Used during the Test

Conducted Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	10/27/2018	10/26/2019
2	Artificial Mains	SCHWARZBECK	NNLK 8121	573	10/27/2018	10/26/2019
3	Pulse Limiter	R&S	ESH3-Z2	101488	10/27/2018	10/26/2019
4	RF Connection Cable	HUBER+SUHNER	EF400	N/A	11/14/2017	11/13/2019
5	Test Software	R&S	ES-K1	N/A	N/A	N/A
6	Temperature and Humidity Meter	MIAOXIN	TH10R	N/A	10/30/2018	10/29/2019

Radia	ted Emissions(Below 1GHz	)				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	C11121	09/30/2018	09/29/2021
2	EMI Test Receiver	R&S	ESCI	100900	10/28/2018	10/27/2019
3	Loop Antenna	R&S	HFH2-Z2	100020	04/02/2018	04/02/2021
4	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	04/05/2017	04/04/2020
5	RF Connection Cable	HUBER+SUHNER	N/A	N/A	09/28/2018	09/27/2019
6	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	09/28/2018	09/27/2019
7	Test Software	R&S	ES-K1	N/A	N/A	N/A
8	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
9	Antenna Mast	Maturo Germany	TAM-4.0-P	N/A	N/A	N/A
10	Temperature and Humidity Meter	KEJIAN	KJ03	N/A	10/30/2018	10/29/2019

Radia	ted Emissions(Above 1GH	z)				
ltem	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Anechoic Chamber	Albatross projects	SAC-3m-01	C11121	09/30/2018	09/29/2021
2	Horn Antenna	SCHWARZBECK	9120D	1011	03/27/2017	03/26/2020
3	Preamplifier	BONN	BLWA0160-2M	1811887	11/14/2018	11/13/2019
4	Pre-amplifier	SCHWARZBECK	BBV 9743	9743-0022	10/17/2018	10/16/2019
5	Broadband Pre-amplifier	SCHWARZBECK	BBV 9718	9718-248	04/28/2018	04/27/2019
6	Spectrum Analyzer	R&S	FSP40	100597	10/27/2018	10/26/2019
7	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	11/15/2018	11/14/2019
8	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	11/15/2018	11/14/2019
9	Test Software	Audix	E3	N/A	N/A	N/A
10	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
11	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A
12	Temperature and Humidity Meter	MINGLE	YH101	N/A	10/30/2018	10/29/2019

RF Cor	nducted Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Spectrum Analyzer	R&S	FSV40	100048	10/28/2018	10/27/2019
2	EXA Signal Analyzer	Agilent	N9020A	MY5050187	09/29/2018	09/28/2019
3	OSP	R&S	OSP120	101317	N/A	N/A

# 5. TEST CONDITIONS AND RESULTS

# 5.1. Antenna requirement

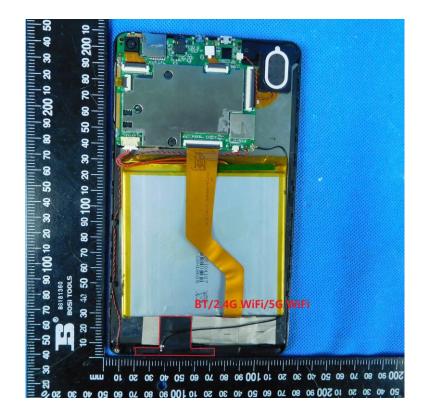
# **Requirement**

#### FCC CFR Title 47 Part 15 Subpart C Section 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. The use of a permanently attached antenna or of anantenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

# Test Result:

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



# 5.2. Conducted Emissions (AC Main)

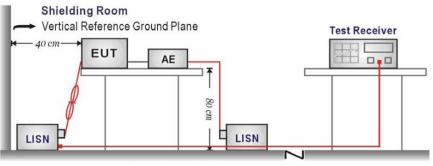
# <u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

	Limit (d	BuV)
Frequency range (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

#### **TEST CONFIGURATION**



→ Horizontal Ground Reference Plane →

# TEST PROCEDURE

- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
- 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 7. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 8. During the above scans, the emissions were maximized by cable manipulation.

# TEST MODE:

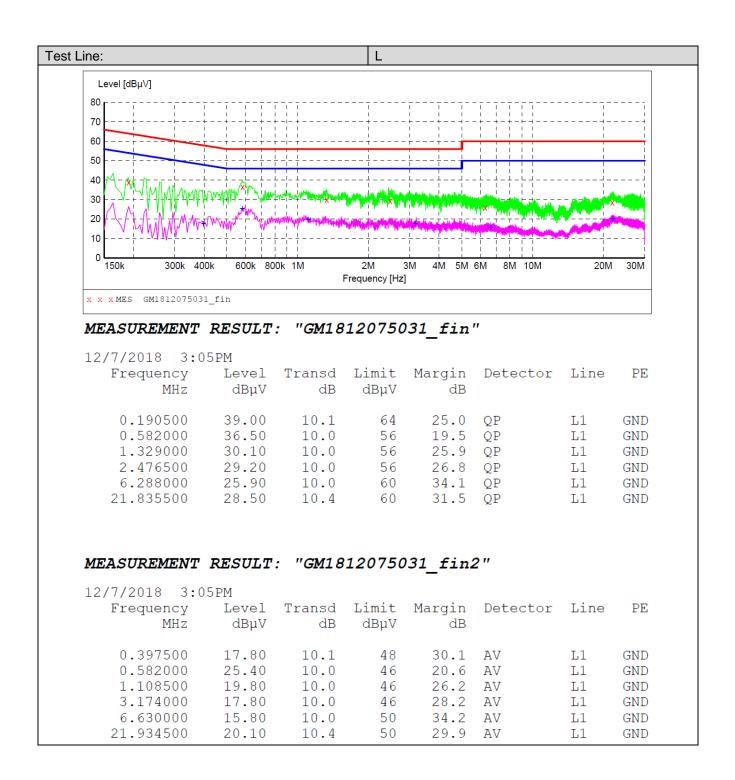
Please refer to the clause 3.3

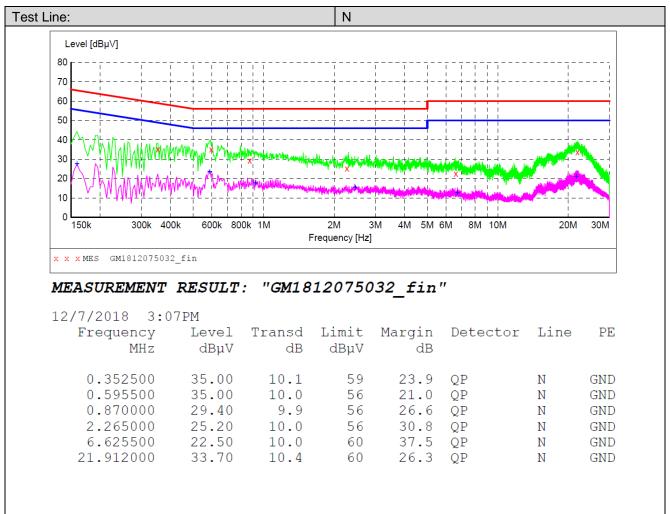
#### TEST RESULTS

#### ☑ Passed □ Not Applicable

Note:

- 1) Transd=Cable lose+ Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit -Level





MEASUREMENT RESULT: "GM1812075032 fin2"

12/7/2018 3 Frequency MHz	Level	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000 0.586500		10.1 10.0	56 46	28.0 22.6		N N	GND GND
0.919500		9.9	46			N	GND
2.454000	15.40	10.0	46	30.6	AV	Ν	GND
6.729000	12.70	10.0	50	37.3	AV	Ν	GND
21.669000	21.00	10.4	50	29.0	AV	Ν	GND

# 5.3. Maximum Conducted Output Power

# <u>LIMIT</u>

# FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

#### For the 5.15~5.25GHz band:

Outdoor AP

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm). if  $G_{Tx}$ >6dBi, then  $P_{out}$  =30-( $G_{Tx}$ -6). e.i.r.p. at any elevation angle above 30 degrees  $\leq$ 125mW (21dBm)

Indoor AP

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 1W (30dBm). if  $G_{Tx}$ >6dBi, then Pout =30-( $G_{Tx}$ -6).

- Point-to-point AP The maximum conducted output power (P<sub>out</sub>) shall not exceed the lesser of 1W (30dBm).
  - if  $G_{Tx}$ >23dBi, then Pout =30-( $G_{Tx}$ -23).
- Client devices

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250W (24dBm). if  $G_{Tx}$ >6dBi, then Pout =24-( $G_{Tx}$ -6).

#### For the 5.25~5.35GHz band:

The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250mW (24dBm) or 11dBm+10 log B, where B is the 26dB emission bandwith in MHz.

if  $G_{Tx}$ >6dBi, then  $P_{out} = 24 - (G_{Tx}-6)$ .

#### For the 5.47~5.725GHz band:

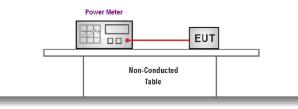
The maximum conducted output power ( $P_{out}$ ) shall not exceed the lesser of 250mW (24dBm) or 11dBm+10 log B, where B is the 26dB emission bandwith in MHz.

if  $G_{Tx}$ >6dBi, then  $P_{out}$  =24-( $G_{Tx}$ -6).

#### For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M) The maximum conducted output power (P<sub>out</sub>) shall not exceed the lesser of 1W (30dBm). if G<sub>Tx</sub>>6dBi, then P<sub>out</sub> =30-(G<sub>Tx</sub>-6).
- Point-to-point systems (P2P)
   The maximum conducted output power (P<sub>out</sub>) shall not exceed the lesser of 1W (30dBm).

# **TEST CONFIGURATION**



# TEST PROCEDURE

- 1. The EUT was tested according to KDB789033 Section E-3-b)
- 2. The maximum conducted output power may be measured using a broadband AVG RF power meter.
- 3. Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
- 4. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
- 5. Record the measurement data.

# TEST MODE:

Please refer to the clause 3.3

# TEST RESULTSPassedIn Not Applicable

Band	Bandwidth (MHz)	Туре	Channel	Conducted Output Power (dBm)	Limit (dBm)	Result
			CH∟	13.95		
		802.11n	СН <sub>м</sub>	13.40	24.00	Pass
	20		СН <sub>Н</sub>	14.28		
	20		CH∟	13.33		
I		802.11a	СН <sub>м</sub>	12.95	24.00	Pass
			СН <sub>Н</sub>	13.06		
	40	802.11n	$CH_{L}$	13.88	24.00	Pass
	40	002.1111	СН <sub>Н</sub>	12.79	24.00	F 855
			$CH_{L}$	14.40		
		802.11n	СН <sub>м</sub>	14.81	24.00	Pass
	20		СН <sub>Н</sub>	15.44		
П	20		CH∟	15.21		
11		802.11a	СН <sub>м</sub>	15.22	24.00	Pass
			СН <sub>Н</sub>	15.18		
	40	802.11n	$CH_{L}$	14.03	24.00	Pass
	40	002.1111	СН <sub>Н</sub>	14.00	24.00	F 055

Band	Bandwidth (MHz)	Туре	Channel	Conducted Output Power (dBm)	Limit (dBm)	Result
			$CH_{L}$	12.74		
		802.11n	СН <sub>м</sub>	12.64	24.00	Pass
	20		СН <sub>Н</sub>	11.90		
	20		$CH_{L}$	12.52		
III		802.11a	СН <sub>м</sub>	12.46	24.00	Pass
			СН <sub>Н</sub>	12.02		
			$CH_{L}$	12.66		
	40	802.11n	СН <sub>м</sub>	12.04	24.00	Pass
			СН <sub>Н</sub>	10.77		
			$CH_{L}$	10.19		
		802.11n	СН <sub>м</sub>	10.74	30.00	Pass
	20		СН <sub>Н</sub>	10.53		
IV	20		$CH_{L}$	10.35		
IV		802.11a	СН <sub>м</sub>	10.90	30.00	Pass
			СН <sub>Н</sub>	10.57		
	40	802.11n	$CH_{L}$	10.84	30.00	Pass
	40	002.1111	СН <sub>н</sub>	11.18	30.00	r ass

# 5.4. Maximum Power Spectral Density

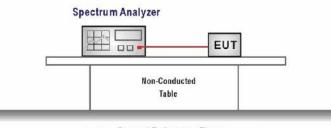
# <u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

For the 5.15~5.25GHz band:
Outdoor AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
if $G_{Tx}$ >6dBi, then PSD =17-( $G_{Tx}$ -6).
<ul> <li>Indoor AP</li> <li>The apple brack as a start close its (DOD) shall not exceed the langes of 47 dDm (ML).</li> </ul>
The peak power spectral density (PSD) shall not exceed the lesser of $17$ dBm/MHz.
if G <sub>Tx</sub> >6dBi, then PSD =17-(G <sub>Tx</sub> -6). ● Point-to-point AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
if $G_{Tx}$ >23dBi, then PSD =17-( $G_{Tx}$ -23).
Client devices
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
if $G_{Tx}$ >6dBi, then PSD =11-( $G_{Tx}$ -6).
For the 5.25~5.35GHz band:
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if $G_{Tx}$ >6dBi, then PSD =11-( $G_{Tx}$ -6).
For the 5.47~5.725GHz band:
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
if $G_{Tx}$ >6dBi, then PSD =11-( $G_{Tx}$ -6).
For the 5.725~5.85GHz band:
<ul> <li>Point-to-multipoint systems (P2M)</li> </ul>
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

- if  $G_{Tx}$ >6dBi, then PSD =30-( $G_{Tx}$ -6).
- Point-to-point systems (P2P)
   The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

# TEST CONFIGURATION



👄 Ground Reference Plane 🝝

# TEST PROCEDURE

- 1. According KDB 789033 D02 Section F
- 2. Analyzer was setting as follow:
  - Center frequency: test channel

Span was set to encompass the entire emission bandwidth of the signal RBW=1MHz for devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz RBW=500kHz for devices operating in the band 5.725-5.85 GHz VBW  $\geq$  3 RBW Number of sweep points > 2 x (span/RBW) Sweep time = auto Detector = Peak Trigger was set to free run for all modes, trace was averaged over 100 sweeps

3. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

# TEST MODE:

Please refer to the clause 3.3

# TEST RESULTS

⊠ Passed

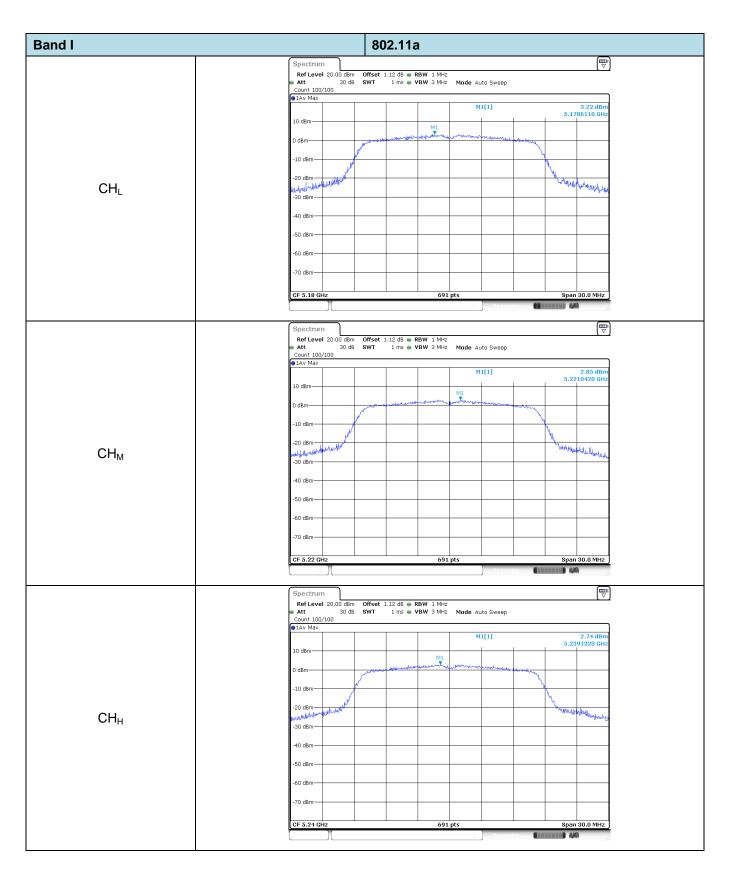
```
    Not Applicable
```

Band	Bandwidth (MHz)	Туре	Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
			CH∟	4.20		
		802.11n	CH <sub>M</sub>	3.22	11.00	Pass
	20		CH <sub>H</sub>	3.57		
	20		CH∟	3.22		
		802.11a	$CH_M$	2.85	11.00	Pass
			СН <sub>н</sub>	2.74		
	40	802.11n	CH∟	0.87	11.00	Pass
	40	002.1111	CH <sub>H</sub>	-1.08	11.00	F 855
			CH∟	4.08		
		802.11n	$CH_M$	5.06	11.00	Pass
	20		CH <sub>H</sub>	5.65		
1	20		CH∟	5.08		
		802.11a	CH <sub>M</sub>	5.22	11.00	Pass
			CH <sub>H</sub>	5.05		
	40	802.11n	CH∟	0.77	11.00	Pass
	40	002.1111	CH <sub>H</sub>	0.54	11.00	F 033

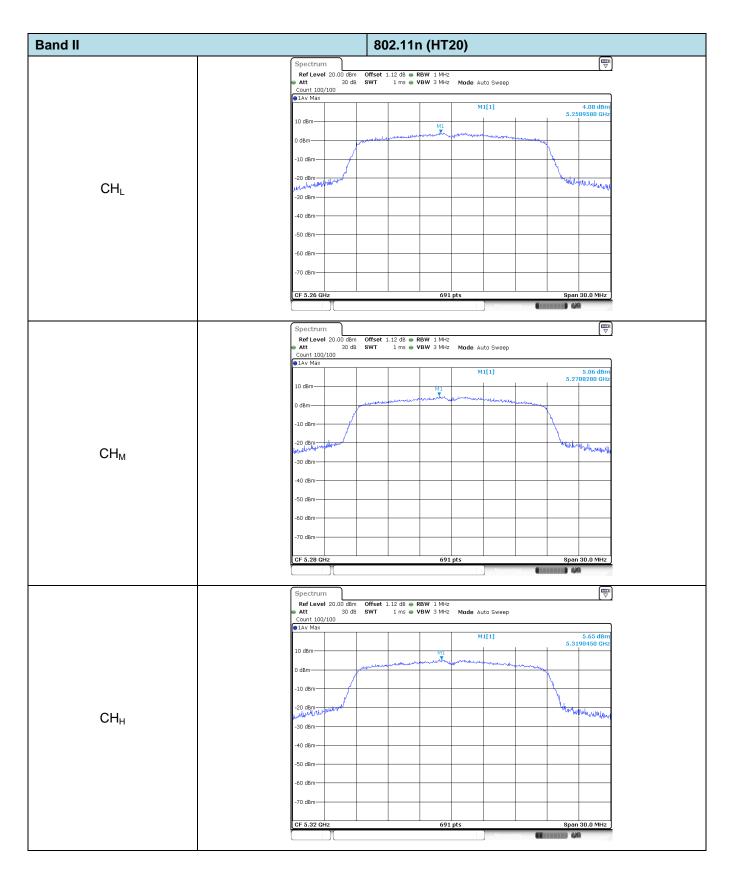
Band	Bandwidth (MHz)	Туре	Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
			$CH_{L}$	2.64		
		802.11n	$CH_{M}$	2.51	11.00	Pass
	20		СН <sub>н</sub>	1.79		
	20		CH∟	2.64		
Ш		802.11a	CH <sub>M</sub>	2.32	11.00	Pass
			СН <sub>н</sub>	2.23		
			CH∟	-0.86		
	40	802.11n	$CH_{M}$	-1.24	11.00	Pass
			СН <sub>н</sub>	-2.84		
Band	Bandwidth (MHz)	Туре	Channel	Power Spectral Density (dBm/500kHz)	Limit (dBm/500KHz)	Result
			CH∟	-1.03		
		802.11n	CH <sub>M</sub>	-0.48	30.00	Pass
	20		СН <sub>н</sub>	-0.89		
IV	20		$CH_{L}$	-0.59		
IV		802.11a	CH <sub>M</sub>	-0.34	30.00	Pass
			СН <sub>н</sub>	-0.98		
	40	802.11n	CH∟	-3.85	30.00	Pass
	40	002.1111	CH <sub>H</sub>	-3.29	30.00	F 033

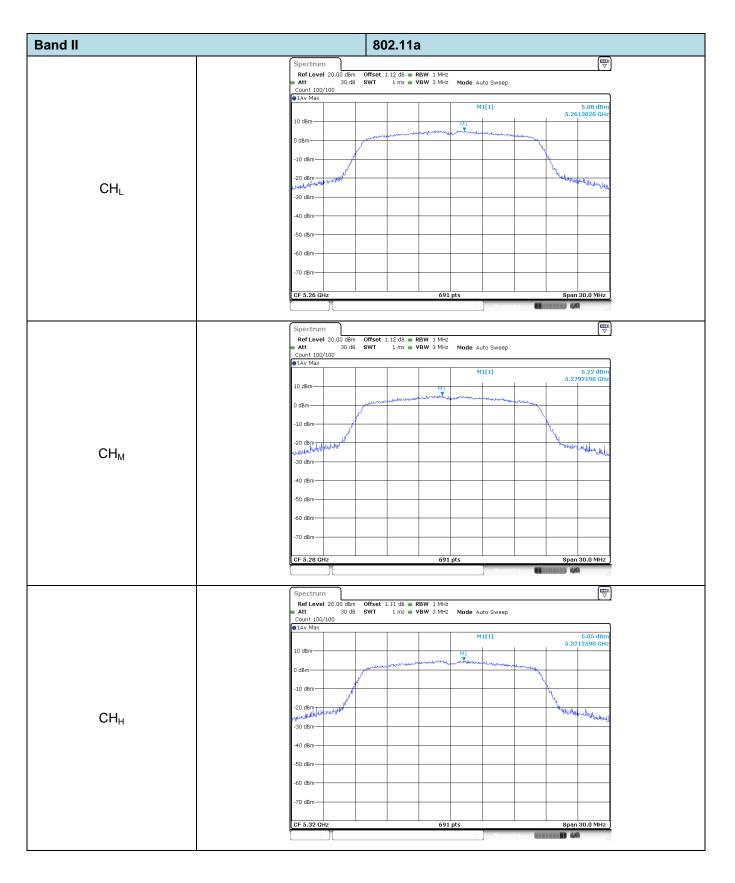
Test plot as follows:

Band I	802.11n (HT20)
	Spectrum         Image: Control of the sector of the
	Color Max
	-10 dBm
CHL	-20 dBm
	-50 dBm
	-70 dBm CF 5.18 GHz 691 pts Span 30.0 MHz
	Spectrum         (₩)           RefLevel 20.00 dBm         Offset 1.12 dB ● RBW 1 MHz           Att         30 dB         SWT         1 ms ● VBW 3 MHz
	Count 100/100  Alar Max  Alar Max  I dam  I
	10 dBm
CH <sub>M</sub>	-20 dBm
	-40 d8m
	-70 dBm
	Spectrum (♥) Ref Level 20.00 dBm Offset 1.12 dB ● RBW 1 MHz
	Att         30 dB         SWT         1 ms         VBW 3 MHz         Mode Auto Sweep           Count 100/100         Image: Count 100/100         Im
	10 dBm //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 / //11 /_//11 //
СН <sub>н</sub>	-20 dBm
	-40 d8m
	-60 dBm
	CF 5.24 GHz 691 pts Span 30.0 MHz



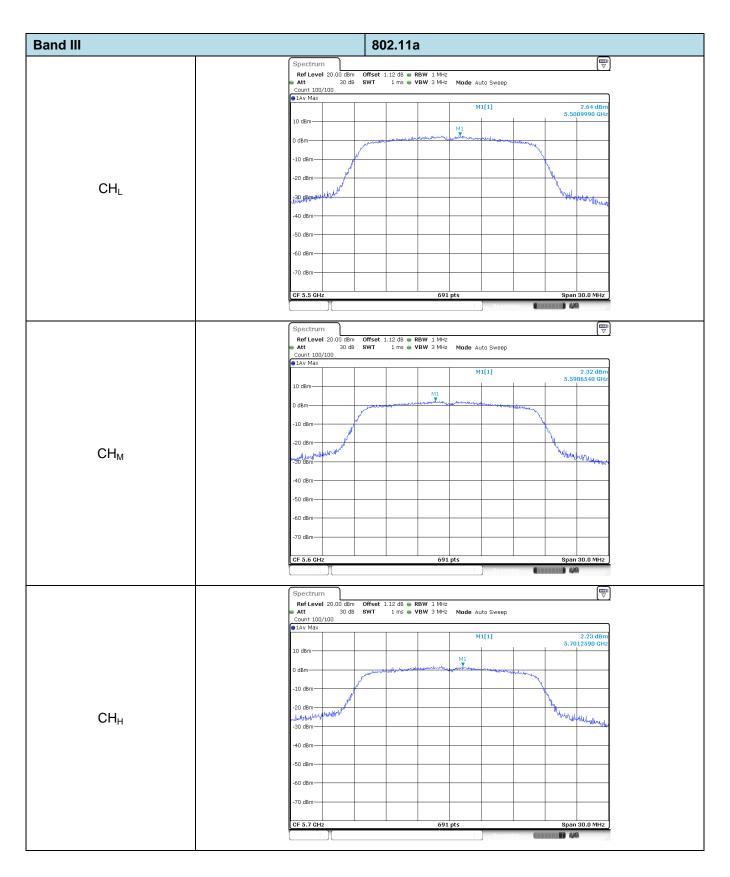
nd l	802.11n (HT40)
	Spectrum         (₩)           Ref Level 20.00 dBm         Offset 1.24 dB ● RBW 1 MHz         (₩)           Att         30 dB         SWT         1 ms ● VBW 3 MHz         Node Auto Sweep           Count 100/100         (100/100)         (100/100)         (100/100)         (100/100)
	Av Max     M1[1] 0.87 dBm     S.1871350 GHz
	-10 dBm
CHL	-20 dBm
	-40 d8m
	-50 dBm
	-70 dBm
	CF 5.19 GHz 691 pts Span 60.0 MHz
	Spectrum     Image: Spectrum       Ref Level 20.00 dBm     Offset 1.24 dB ● RBW 1 MHz       Att     30 dB     SWT     1 ms ● VBW 3 MHz
	Count 100/100
	10 dBm 5.2277420 GHz
	10 dBm
CHu	10 dBm
СН <sub>н</sub>	10 dBm
СН <sub>н</sub>	10 dBm
СН <sub>н</sub>	10 dBm





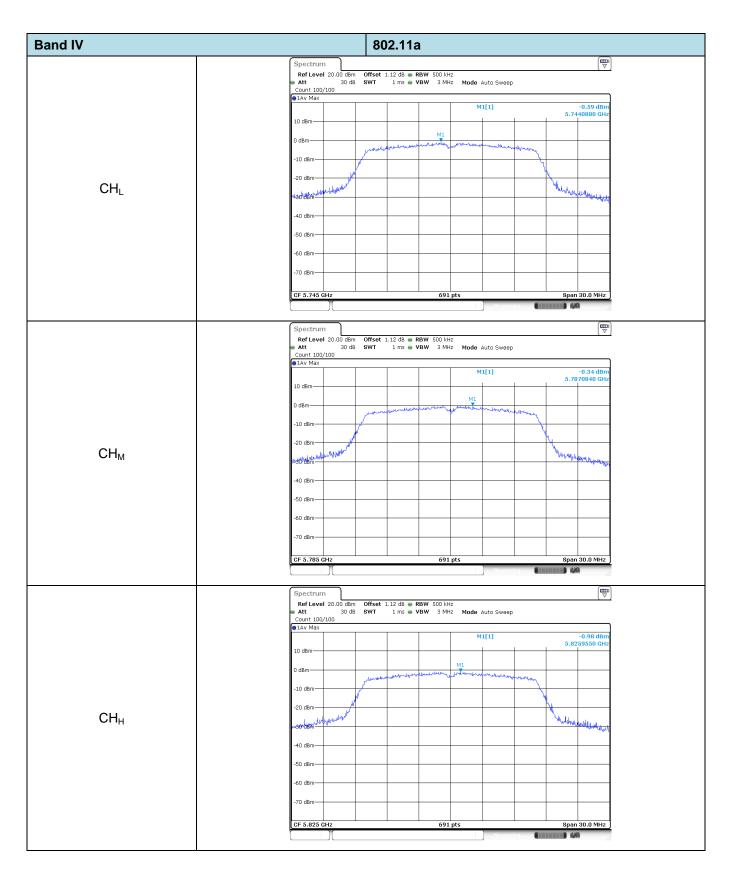
Band II	802.11n (HT40)
	Spectrum RefLevel 20.00 dBm Offset 1.24 dB ● RBW 1 MHz ↓ Att 30 dB SWT 1 ms ● VBW 3 MHz Mode Auto Sweep Count 100/100
CHL	10 dBm     10 dBm     10 dBm
	-10 dBm
	-40 d8m
	-60 dBm
CH <sub>H</sub>	Spectrum Ref Level 20.00 dBm Offset 1.24 dB  WBW 1 MHz Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep Count 100/100
	-10 dBm
	-30 dBm
	-60 dBm
	CF 5.31 GHz 691 pts Span 60.0 MHz

Band III 802.11n (HT20) ₿ Spectrum RefLevel 20.00 dBm Offset 1.12 dB 
RBW 1 MHz
Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep Count 100/100 M1[1] 2.64 dB 5.5016930 GH 10 dBm-M1 0 dBm--10 dBm 20 dBm  $CH_{L}$ 39Ldekil 40 dBm -50 dBm -60 dBm 70 dBm Span 30.0 MH: CF 5.5 GI 691 p □ Spectrum Ref Level 20.00 dBm Att 30 dB Count 100/100 1Av Max Mode Auto Sweep M1[1] 2.51 dB 5.5979160 GF 10 dBm-M1 0 dBm -10 dBm--20 dBm Herens  $\mathsf{CH}_\mathsf{M}$ -30 dBmwhenty -40 dBm -50 dBm--60 dBm 70 dBm-691 pt CF 5.6 GH 30.0 MHz **1** ₽ Spectrum . RefLevel 20.00 dBm Offset 1.12 dB ● RBW 1 MHz Att 30 dB SWT 1 ms ● VBW 3 MHz Mode Auto Sweep Count 100/100 M1[1] 1.79 dB 5.6985240 Gi 10 dBm-M1 0 dBm -10 dBm -20 dBm Mushall Hala wales  $\mathsf{CH}_{\mathsf{H}}$ -30 dBm 40 dBm -50 dBm -60 dBm -70 dBm CF 5.7 GHz 691 pts Span 30.0 MHz 



Band III 802.11n (HT40) ₿ Spectrum RefLevel 20.00 dBm Offset 1.23 dB 
 RBW 1 MHz
Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep - Att Count 100/100 1Av Max\_\_\_\_ M1[1] -0.86 dB 5.5083500 GF 10 dBm-M1 0 dBm--10 dBm 20 dBm  $CH_{L}$ 30,d8m-5. AL mon 40 dBm -50 dBm -60 dBm 70 dBm Span 60.0 MH: CF 5.51 691 120 □ Spectrum Ref Level 20.00 dBm Att 30 dB Count 100/100 1Av Max Offset 1.24 dB ● RBW 1 MHz SWT 1 ms ● VBW 3 MHz Mode Auto Sweep M1[1] -1.24 dBr 5.5826190 GH 10 dBm-M1 تليس 0 dBm بالبوجين ا -10 dBm--20 dBm  $\mathsf{CH}_\mathsf{M}$ -38 d9m when -40 dBm -50 dBm--60 dBm 70 dBm-691 pt CF 5.59 0 50.0 MHz **11** Spectrum . RefLevel 20.00 dBm Offset 1.24 dB ● RBW 1 MHz Att 30 dB SWT 1 ms ● VBW 3 MHz Mode Auto Sweep Count 100/100 M1[1] -2.84 dB 5.6760780 GF 10 dBm-0 dBm التعري -10 dBm -20 dBm  $\mathsf{CH}_{\mathsf{H}}$ -90 dBm-40 dBm -50 dBm -60 dBm -70 dBm CF 5.67 GH 691 pts Span 60.0 MHz 

Band IV 802.11n (HT20) Spectrum RefLevel 20.00 dBm Offset 1.12 dB 
RBW 500 kHz
Att 30 dB SWT 1 ms 
VBW 3 MHz Mode Auto Sweep Count 100/100 M1[1] -1.03 dB 5.7439580 GF 10 dBm-М1 0 dBm-Johnpun where he mathing -10 dBm 20 dBm  $CH_{L}$ Julierth May make for some and some and Jordem M 40 dBm -50 dBm -60 dBm 70 dBm Span 30.0 MH: CF 5.745 691 120 Spectrum Ref Level 20.00 dBm Att 30 dB Count 100/100 1Av Max Offset 1.12 dB ● RBW 500 kHz SWT 1 ms ● VBW 3 MHz Mode Auto Sweep M1[1] -0.48 dB 5.7866060 GH 10 dBm-0 dBm Ĵ. -and -10 dBm--20 dBm  $\mathsf{CH}_\mathsf{M}$ كمكاسمالل Welling Hiller 130 UBm--40 dBm -50 dBm--60 dBm 70 dBm-691 pt CF 5.785 30.0 MHz **11** Spectrum RefLevel 20.00 dBm Offset 1.12 dB 
RBW 500 kHz
Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep Count 100/100 -0.89 dB 5.8259550 GF M1[1] 10 dBm-M1 0 dBm Marca -10 dBm -20 dBm  $\mathsf{CH}_{\mathsf{H}}$ Yuluaha -30 dBm-Aug -40 dBm -50 dBm -60 dBm -70 dBm 691 pts Span 30.0 MHz CF 5.825 GHz **H** 



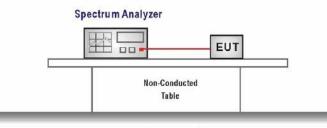
and IV	802.11n (HT40)
	Spectrum         Imp           RefLevel 20.00 dBm         Offset 1.24 dB         RBW 500 kHz           Att         30 dB         SWT         1 ms         VBW         3 MHz           Count 100/100         Count 100/100         SWT         1 ms         VBW         3 MHz
CHL	Av Max     M1[1] -3.85 dBm     5.7565630 GHz     10 dBm
	0 dBm
	-20 dBm
	-40 dBm
	-60 dBm
	CF 5.755 GHz 691 pts Span 60.0 MHz
СН <sub>н</sub>	Spectrum     Image: Construction of the section of the
	Oddin 100/100                • 1AV Max                 10 dBm                   10 dBm
	0 dBm
	-20 dBm
	-50 dBm
	-60 dBm
	CF 5.795 GHz 691 pts Span 60.0 MHz

# 5.5. 26dB bandwidth and 99% Occupy bandwidth

#### LIMIT

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

#### **TEST CONFIGURATION**



Ground Reference Plane

#### TEST PROCEDURE

- 1. According KDB 789033 D02 Section C
- 2. Connect the antenna port(s) to the spectrum analyzer input.
- 3. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =Channel center frequency Span=2 x emission bandwidth RBW = 1% to 5% of the emission bandwidth VBW>3 x RBW Sweep time= auto couple Detector = Peak Trace mode = max hold

- 4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
- 5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission, and use the 99 % power bandwidth function of the instrument

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☑ Passed □ Not Applicable

Shenzhen Huatongwei International Inspection Co., Ltd.

Band	Bandwidth (MHz)	Туре	Channel	99% Occupy bandwith (MHz)	26dB bandwidth (MHz)	Result
			CH∟	17.65	23.22	
	802.11n	CH <sub>M</sub>	17.62	23.91	Pass	
	20 I		СН <sub>н</sub>	17.59	21.15	
		802.11a	CH∟	16.63	20.34	Pass
I			CH <sub>M</sub>	16.60	20.22	
			СН <sub>н</sub>	16.60	19.83	
	40	802.11n	CH∟	36.14	46.98	Pass
	40		СН <sub>н</sub>	36.14	43.80	
		802.11n	CH∟	17.56	22.20	Pass
	20 II		CH <sub>M</sub>	17.62	19.83	
			СН <sub>н</sub>	17.53	19.68	
		802.11a	CH∟	16.54	19.92	Pass
11			CH <sub>M</sub>	16.45	19.59	
		СН <sub>н</sub>	16.60	19.74		
	40	40 802.11n	CH∟	36.14	43.50	- Pass
	40		CH <sub>H</sub>	36.20	43.62	

Band	Bandwidth (MHz)	Туре	Channel	99% Occupy bandwith (MHz)	26dB bandwidth (MHz)	Result
	20	802.11n	CH∟	17.53	19.56	Pass
			CH <sub>M</sub>	17.59	19.68	
			СН <sub>н</sub>	17.62	20.22	
		20 802.11a	$CH_{L}$	16.48	19.56	Pass
Ш			CH <sub>M</sub>	16.48	20.55	
			СН <sub>н</sub>	16.60	20.52	
			$CH_{L}$	36.02	40.74	
40	802.11n	$CH_{M}$	36.02	40.86	Pass	
			СН <sub>н</sub>	36.08	42.12	

Band I	802.11n (HT20)
	Spectrum         Image: Construction of the sector of
CHL	Count 500/500            •• IPk View           •• M1[1]         •• 26.06 dBm             10 dBm           M2           Occ Bw           S.1690200 GHz             0 dBm           M2           Occ Bw           S.1690200 GHz             -10 dBm           M2           Occ Bw           S.1787400 GHz             -20 dBm           Old           Old           S.1787400 GHz             -30 dBm           Old           Old           Old             -40 dBm           Old           Old           Old             -50 dBm           Old           Old           Old             -70 dBm           Old           Old           Old             Type          Fold           Sold           Span 30.0 MHz             Marker           Sold           Sold           Sold           Int             Int           S.189902 Hz            -26.06 dBm
	Spectrum
CHM	Ref Level 20.50 dbm       Offset 1.00 db       RBW 200 kHz         Att       30 db       SWT       37.8 µs       VBW       1 MHz       Mode Auto FFT         0 lb       Wint       M1[1]       -28.36 dbm       5.2086900 GHz       -22.03 dbm         0 db       M1[1]       -28.36 dbm       5.2086900 GHz       -2.20 dbm         0 db       M1       M2       Occ Bw       17.622377622 HHz       -2.20 dbm         -10 dbm       M2       M2[1]       72.52237622 HHz       -2.20 dbm         -10 dbm       M2       M2[1]       72.522196800 GHz       -2.20 dbm         -0 dbm       M2       M2[1]       72.522196800 GHz       -2.20 dbm         -0 dbm       M3       M3       M3       M3       M3         -0 dbm       M3       M3       M3       M3       M3       M3         -0 dbm       M1       1       5.20869 GHz       -28.36 dbm       M3
CH <sub>H</sub>	Att       30 db       SWT       37.8 µb       VBW       1 MHz       Mode Auto FFT         Count 500/500       Image: State Sta

Band I	802.11a
Bandi	Spectrum III III III III IIII IIII IIII IIII
	Ref Level 20.50 dBm Offset 1.00 dB 🖷 RBW 200 kHz
	● Att 30 dB SWT 37.8 μs ● VBW 1 MHz Mode Auto FFT Count 500/500
	●1Pk View M1[1] -26.36 dBm
	10 d8m 5.1700100 GHz M2 OCC BW 16.633366633 MHz
	0 dBm
	-10 dBm-
	-20 dBm
	-40 dBm
CHL	-50 dBm-
	-60 dBm-
	-70 dBm-
	CF 5.18 GHz 1001 pts Span 30.0 MHz
	Marker Type   Ref   Trc   X-value   Y-value   Function   Function Result
	M1         1         5.17001 GHz         -26.36 dBm           T1         1         5.1716683 GHz         -9.99 dBm         Occ Bw         16.633366633 MHz
	T2         1         5.1883017 GHz         -9.57 dBm           M2         1         5.18126 GHz         -0.24 dBm
	D3 M1 1 20.34 MHz -0.19 dB Mesuring
	Spectrum (♥
	Ref Level         20.50 dBm         Offset         1.00 dB         RBW         200 kHz           Att         30 dB         SWT         37.8 µs         VBW         1 MHz         Mode         Auto FFT
	Count 500/500
	10 dBm M1[1] -27.18 dBm 5.2096500 GHz
	0 dbm M2 00cBw 16.603396603 MHZ
	-10 dBm
	-20 dBm
	-30 dBm
<u>CU</u>	-40 dBm-
CH <sub>M</sub>	-50 dBm
	-60 dBm
	CF 5.22 GHz         1001 pts         Span 30.0 MHz
	Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.20965 GHz         -27.18 dBm         -
	T1         1         5.2116693 GHz         -11.27 dBm         Occ Bw         16.603396603 MHz           T2         1         5.2282717 GHz         -11.00 dBm            M2         1         5.2212 GHz         -1.10 dBm
	D3 M1 1 20.22 MHz -0.28 dB
	Mexisting
	Spectrum 🕎
	RefLevel 20.50 dBm Offset 1.00 dB RBW 200 kHz Att 30 dB SWT 37.8 µs VBW 1 MHz Mode Auto FFT
	Count 500/500
	M1[1] -26.37 dBm 10 dBm 5.2299800 GHz
	M2 OCC BW 16.603396603 MH2
	0 dBm
	20 den
	-20 doinin 
	-40 dBm-
CH <sub>H</sub>	-50 dBm
	-60 d8m
	-70 dBm
	CF 5.24 GHz 1001 pts Span 30.0 MHz Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.22998 GHz         -26.37 dBm         -26.37 dBm         -26.37 dBm
	T1         1         5.2317283 GHz         -9.87 dBm         Occ Bw         16.603396603 MHz           T2         1         5.2483317 GHz         -10.33 dBm         -
	M2         1         5.23874 GHz         -0.21 dBm           D3         M1         1         19.83 MHz         0.06 dB
	Measuring.

and I	802.11n (HT40)
	Spectrum         Image: Constraint of the section of the sectio
	Att 30 dB SWT 1 ms ● VBW 2 MHz Mode Auto Sweep Count 500/500      P1Pk View      M1[1] -25.53 dBm
	10 dBm 5.1675600 GHz 0 dBm 0 dBm 1.02 dBm 1.02 dBm 1.02 dBm 1.02 dBm 1.02 dBm
	-10 dBm
CH∟	40 d8m
	-50 dBm
	CF 5.19 GHz 1001 pts Span 60.0 MHz Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.16756 GHz         -25.53 dBm         -
	M2 1 5.19594 GHz 1.02 dBm
	M2         1         5.19594 GHz         1.02 dBm           D3         M1         1         46.98 MHz         0.53 dB
	D3 M1 1 46.98 MHz 0.53 dB
	D3         M1         1         46.98 MHz         0.53 dB           Ma wurking         Ma wurking         Ma           Spectrum         Image: Constraint of the second sec
	D3         M1         1         46.98         MHz         0.53         dB           Merendene           Spectrum           Ref Level 20.50 dBm         Offset 1.00 dB @ RBW 500 kHz           Att 30 dB SWT 1 ms @ VBW 2 MHz           M1[1]         -27.66 dBm           Spectrum           0 dBm         M1[1]         -27.66 dBm           10 dBm         M1[1]         -27.66 dBm           0 dBm         M12         Occc Bw         36.143856144           0 dBm         M12         Occ Bw         36.143856144           0 dBm         M12         Occ Bw         36.143856144
	D3     M1     1     46.98 MHz     0.53 dB       Merenetices       Spectrum       Ref Level 20.50 dBm     Offset 1.00 dB     RBW 500 kHz       Mathematical and the second data and
CH	D3     M1     1     46.98 MHz     0.53 dB       Merenetice       Spectrum       Ref Level 20.50 dBm       Offset 1.00 dB @ RBW 500 kHz       MI [1]       • 27.66 dBm       Count 500/500       ID Bm     M1       ID dBm     M2     Occ Bw       Occ Bw       36.143856144 MHz       -1.00 dBm       -1.00 dBm       -1.00 dBm       -1.00 dBm       -27.66 dBm       -27.66 dBm       -27.66 dBm       -27.600 GHz       -27.60 dBm       -27.60 dBm       -27.60 dBm       -20.97 dBm       -40 dBm
СНн	D3     M1     1     46.98 MHz     0.53 dB       M1     M1     46.98 MHz     0.53 dB       M1     M1     M1
СН <sub>Н</sub>	D3       M1       1       46.98 MHz       0.53 dB         We were read       We were read       MA         Spectrum       Image: constraint of the second of the sec
СНн	D3         M1         1         46.98 MHz         0.53 dB           We were read         We were read         We were read         We were read           Ref Level         20.50 dBm         Offset         1.00 dB         RBW 500 kHz           • Att         30 dB         SWT         1 ms         • VBW         Mode         Auto Sweep           Count         50.0500         Image: read         M1[1]         -27.66 dBm         -27.66 dBm           0 dBm         M2         Occc Bw         36.143850144 MHz         -31.00 dBm         -36.13830144 MHz         -31.00 dBm           -10 dBm         M2         Occc Bw         36.143830144 MHz         -36.00 dBm         -36.00 dBm         -38.00 d

and II	802.11n (HT20)
	Ref Level         20.50 dBm         Offset         1.00 dB         RBW         200 kHz           Att         30 dB         SWT         37.8 µs         VBW         1 MHz         Mode         Auto FFT
	Count 500/500 ● 1Pk View
	10 dBm M1[1] -26.05 dBm 5.2502200 GHz
	0 dBm 17.562437562 MHz 0 dBm 11. 200 Bm 20.01 dBm 0.01 dBm 11. 200 Bm 20.01 dBm 20.01
	-10 dBm
	-20 dBm D3 D3D
	-39.48m
CH	-40 dBm-
CHL	-50 dBm
	-70 dBm
	CF 5.26 GHz         1001 pts         Span 30.0 MHz
	Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.25022 GHz         -26.05 dBm         -27.05 dBm         -27.05 dBm           T1         1         5.2512188 GHz         -7.52 dBm         Occ Bw         17.562437562 MHz
	T2 1 5.2687812 GHz -7.45 dBm
	D3 M1 1 22.2 MHz 0.33 dB
	Messaring
	Spectrum 🕎
	Ref Level         20.50 dBm         Offset         1.00 dB         RBW         200 kHz           ● Att         30 dB         SWT         37.8 µs         ● VBW         1 MHz         Mode         Auto FFT
	Count 500/500
	M1[1] -25.90 dbm
	M2 Occ Bw 17.622377622 MHz
	0 dBm 1
	20.487
	-20 dbm // // // // // // // // // // // // //
	-40 dBm-
CH <sub>M</sub>	-50 dBm-
	-60 dBm
	-70 dBm-
	CF 5.28 GHz 1001 pts Span 30.0 MHz Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.2701 GHz         -25.90 dBm         -          -         -
	T1         1         5.2712188 GHz         -7.39 dBm         Occ Bw         17.622377622 MHz           T2         1         5.2888412 GHz         -8.75 dBm
	M2         1         5.27874 GHz         0.50 dBm           D3         M1         1         19.83 MHz         0.39 dB
	Mexaning Milling MA
	Spectrum 🕎
	RefLevel 20.50 dBm Offset 1.00 dB ● RBW 200 kHz ● Att 30 dB SWT 37.8 µs ● VBW 1 MHz Mode Auto FFT
	Count 500/500 Prove Autor Print Prove Autor Prove Autor Print Prove Autor Prove Aut
	M1[1] -24.63 dBm
	10 dBill M2 Occ Bw 17.532467582 MHz
	0 dBm 11 1.41 0Bm -10 dBm10 dBm
	20.48m MI
	-20 GB// 01 - 24,595 GB// 02 - 24,595 GB// 04 - 24,595 GB
	-40 dBm
	-50 dBm
CH <sub>H</sub>	
CH <sub>H</sub>	-60 dBm-
CH <sub>H</sub>	-60 dBm
CH <sub>H</sub>	-60 dBm -70 dBm CF 5.32 GHz 1001 pts Span 30.0 MHz
CH <sub>H</sub>	-60 dBm -70 dBm CF 5.32 GHz 1001 pts Span 30.0 MHz Marker Type Ref Trc X-value Y-value Function Function Result
CH <sub>H</sub>	-60 dBm -70 dBm -70 dBm GF 5.32 GHz Marker Marker
CH <sub>H</sub>	of 0 dBm         control         state

and II	802.11a
	Spectrum         (₩)           Ref Level 20.50 dBm         Offset 1.00 dB ● RBW 200 kHz
	● Att 30 dB SWT 37.8 µs ● VBW 1 MHz Mode Auto FFT Count 500/500 ● IPK View
	10 dBm M1[1] -24.93 dBm 5.2499800 GHz M2 Occ Bw 16.543456543 MHz
	0 dBm
	-10 d8m
CH∟	-40 d8m-
-	-60 d8m
	-70 dBm
	Marker Type Ref Trc X-value Y-value Function Function Result
	M1         1         5.24998 GHz         -24.93 0Bm           T1         1         5.2517283 GHz         -8.23 dBm         Occ Bw         16.543456543 MHz           T2         1         5.262717 GHz         -7.62 dBm          16.543456543 MHz
	M2         1         5.26126 GHz         1.19 dBm           D3         M1         1         19.92 MHz         -0.25 dB
	Spectrum 🕎
	Spectrum         ▼           RefLevel 20.50 dBm         Offset 1.00 dB         RBW 200 kHz           Att         30 dB         SWT         37.8 µs         VBW         1 MHz         Mode Auto FFT
	Count 500/500  IPk View
	10 dBm         M1[1]         -25.11 dBm           10 dBm         S.2701900 GHz         S.2701900 GHz           10 dBm         M2_OCC BW         16.453546454 MHz
	0 dBm 1.44 dBm 1.44 dBm 5.2812600 GHz
	-20 dBm 103
	-40 dBm
CH <sub>M</sub>	-50 dBm-
	-60 d8m
	CF 5.28 GHz         1001 pts         Span 30.0 MHz
	Marker         Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.27019 GHz         -25.11 dBm
	T1         1         5.2717582 Mz         -8.22 dBm         Occ Bw         16.453546454 MHz           T2         1         5.2882118 GHz         -7.27 dBm         16.453546454 MHz           M2         1         5.2882126 GHz         1.44 dBm         14.46 Mm
	D3         M1         1         19.59         Miz         0.10         db           V         Maxwellow         Maxw
	Spectrum 🕎
	RefLevel 20.50 dBm Offset 1.00 dB ■ RBW 200 kHz Att 30 dB SWT 37.8 µs ■ VBW 1 MHz Mode Auto FFT Count 500/500
	PIR View     M1[1] -25.76 dBm
	10 dBm 5.3102200 GHz 0 dBm 0 dBm0 dBm
	-10 dBm
	-20 dBm - 111 - 25.723 dBm - 23.723 dBm - 23
CH <sub>H</sub>	-40 dBm
	-50 dBm
	-70 dBm-
	CF 5.32 GHz 1001 pts Span 30.0 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result
	M1 1 5.31022 GHz -25.76 dBm
	M1 1 5.31022 GHz -25.76 dBm

nd ll		802.11n (HT40)		
	Spectrum		₩	
		Offset 1.00 dB 👄 RBW 500 kHz	[  ]	
	👄 Att 30 dB		veep	
	Count 500/500 • 1Pk View			
		M1[1]	-25.99 dBm	
	10 dBm	Qgc Bw	5.2477400 GHz 36.143856144 MHz	
	0 dBm	and the second s	To 0.11 dBm	
	-10 dBm		5.2760000 GHz	
	-20 dBm			
	-20 dbin M1 -20 dbm 01 -25.886 dBr	n	- D3	
			warden	
	-40 dBm			
CHL	-50 dBm			
	-60 dBm			
	-70 dBm			
	CF 5.27 GHz Marker	1001 pts	Span 60.0 MHz	
	Type Ref Trc	X-value Y-value Function	Function Result	
	M1 1 T1 1	5.24774 GHz -25.99 dBm 5.251958 GHz -6.26 dBm Occ Bw	36.143856144 MHz	
	T2 1	5.2881019 GHz -6.26 dBm 5.276 GHz 0.11 dBm		
	M2 1 D3 M1 1	43.5 MHz -0.95 dB		
		Me	asuring	
	Spectrum			
	Ref Level 20.50 dBm	Offset 1.00 d8 ⊕ RBW 500 HHz SWT 1 ms ● VBW 2 MHz Mode Auto SV		
	Ref Level 20.50 dBm ● Att 30 dB Count 500/500			
	RefLevel 20.50 dBm Att 30 dB	SWT 1 ms 👄 VBW 2 MHz Mode Auto Sv	veep	
	Ref Level 20.50 dBm ▲ Att 30 dB Count 500/500 ● 1Pk View	SWT 1 ms  VBW 2 MHz Mode Auto Sv M1[1]	(₩) ************************************	
	Ref Level         20.50 dBm           Att         30 dB           Count         500/500           IPk         View           10 dBm         10	SWT 1 ms • VBW 2 MHz Mode Auto Sv 	( veep -25.75 dBm 5.2875500 GHz 36.203796204 MHz	
	Ref Level         20.50         dBm           Att         30         dB         Count.500/500           ● 1Pk         View         10         dBm         0           0         dBm         T         T         T	SWT 1 ms  VBW 2 MHz Mode Auto Sv M1[1]	(₩) ************************************	
	Ref Level         20.50 dBm           Att         30 dB           Count         500/500           ● 1Pk View           10 dBm           0 dBm	SWT         1 ms         VBW         2 MHz         Mode Auto Sv           M1[1]         M2         Occ Bw         M2[1]           M2         M2[1]         M2[1]         M2[1]	-25.75 dBm 5.2875600 GHz 36.203795204 MHz 12 0.51 dBm	
	Ref Level         20.50 dBm           Att         30 dB           Count 500/500           ● IPk View           10 dBm           -10 dBm           -20 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw	-25.75 dBm 5.2875600 GHz 36.203796204 MHz 72 0.61 dBm 5.3087000 GHz	
	Ref Level         20.50 dBm           Att         30 dB           Count         500/500           ● 1Pk View           10 dBm           0 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw	-25.75 dBm 5.2875600 GHz 36.203795204 MHz 12 0.51 dBm	
	Ref Level         20.50 dBm           Att         30 dB           Count         500/500           ●1Pk         View           10 dBm         10 dBm           -10 dBm         10 dBm           -20 dBm         10 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CHu	Ref Level 20.50 dBm           Att         30 dB           Count 500/500           IPk View           10 dBm           -10 dBm           -20 dBm           -30 dBm           -40 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CH <sub>H</sub>	Ref Level         20.50 dBm           Att         30 dB           Court 500/500         19k View           10 dBm         0           -10 dBm         -           -20 dBm         -           -30 dBm         -           -30 dBm         -           -30 dBm         -           -30 dBm         -	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CH <sub>H</sub>	Ref Level 20.50 dBm           Att         30 dB           Court 500/500           IPk View           10 dBm           -10 dBm           -20 dBm           -30 dBm           -30 dBm           -30 dBm           -30 dBm           -50 dBm           -50 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CH <sub>H</sub>	Ref Level         20.50 dBm           Att         30 dB           Court 500/500         19k View           10 dBm         0           -10 dBm         -           -20 dBm         -           -30 dBm         -           -30 dBm         -           -30 dBm         -           -30 dBm         -	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CH <sub>H</sub>	Ref Level 20.50 dBm           Att         30 dB           Court 500/500           IPk View           10 dBm           -10 dBm           -20 dBm           -30 dBm           -30 dBm           -30 dBm           -30 dBm           -50 dBm           -50 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2(1) M2 Occ Bw		
CH <sub>H</sub>	Ref Level 20.50 dBm           Att         30 dB           Court 500/500           IPk View           10 dBm           0 dBm           -20 dBm           -30 dBm           -30 dBm           -50 dBm           -50 dBm           -60 dBm           -70 dBm           -70 dBm           -70 dBm           -70 dBm	SWT 1 ms • VBW 2 MHz Mode Auto Sv M1[1] M2 Occ Bw M2		
CH <sub>H</sub>	Ref Level         20.50 dBm           Att         30 dB           Court 500/500           IPk View           10 dBm           -10 dBm           -20 dBm           -30 dBm           -30 dBm           -50 dBm           -50 dBm           -60 dBm           -70 dBm	SWT         1 ms         VBW         2 MHz         Mode Auto Sv           M1         M1         M1         M1         M1           M2         Occ Bw         Occ Bw         M2         M2         M2         M2         M2         M1         M2		
CH <sub>H</sub>	Ref Level         20.50 dBm           Att         30 dB           Count 500/500         11k View           10 dBm         10 dBm           -10 dBm	SWT         1 ms         VBW         2 MHz         Mode Auto Sy           MI[1]         Mi         Occ Bw           Startos GHz         -25.75 GBm           System Occ Bw         Occ Bw		
CH <sub>H</sub>	Ref Level 20.50 dBm           Att         30 dB           Court 500/500           1Pk View           10 dBm           0 dBm           -10 dBm           -20 dBm           -30 dBm           -30 dBm           -50 dBm           -60 dBm           -70 dBm           -71 d1           TT           TT           TT           TT           TT           Marker           TT           TT           TT           TT           TT           TT           TT	SWT 1 ms • VBW 2 MHz Mode Auto Sv MI[1] M2 Occ Bw M2[1] Occ Bw S.28756 GHz S.291696 Hz S.291696 Hz S.291696 Hz S.291696 Hz S.291696 Hz S.29169 Hz S.29169 Hz S.29169 Hz S.29169 Hz S.207 SG Hz S.29169 Hz S.207 SG Hz S.29169 Hz S.207 SG Hz		
СНн	Ref Level         20.50 dBm           Att         30 dB           Court 500/500 d           IPk View           10 dBm           -10 dBm           -20 dBm           -30 dBm           -30 dBm           -50 dBm           -50 dBm           -60 dBm           -70 dBm           -70 dBm           -70 dBm           -71 dBm           -70 dBm	SWT         1 ms         VBW         2 MHz         Mode Auto Sv           Mail         Mail         Occ Bw         Mail		

nd III	802.11n (HT20)
	Spectrum         ♥           Ref Level 20.50 dBm Offset 1.00 dB ■ RBW 200 kHz         ♥           Att         30 dB SWT 37.8 µs ● VBW 1 MHz         Mode Auto FFT           Count 500/500         ● 1Pk View         111         -27.82 dBm           10 dBm
CHL	-10 dBm 5. 4987400 GHz
	-60 dBm         -60 dBm         -70 dBm <t< td=""></t<>
	03         M1         1         19.56 MHz         0.41 dB
CHM	Att         30 dB         SWT         37.8 µs         VBW         1 MHz         Mode Auto FFT           Count 500/500         • </td
	-30 dbm 01 - 27.352 dbm 01 - 27.352 dbm 01 - 27.352 dbm 01 - 27.352 dbm 01 - 27.052 dbm 01 - 2
	Marker         Type         Ref         Transmission         Y-value         Y-value         Function         Function Result           M1         1         5.59013 GHz         -28.15 dBm              T1         1         5.5911808 GHz         -9.04 dBm         Occ Bw         17.592407592 MHz           T2         1         5.609712 GHz         -9.21 dBm              M2         1         5.59912 GHz         -1.35 dBm              D3         M1         1         19.68 MHz         0.64 dB
	Spectrum         ♥           Ref Level 20.50 dBm         Offset 1.00 dB ● RBW 200 Hz           Att         30 dB           SWT         37.8 µs           VBW         1 MHz           Mode Auto FFT           Count 500/500           IFK view
CH <sub>H</sub>	M1[1]         -28.57 dBm           10 dBm         M2         Occ Bw         17.622377622 MHz           0 dBm         M2         M2[1]         -2.18 dBm           -10 dBm         M2         M2[1]         -2.18 dBm           -20 dBm         M2         M2[1]         -2.18 dBm
	-40 dBm
	CF 5.7 GHz         1001 pts         Span 30.0 MHz           Marker         Your State         Function         Function Result           1         1         5.69971 GHz         -28.57 dBm         -           11         1         5.69971 GHz         -29.57 dBm         -           11         1         5.69911G GHz         -10.33 dBm         Occ Bw         17.622377622 MHz           12         1         5.708112 GHz         -9.63 dBm         Occ Bw         17.622377622 MHz

Band III	802.11a
	Spectrum
	RefLevel 20.50 dBm Offset 1.00 dB ● RBW 200 kHz ● Att 30 dB SWT 37.8 µs ● VBW 1 MHz Mode Auto FFT
	Count 500/500  File View
	10 dBm M1[1] - 27.93 dBm 5.4902500 GHz 5.4902500 GHz 0.00
	0 dBm
	-10 dBm
	20. dBm 01 - 22. 372 dBm 03
	AD 38 Martin
CHL	-50 dBm
	-70 dBm
	CF 5.5 GHz 1001 pts Span 30.0 MHz
	Marker         Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.49025 GHz         -27.93 dbm
	M1         1         5.49025 GHz         -27.99 dBm           T1         1         5.4917582 GHz         -10.28 dBm         Occ 8w         16.483516484 MHz           T2         1         5.5082418 GHz         -10.41 dBm          16.483516484 MHz
	M2         1         5.50126 GHz         -1.57 dBm           D3         M1         1         19.56 MHz         0.26 dB
	Spectrum Ref Level 20.50 dBm Offset 1.00 dB ● RBW 200 kHz
	Att 30 dB SWT 37.8 µs VBW 1 MHz Mode Auto FFT Count 500/500
	● 1Pk View M1[1] -27.59 dBm
	10 dBm 5.5893200 GHz M2 0cc Bw 16.483516484 MHz
	0 dBm
	-20 dBm
	-southing the second se
CH <sub>M</sub>	-40 dBm
	-60 dBm
	-70 dBm
	CF 5.6 GHz 1001 pts Span 30.0 MHz Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.58932 GHz         -27.59 dBm         -27.59 dBm <td< td=""></td<>
	T1         1         5.5917582 GHz         -10.84 dBm         Occ Bw         16.483516484 MHz           T2         1         5.6082418 GHz         -11.03 dBm             M2         1         5.60126 GHz         -1.43 dBm
	D3 M1 1 20.55 MHz -0.22 dB Messuring
	Spectrum
	RefLevel 20.50 dBm Offset 1.00 dB ● RBW 200 kHz Att 30 dB SWT 37.8 µs ● VBW 1 MHz Wade Auto FFT
	Count 500/500
	10 dBm M1[1] -28.59 dBm 5.6893200 GHz
	Occ Bw 16.603996003 MHz
	-20 dBm M1 50 531 dBm 50 531 dBm 50 531 dBm 50 50 50 50 50 50 50 50 50 50 50 50 50
	→0 dBm
CH <sub>H</sub>	-50 dBm
	-60 dBm
	CF 5.7 GHz         1001 pts         Span 30.0 MHz
	Marker Type   Ref   Trc   X-value   Y-value   Function   Function Result
	M1         1         5.68932 GHz         -28.59 dBm           T1         1         5.6916084 GHz         -12.40 dBm         Occ Bw         16.603396603 MHz           T2         1         5.7082118 GHz         -11.22 dBm          1
	12         1         5.708/18 0Hz         -1.1.22 dbm           M2         1         5.70126 GHz         -2.53 dbm           D3         M1         1         20.52 MHz         -0.76 dB

and III	802.11n (HT40)
	Spectrum Ref Level 20.50 dBm Offset 1.00 dB  RBW 500 kHz
	KATLEVEI2U.SU dam Untset 1.00 da ■ KBW SUU KH2 ■ Att 30 dB SWT 1 ms ■ VBW 2 MH2 Mode Auto Sweep Count 500/500
	●IPk View M1[1] -27.58 dBm
	10 dBm 5,4892400 CH2
	0 dBm 1 - 1.17 dBm - 1
	-10 d8m
	-20 dBm
	Advantumente and a second and a
CHL	-40 d8m
011L	-50 dbm
	-70 dBm-
	CF 5.51 GHz         1001 pts         Span 60.0 MHz
	Marker           Type         Ref         Trc         X-value         Function         Function Result
	M1         1         5.49924 GHz         -27.58 dBm           T1         1         5.491958 GHz         -6.72 dBm         Occ Bw         36.023976024 MHz
	T2         1         5.527982 GHz         -7.87 dBm           M2         1         5.50772 GHz         -1.17 dBm
	D3 M1 1 40.74 MHz -0.02 dB Measuring
	Spectrum Ref Level 20.50 dBm Offset 1.00 dB ● RBW 500 kHz
	Att 30 dB SWT 1 ms VBW 2 MHz Mode Auto Sweep Count 500/500
	●1Pk View
	10 dBm 5,5691200 GHz
	0 dBm M2[1] -1.39 dBm
	-10 dBm
	-20 dBm
	489 dBm
CHM	-50 dBm
101	-60 d8m
	-70 dBm
	CF 5.59 GHz 1001 pts Span 60.0 MHz
	Marker           Type         Ref         Trc         X-value         Y-value         Function         Function Result
	M1         1         5.56912 GHz         -28.26 dBm           T1         1         5.571958 GHz         -6.80 dBm         Occ Bw         36.023976024 MHz           T2         1         5.67020 CHz         -7.67 dBm         Occ Bw         36.023976024 MHz
	T2         1         5.607962 GHz         -7.67 dBm           M2         1         5.5879 GHz         -7.39 dBm           D3         M1         1         40.86 MHz         -0.52 dB
	(Spectrum) (₩
	Ref Level 20.50 dBm Offset 1.00 dB 🖷 RBW 500 kHz
	Att 30 dB SWT 1 ms VBW 2 MHz Mode Auto Sweep Count 500/500
	(1Pk View     (1)     (2)
	10 dBm 5.6491000 GHz Occ Bw 36.083916084 MHz
	0 dBm
	-10 dBm
	M1 / has been been been been been been been bee
СН <sub>Н</sub>	40 dBm
	-50 dBm
	-60 dBm
	-70 dBm
I	CF 5.67 GHz 1001 pts Span 60.0 MHz
	Marker
	Type Ref Trc X-value Y-value Function Function Result
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.6491 GHz         -29.80 dBm         -         -         -           T1         1         5.51958 GHz         -9.96 dBm         Occ Bw         36.083916084 MHz
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.6491 GHz         -29.80 dBm         -
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.6491 GHz         -29.80 dBm         -

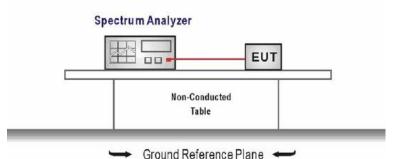
# 5.6. 6dB Bandwidth

# <u>LIMIT</u>

#### FCC CFR Title 47 Part 15 Subpart E Section 15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

## **TEST CONFIGURATION**



## TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =test channel center frequency Span=2 x emission bandwidth RBW = 100 kHz, VBW ≥ 3 × RBW Sweep time= auto couple Detector = Peak Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
- 4. 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, and record the pertinent measurements.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☑ Passed □ Not Applicable

Band	Bandwidth (MHz)	Туре	Channel	6dB bandwith (MHz)	99% Occupy bandwith (MHz)	Result
			$CH_{L}$	15.96	17.59	
	802.11n	802.11n	CH <sub>M</sub>	16.29	17.59	Pass
	20	20 –	СН <sub>н</sub>	15.12	17.56	
11/	20		20	$CH_{L}$	15.84	16.45
IV	802.11a	CH <sub>M</sub>	15.48	16.45	Pass	
			СН <sub>н</sub>	15.84	16.51	
	40 802.115	$CH_{L}$	35.30	35.95	Dooo	
	40	802.11n	CH <sub>н</sub>	35.30	35.86	Pass

Spectrum         (₩)           Ref Level 20.50 dBm         Offset 1.00 dB ● RBW 100 kHz           Att         30 dB         SWT         75.9 µs         VBW 300 kHz         Mode Auto FFT           Count 500/500         61Fk View
Count 500/500  1Pk View
10 dBm         -12.20 dBm           10 dBm         5.7374400 GHz           0 dBm         0 ccc Bw           11 dBm         11.592407592 MHz           0 dBm         -5.23 dBm           -10 rBm         5.747400 GHz           -20 dBm         -11.229 dBm           -30 dBm         -11.29 dBm           -30 dBm         -11.29 dBm           -30 dBm         -11.29 dBm
S0 dBm         Image: CF 5.745 GHz         Image: CF 5.73724 GHz         Image: CF 5.23 GHz
Spectrum Ref Level 20.50 dBm Offset 1.00 dB ● RBW 100 kHz
Att 30 dB SWT 75.9 µs ● VBW 300 kHz Mode Auto FFT Count 500/500     DIPk View     M1[1] -10.42 dBm     DI dBm
-20 dBm
Type         Ref         Tropic         Y-value         Function         Function Result           M1         1         5.7766 GHz         10.42 dBm         10.02 Bm         10.42 dBm           T1         1         5.7766 GHz         -1.0.42 dBm         10.02 Bm         10.42 dBm           T2         1         5.7761 GHZ         -1.33 4d Bm         Occ Bw         17.592407592 MHz           T2         1         5.7837 6d Lz         -1.1.82 dBm         Dcc Bw         17.592407592 MHz           D3         M1         1         16.29 MHz         -0.18 dB         D
Spectrum
Att 30 dB SWT 75.9 µs ♥ VBW 300 kHz Mode Auto FFT Count 500/500      B/Fk View      10 dBm     10 dBm     10 dBm     11 M1     11
-20 dBm
Y/U dam         Span 30.0 MHz           CF 5.825 CHz         1001 pts         Span 30.0 MHz           Warker         Yue         Yue         Function         Function Result           M1         1         5.812747 CHz         -11.33 dBm         Function         Function Result           T1         1         5.81258 GHz         -12.63 dBm         Occ Bw         17.562437562 MHz           T2         1         5.8337812 GHz         -12.09 dBm         Occ Bw         17.562437562 MHz           M2         1         5.82374 GHz         -5.20 dBm         Occ Bw         Image: Character State S

Band IV	802.11a
	Spectrum         Image: Construction of the sector of
CHL	Count 500/500           I Dr. View         MI[1]         -11.97 dBm           10 dBm         Signable Cripton           0 dBm         Occ Bw         16.453346454 MHz           0 dBm         Image: Signable Cripton           -10.dBm         D1 -11.381 dBd colspan="2">101.45346454 MHz           -20 dBm         Image: Signable Cripton           -30 dBm         Image: Signable Cripton           -50 dBm         Image: Signable Cripton           -70 dBm         Image: Signable Cripton           -70 dBm         Image: Signable Cripton           Til         1         Signable Cripton           Til         Image: Signable Cripton           Til         1         Signable Cripton           Til         Image: Signable Cripton           Til         Signable Cripton           Til         Signable Cripton           Til         Signable Cripton      <
CH <sub>M</sub>	Spectrum         Image: Constraint of the second secon
CH <sub>H</sub>	Spectrum         Image: Construction of the set of the s

Band IV	802.11n (HT40)	
	Spectrum           Ref Level 20.50 dBm         Offset         1.00 dB         RBW         100 kHz           Att         30 dB         SWT         132.7 µs         VBW         300 kHz         Mode         Auto FFT	
		15.44 dBm 73478 GHz
	0 dBm 0 cc Bw 35.94790 0 dBm M2[1] 5.758	1592 MHz -7.81 dBm 37391 GHz
	-10 dBm	
CHL	-50 dBm	yher han y
	-60 dBm	
	Marker	60.0 MHz
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         5.7373478 GHz         -15.44 dBm           35.947901           T1         1         5.7372476 GHz         -17.03 dBm         Occ Bw         35.947901           T2         1         5.772974 GHz         -15.71 dBm          35.947901           M2         1         5.7759791 GHz         -7.81 dBm	1592 MHz
	D3         M1         1         35.3043 MHz         0.44 dB	
	Spectrum Ref Level 20.50 dBm Offset 1.00 dB  RBW 100 kHz	
	Att 30 dB SWT 132.7 µs      VBW 300 kHz Mode Auto FFT     Count 500/500     In the second seco	
	10 dBm M1[1] 5.777 Occ Bw 35.86107	15.08 dBm 73478 GHz 70912 MHz -7.46 dBm
	-20 dBm	24783 GHz
	-30 dBm -40 dBm -40 dBm	where we way
CH <sub>H</sub>	-50 dBm	
		60.0 MHz
	Marker Type   Ref   Trc   X-value   Y-value   Function   Function Result	
	M1         1         5.7773478         GHz         -15.08 dBm           T1         1         5.777026         GHz         -15.68 dBm         Occ Bw         35.861070           T2         1         5.8128871         GHz         -15.09 dBm         M2         1         5.72924733         GHz         -7.46 dBm         M2         1         5.72924733         GHz         -7.46 dBm         M2         M2         1         5.72924733         GHz         -7.46 dBm         M2         M2 <td>0912 MHz</td>	0912 MHz
	D3 M1 1 35.3043 MHz -0.54 dB	

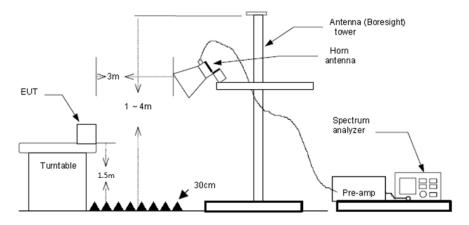
# 5.7. Band edge

	Un-restricted ban	d emissions above 1GHz	
Operating Band	Frequency	EIRP Limit	Value
5150-5250MHz	Above 1GHz	-27dBm/MHz (68.2dBuV/m@3m)	Peak
5250-5350MHz	Above 1GHz	-27dBm/MHz (68.2dBuV/m@3m)	Peak
5470-5725MHz	Above 1GHz	-27dBm/MHz (68.2dBuV/m@3m)	Peak
	1GHz-5.65GHz	-27dBm/MHz (68.2dBuV/m@3m)	Peak
	5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m@3m)	Peak
	5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m@3m)	Peak
5705 5050 MU-	5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m@3m)	Peak
5725-5850 MHz	5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m@3m)	Peak
	5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m@3m)	Peak
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m@3m)	Peak
	Above 5.925GHz	-27dBm/MHz (68.2dBuV/m@3m)	Peak

\* Increase/Decreases with the linearly of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.  $E[dB\mu V/m] = EIRP[dBm] + 95.2$ , for d = 3 meters.

## **TEST CONFIGURATION**



#### TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow: RBW=1MHz, VBW=3MHz PEAK detector for Peak value. RBW=1MHz, VBW=3MHz RMS detector for Average value.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☑ Passed □ Not Applicable

Band: I&II				Worst mo	ode: 802.11a	a	Test channel: CH <sub>L</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5150.00	18.54	31.70	9.79	0.00	60.03	68.20	-8.17	Horizontal	Peak
5150.00	19.48	31.70	9.79	0.00	60.97	68.20	-7.23	Vertical	Peak
5150.00	7.95	31.70	9.79	0.00	49.44	54.00	-4.56	Horizontal	Average
5150.00	8.76	31.70	9.79	0.00	50.25	54.00	-3.75	Vertical	Average

Band: I&II				Worst mo	ode: 802.11a	a	Test channel: CH <sub>H</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5350.00	18.85	31.40	10.05	0.00	60.30	68.20	-7.90	Horizontal	Peak
5350.00	22.13	31.40	10.05	0.00	63.58	68.20	-4.62	Vertical	Peak
5350.00	7.80	31.40	10.05	0.00	49.25	54.00	-4.75	Horizontal	Average
5350.00	7.76	31.40	10.05	0.00	49.21	54.00	-4.79	Vertical	Average

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Band: III				Worst mo	ode: 802.11a	a	Test channel: CH <sub>L</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5470.00	4.60	31.78	10.18	0.00	46.56	68.20	-21.64	Horizontal	Peak
5470.00	8.58	31.78	10.18	0.00	50.54	68.20	-17.66	Vertical	Peak
5470.00	4.30	31.78	10.18	0.00	46.26	54.00	-7.74	Horizontal	Average
5470.00	4.57	31.78	10.18	0.00	46.53	54.00	-7.47	Vertical	Average

Band: III				Worst mo	ode: 802.11a	a	Test channel: CH <sub>H</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5725.00	8.92	31.73	10.47	0.00	51.12	68.20	-17.08	Horizontal	Peak
5725.00	6.73	31.73	10.47	0.00	48.93	68.20	-19.27	Vertical	Peak
5725.00	6.55	31.73	10.47	0.00	48.75	54.00	-5.25	Horizontal	Average
5725.00	3.56	31.73	10.47	0.00	45.76	54.00	-8.24	Vertical	Average

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Band: IV				Worst mo	ode: 802.11a	1	Test channel: CH <sub>L</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5725.00	12.68	31.73	10.47	0.00	54.88	68.20	-13.32	Horizontal	Peak
5725.00	12.76	31.73	10.47	0.00	54.96	68.20	-13.24	Vertical	Peak
5725.00	6.98	31.73	10.47	0.00	49.18	54.00	-4.82	Horizontal	Average
5725.00	4.43	31.73	10.47	0.00	46.63	54.00	-7.37	Vertical	Average

Band: IV				Worst mo	ode: 802.11a	a	Test channel: CH <sub>H</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
5850.00	13.95	32.20	10.61	0.00	56.76	68.20	-11.44	Horizontal	Peak
5850.00	11.86	32.20	10.61	0.00	54.67	68.20	-13.53	Vertical	Peak
5850.00	7.36	32.20	10.61	0.00	50.17	54.00	-3.83	Horizontal	Average
5850.00	6.15	32.20	10.61	0.00	48.96	54.00	-5.04	Vertical	Average

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

# 5.8. Radiated Spurious Emissions

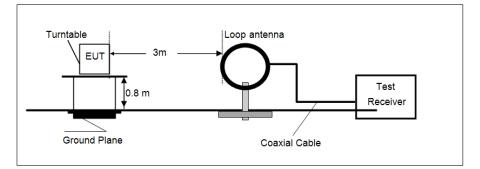
# <u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209 and Part 15 Subpart E Section 15.407

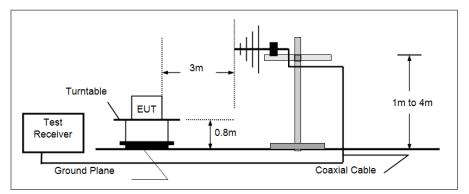
Unwanted emissions below	v 1GHz and Restricted band emissions	above 1GHz
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

# **TEST CONFIGURATION**

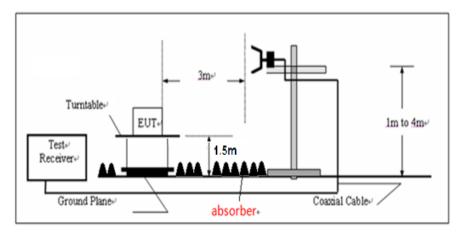
• 9KHz ~30MHz



• 30MHz ~ 1GHz



• Above 1GHz



# TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

 (3) From 1 GHz to 10<sup>th</sup> harmonic: RBW=1MHz, VBW=3MHz Peak detector for Peak value. RBW=1MHz, VBW=3MHz RMS detector for Average value.

## TEST MODE:

Please refer to the clause 3.3

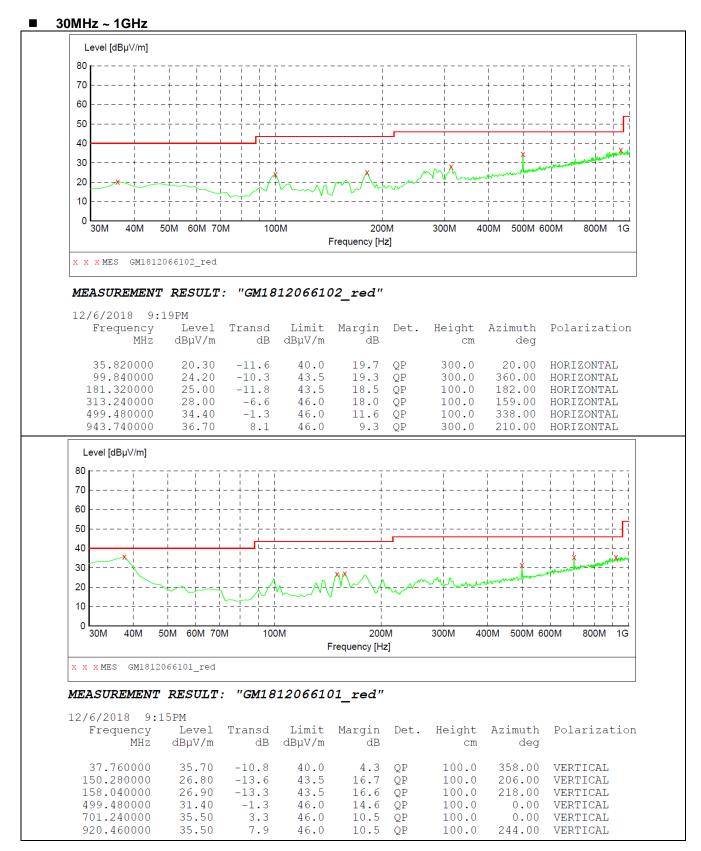
#### TEST RESULTS

☑ Passed □ Not Applicable

#### Measurement data:

#### ■ 9kHz ~ 30MHz

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



Remark:

Transd=Cable lose+ Antenna factor- Pre-amplifier; Margin=Limit -Level

## Above 1GHz

Band: I				Worst mo	ode: 802.11r	n(HT20)	Test channel: $CH_{L}$		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1773.13	32.81	25.35	5.91	37.38	26.69	68.20	-41.51	Horizontal	Peak
7027.82	29.74	35.38	11.85	33.83	43.14	68.20	-25.06	Horizontal	Peak
9538.54	30.63	39.05	13.72	33.87	49.53	68.20	-18.67	Horizontal	Peak
11226.25	28.62	40.30	13.48	35.32	47.08	68.20	-21.12	Horizontal	Peak
1805.01	32.29	25.39	5.97	37.41	26.24	68.20	-41.96	Vertical	Peak
4234.72	30.73	30.07	8.97	36.53	33.24	68.20	-34.96	Vertical	Peak
6511.12	28.49	34.02	11.20	33.63	40.08	68.20	-28.12	Vertical	Peak
8814.77	30.43	37.71	13.12	32.99	48.27	68.20	-19.93	Vertical	Peak

Band: I				Worst mo	ode: 802.11r	n(HT20)	Test channel: CH <sub>M</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1814.22	32.53	25.39	5.98	37.42	26.48	68.20	-41.72	Horizontal	Peak
4034.78	31.44	29.77	8.81	36.73	33.29	68.20	-34.91	Horizontal	Peak
5022.19	29.05	31.59	9.69	35.34	34.99	68.20	-33.21	Horizontal	Peak
10534.09	29.65	39.98	13.59	36.69	46.53	68.20	-21.67	Horizontal	Peak
1904.12	31.24	25.34	6.12	37.51	25.19	68.20	-43.01	Vertical	Peak
3135.99	33.05	28.80	7.64	37.45	32.04	68.20	-36.16	Vertical	Peak
4946.07	30.70	31.45	9.63	35.47	36.31	68.20	-31.89	Vertical	Peak
6511.12	28.49	34.02	11.20	33.63	40.08	68.20	-28.12	Vertical	Peak

#### Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measuring frequencies from 1 GHz to 40GHz.

Band: I				Worst mo	ode: 802.11	n(HT20)	Test channel: CH <sub>H</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1795.84	32.27	25.39	5.95	37.40	26.21	68.20	-41.99	Horizontal	Peak
4809.50	29.60	31.58	9.55	35.72	35.01	68.20	-33.19	Horizontal	Peak
7081.70	29.53	35.55	11.85	33.74	43.19	68.20	-25.01	Horizontal	Peak
9636.16	29.12	39.08	13.72	33.95	47.97	68.20	-20.23	Horizontal	Peak
1938.35	31.38	25.69	6.17	37.54	25.70	68.20	-42.50	Vertical	Peak
6140.85	29.34	32.66	10.91	34.00	38.91	68.20	-29.29	Vertical	Peak
7981.72	29.43	37.03	12.39	33.07	45.78	68.20	-22.42	Vertical	Peak
11341.14	29.40	40.30	13.43	35.00	48.13	68.20	-20.07	Vertical	Peak

Band: II				Worst mo	ode: 802.11a	à	Test cha	annel: CH <sub>L</sub>	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2617.48	31.96	27.85	6.95	37.59	29.17	68.20	-39.03	Horizontal	Peak
3598.09	32.61	29.29	8.27	37.06	33.11	68.20	-35.09	Horizontal	Peak
6921.30	28.28	34.83	11.75	33.84	41.02	68.20	-27.18	Horizontal	Peak
8125.22	30.69	36.92	12.59	33.03	47.17	68.20	-21.03	Horizontal	Peak
2269.73	32.13	27.92	6.56	37.59	29.02	68.20	-39.18	Vertical	Peak
2671.33	30.81	28.02	7.07	37.59	28.31	68.20	-39.89	Vertical	Peak
6379.86	30.31	33.26	10.99	33.74	40.82	68.20	-27.38	Vertical	Peak
8837.24	28.50	37.74	13.14	32.99	46.39	68.20	-21.81	Vertical	Peak

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measuring frequencies from 1 GHz to 40GHz.

Band: II				Worst mo	ode: 802.11a	3	Test channel: CH <sub>M</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2519.42	32.38	27.32	6.85	37.59	28.96	68.20	-39.24	Horizontal	Peak
4501.49	30.80	30.70	9.30	36.29	34.51	68.20	-33.69	Horizontal	Peak
6678.99	28.58	34.20	11.45	33.72	40.51	68.20	-27.69	Horizontal	Peak
10400.86	30.30	39.65	13.59	36.25	47.29	68.20	-20.91	Horizontal	Peak
1894.45	32.55	25.31	6.11	37.50	26.47	68.20	-41.73	Vertical	Peak
4170.53	31.11	29.97	8.92	36.59	33.41	68.20	-34.79	Vertical	Peak
5204.40	30.57	31.49	9.84	34.98	36.92	68.20	-31.28	Vertical	Peak
7921.00	28.58	36.78	12.68	33.06	44.98	68.20	-23.22	Vertical	Peak

Band: II				Worst mo	ode: 802.11a	a	Test cha	annel: CH <sub>H</sub>	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1948.25	30.65	25.79	6.19	37.55	25.08	68.20	-43.12	Horizontal	Peak
3863.90	31.93	29.66	8.59	36.86	33.32	68.20	-34.88	Horizontal	Peak
6094.14	29.59	32.50	10.83	34.05	38.87	68.20	-29.33	Horizontal	Peak
8615.13	28.76	37.39	12.91	32.94	46.12	68.20	-22.08	Horizontal	Peak
1814.22	31.88	25.39	5.98	37.42	25.83	68.20	-42.37	Vertical	Peak
4444.56	30.21	30.59	9.20	36.34	33.66	68.20	-34.54	Vertical	Peak
6299.18	30.15	33.10	11.00	33.83	40.42	68.20	-27.78	Vertical	Peak
8904.99	29.06	37.81	13.21	33.01	47.07	68.20	-21.13	Vertical	Peak

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measuring frequencies from 1 GHz to 40GHz.

Band: III				Worst mo	ode: 802.11a	a	Test channel: CH <sub>L</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1823.48	33.27	25.38	6.00	37.43	27.22	68.20	-40.98	Horizontal	Peak
3472.12	32.54	28.78	8.07	37.16	32.23	68.20	-35.97	Horizontal	Peak
4933.50	29.74	31.43	9.63	35.50	35.30	68.20	-32.90	Horizontal	Peak
6445.16	29.23	33.62	11.07	33.68	40.24	68.20	-27.96	Horizontal	Peak
1777.65	32.33	25.36	5.92	37.38	26.23	68.20	-41.97	Vertical	Peak
3953.44	31.13	29.70	8.71	36.79	32.75	68.20	-35.45	Vertical	Peak
5504.17	29.47	31.90	10.20	34.42	37.15	68.20	-31.05	Vertical	Peak
9587.23	30.15	39.06	13.74	33.91	49.04	68.20	-19.16	Vertical	Peak

Band: III				Worst mo	ode: 802.11a	a	Test cha	annel: CH <sub>M</sub>	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1487.51	32.16	25.81	5.25	37.08	26.14	68.20	-42.06	Horizontal	Peak
4490.05	33.47	30.68	9.28	36.30	37.13	68.20	-31.07	Horizontal	Peak
6347.47	29.28	33.20	11.00	33.78	39.70	68.20	-28.50	Horizontal	Peak
6662.01	28.66	34.20	11.43	33.71	40.58	68.20	-27.62	Horizontal	Peak
1818.84	31.87	25.38	5.99	37.43	25.81	68.20	-42.39	Vertical	Peak
3700.26	32.64	29.30	8.39	36.98	33.35	68.20	-34.85	Vertical	Peak
4983.99	29.57	31.48	9.66	35.41	35.30	68.20	-32.90	Vertical	Peak
8334.70	28.71	36.47	12.82	32.96	45.04	68.20	-23.16	Vertical	Peak

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measuring frequencies from 1 GHz to 40GHz.

Band: III				Worst mo	ode: 802.11a	a	Test cha	annel: CH <sub>H</sub>	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1737.38	34.35	25.28	5.84	37.34	28.13	68.20	-40.07	Horizontal	Peak
3653.46	32.39	29.30	8.33	37.02	33.00	68.20	-35.20	Horizontal	Peak
4858.72	29.26	31.48	9.58	35.63	34.69	68.20	-33.51	Horizontal	Peak
7338.62	28.92	36.30	12.01	33.29	43.94	68.20	-24.26	Horizontal	Peak
1851.54	32.32	25.35	6.04	37.46	26.25	68.20	-41.95	Vertical	Peak
4983.99	29.57	31.48	9.66	35.41	35.30	68.20	-32.90	Vertical	Peak
5925.86	29.00	32.35	10.64	34.19	37.80	68.20	-30.40	Vertical	Peak
8187.50	28.53	36.74	12.74	33.01	45.00	68.20	-23.20	Vertical	Peak

Band: IV				Worst mo	ode: 802.11a	à	Test channel: CH <sub>L</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1711.05	32.66	25.22	5.79	37.31	26.36	68.20	-41.84	Horizontal	Peak
3192.37	32.69	28.80	7.71	37.40	31.80	68.20	-36.40	Horizontal	Peak
4809.50	29.60	31.58	9.55	35.72	35.01	68.20	-33.19	Horizontal	Peak
7508.69	28.93	36.11	12.42	33.02	44.44	68.20	-23.76	Horizontal	Peak
1764.12	33.81	25.33	5.89	37.37	27.66	68.20	-40.54	Vertical	Peak
3543.55	32.85	29.13	8.18	37.11	33.05	68.20	-35.15	Vertical	Peak
5504.17	29.47	31.90	10.20	34.42	37.15	68.20	-31.05	Vertical	Peak
7643.68	28.94	36.16	12.84	33.03	44.91	68.20	-23.29	Vertical	Peak

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measuring frequencies from 1 GHz to 40GHz.

Band: IV				Worst mo	ode: 802.11a	a	Test channel: CH <sub>M</sub>		
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2086.86	32.01	26.65	6.34	37.60	27.40	68.20	-40.80	Horizontal	Peak
2705.54	31.12	28.10	7.15	37.59	28.78	68.20	-39.42	Horizontal	Peak
5073.59	30.98	31.80	9.73	35.23	37.28	68.20	-30.92	Horizontal	Peak
7172.41	28.51	36.04	11.86	33.58	42.83	68.20	-25.37	Horizontal	Peak
1569.19	31.59	25.17	5.48	37.15	25.09	68.20	-43.11	Vertical	Peak
3308.19	31.73	28.20	7.85	37.30	30.48	68.20	-37.72	Vertical	Peak
6017.06	28.86	32.50	10.70	34.13	37.93	68.20	-30.27	Vertical	Peak
9298.80	28.76	39.19	13.59	33.52	48.02	68.20	-20.18	Vertical	Peak

Band: IV				Worst mo	ode: 802.11a	a	Test cha	annel: CH <sub>H</sub>	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1659.57	32.88	25.08	5.69	37.26	26.39	68.20	-41.81	Horizontal	Peak
4310.85	30.65	30.23	9.05	36.46	33.47	68.20	-34.73	Horizontal	Peak
6267.19	29.50	33.03	11.00	33.86	39.67	68.20	-28.53	Horizontal	Peak
9251.58	30.08	38.91	13.55	33.44	49.10	68.20	-19.10	Horizontal	Peak
1851.54	32.32	25.35	6.04	37.46	26.25	68.20	-41.95	Vertical	Peak
4181.16	30.40	29.98	8.92	36.58	32.72	68.20	-35.48	Vertical	Peak
7394.88	29.48	36.30	12.06	33.20	44.64	68.20	-23.56	Vertical	Peak
9157.86	29.53	38.43	13.46	33.29	48.13	68.20	-20.07	Vertical	Peak

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

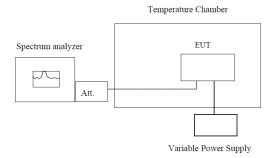
3. Measuring frequencies from 1 GHz to 40GHz.

# 5.9. Frequency stability

# <u>LIMIT</u>

Within Operation Band

# TEST CONFIGURATION



Note: Measurement setup for testing on Antenna connector

# TEST PROCEDURE

- 1. The equipment under test was connected to an external power supply.
- 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
- 3. The EUT was placed inside the temperature chamber.
- 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
- 5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
- 6. Repeat step measure with  $10^{\circ}$  increased per stage until the highest temperature of +50° reached.

## TEST MODE:

Transmitting with unmodulation

## TEST RESULTS

☑ Passed □ Not

Not Applicable

# Voltage VS Frequency stability

Band: I			Test Frequency: 5180.00MHz			
Temperature (℃)	Voltage (V)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result		
25	3.60	3000.00	0.57915	PASS		
25	3.70	3000.00	0.57915	PASS		
25	4.20	3000.00	0.57915	PASS		

Band: II			Test Frequency: 5260.00MHz			
Temperature (℃)	Voltage (V)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result		
25	3.60	3000.00	0.57034	PASS		
25	3.70	3000.00	0.57034	PASS		
25	4.20	3000.00	0.57034	PASS		

Band: III			Test Frequency: 5500.00MHz			
Temperature (℃)	Voltage (V)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result		
25	3.60	3000.00	0.54546	PASS		
25	3.70	3000.00	0.54546	PASS		
25	4.20	3000.00	0.54546	PASS		

Band: IV			Test Frequency: 5745.00MHz	
Temperature (°C)Voltage (V)Frequency Deviation (Hz)		Frequency Deviation (ppm)	Result	
25	3.60	3000.00	0.52219	PASS
25	3.70	3000.00	0.52219	PASS
25	4.20	3000.00	0.52219	PASS

# Temperature VS Frequency stability

Band: I			Test Frequency: 5180.00MHz	
Voltage (V)	Temperature (℃)	(°C) Frequency Deviation Frequency Deviation ( (Hz)		Result
3.70	-20	3000.00	0.57915	PASS
3.70	-10	3000.00	0.57915	PASS
3.70	0	3000.00	0.57915	PASS
3.70	10	3000.00	0.57915	PASS
3.70	20	3000.00	0.57915	PASS
3.70	30	3000.00	0.57915	PASS
3.70	40	3000.00	0.57915	PASS
3.70	50	3000.00	0.57915	PASS

Band: II			Test Frequency: 5260.00MHz	
Voltage (V)	Temperature (°C)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
3.70	-20	3000.00	0.57034	PASS
3.70	-10	3000.00	0.57034	PASS
3.70	0	3000.00	0.57034	PASS
3.70	10	3000.00	0.57034	PASS
3.70	20	3000.00	0.57034	PASS
3.70	30	3000.00	0.57034	PASS
3.70	40	3000.00	0.57034	PASS
3.70	50	3000.00	0.57034	PASS

Band: III			Test Frequency: 5500.00MHz	
Voltage (V)	Temperature (℃)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
3.70	-20	3000.00	0.54546	PASS
3.70	-10	3000.00	0.54546	PASS
3.70	0	3000.00	0.54546	PASS
3.70	10	3000.00	0.54546	PASS
3.70	20	3000.00	0.54546	PASS
3.70	30	3000.00	0.54546	PASS
3.70	40	3000.00	0.54546	PASS
3.70	50	3000.00	0.54546	PASS

Band: IV			Test Frequency: 5745.00MHz	
Voltage (V)	Temperature (℃)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
3.70	-20	3000.00	0.52219	PASS
3.70	-10	3000.00	0.52219	PASS
3.70	0	3000.00	0.52219	PASS
3.70	10	3000.00	0.52219	PASS
3.70	20	3000.00	0.52219	PASS
3.70	30	3000.00	0.52219	PASS
3.70	40	3000.00	0.52219	PASS
3.70	50	3000.00	0.52219	PASS

# 5.10. Dynamic Frequency Selection(DFS)

# **Requirement**

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

	Operational Mode			
Requirement	Master	Client Without Radar Detection	Client With Radar Detection	
Non-Occupancy Period	Yes	Not required	Yes	
DFS Detection Threshold	Yes	Not required	Yes	
Channel Availability Check Time	nnel Availability Check Time Yes		Not required	
U-NII Detection Bandwidth	Yes	Not required	Yes	

Table 2: Applicability of DFS requirements during normal operation

	Operational Mode		
Requirement	Master Device or Client with Radar Detection	Client Without Radar Detection	
DFS Detection Threshold	Yes	Not required	
Channel Closing Transmission Time	Yes	Yes	
Channel Move Time	Yes	Yes	
U-NII Detection Bandwidth	Yes	Not required	

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

## <u>LIMIT</u>

1. DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 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.

#### 2. DFS Response Requirements

Table 4: DFS Response Requirement Values

Paramenter	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.	
<ul> <li>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.</li> <li>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 facilitating 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.</li> </ul>		

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

#### 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.

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
		Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$Roundup \begin{cases} \left(\frac{1}{360}\right), \\ \left(\frac{19 \cdot 10^{6}}{PRI_{\mu sec}}\right) \end{cases}$		
1	1	Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A		60%	30
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
	Ag	gregate (Radar Types 1	-4)	80%	120
Note 1: Sh	nort Pulse		e used for the detection channel closing time test	bandwidth test, channel sts.	move time,

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A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. 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. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

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For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 µsec is selected, the number of pulses

$$up \left\{ \left(\frac{1}{360}\right) \cdot \left(\frac{19 \cdot 10^6}{3066}\right) \right\} = R$$

would be Round up

) = Round up {17.2} = 18.

Pulse Repetition Frequency	Pulse Repetition Frequency	Pulse Repetition Interval
Number	(Pulses Per Second)	(Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

## Table 5a - Pulse Repetition Intervals Values for Test A

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

Table 6 – Long Pulse Radar Test Waveform

The parameters for this waveforms 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 wave forms, then each additional waveform must also be unique and not repeated from the previous waveforms.

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

Table 7 – Frequency Hopping Radar Test Waveform

For the Frequency Hopping Radar Type, the same Burst parameters are used for each wave form. The hopping sequence is different for each wave form 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 5250–5724MHz.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.

#### Calibration of Radar Waveform

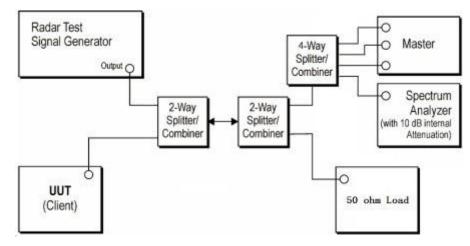
Radar Waveform Calibration Procedure

- 1) A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master
- 2) The interference Radar Detection Threshold Level is -62dBm + 0dBi +1dB = -61dBm that had been taken into account the output power range and antenna gain.
- 3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3

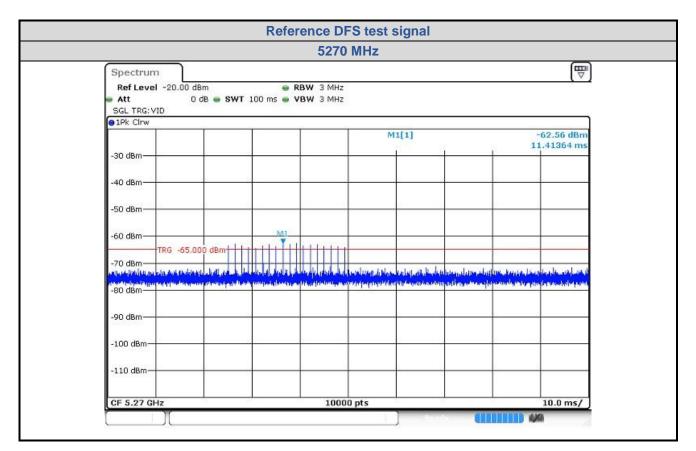
MHz. The spectrum analyzer had offset -1.0dB to compensate RF cable loss 1.0dB.

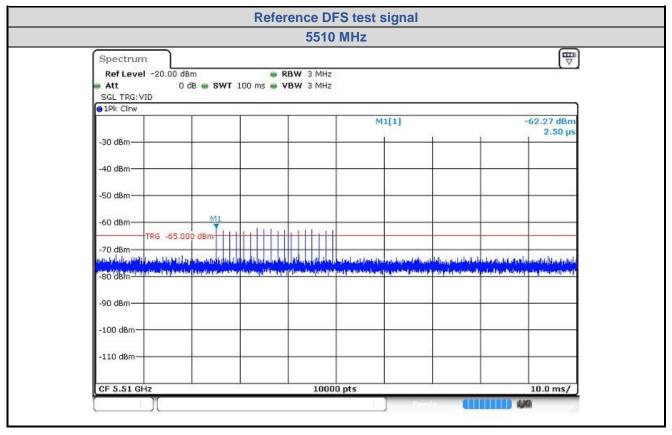
4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was - -62dBm + 0dBi +1dB = -61dBm. Capture the spectrum analyzer plots on short pulse radar waveform.

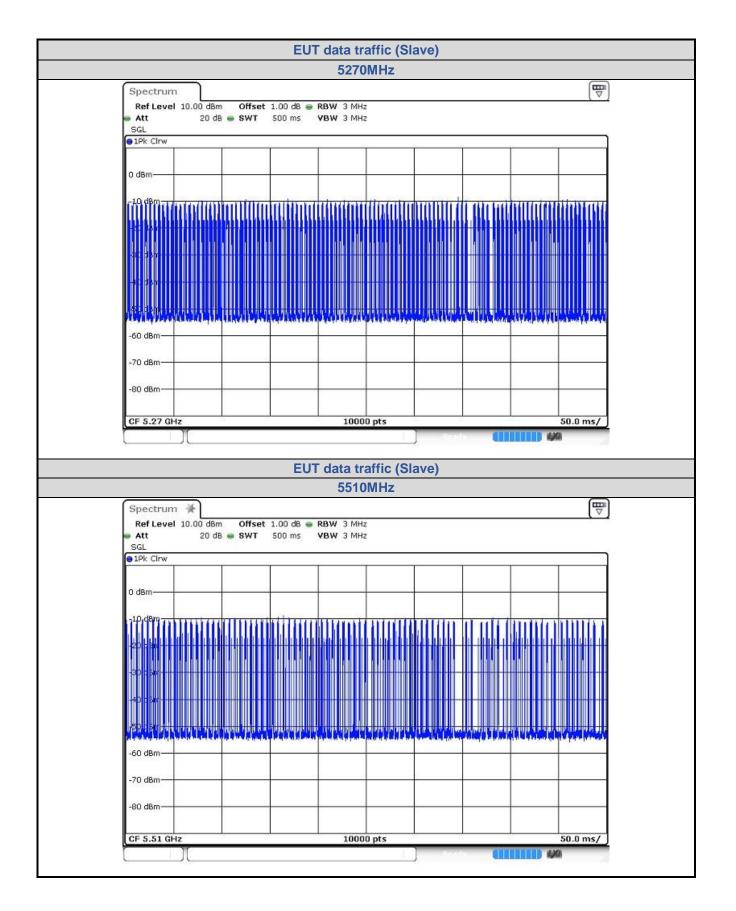
# **Conducted Calibration Setup**



#### **Radar Waveform Calibration Result**

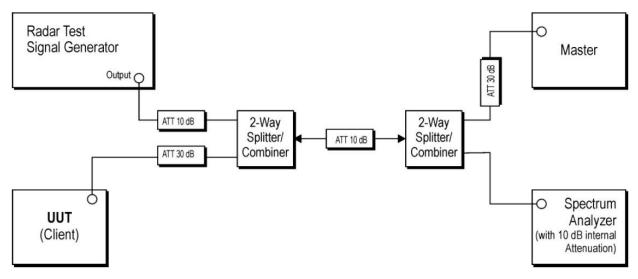






## **TEST CONFIGURATION**

Setup for Client with injection at the Master



## TEST PROCEDURE

- 1. The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- 2. The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device
- 3. A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- 4. EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.
- 5. When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
- 6. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type
- 7. Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.3ms) =S (12000ms) / B (4000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.3ms); where C is the Closing Time, N is the number of spectrum

analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

8. Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

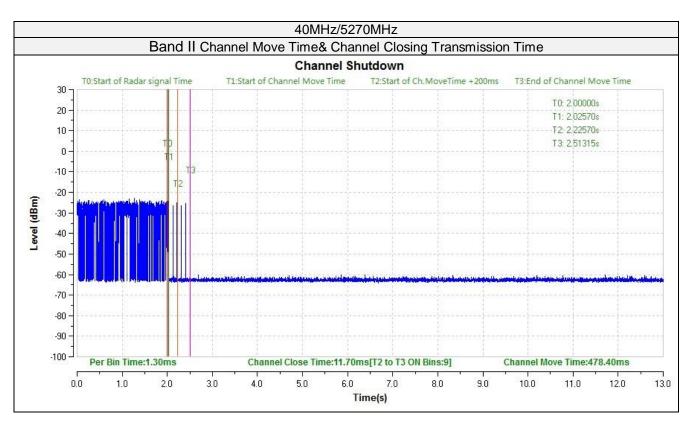
#### TEST MODE:

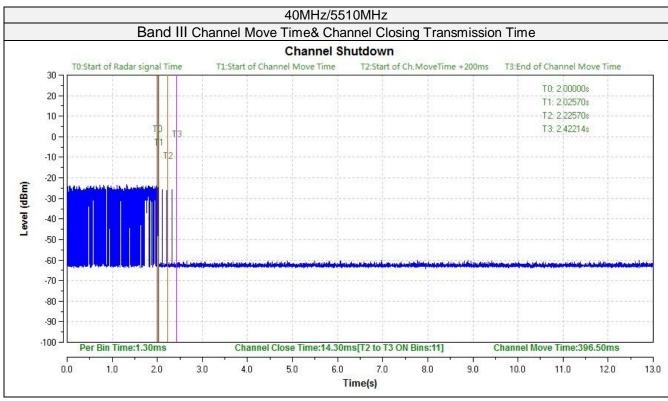
Please refer to the clause 3.3

## TEST RESULTS

#### ☑ Passed □ Not Applicable

BW/ Channel	Maximum EIRP Power(dBm)	Test Item	Test Result	Limit	Result
	14.03	Channel Move Time	0.478s	<10s	Pass
40MHz/ 5270MHz		Channel Closing Transmission Time	11.70ms	<60ms	Pass
	12.66	Channel Move Time	0.397s	<10s	Pass
40MHz/ 5510MHz		Channel Closing Transmission Time	14.30ms	<60ms	Pass





# 6. Test Setup Photos of the EUT

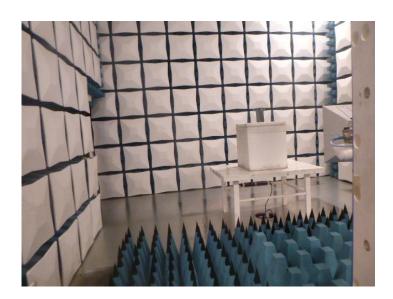
Conducted Emissions (AC Mains)



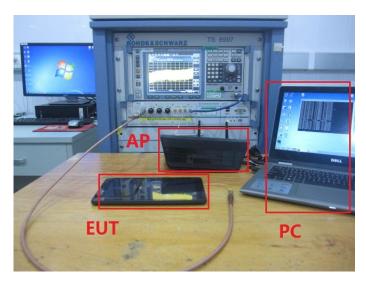
**Radiated Emissions** 







DFS test setup



# 7. External and Internal Photos of the EUT

Reference to the test report No.: CHTEW18120058

-----End of Report-----