



TEST REPORT

Report No. : **CHTEW19070049** Report Verification: 

Project No. : **SHT1906080901EW**

FCC ID : **2ABQ6-K10**

Applicant's name : **Inspira Technologies LLC**
Address : 1901 4th Ave, Suite 210, San Diego, CA 92101, USA
Manufacturer : Inspira Technologies LLC
Address : 1901 4th Ave, Suite 210, San Diego, CA 92101, USA

Test item description : **Tablet**

Trade Mark : -

Model/Type reference : **K10**

Listed Model(s) : -

Standard : **FCC CFR Title 47 Part 15 Subpart E Section 15.407**

Date of receipt of test sample : **Jun.27, 2019**

Date of testing : **Jun.27, 2019- Jul.12, 2019**

Date of issue : **Jul.15, 2019**

Result : **PASS**

Compiled by
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Approved by
(position+printedname+signature) : RF Manager Hans Hu



Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd**

Address : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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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:

FCC Rules Part 15.407: 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	2019-07-15	Original

2. TEST DESCRIPTION

Test Item	FCC Rule	Result	Test Engineer
Antenna Requirement	15.203	PASS	Jiongsheng Feng
Line Conducted Emissions (AC Main)	15.207	PASS	Kang Yang
Maximum Conducted Output Power	15.407(a)	PASS	Bruce Wong
Maximum Power Spectral Density	15.407(a)	PASS	Bruce Wong
26dB Bandwidth and 99% Occupy bandwith	15.407(a)	PASS	Bruce Wong
6dB Bandwidth	15.407(a)	PASS	Bruce Wong
Band edge	15.407(b)	PASS	Bruce Wong
Radiated Spurious Emissions	15.209	PASS	Bruce Wong
Frequency Stability	15.407(g)	PASS	Bruce Wong

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

3. SUMMARY

3.1. Client Information

Applicant:	Inspira Technologies LLC
Address:	1901 4th Ave, Suite 210, San Diego, CA 92101, USA
Manufacturer:	Inspira Technologies LLC
Address:	1901 4th Ave, Suite 210, San Diego, CA 92101, USA

3.2. Product Description

Name of EUT	Tablet
Trade Mark:	-
Model No.:	K10
Listed Model(s):	-
Power supply:	DC 3.7V from battery
Adapter information:	Model: K-T100502000U Input: 100-240V a.c., 50-60Hz, 0.35A Max Output: 5V d.c., 2000mA

5G WIFI

Supported type:	<input checked="" type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input checked="" type="checkbox"/> 802.11n(HT40)		
	<input type="checkbox"/> 802.11ac(HT20)	<input type="checkbox"/> 802.11ac(HT40)	<input type="checkbox"/> 802.11ac(HT80)		
Function:	<input type="checkbox"/> Outdoor AP	<input checked="" type="checkbox"/> Indoor AP	<input type="checkbox"/> Fixed P2P		
	<input type="checkbox"/> Client				
Modulation:	BPSK, QPSK, 16QAM, 64QAM				
Operation frequency:	<input checked="" type="checkbox"/> Band I:	5150MHz~5250MHz			
	<input checked="" type="checkbox"/> Band IV:	5725MHz~5850MHz			
Supported Bandwidth	20MHz:	802.11n, 802.11a			
	40MHz:	802.11n			
Antenna type:	FPCB				
Antenna gain:	≥0dBi±0.5 dBi				

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.

Band	Test Channel	20MHz		40MHz	
		Channel	Frequency (MHz)	Channel	Frequency (MHz)
I	CH _L	36	5180	38	5190
	CH _M	44	5220	-	-
	CH _H	48	5240	46	5230
IV	CH _L	149	5745	151	5755
	CH _M	157	5785	-	-
	CH _H	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

○	N/A	Manufacturer :	N/A
		Model No. :	N/A
○	N/A	Manufacturer :	N/A
		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.: 5377A

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.: 5377A.

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	0.51 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.02 dB	(1)
Radiated Emissions below 1GHz	4.90 dB	(1)
Radiated Emissions above 1GHz	4.96 dB	(1)
Occupied Bandwidth	70 Hz	(1)
Frequency error	70 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 Emission						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Shielded Room	Albatross projects	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	ESCI	101247	2018/10/27	2019/10/26
●	Artificial Mains	SCHWARZBECK	NNLK 8121	573	2018/10/27	2019/10/26
●	Pulse Limiter	R&S	ESH3-Z2	100499	2018/10/27	2019/10/26
●	RF Connection Cable	HUBER+SUHNER	EF400	N/A	2018/11/15	2019/11/14
●	Test Software	R&S	ES-K1	N/A	N/A	N/A
○	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	2018/10/28	2019/10/27
○	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	2018/10/28	2019/10/27
○	Four Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T8-02	20375	2018/10/28	2019/10/27
○	V-Network	R&S	ESH3-Z6	100211	2018/10/27	2019/10/26
○	V-Network	R&S	ESH3-Z6	100210	2018/10/27	2019/10/26
○	2-Line V-Network	R&S	ESH3-Z5	100049	2018/10/27	2019/10/26

● Radiated Emission-6th test site						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	N/A	2018/09/30	2021/09/29
●	EMI Test Receiver	R&S	ESCI	100900	2018/10/28	2019/10/27
●	Loop Antenna	R&S	HFH2-Z2	100020	2017/11/20	2020/11/19
●	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	2017/04/05	2020/04/04
●	Pre-Amplifier	SCHWARZBECK	BBV 9742	N/A	2018/11/15	2019/11/14
●	RF Connection Cable	HUBER+SUHNER	N/A	N/A	2018/09/28	2019/09/27
●	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	2018/09/28	2019/09/27
●	Test Software	R&S	ES-K1	N/A	N/A	N/A
●	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
●	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

● Radiated emission-7th test site						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	SAC-3m-01	N/A	2018/09/30	2021/09/29
●	Spectrum Analyzer	R&S	FSP40	100597	2018/10/27	2019/10/26
●	Horn Antenna	SCHWARZBECK	9120D	1011	2017/03/27	2020/03/26
●	Pre-amplifier	BONN	BLWA0160-2M	1811887	2018/11/14	2019/11/13
●	Pre-amplifier	CD	PAP-0102	12004	2018/11/14	2019/11/13
●	Broadband Pre-amplifier	SCHWARZBECK	BBV 9718	9718-248	2019/04/26	2020/04/25
●	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	2018/11/15	2019/11/14
●	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	2018/11/15	2019/11/14
●	Test Software	Audix	E3	N/A	N/A	N/A

●	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
●	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2018/10/28	2019/10/27
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2018/09/29	2019/09/28
●	OSP	R&S	OSP120	101317	N/A	N/A
○	Radio communication tester	R&S	CMW500	137688-Lv	2018/09/29	2019/09/28
○	Test software	Tonscend	JS1120-1(LTE)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-2(WIFI)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-3(WCDMA)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-4(GSM)	N/A	N/A	N/A

5. **TEST CONDITIONS AND RESULTS**

5.1. Antenna requirement

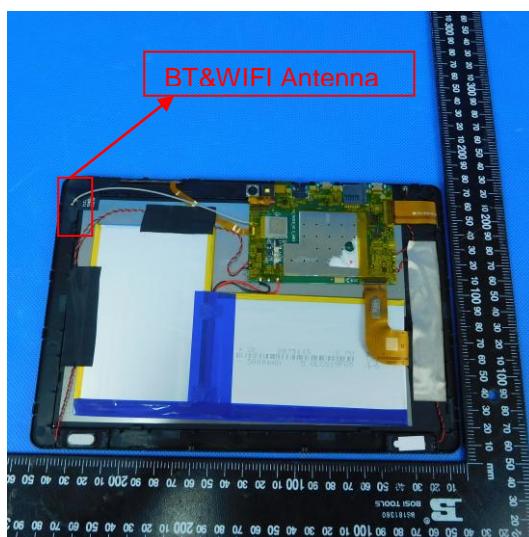
Requirement

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 an antenna 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)

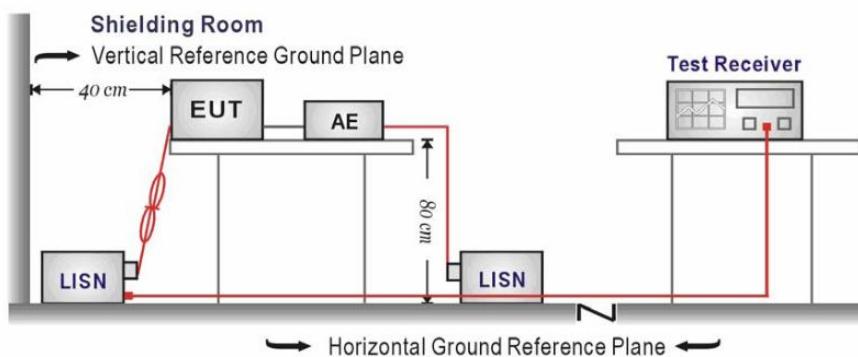
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

Frequency range (MHz)	Limit (dBuV)	
	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



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:

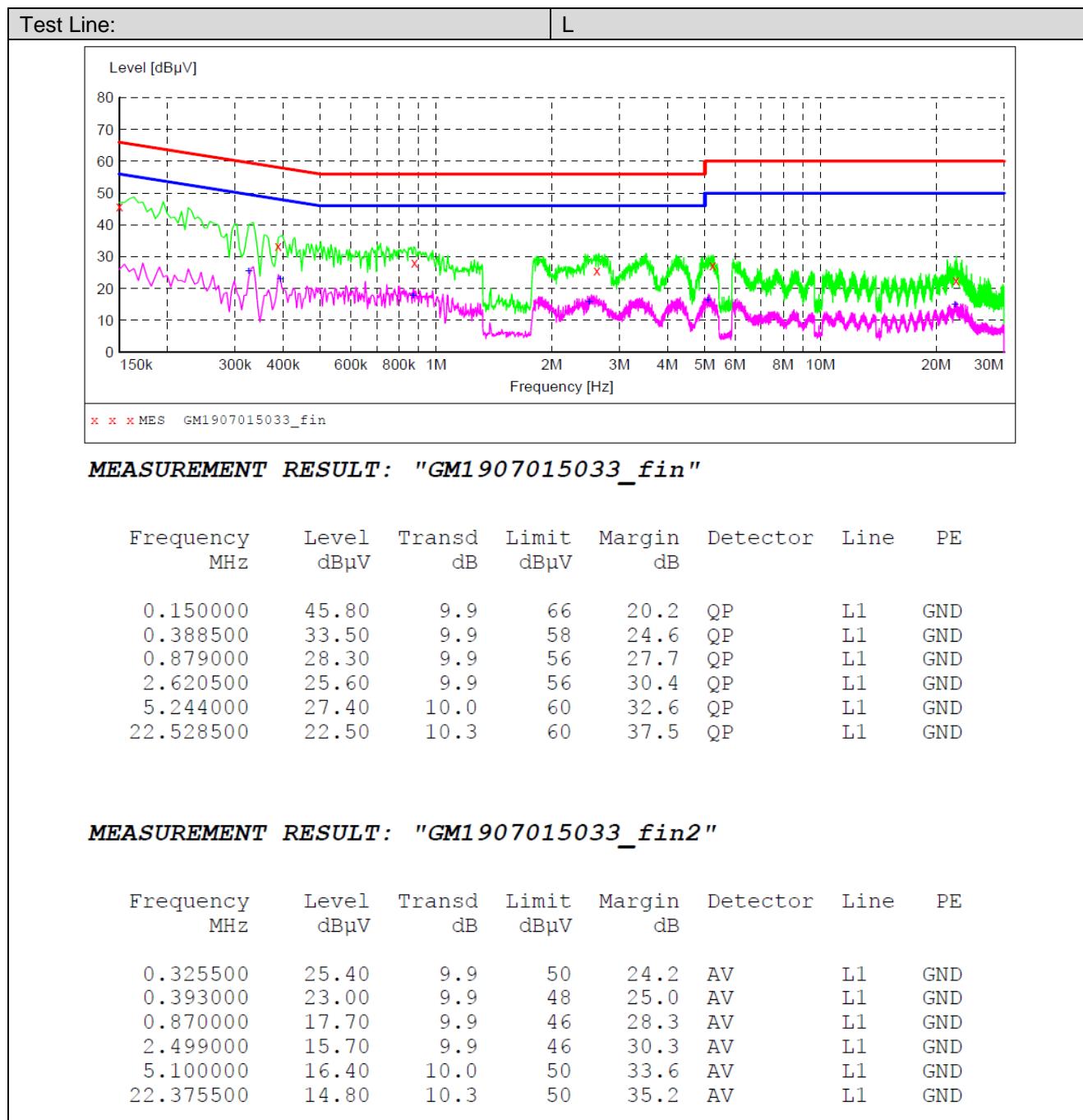
Please refer to the clause 3.3

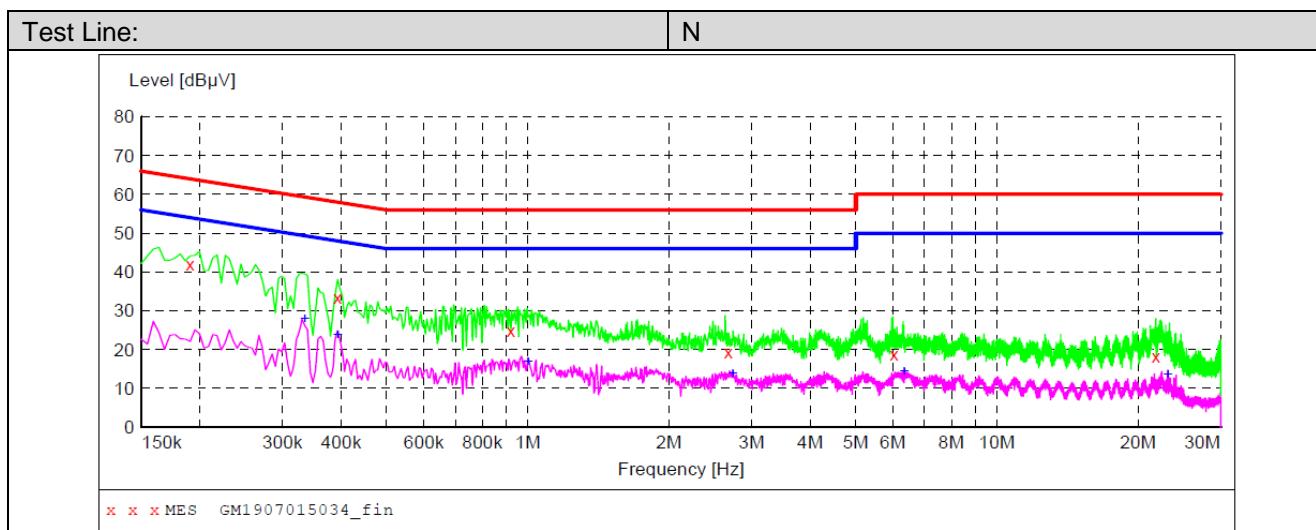
TEST RESULTS

Passed Not Applicable

Note:

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





MEASUREMENT RESULT: "GM1907015034_fin"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.190500	42.00	9.9	64	22.0	QP	N	GND
0.393000	33.50	9.9	58	24.5	QP	N	GND
0.919500	24.80	9.9	56	31.2	QP	N	GND
2.674500	19.30	9.9	56	36.7	QP	N	GND
6.031500	18.70	10.0	60	41.3	QP	N	GND
21.799500	18.20	10.2	60	41.8	QP	N	GND

MEASUREMENT RESULT: "GM1907015034_fin2"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.334500	27.80	9.9	49	21.5	AV	N	GND
0.393000	23.70	9.9	48	24.3	AV	N	GND
1.000500	16.80	9.9	46	29.2	AV	N	GND
2.737500	13.80	9.9	46	32.2	AV	N	GND
6.346500	14.50	10.0	50	35.5	AV	N	GND
23.127000	13.60	10.3	50	36.4	AV	N	GND

5.3. Maximum Conducted Output Power

LIMIT

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

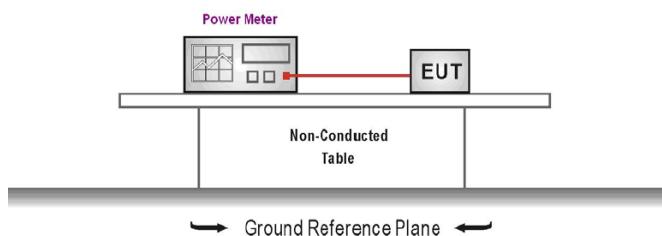
For the 5.15~5.25GHz band:

- Outdoor AP
The maximum conducted output power (P_{out}) shall not exceed the lesser of 1W (30dBm).
if $G_{Tx} > 6\text{dBi}$, then $P_{out} = 30 - (G_{Tx} - 6)$. e.i.r.p. at any elevation angle above 30 degrees $\leq 125\text{mW}$ (21dBm)
- Indoor AP
The maximum conducted output power (P_{out}) shall not exceed the lesser of 1W (30dBm).
if $G_{Tx} > 6\text{dBi}$, then $P_{out} = 30 - (G_{Tx} - 6)$.
- Point-to-point AP
The maximum conducted output power (P_{out}) shall not exceed the lesser of 1W (30dBm).
if $G_{Tx} > 23\text{dBi}$, then $P_{out} = 30 - (G_{Tx} - 23)$.
- Client devices
The maximum conducted output power (P_{out}) shall not exceed the lesser of 250W (24dBm).
if $G_{Tx} > 6\text{dBi}$, 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_{out}) shall not exceed the lesser of 1W (30dBm).
if $G_{Tx} > 6\text{dBi}$, then $P_{out} = 30 - (G_{Tx} - 6)$.
- Point-to-point systems (P2P)
The maximum conducted output power (P_{out}) 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 RESULTS

Passed Not Applicable

Band	Bandwidth (MHz)	Type	Channel	Conducted Output Power (dBm)	Limit (dBm)	Result
I	20	802.11n	CH _L	10.01	30.00	Pass
			CH _M	11.73		
			CH _H	10.41		
	40	802.11a	CH _L	10.67	30.00	Pass
			CH _M	12.46		
			CH _H	11.22		
	20	802.11n	CH _L	11.76	30.00	Pass
			CH _H	11.20		
IV	20	802.11n	CH _L	12.92	30.00	Pass
			CH _M	11.56		
			CH _H	11.57		
	40	802.11a	CH _L	13.89	30.00	Pass
			CH _M	12.51		
			CH _H	12.42		
	20	802.11n	CH _L	12.19	30.00	Pass
			CH _H	10.46		

5.4. Maximum Power Spectral Density

LIMIT

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

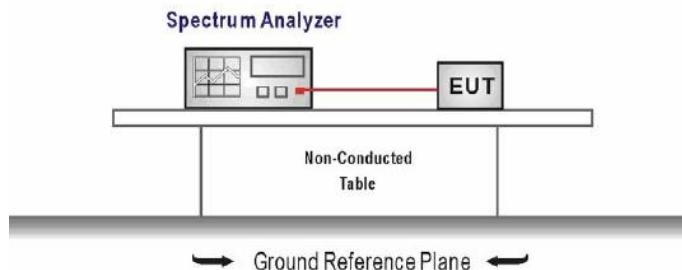
For the 5.15~5.25GHz band:

- Outdoor AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
if $G_{Tx} > 6\text{dBi}$, then $\text{PSD} = 17 - (G_{Tx} - 6)$.
- Indoor AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
if $G_{Tx} > 6\text{dBi}$, then $\text{PSD} = 17 - (G_{Tx} - 6)$.
- Point-to-point AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
if $G_{Tx} > 23\text{dBi}$, then $\text{PSD} = 17 - (G_{Tx} - 23)$.
- Client devices
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
if $G_{Tx} > 6\text{dBi}$, then $\text{PSD} = 11 - (G_{Tx} - 6)$.

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.
if $G_{Tx} > 6\text{dBi}$, then $\text{PSD} = 30 - (G_{Tx} - 6)$.
- Point-to-point systems (P2P)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

TEST CONFIGURATION



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 ≥ 3 RBW
Number of sweep points $> 2 \times (\text{span}/\text{RBW})$
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:

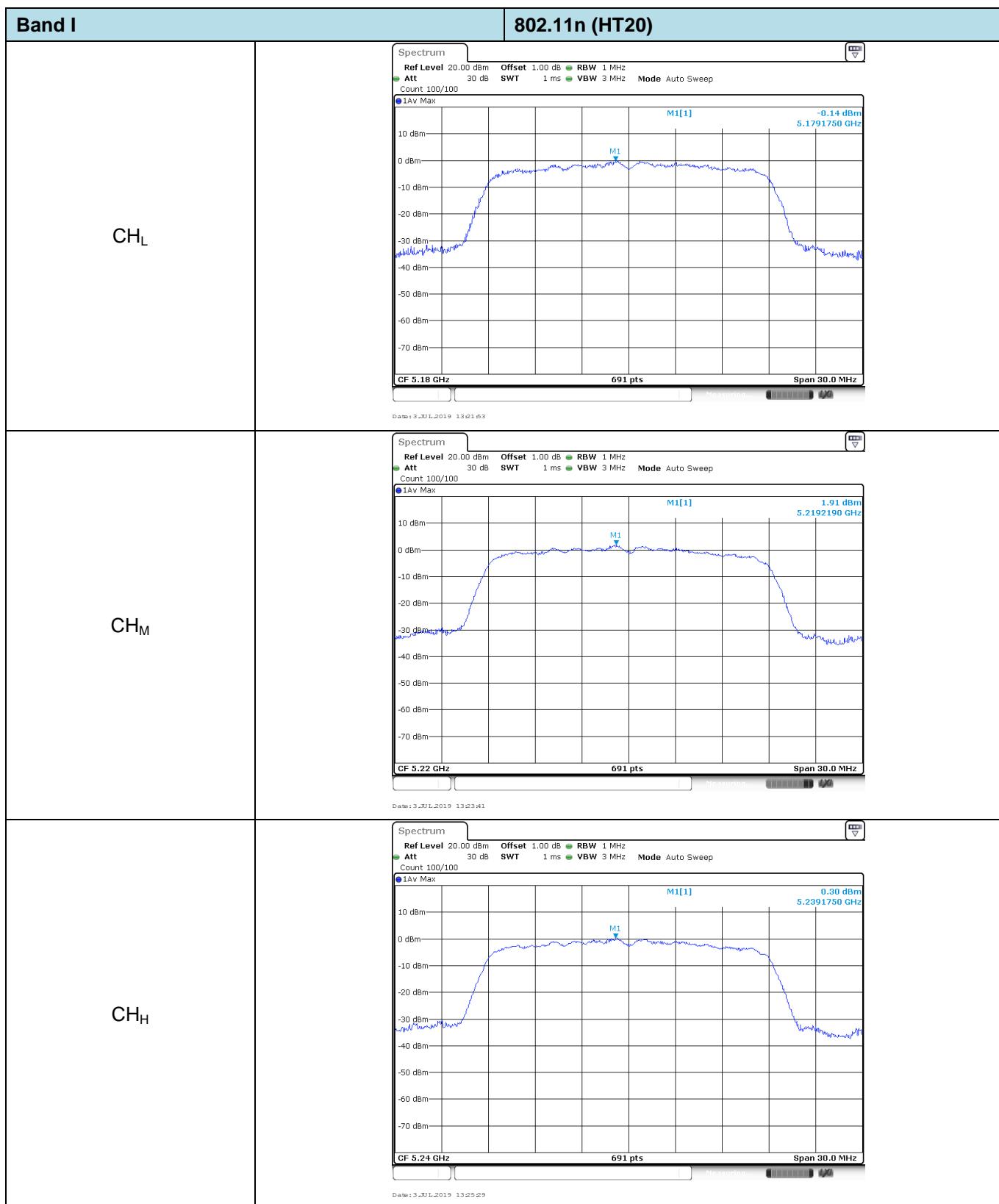
Please refer to the clause 3.3

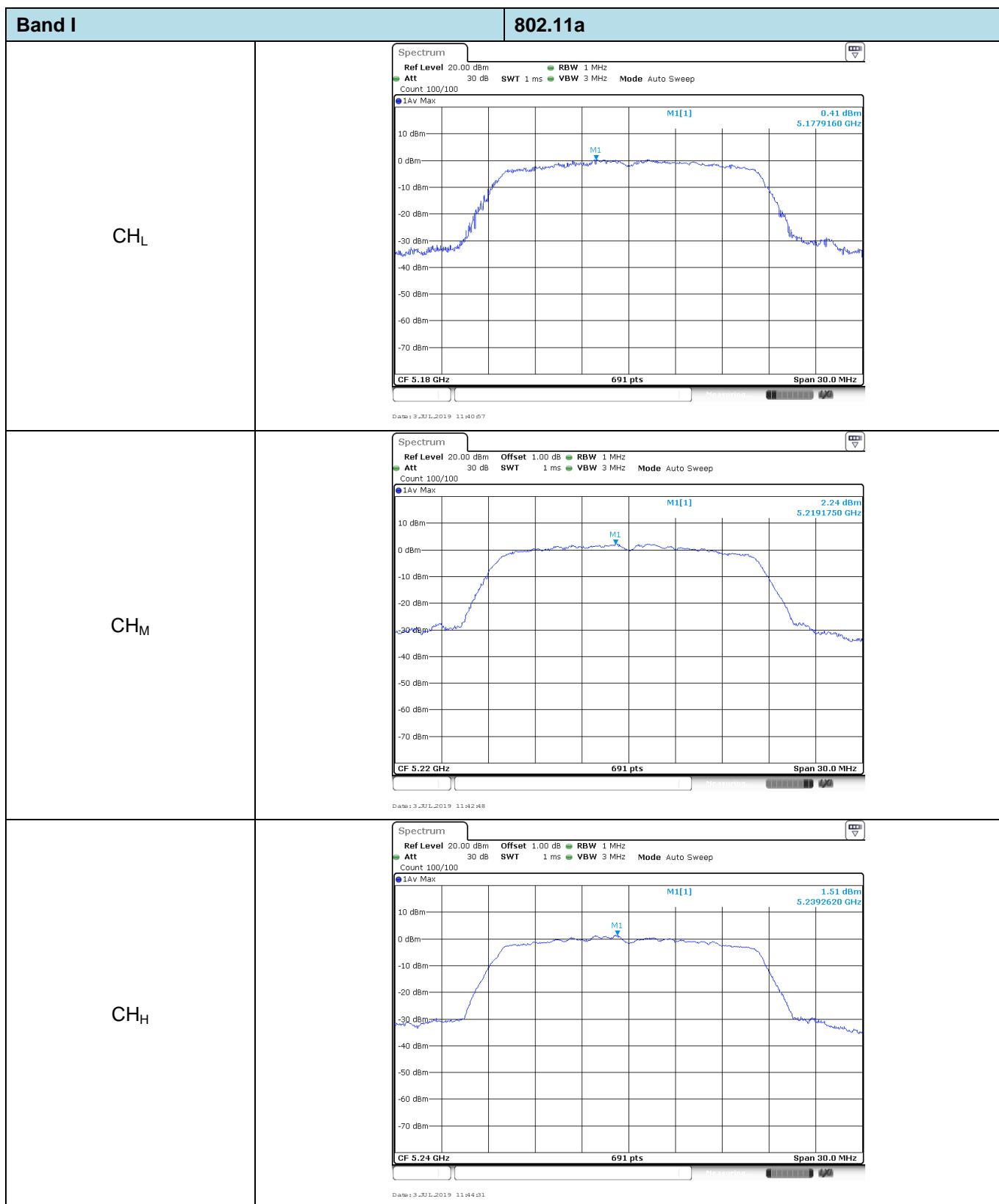
TEST RESULTS

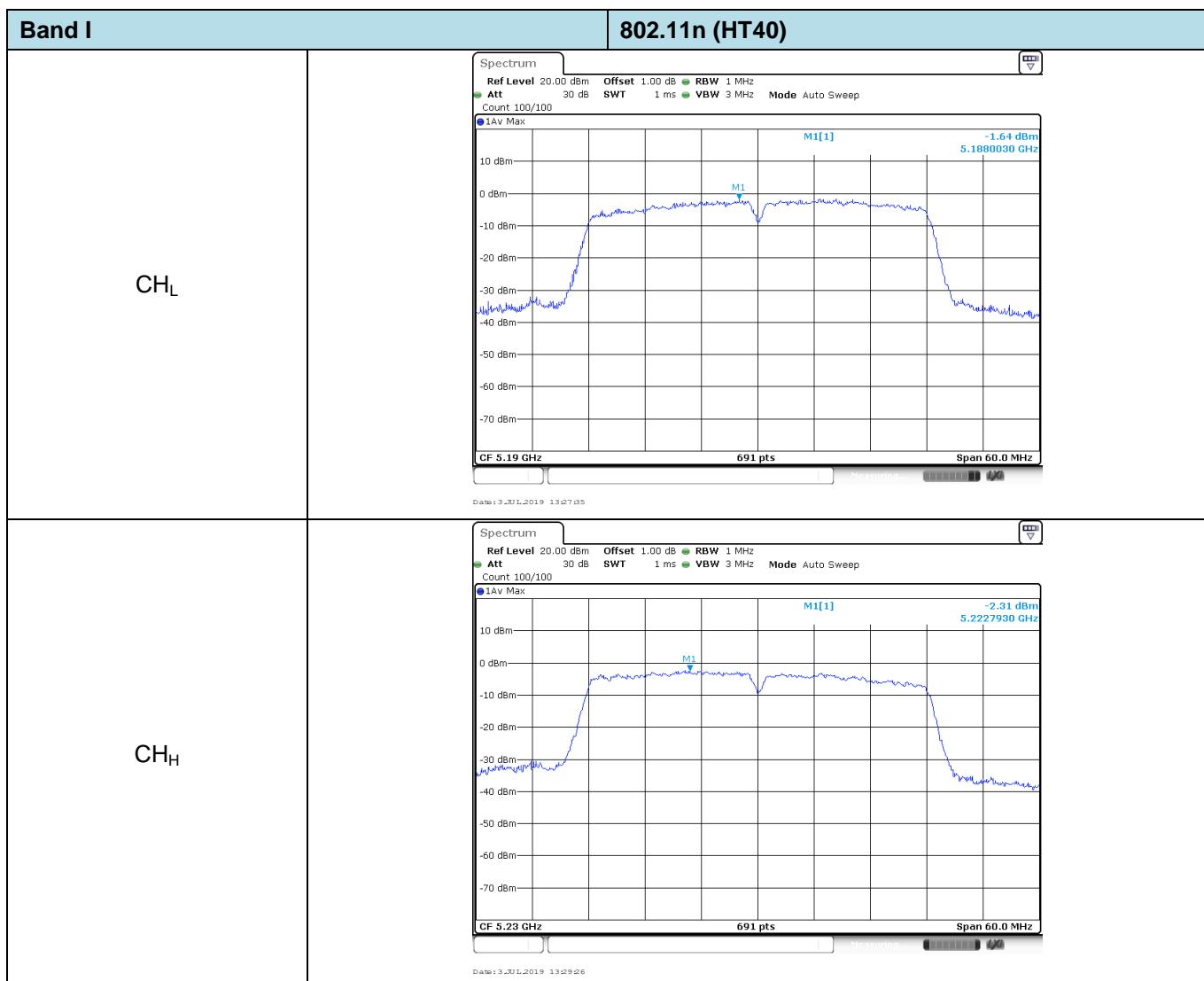
Passed Not Applicable

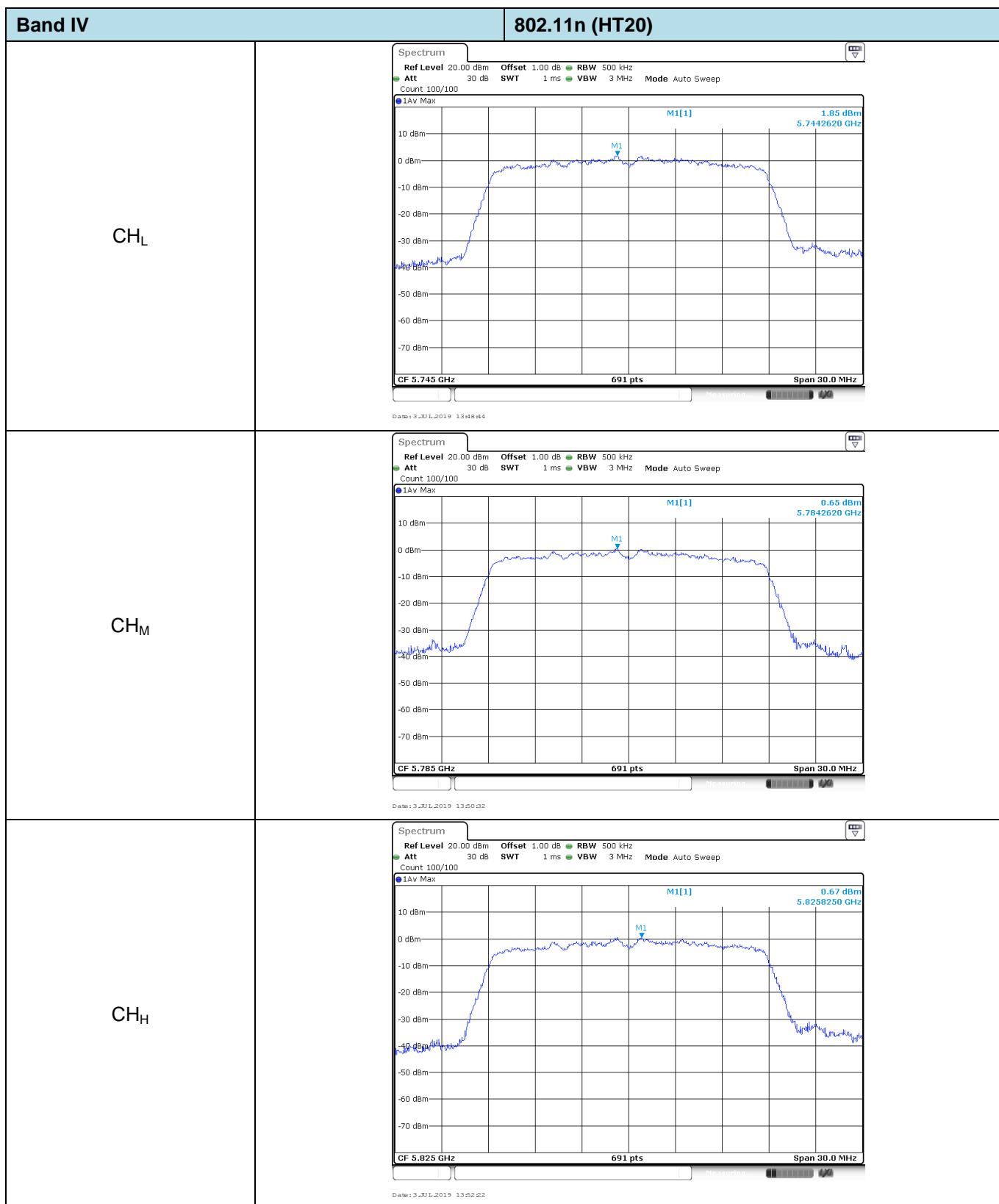
Band	Bandwidth (MHz)	Type	Channel	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
I	20	802.11n	CH _L	-0.14	17.00	Pass
			CH _M	1.91		
			CH _H	0.30		
	20	802.11a	CH _L	0.41	17.00	Pass
			CH _M	2.24		
			CH _H	1.51		
	40	802.11n	CH _L	-1.64	17.00	Pass
			CH _H	-2.31		
Band	Bandwidth (MHz)	Type	Channel	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Result
IV	20	802.11n	CH _L	1.85	30.00	Pass
			CH _M	0.65		
			CH _H	0.67		
	20	802.11a	CH _L	2.90	30.00	Pass
			CH _M	1.95		
			CH _H	1.67		
	40	802.11n	CH _L	-2.76	30.00	Pass
			CH _H	-4.54		

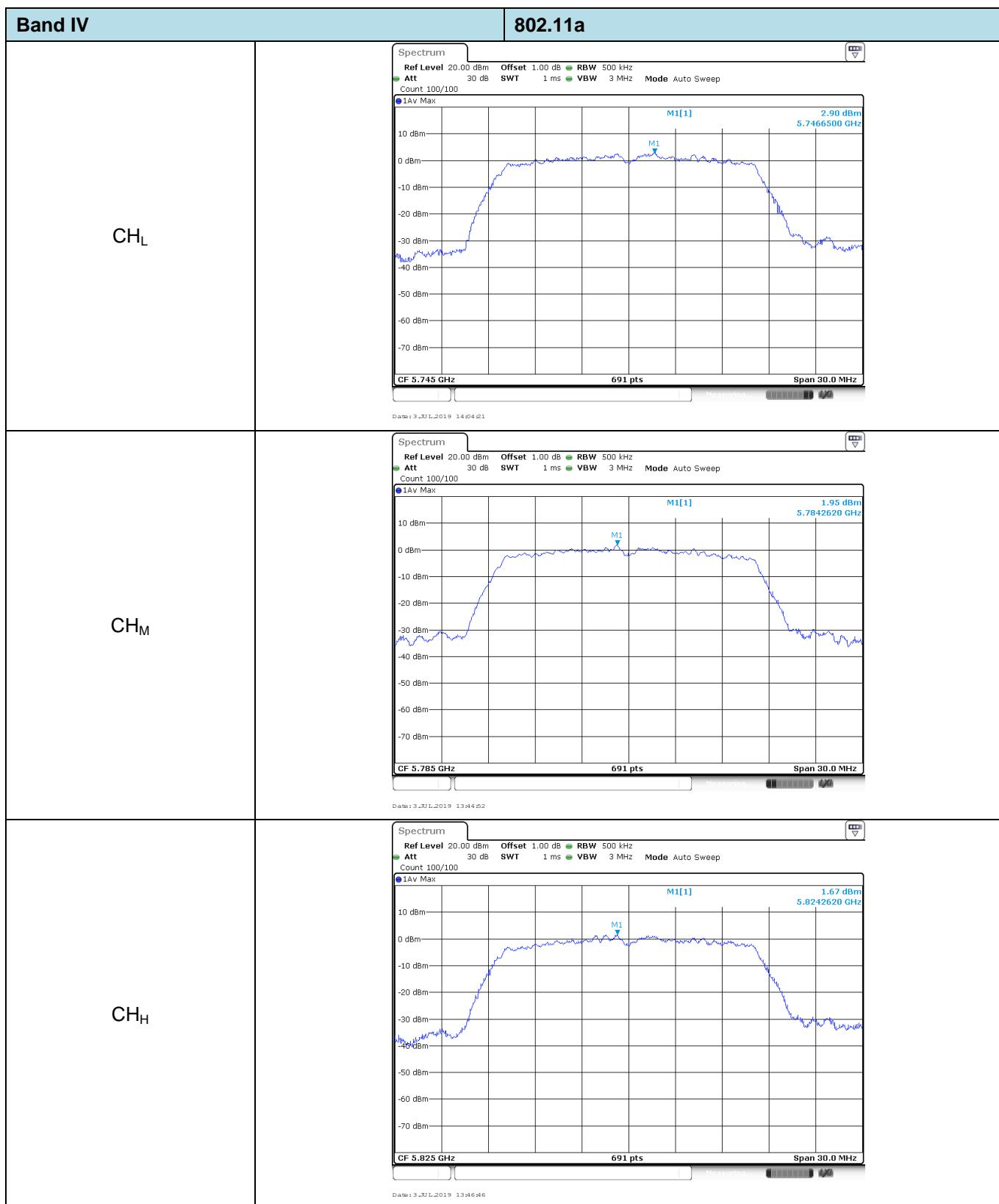
Test plot as follows:

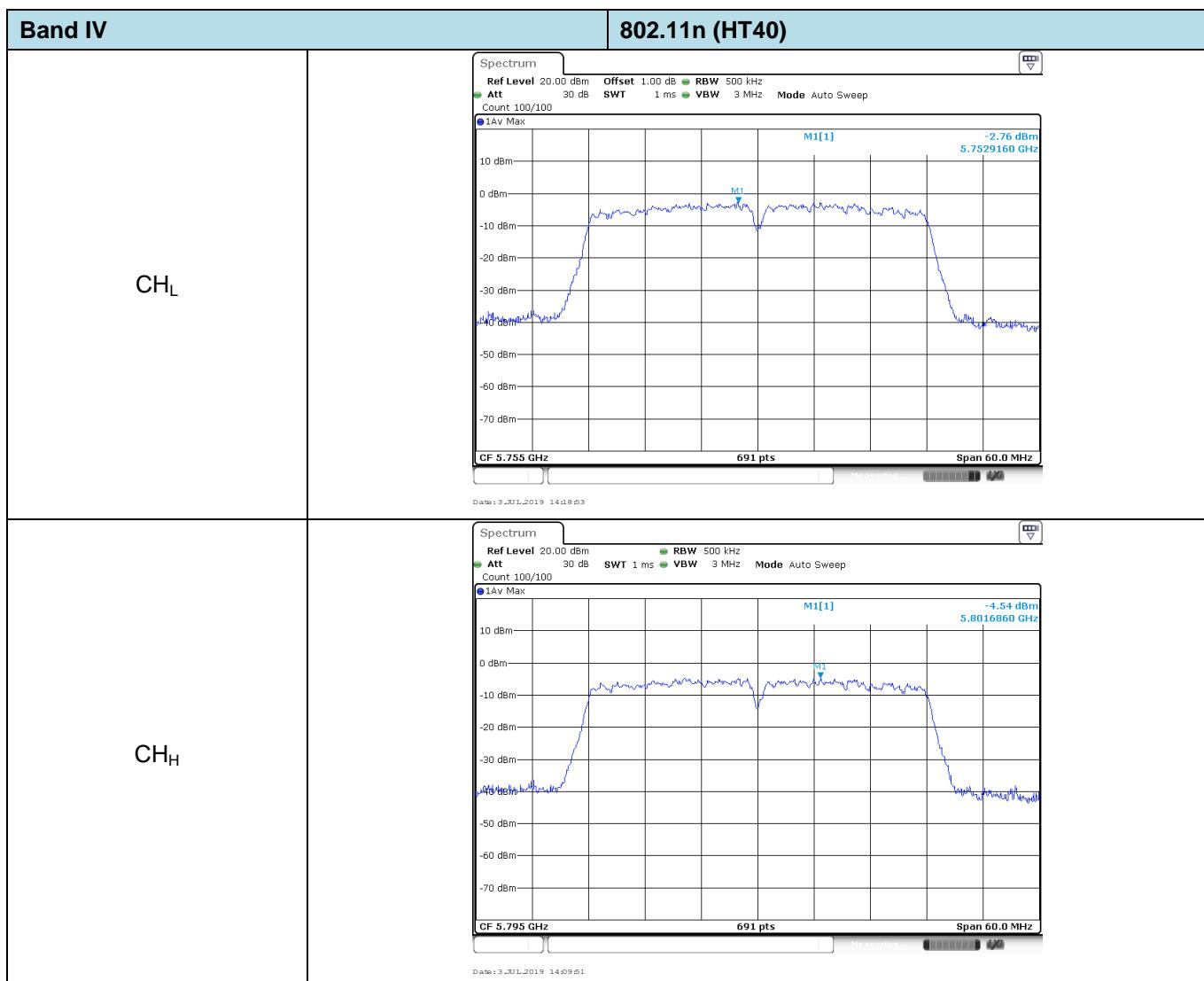










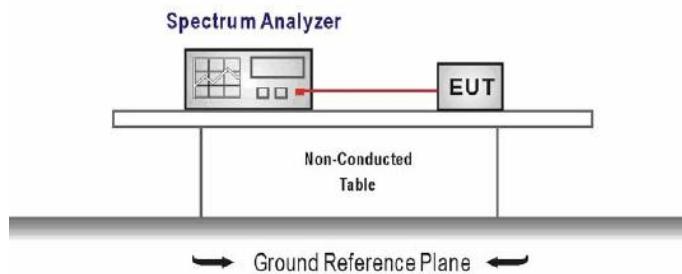


5.5. 26dB bandwidth and 99% Occupy bandwidth

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



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

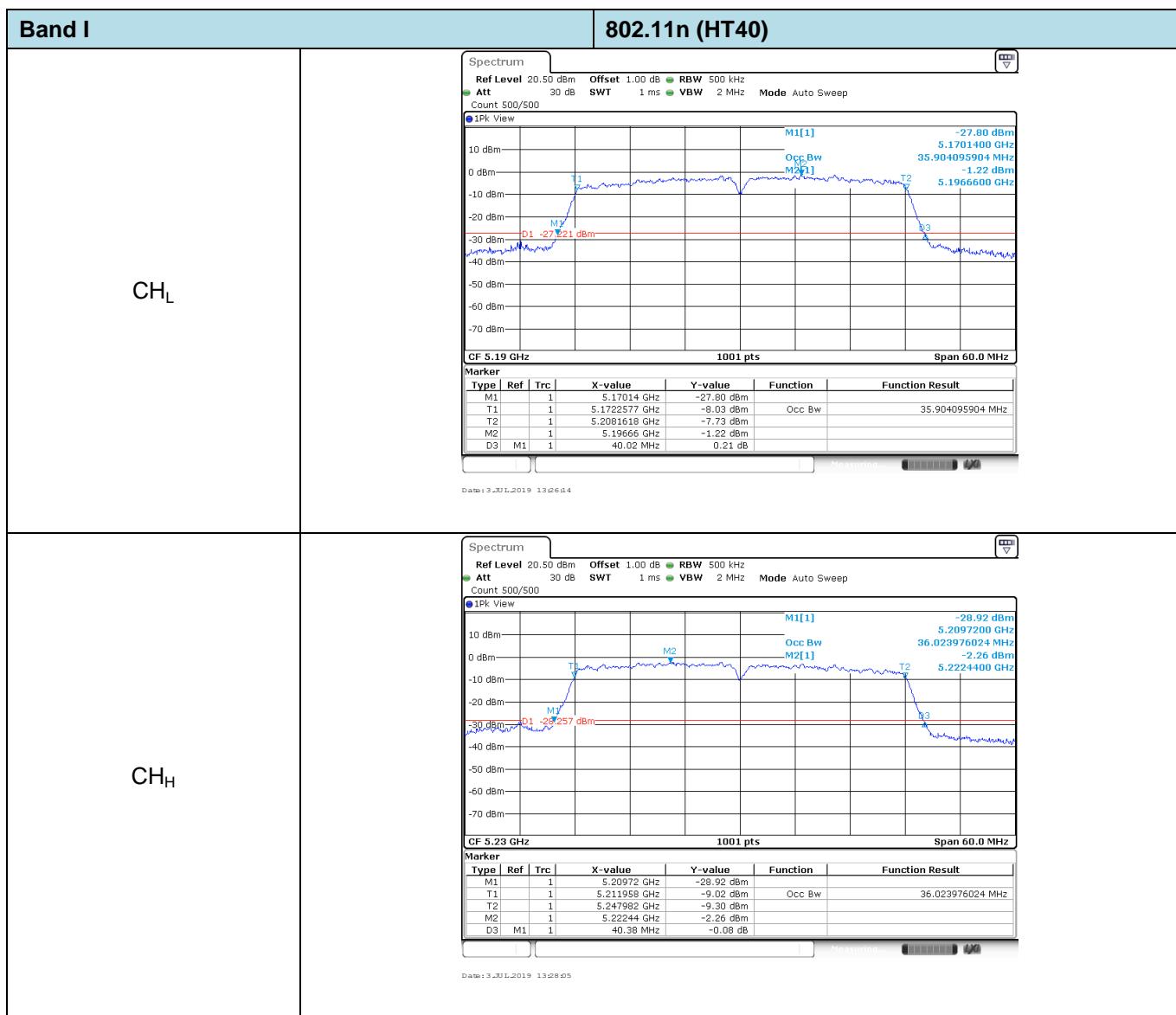
TEST RESULTS

Passed Not Applicable

Band	Bandwidth (MHz)	Type	Channel	99% Occupy bandwith (MHz)	26dB bandwidth (MHz)	Result
I	20	802.11n	CH _L	17.59	19.86	Pass
			CH _M	17.62	19.83	
			CH _H	17.59	19.77	
	802.11a		CH _L	16.57	19.50	Pass
			CH _M	16.69	19.62	
			CH _H	16.45	19.29	
	40	802.11n	CH _L	35.90	40.02	Pass
			CH _H	36.02	40.38	







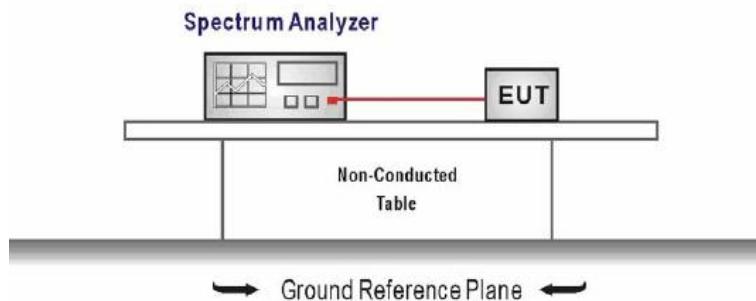
5.6. 6dB Bandwidth

LIMIT

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 $\geq 3 \times$ 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.

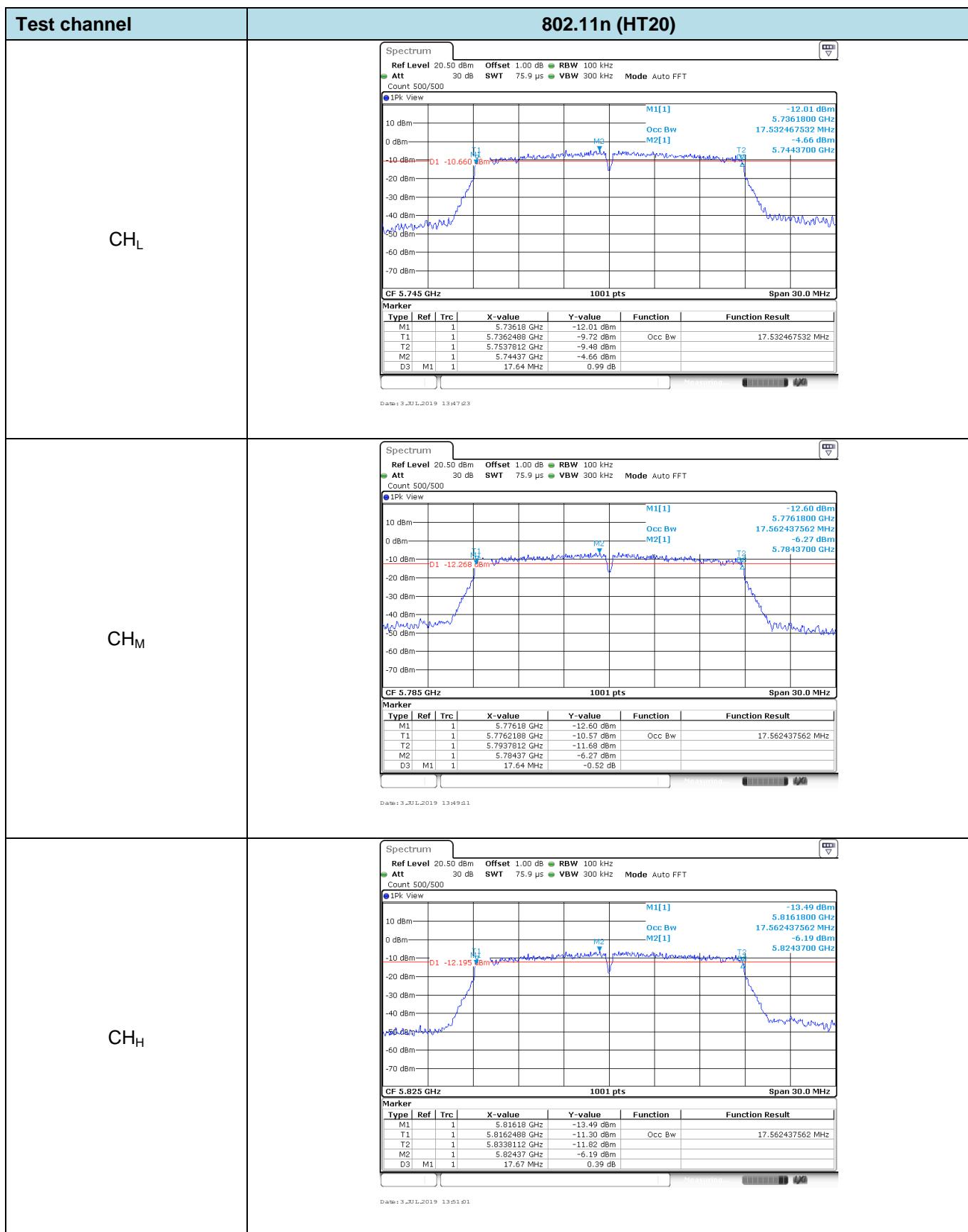
TEST MODE:

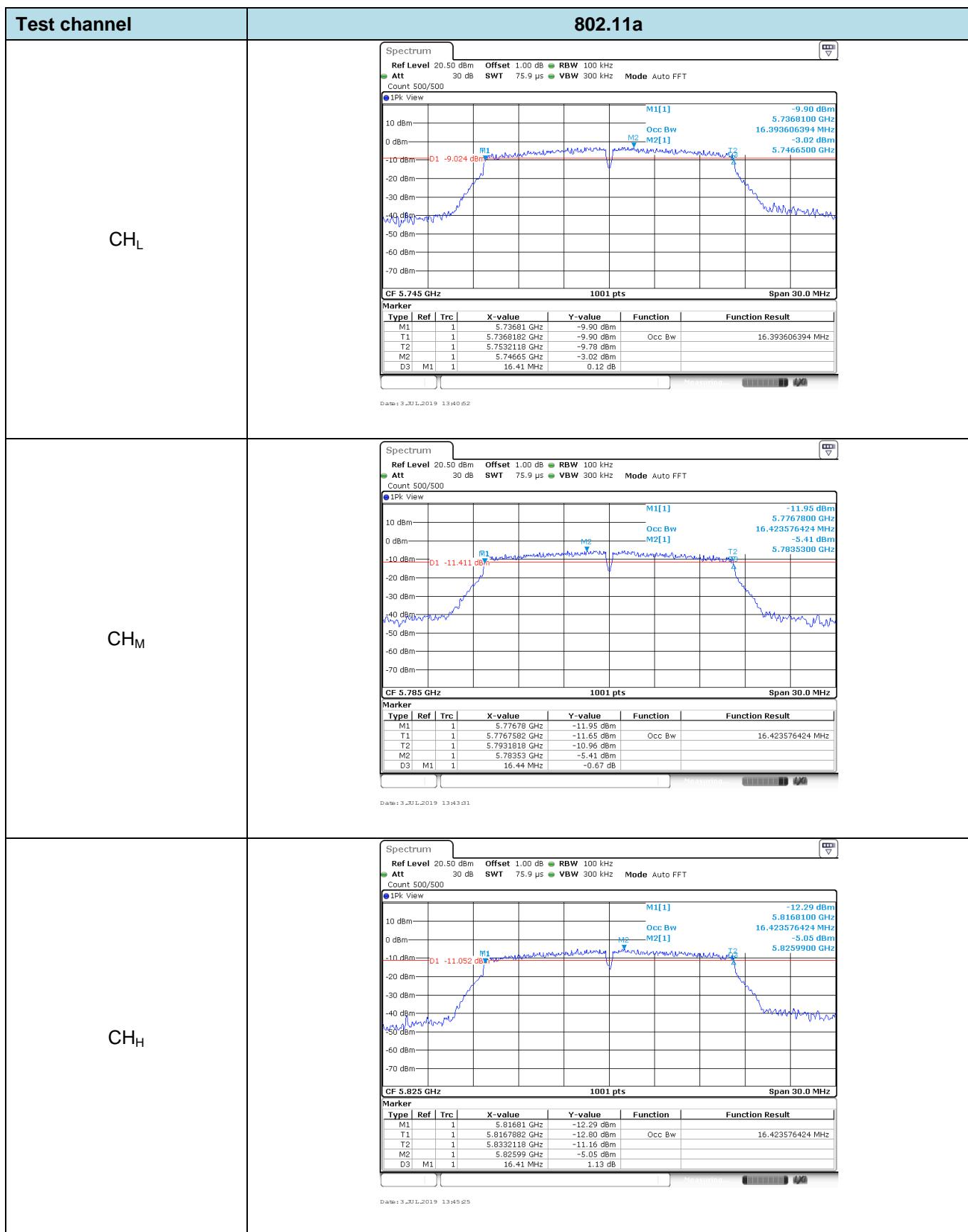
Please refer to the clause 3.3

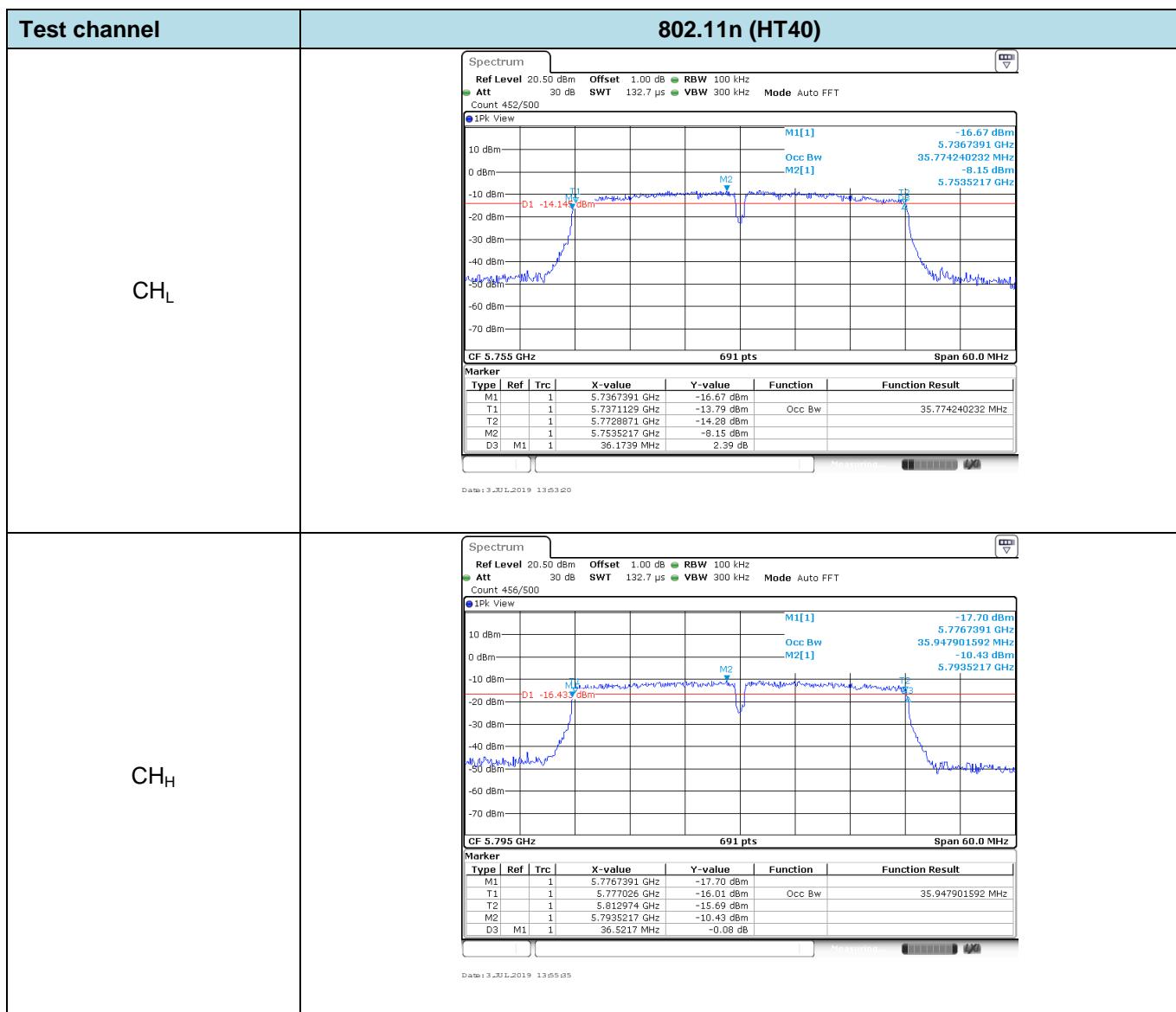
TEST RESULTS

Passed Not Applicable

Band	Bandwidth (MHz)	Type	Channel	6dB bandwith (MHz)	99% Occupy bandwith (MHz)	Result
IV	20	802.11n	CH _L	17.64	17.53	Pass
			CH _M	17.64	17.56	
			CH _H	17.67	17.56	
		802.11a	CH _L	16.41	16.39	Pass
			CH _M	16.44	16.42	
			CH _H	16.41	16.42	
	40	802.11n	CH _L	36.17	35.77	Pass
			CH _H	36.52	35.95	







5.7. Band edge

LIMIT

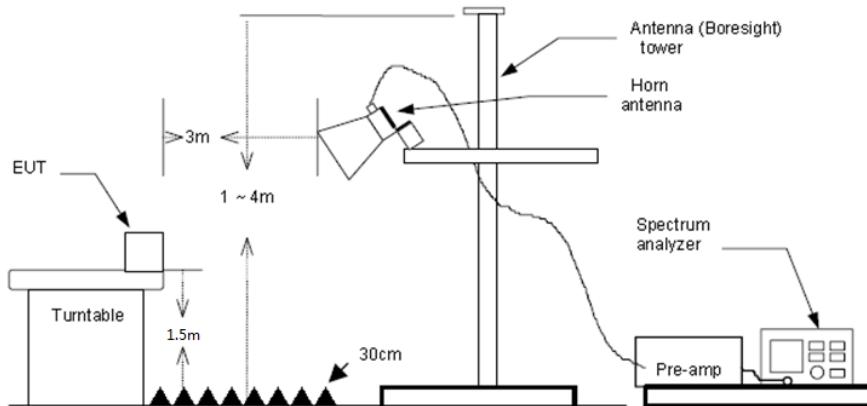
FCC CFR Title 47 Part 15 Subpart E Section 15.407(b)

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

* Increase/Decreases with the linearity 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. $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$, 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 was positioned 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 the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. 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			Worst mode: 802.11a				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
5149.67	15.08	31.70	9.79	0.00	56.57	74.00	-17.43	Horizontal	Average
5149.67	14.85	31.70	9.79	0.00	56.34	74.00	-17.66	Vertical	Average
5149.67	6.79	31.70	9.79	0.00	48.28	54.00	-5.72	Horizontal	Peak
5149.67	6.09	31.70	9.79	0.00	47.58	54.00	-6.42	Vertical	Peak

Band: I			Worst mode: 802.11a				Test channel: CH _H		
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
5349.35	15.13	31.40	10.05	0.00	56.58	74.00	-17.42	Horizontal	Average
5349.35	12.85	31.40	10.05	0.00	53.30	74.00	-19.70	Vertical	Average
5349.35	8.76	31.40	10.05	0.00	50.21	54.00	-3.79	Horizontal	Peak
5349.35	10.80	31.40	10.05	0.00	52.25	54.00	-1.75	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. Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

Band: IV			Worst mode: 802.11a			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
5725.49	16.44	31.73	10.47	0.00	58.64	74.00	-15.36	Horizontal	Average
5725.49	17.07	31.73	10.47	0.00	59.27	74.00	-14.73	Vertical	Average
5725.49	8.23	31.73	10.47	0.00	50.43	54.00	-3.57	Horizontal	Peak
5725.49	9.86	31.73	10.47	0.00	52.06	54.00	-1.94	Vertical	Peak

Band: IV			Worst mode: 802.11a			Test channel: CH _H			
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	14.86	32.20	10.61	0.00	57.67	74.00	-16.33	Horizontal	Average
5850.00	12.95	32.20	10.61	0.00	55.76	74.00	-18.24	Vertical	Average
5850.00	8.15	32.20	10.61	0.00	50.96	54.00	-3.04	Horizontal	Peak
5850.00	9.36	32.20	10.61	0.00	52.17	54.00	-1.83	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. Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

5.8. Radiated Spurious Emissions

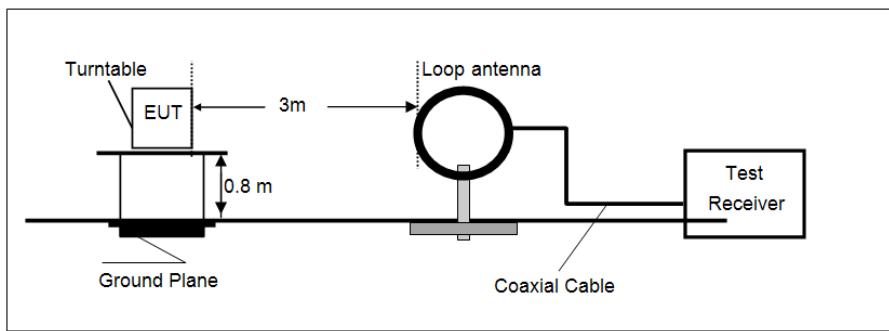
LIMIT

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

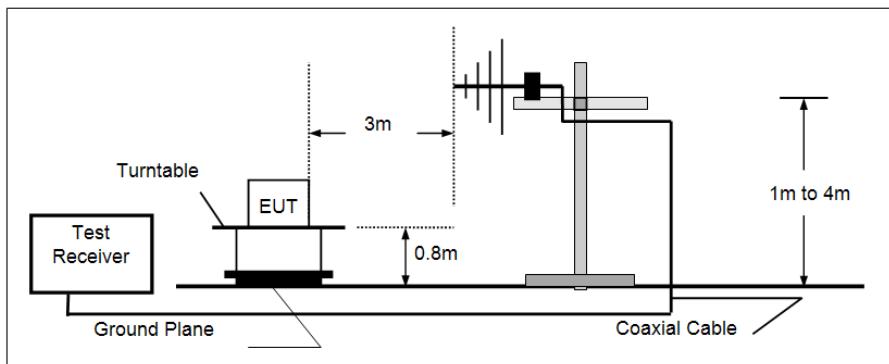
Unwanted emissions below 1GHz and Restricted band emissions above 1GHz		
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

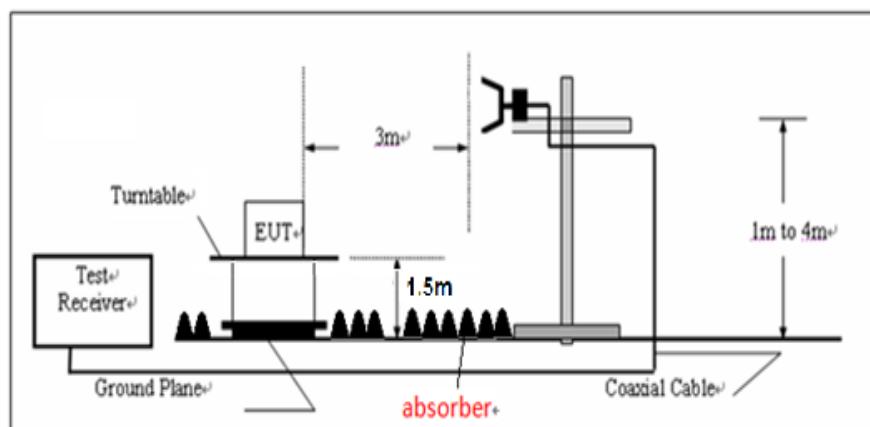
- 9KHz ~30MHz



- 30MHz ~ 1GHz



- Above 1GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013
2. 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 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

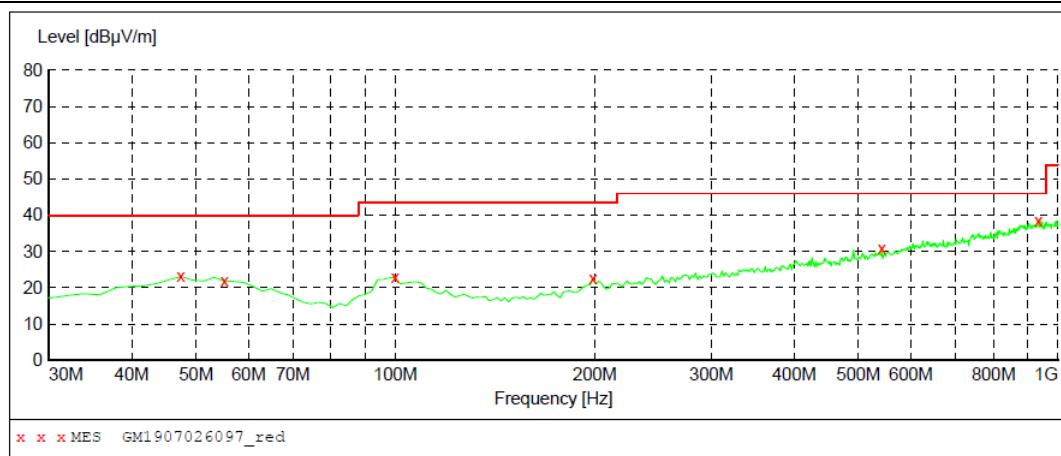
Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

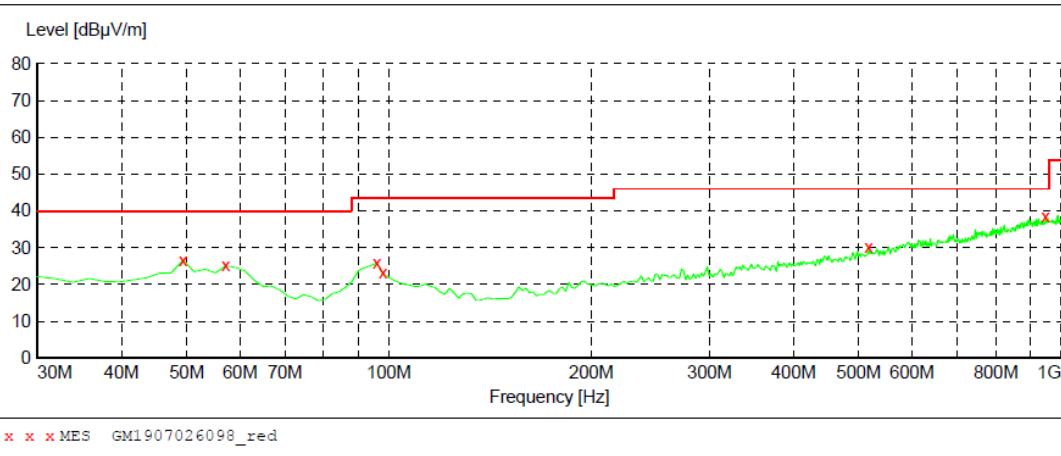
Measurement data:**■ 9kHz ~ 30MHz**

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.

■ 30MHz ~ 1GHz**MEASUREMENT RESULT: "GM1907026097_red"**

7/2/2019 8:03PM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	23.10	-4.9	40.0	16.9	QP	100.0	114.00	HORIZONTAL
55.220000	21.80	-5.3	40.0	18.2	QP	100.0	156.00	HORIZONTAL
99.840000	22.90	-6.7	43.5	20.6	QP	300.0	271.00	HORIZONTAL
198.780000	22.50	-5.8	43.5	21.0	QP	300.0	359.00	HORIZONTAL
542.160000	31.00	2.8	46.0	15.0	QP	100.0	238.00	HORIZONTAL
934.040000	38.60	10.8	46.0	7.4	QP	100.0	87.00	HORIZONTAL

**MEASUREMENT RESULT: "GM1907026098_red"**

7/2/2019 8:06PM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
49.400000	26.60	-4.8	40.0	13.4	QP	100.0	33.00	VERTICAL
57.160000	25.10	-5.5	40.0	14.9	QP	100.0	208.00	VERTICAL
95.960000	25.90	-7.3	43.5	17.6	QP	100.0	143.00	VERTICAL
97.900000	23.10	-6.9	43.5	20.4	QP	100.0	114.00	VERTICAL
516.940000	30.10	2.4	46.0	15.9	QP	100.0	346.00	VERTICAL
947.620000	38.60	10.8	46.0	7.4	QP	100.0	355.00	VERTICAL

Remark:

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

■ Above 1GHz

Band: I		Worst mode: 802.11a				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)	Over Limit (dB)	Polarization	Test value
2597.56	-4.19	27.79	6.91	0.00	30.51	74.00	-43.49	Horizontal	Peak
4388.35	-5.29	30.47	9.12	0.00	34.30	74.00	-39.70	Horizontal	Peak
5138.58	-2.41	31.74	9.78	0.00	39.11	74.00	-34.89	Horizontal	Peak
8549.59	-4.06	37.10	12.88	0.00	45.92	74.00	-28.08	Horizontal	Peak
3200.50	-2.74	28.80	7.72	0.00	33.78	74.00	-40.22	Vertical	Peak
4467.25	-3.24	30.63	9.24	0.00	36.63	74.00	-37.37	Vertical	Peak
6527.71	-3.42	34.06	11.23	0.00	41.87	74.00	-32.13	Vertical	Peak
8725.48	-6.40	37.85	13.02	0.00	44.47	74.00	-29.53	Vertical	Peak

Band: I		Worst mode: 802.11a				Test channel: CH _M			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3128.01	-2.70	28.80	7.63	0.00	33.73	74.00	-40.27	Horizontal	Peak
4004.08	-4.98	29.71	8.78	0.00	33.51	74.00	-40.49	Horizontal	Peak
9228.06	-6.65	38.77	13.53	0.00	45.65	74.00	-28.35	Horizontal	Peak
9370.08	-6.40	39.06	13.66	0.00	46.32	74.00	-27.68	Horizontal	Peak
1732.97	-1.74	25.27	5.83	0.00	29.36	74.00	-44.64	Vertical	Peak
3662.78	-2.62	29.30	8.34	0.00	35.02	74.00	-38.98	Vertical	Peak
5560.50	-4.09	31.84	10.24	0.00	37.99	74.00	-36.01	Vertical	Peak
10295.50	-6.37	39.30	13.57	0.00	46.50	74.00	-27.50	Vertical	Peak

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Measuring frequencies from 1 GHz to 40GHz.
- Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

Band: I		Worst mode: 802.11a				Test channel: CH _H			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1283.34	-2.18	26.22	4.80	0.00	28.84	74.00	-45.16	Horizontal	Peak
2418.87	-4.63	27.52	6.78	0.00	29.67	74.00	-44.33	Horizontal	Peak
4490.05	-4.93	30.68	9.28	0.00	35.03	74.00	-38.97	Horizontal	Peak
8441.46	-4.99	36.72	12.86	0.00	44.59	74.00	-29.41	Horizontal	Peak
3018.50	-1.49	28.64	7.50	0.00	34.65	74.00	-39.35	Vertical	Peak
4117.79	-2.67	29.92	8.87	0.00	36.12	74.00	-37.88	Vertical	Peak
6868.65	-3.98	34.48	11.69	0.00	42.19	74.00	-31.81	Vertical	Peak
10217.17	-6.12	39.22	13.56	0.00	46.66	74.00	-27.34	Vertical	Peak

Band: IV		Worst mode: 802.11a				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)	Over Limit (dB)	Polarization	Test value
2218.32	-3.48	27.61	6.47	0.00	30.60	74.00	-43.40	Horizontal	Peak
3570.71	-3.82	29.21	8.22	0.00	33.61	74.00	-40.39	Horizontal	Peak
6956.63	-3.48	35.04	11.80	0.00	43.36	74.00	-30.64	Horizontal	Peak
10348.05	-7.95	39.47	13.58	0.00	45.10	74.00	-28.90	Horizontal	Peak
1464.96	-2.82	25.83	5.19	0.00	28.20	74.00	-45.80	Vertical	Peak
3112.13	-2.40	28.80	7.61	0.00	34.01	74.00	-39.99	Vertical	Peak
4170.53	-2.51	29.97	8.92	0.00	36.38	74.00	-37.62	Vertical	Peak
9181.20	-6.91	38.53	13.48	0.00	45.10	74.00	-28.90	Vertical	Peak

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Measuring frequencies from 1 GHz to 40GHz.
- Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

Band: IV		Worst mode: 802.11a				Test channel: CH _M			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2584.37	-3.12	27.71	6.90	0.00	31.49	74.00	-42.51	Horizontal	Peak
3700.26	-3.88	29.30	8.39	0.00	33.81	74.00	-40.19	Horizontal	Peak
6172.20	-3.66	32.79	10.96	0.00	40.09	74.00	-33.91	Horizontal	Peak
7527.83	-3.93	36.13	12.49	0.00	44.69	74.00	-29.31	Horizontal	Peak
3018.50	-1.49	28.64	7.50	0.00	34.65	74.00	-39.35	Vertical	Peak
4410.75	-3.77	30.52	9.15	0.00	35.90	74.00	-38.10	Vertical	Peak
6713.08	-2.82	34.17	11.50	0.00	42.85	74.00	-31.15	Vertical	Peak
9514.29	-5.86	39.04	13.72	0.00	46.90	74.00	-27.10	Vertical	Peak

Band: IV		Worst mode: 802.11a				Test channel: CH _H			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2854.11	-3.67	28.32	7.40	0.00	32.05	74.00	-41.95	Horizontal	Peak
3653.46	-3.46	29.30	8.33	0.00	34.17	74.00	-39.83	Horizontal	Peak
8250.27	-3.58	36.55	12.79	0.00	45.76	74.00	-28.24	Horizontal	Peak
10400.86	-8.74	39.65	13.59	0.00	44.50	74.00	-29.50	Horizontal	Peak
3080.60	-2.45	28.76	7.58	0.00	33.89	74.00	-40.11	Vertical	Peak
3672.11	-3.05	29.30	8.35	0.00	34.60	74.00	-39.40	Vertical	Peak
6611.33	-2.85	34.20	11.37	0.00	42.72	74.00	-31.28	Vertical	Peak
12717.59	-4.73	38.86	14.53	0.00	48.66	74.00	-25.34	Vertical	Peak

Remark:

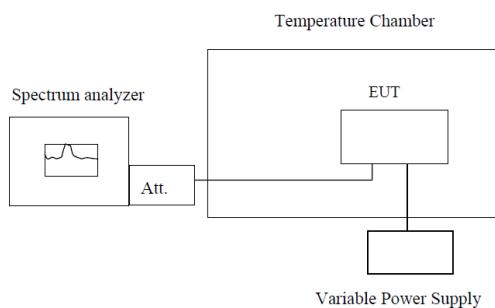
- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Measuring frequencies from 1 GHz to 40GHz.
- Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

5.9. Frequency stability

LIMIT

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°C 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°C increased per stage until the highest temperature of +50°C reached.

TEST MODE:

Transmitting with unmodulation

TEST RESULTS

Passed Not Applicable

Voltage VS Frequency stability

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

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

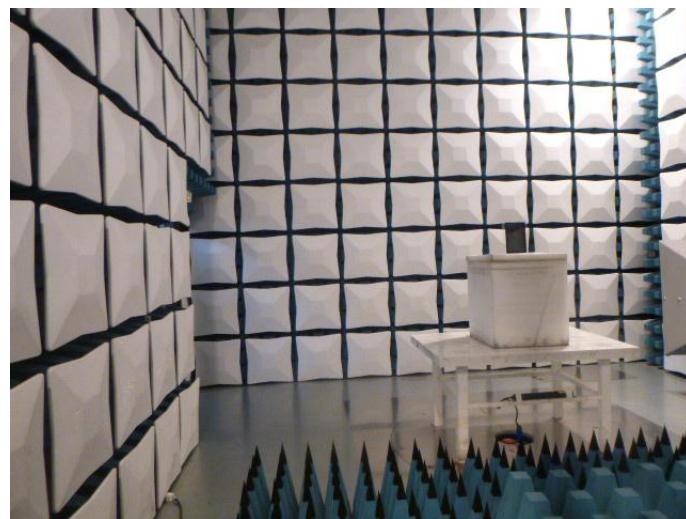
6. Test Setup Photos of the EUT

Conducted Emissions (AC Mains)



Radiated Emissions





7. External and Internal Photos of the EUT

Reference to the report No.: CHTEW19070046.

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