

FCC Test Report (WLAN)

Report No.: RF191227E01-1

FCC ID: C3K1889

Test Model: 1889

Received Date: Dec. 27, 2019

Test Date: Mar. 24 to Apr. 21, 2020

Issued Date: June 24, 2020

Applicant: Microsoft Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF191227E01-1	Original release.	June 24, 2020

1 Certificate of Conformity

Product: Dual-band wireless accessory radio

Brand: Microsoft

Test Model: 1889

Sample Status: ENGINEERING SAMPLE

Applicant: Microsoft Corporation

Test Date: Mar. 24 to Apr. 21, 2020

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :



Date:

June 24, 2020

Claire Kuan / Specialist

Approved by :



Date:

June 24, 2020

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -22.54dB at 16.46875MHz.
15.407(b)(1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -4.2dB at 57.90MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted Emissions	9kHz ~ 40GHz	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Dual-band wireless accessory radio
Brand	Microsoft
Test Model	1889
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11n: up to 72.2Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11n (HT20): 11 5GHz: 802.11n (HT20): 9
Output Power	2.4GHz: 90.157 mW 5.18 ~ 5.24GHz: 10.28 mW 5.745 ~ 5.825GHz: 10.568 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The antennas provided to the EUT, please refer to the following table:

Antenna No.	Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
MAIN	0	4.56	2.4 ~ 2.4835GHz	PCB	NA	NA
		3.93	5.15~5.25GHz (5G B1)	PCB	NA	NA
		3.94	5.25~5.35GHz (5G B2)	PCB	NA	NA
		3.48	5.47~5.725GHz (5G B3)	PCB	NA	NA
		3.35	5.725~5.85GHz (5G B4)	PCB	NA	NA
DIV	1	---	2.4 ~ 2.4835GHz	PCB	NA	NA
		3.21	5.15~5.25GHz (5G B1)	PCB	NA	NA
		3.3	5.25~5.35GHz (5G B2)	PCB	NA	NA
		2.64	5.47~5.725GHz (5G B3)	PCB	NA	NA
		2.97	5.725~5.85GHz (5G B4)	PCB	NA	NA

1. The EUT incorporates function as following.

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11n (HT20)	1TX (Fixed Chain 0)	1RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11n (HT20)	1TX (Fixed Chain 0)	2RX

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned **on Y-plane (for below 1GHz) and X-plane (for above 1GHz)**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11n (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11n (HT20)	5180-5240, 5745-5825	36 to 48, 149 to 165	48, 165	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11n (HT20)	5180-5240, 5745-5825	36 to 48, 149 to 165	48	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

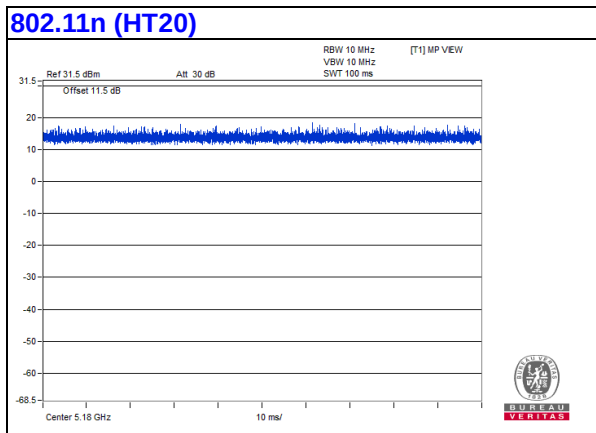
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11n (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5

Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE<1G	25deg. C, 75%RH	120Vac, 60Hz	Nelson Teng
PLC	25deg. C, 62%RH	120Vac, 60Hz	Sampson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	PHIHONG	PSC15A-050	NA	NA	Supplied by client
B.	Test Tool	MediaTek Inc.	NA	NA	NA	Supplied by client
C.	Laptop	DELL	E5430	GM1SKV1	FCC DoC	Provided by Lab
D.	ADAPTER	MediaTek Inc.	M1096761-001	NA	NA	Supplied by client

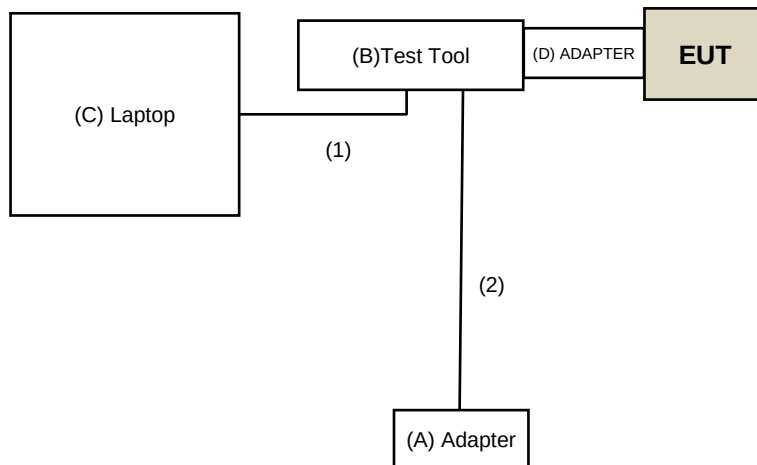
Note:

1. All power cords of the above support units are non-shielded (1.8m).

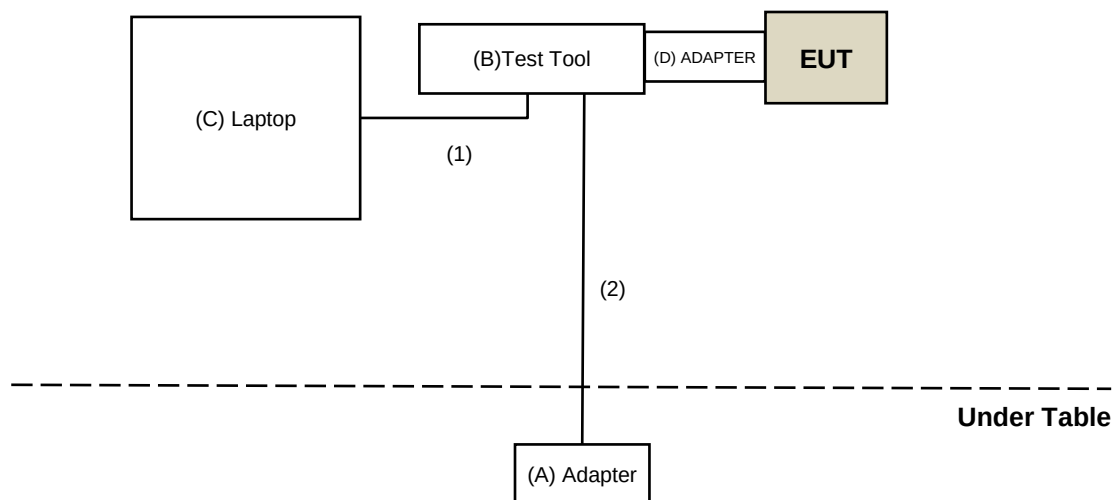
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Type B Cable	1	1.8	Yes	0	Provided by Lab
2.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test

For AC Power Conducted Emissions Test:



For Radiated Emissions Test:



3.5 General Description of Applied Standard and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement (Radiated Versus Conducted)

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☒ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.2 Test Instruments

For radiated emission below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Mar. 24, 2020

For radiated emission above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
High pass filter Wainwright Instruments	11SH10-8000/18000/T-O/OP	1	Jan. 08, 2020	Jan. 07, 2021

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Apr. 14, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

Note:

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Apr. 21, 2020

4.1.3 Test Procedure

Following FCC KDB 789033 D02 General UNII Test Procedures:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.
- d. For all of Radiation emission test

For Radiated emission below 30MHz

- d-1.1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- d-1.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d-1.3. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d-1.4. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- d-1.5. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.
2. KDB 414788 OATS and Chamber Correlation Justification
 - Based on FCC 15.31(f)(2) : measurements may be performed at a distance closer than that specified in the regulations; however, an attempts should be made to avoid making measurements in the near field.
 - OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

For Radiated emission above 30MHz

- d-2.1. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- d-2.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d-2.3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d-2.4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- d-2.5. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- d-2.6. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

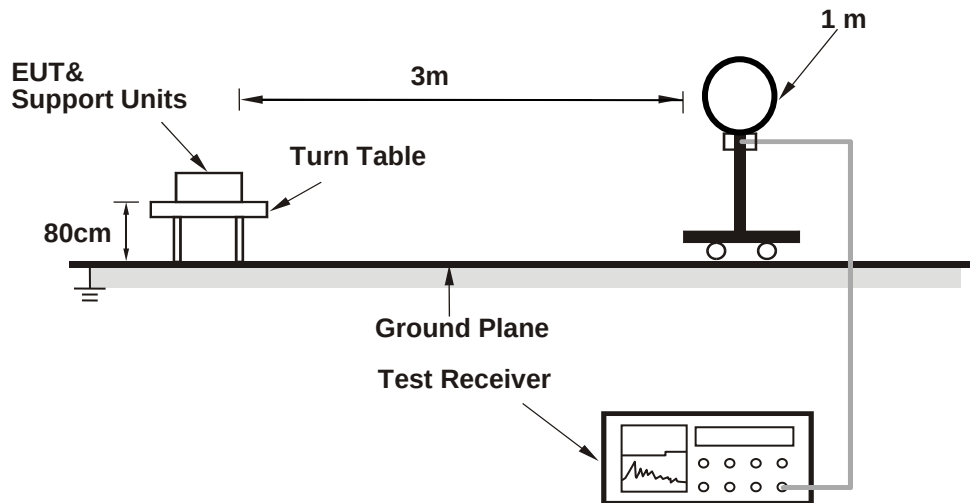
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

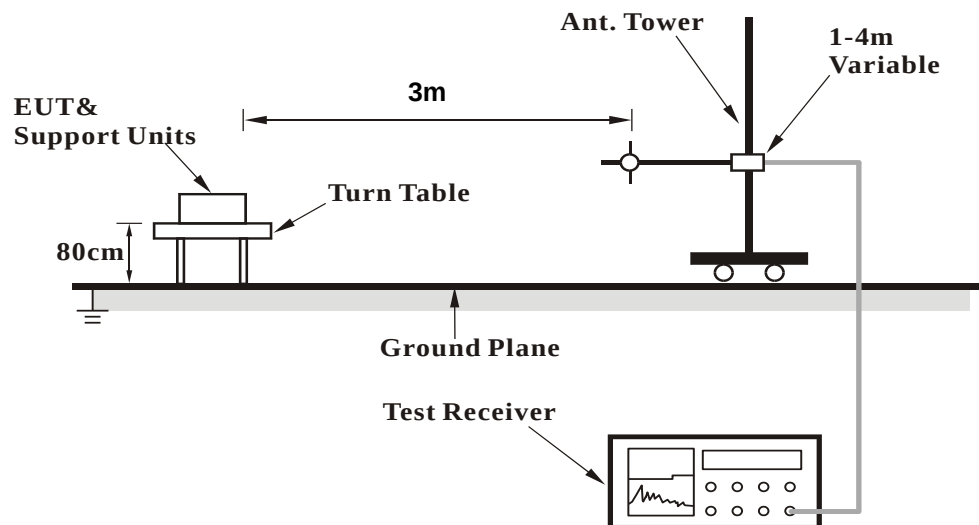
No deviation.

4.1.5 Test Setup

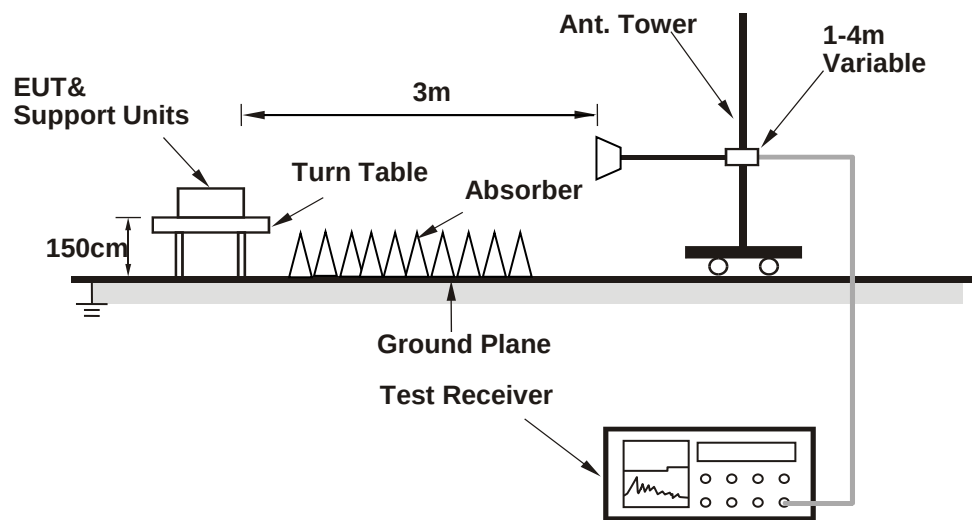
For Radiated emission below 30MHz



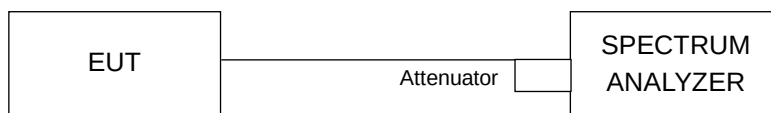
For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For Conducted Configuration:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Condition

- Connected the EUT with the Laptop which is placed on testing table.
- Controlling software (MT7663 QA 0.0.2.6) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Radiated Measurement)

Radiated versus Conducted Measurement	
☐ Conducted measurement	☒ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Radiated test was done with 50ohm terminator on antenna port

Above 1GHz Data:

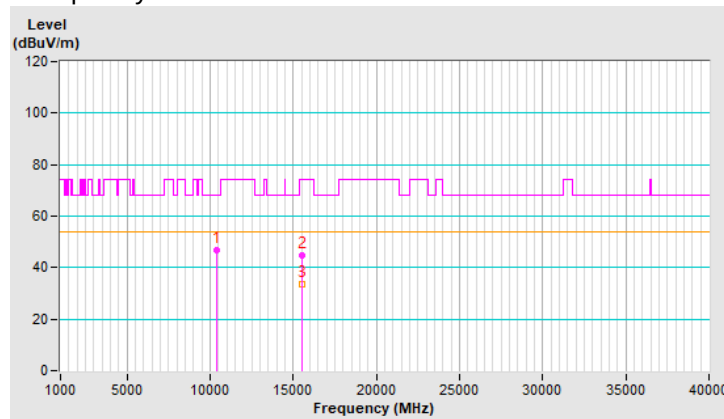
802.11n (HT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10360.00	46.8 PK	68.2	-21.4	1.60 H	323	34.1	12.7
2	15540.00	44.7 PK	74.0	-29.3	1.36 H	211	31.5	13.2
3	15540.00	33.4 AV	54.0	-20.6	1.36 H	211	20.2	13.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

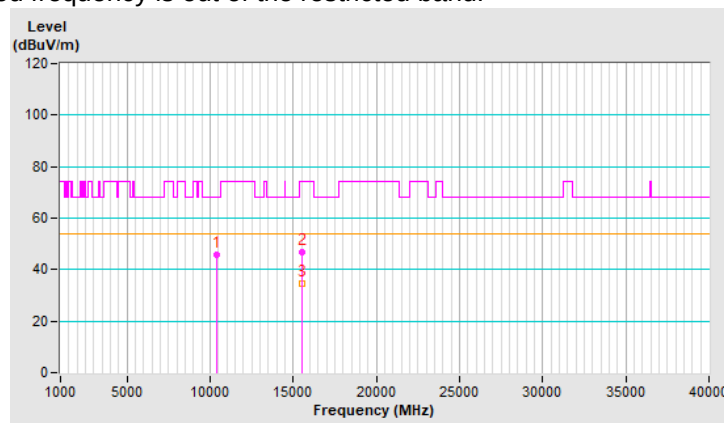


CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10360.00	45.6 PK	68.2	-22.6	2.41 V	161	32.9	12.7
2	15540.00	46.7 PK	74.0	-27.3	1.57 V	140	33.5	13.2
3	15540.00	34.7 AV	54.0	-19.3	1.57 V	140	21.5	13.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

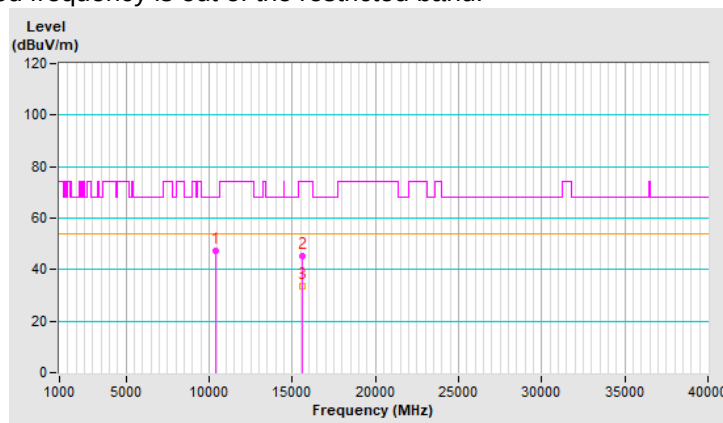


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10400.00	47.3 PK	68.2	-20.9	1.61 H	335	34.5	12.8
2	15600.00	45.3 PK	74.0	-28.7	1.35 H	208	31.8	13.5
3	15600.00	33.8 AV	54.0	-20.2	1.35 H	208	20.3	13.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

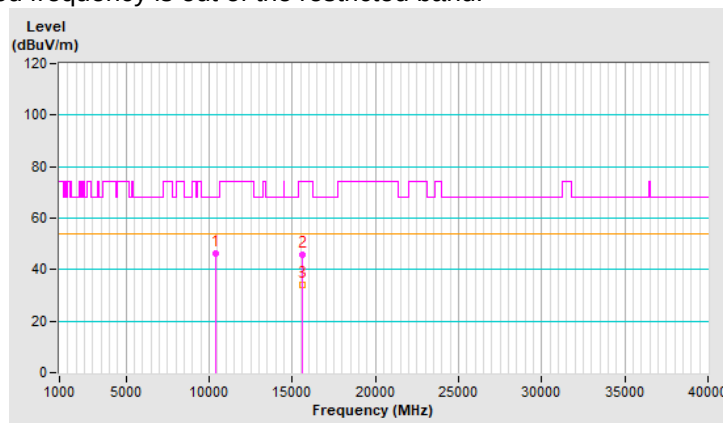


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10400.00	46.2 PK	68.2	-22.0	2.40 V	161	33.4	12.8
2	15600.00	45.9 PK	74.0	-28.1	1.49 V	146	32.4	13.5
3	15600.00	34.1 AV	54.0	-19.9	1.49 V	146	20.6	13.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

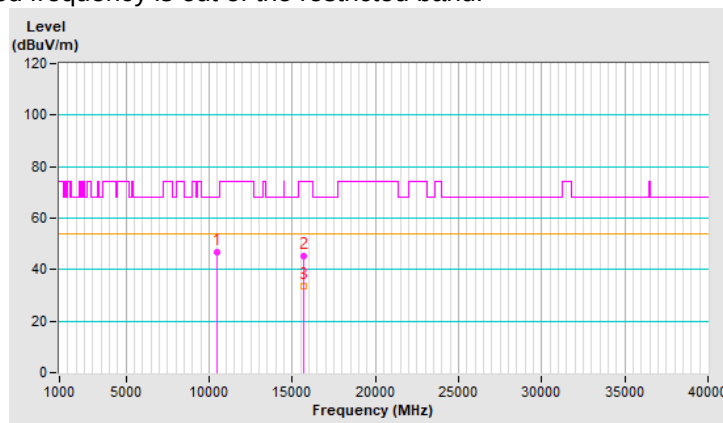


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10480.00	46.7 PK	68.2	-21.5	1.61 H	323	33.6	13.1
2	15720.00	45.1 PK	74.0	-28.9	1.32 H	222	31.3	13.8
3	15720.00	33.7 AV	54.0	-20.3	1.32 H	222	19.9	13.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

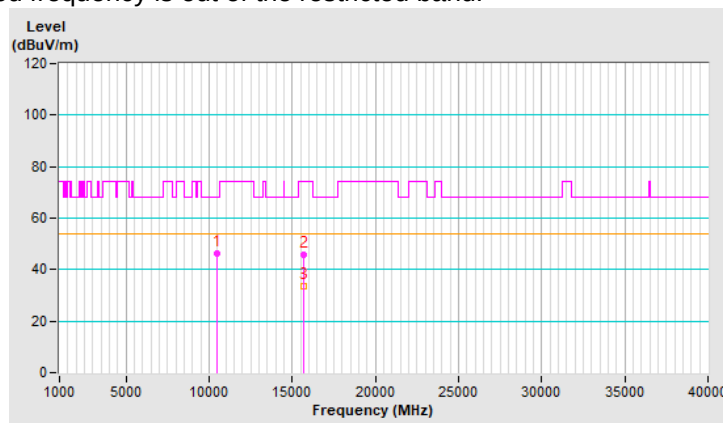


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10480.00	46.5 PK	68.2	-21.7	2.44 V	175	33.4	13.1
2	15720.00	45.7 PK	74.0	-28.3	1.52 V	131	31.9	13.8
3	15720.00	33.7 AV	54.0	-20.3	1.52 V	131	19.9	13.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

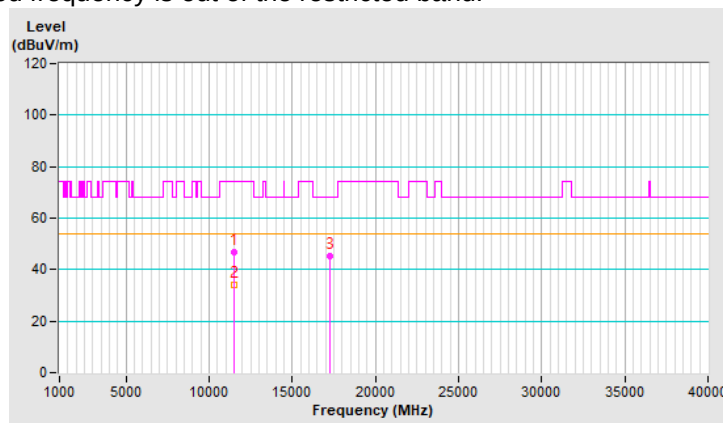


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	46.7 PK	74.0	-27.3	1.53 H	322	33.4	13.3
2	11490.00	34.2 AV	54.0	-19.8	1.53 H	322	20.9	13.3
3	#17235.00	45.1 PK	68.2	-23.1	1.34 H	208	27.5	17.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

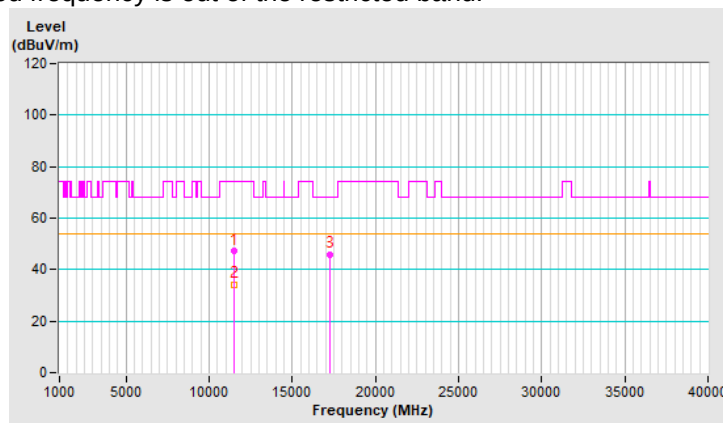


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	47.1 PK	74.0	-26.9	2.31 V	170	33.8	13.3
2	11490.00	34.1 AV	54.0	-19.9	2.31 V	170	20.8	13.3
3	#17235.00	45.8 PK	68.2	-22.4	1.54 V	132	28.2	17.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

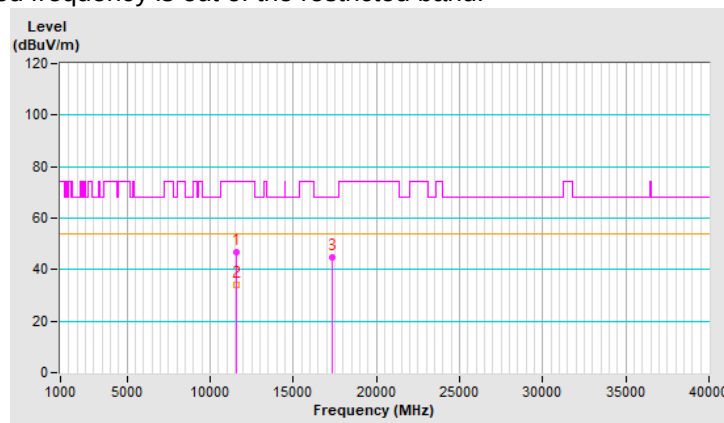


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	46.9 PK	74.0	-27.1	1.53 H	322	33.7	13.2
2	11570.00	34.2 AV	54.0	-19.8	1.53 H	322	21.0	13.2
3	#17355.00	44.9 PK	68.2	-23.3	1.40 H	207	27.3	17.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

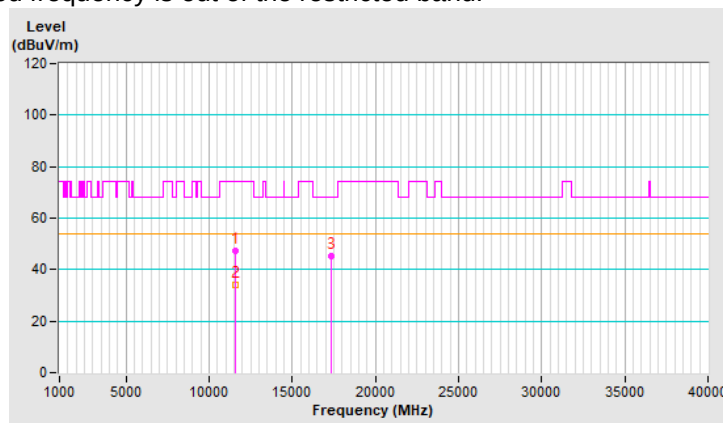


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	47.3 PK	74.0	-26.7	2.38 V	162	34.1	13.2
2	11570.00	34.2 AV	54.0	-19.8	2.38 V	162	21.0	13.2
3	#17355.00	45.2 PK	68.2	-23.0	1.54 V	139	27.6	17.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

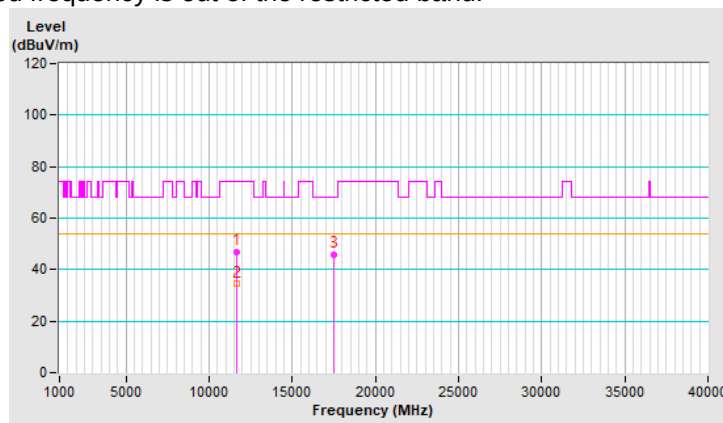


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	47.0 PK	74.0	-27.0	1.63 H	323	33.7	13.3
2	11650.00	34.4 AV	54.0	-19.6	1.63 H	323	21.1	13.3
3	#17475.00	45.7 PK	68.2	-22.5	1.35 H	231	27.8	17.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

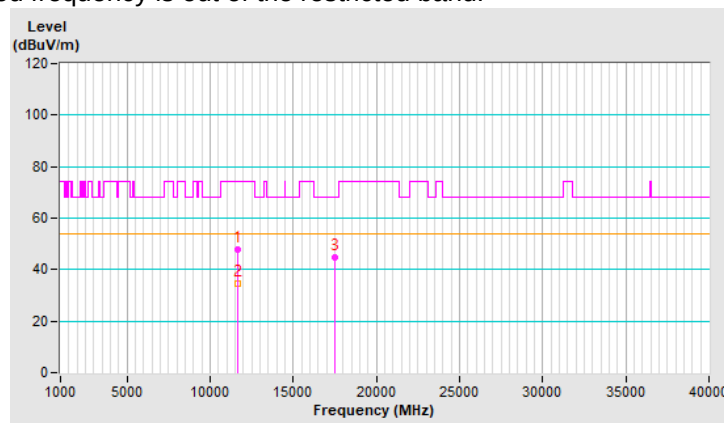


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	47.8 PK	74.0	-26.2	2.36 V	182	34.5	13.3
2	11650.00	34.7 AV	54.0	-19.3	2.36 V	182	21.4	13.3
3	#17475.00	45.0 PK	68.2	-23.2	1.48 V	138	27.1	17.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.



Below 1GHz Data:

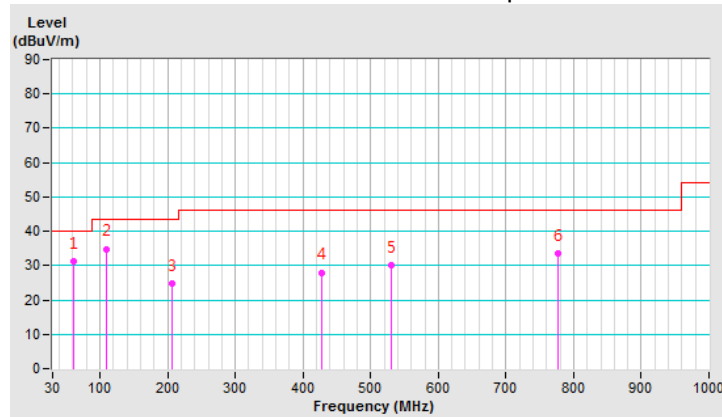
802.11n (HT20)

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	60.58	31.2 QP	40.0	-8.8	3.00 H	360	39.8	-8.6
2	109.83	34.9 QP	43.5	-8.6	3.00 H	303	45.3	-10.4
3	206.64	24.7 QP	43.5	-18.8	2.50 H	275	34.9	-10.2
4	427.17	28.0 QP	46.0	-18.0	1.50 H	132	31.1	-3.1
5	529.84	30.1 QP	46.0	-15.9	2.00 H	187	31.0	-0.9
6	777.17	33.6 QP	46.0	-12.4	1.50 H	213	29.4	4.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

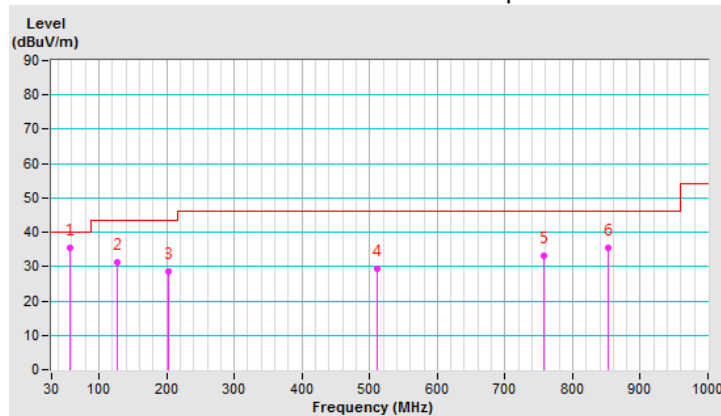


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.72	35.6 QP	40.0	-4.4	1.00 V	117	44.0	-8.4
2	127.56	31.4 QP	43.5	-12.1	1.00 V	63	40.1	-8.7
3	202.47	28.5 QP	43.5	-15.0	1.00 V	177	38.8	-10.3
4	510.47	29.3 QP	46.0	-16.7	2.00 V	302	30.4	-1.1
5	758.01	33.1 QP	46.0	-12.9	2.00 V	112	29.2	3.9
6	852.05	35.3 QP	46.0	-10.7	2.00 V	142	30.2	5.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

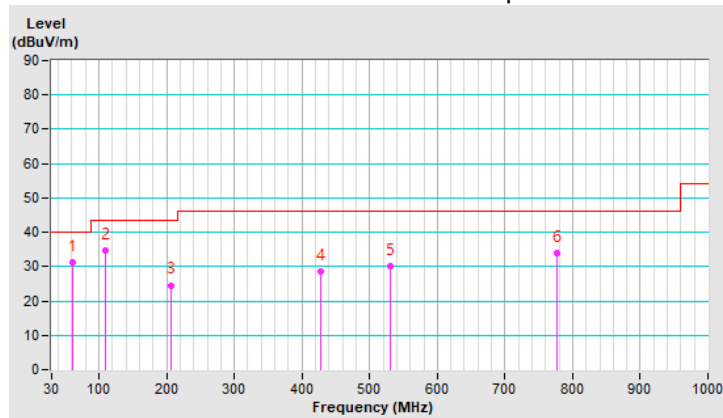


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	60.74	31.4 QP	40.0	-8.6	3.00 H	324	40.0	-8.6
2	109.95	34.7 QP	43.5	-8.8	3.00 H	288	45.0	-10.3
3	206.72	24.6 QP	43.5	-18.9	2.50 H	255	34.8	-10.2
4	427.28	28.5 QP	46.0	-17.5	1.50 H	152	31.6	-3.1
5	529.97	30.0 QP	46.0	-16.0	2.00 H	193	30.9	-0.9
6	777.30	33.8 QP	46.0	-12.2	1.50 H	234	29.6	4.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

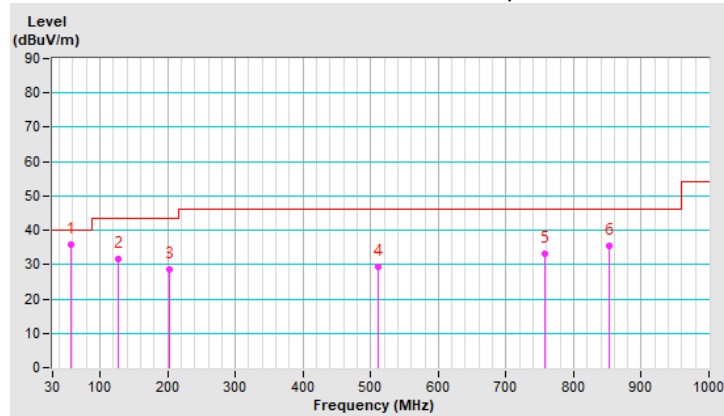


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.90	35.8 QP	40.0	-4.2	1.00 V	139	44.2	-8.4
2	127.69	31.6 QP	43.5	-11.9	1.00 V	81	40.2	-8.6
3	202.59	28.6 QP	43.5	-14.9	1.00 V	195	38.8	-10.2
4	510.62	29.4 QP	46.0	-16.6	2.00 V	321	30.5	-1.1
5	758.14	33.2 QP	46.0	-12.8	2.00 V	131	29.3	3.9
6	852.19	35.4 QP	46.0	-10.6	2.00 V	159	30.3	5.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.1.8 Test Results (Conducted Measurement)

Radiated versus Conducted Measurement	
☒ Conducted measurement	☐ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions). Note: In order to obtain results more easily, change max hold to view as following. It has no effect on the result.	

Conducted Measurement Factor
a. The composite gain will be used (For U-NII-1: Composite gain = 3.94dBi For U-NII-3: Composite gain = 3.94dBi) b. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. c. For the band edge the gain for the specific band may have been used. d. In restricted bands below 1000 MHz, add upper bound on ground plane reflection: For $f = 30 - 1000$ MHz, add 4.7 dB. Note: The conducted emission test was considered some factor to compute test result.

Above 1GHz Data

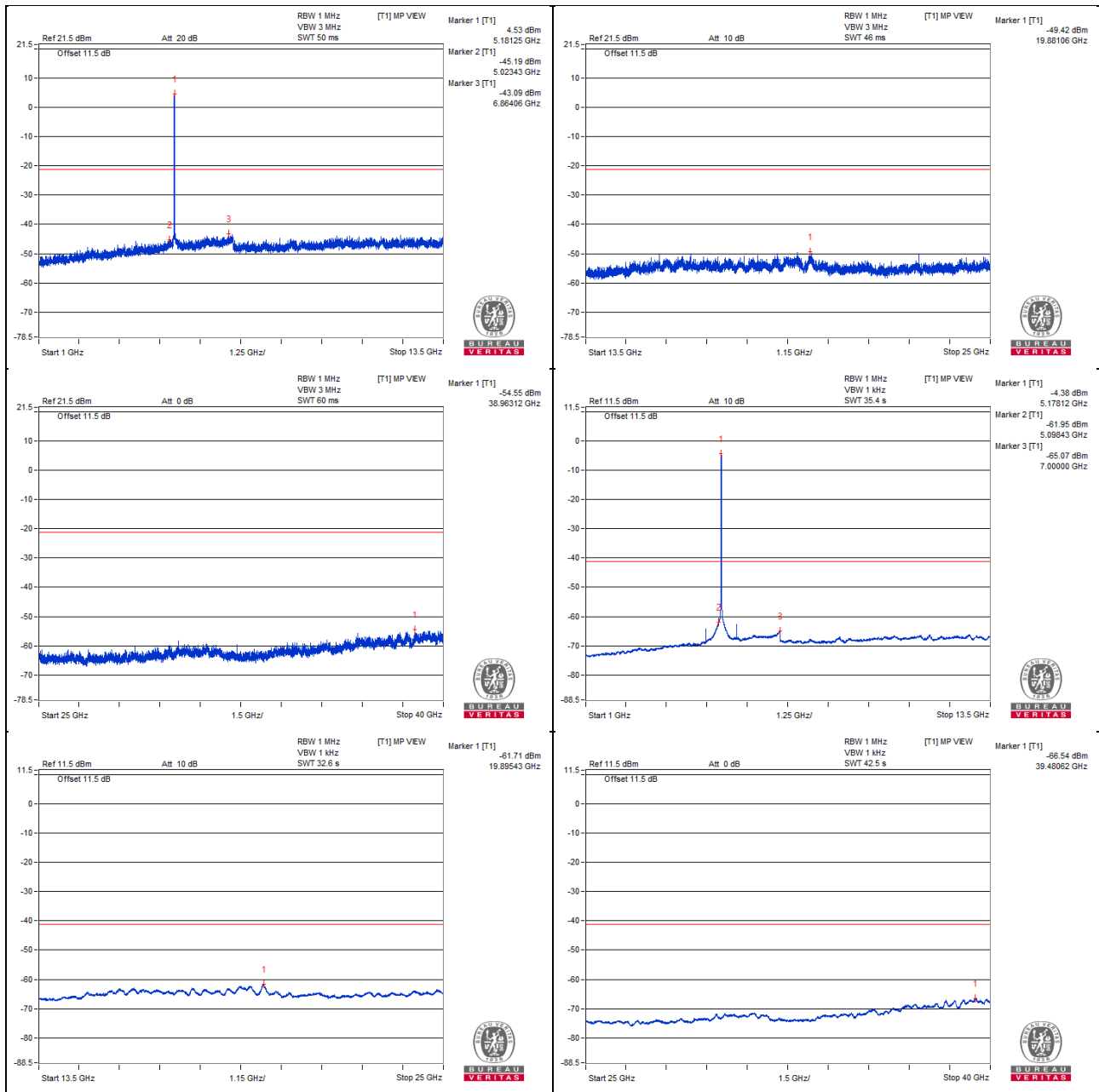
802.11n (HT20) - Channel 36

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5181.25 PK	103.72	*		4.53	3.94	8.47
2	5023.43 PK	54.01	74	-19.99	-45.19	3.94	-41.25
3	6864.06 PK	56.11	68.2	-12.09	-43.09	3.94	-39.15
4	19881.06 PK	49.78	74	-24.22	-49.42	3.94	-45.48
5	38963.12 PK	44.65	74	-29.35	-54.55	3.94	-50.61
6	5178.12 AV	94.82	*		-4.38	3.94	-0.44
7	5098.43 AV	37.25	54	-16.75	-61.95	3.94	-58.01
8	7000 AV	34.13	#		-65.07	3.94	-61.13
9	19895.43 AV	37.49	54	-16.51	-61.71	3.94	-57.77
10	39480.62 AV	32.66	54	-21.34	-66.54	3.94	-62.60

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.
3. # : Non-restricted frequency, no limit for average emission.

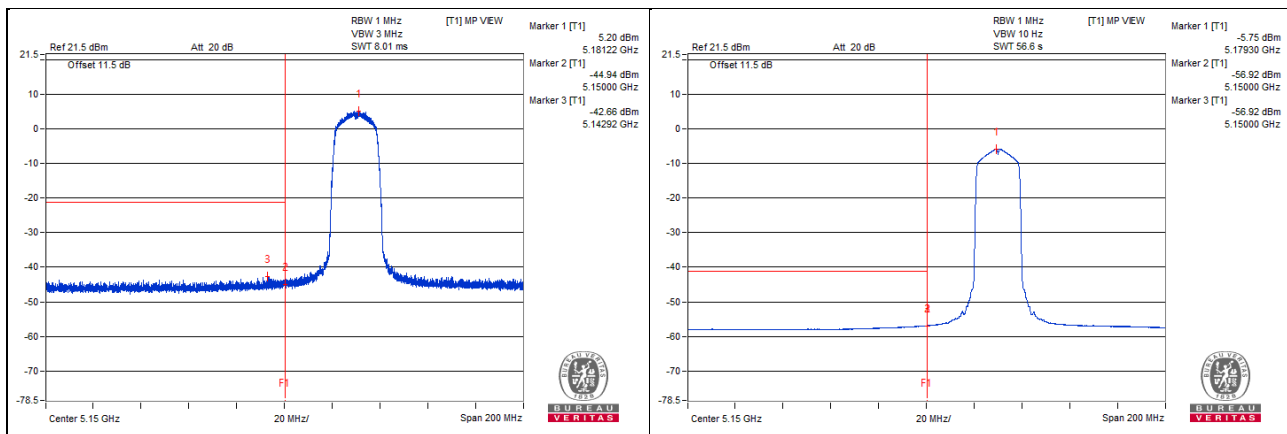


Bandedge table

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5181.22 PK	104.39	*		5.2	3.93	9.13
2	5150 PK	54.25	74	-19.75	-44.94	3.93	-41.01
3	5142.92 PK	56.53	74	-17.47	-42.66	3.93	-38.73
4	5179.3 AV	93.44	*		-5.75	3.93	-1.82
5	5150 AV	42.27	54	-11.73	-56.92	3.93	-52.99
6	5150 AV	42.27	54	-11.73	-56.92	3.93	-52.99

Note :

1. Emission Level (dBUV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.



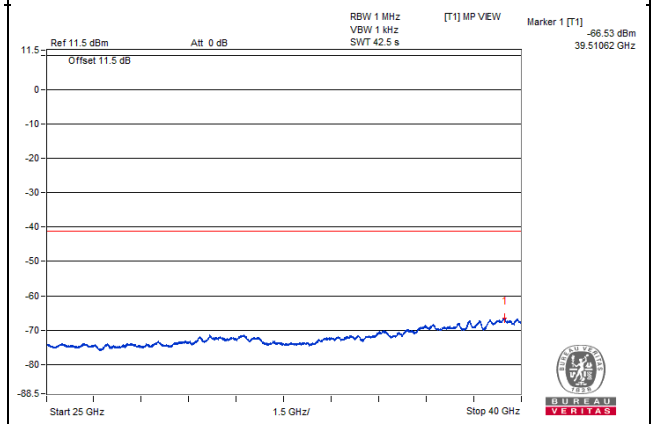
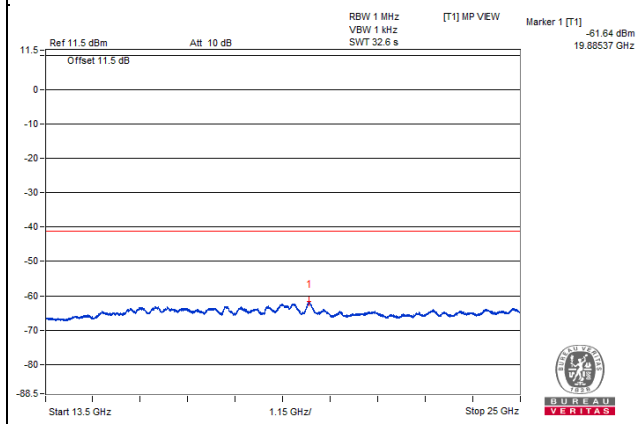
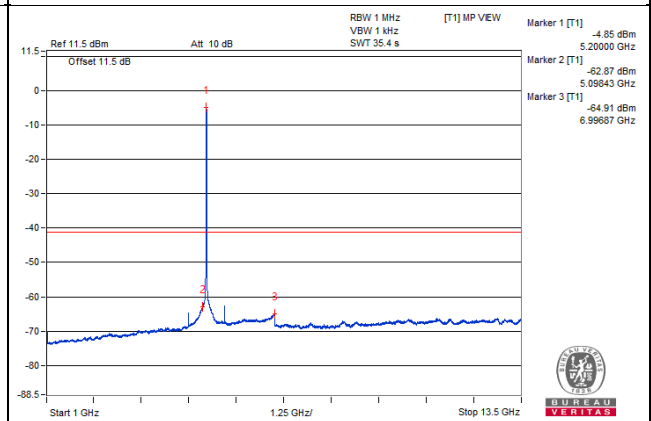
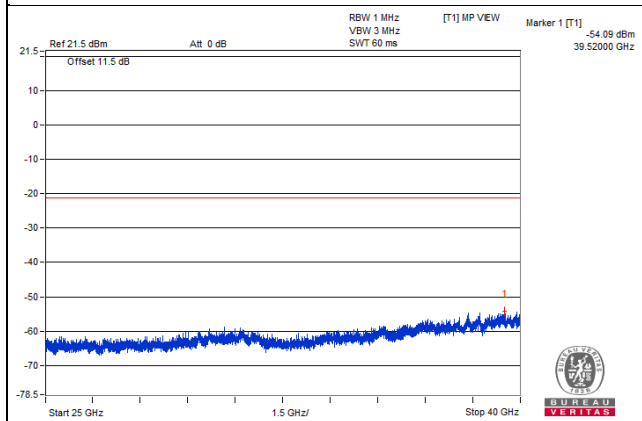
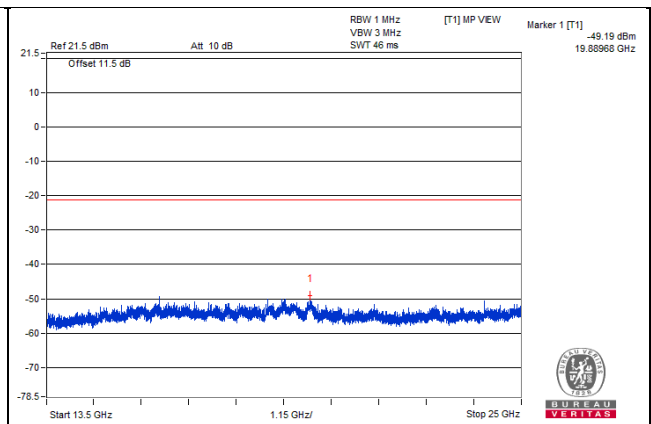
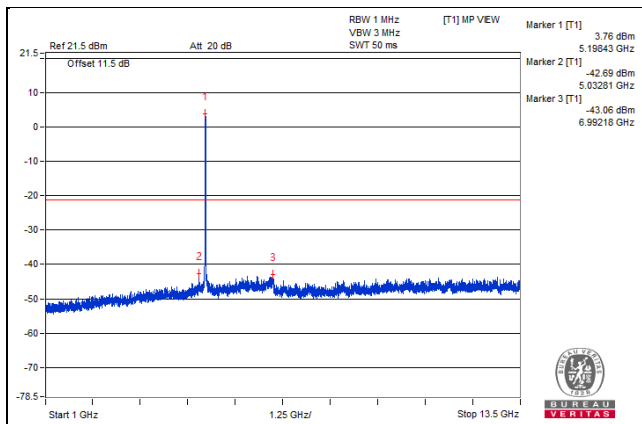
802.11n (HT20) - Channel 40

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5198.43 PK	102.96	*		3.76	3.94	7.70
2	5032.81 PK	56.51	74	-17.49	-42.69	3.94	-38.75
3	6992.18 PK	56.14	68.2	-12.06	-43.06	3.94	-39.12
4	19889.68 PK	50.01	74	-23.99	-49.19	3.94	-45.25
5	39520 PK	45.11	74	-28.89	-54.09	3.94	-50.15
6	5200 AV	94.35	*		-4.85	3.94	-0.91
7	5098.43 AV	36.33	54	-17.67	-62.87	3.94	-58.93
8	6996.87 AV	34.29	#		-64.91	3.94	-60.97
9	19885.37 AV	37.56	54	-16.44	-61.64	3.94	-57.70
10	39510.62 AV	32.67	54	-21.33	-66.53	3.94	-62.59

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.
3. # : Non-restricted frequency, no limit for average emission.

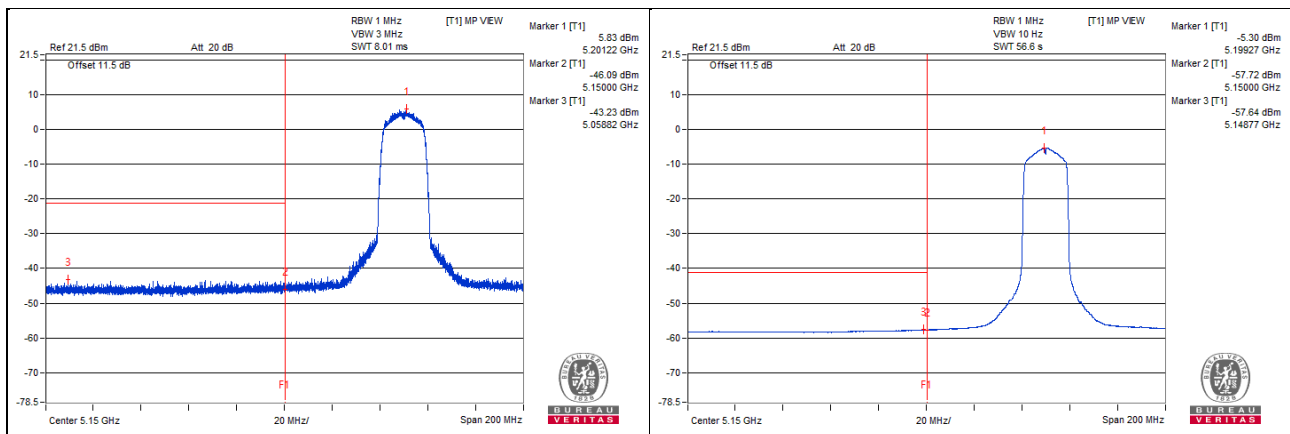


Bandedge table

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5201.22 PK	105.02	*		5.83	3.93	9.76
2	5150 PK	53.1	74	-20.9	-46.09	3.93	-42.16
3	5058.82 PK	55.96	74	-18.04	-43.23	3.93	-39.3
4	5199.27 AV	93.89	*		-5.3	3.93	-1.37
5	5150 AV	41.47	54	-12.53	-57.72	3.93	-53.79
6	5148.77 AV	41.55	54	-12.45	-57.64	3.93	-53.71

Note :

1. Emission Level (dBUV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.



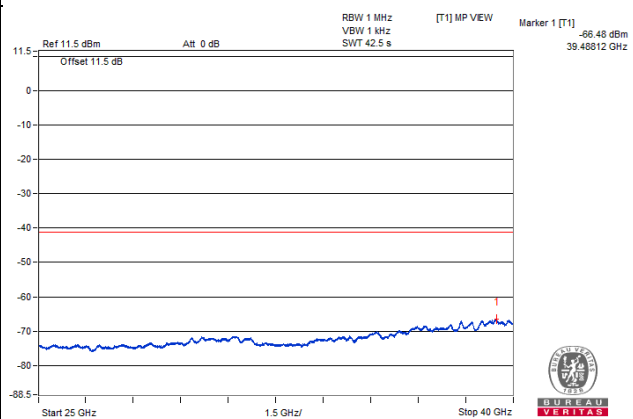
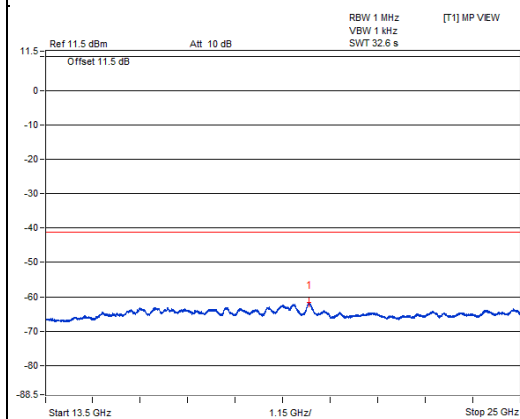
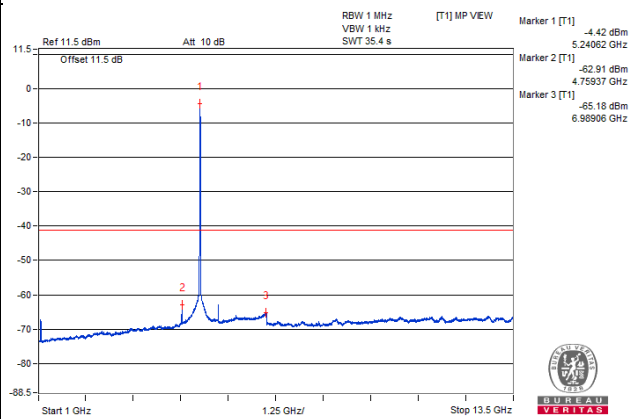
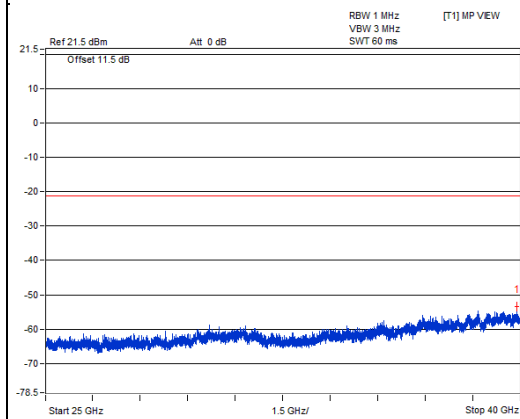
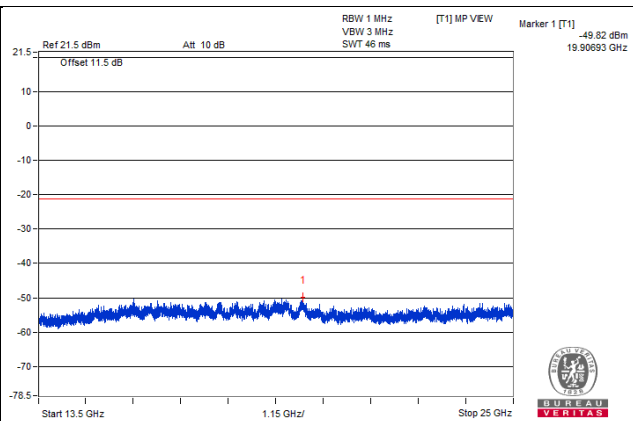
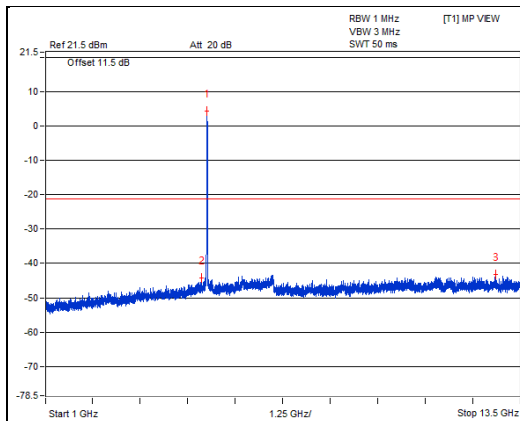
802.11n (HT20) - Channel 48

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5240.62 PK	103.46	*		4.26	3.94	8.20
2	5095.31 PK	54.90	74	-19.10	-44.3	3.94	-40.36
3	12864.06 PK	56.06	68.2	-12.14	-43.14	3.94	-39.20
4	19906.93 PK	49.38	74	-24.62	-49.82	3.94	-45.88
5	39928.75 PK	45.88	74	-28.12	-53.32	3.94	-49.38
6	5240.62 AV	94.78	*		-4.42	3.94	-0.48
7	4759.37 AV	36.29	54	-17.71	-62.91	3.94	-58.97
8	6989.06 AV	34.02	#		-65.18	3.94	-61.24
9	19888.25 AV	37.67	54	-16.33	-61.53	3.94	-57.59
10	39488.12 AV	32.72	54	-21.28	-66.48	3.94	-62.54

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.
3. # : Non-restricted frequency, no limit for average emission.

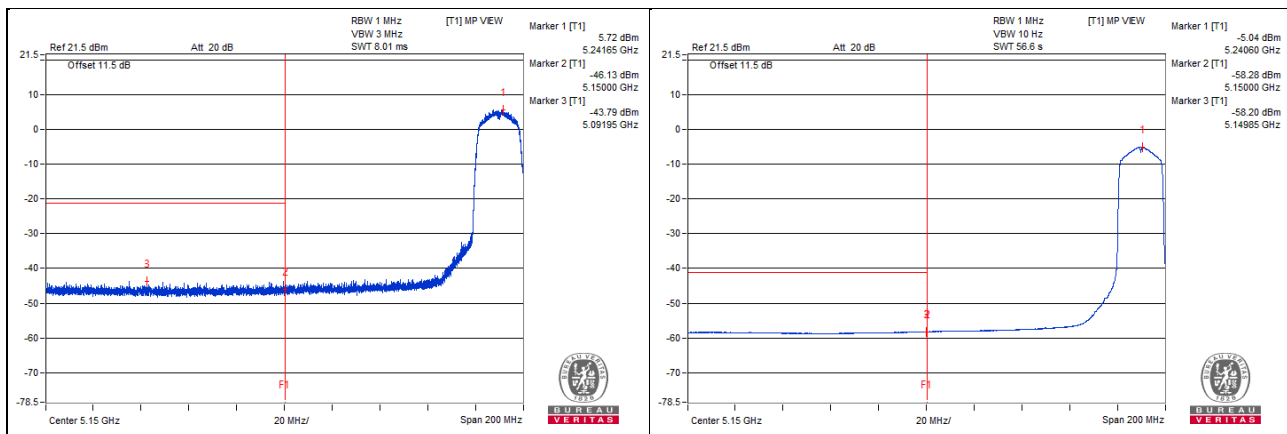


Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5241.65 PK	104.91	*		5.72	3.93	9.65
2	5150 PK	53.06	74	-20.94	-46.13	3.93	-42.2
3	5091.95 PK	55.4	74	-18.6	-43.79	3.93	-39.86
4	5240.6 AV	94.15	*		-5.04	3.93	-1.11
5	5150 AV	40.91	54	-13.09	-58.28	3.93	-54.35
6	5149.85 AV	40.99	54	-13.01	-58.2	3.93	-54.27

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.



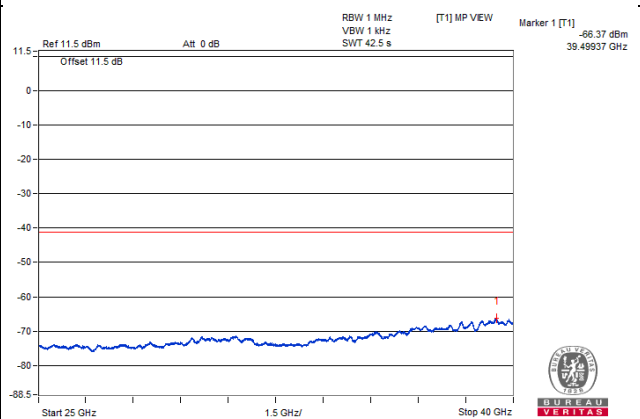
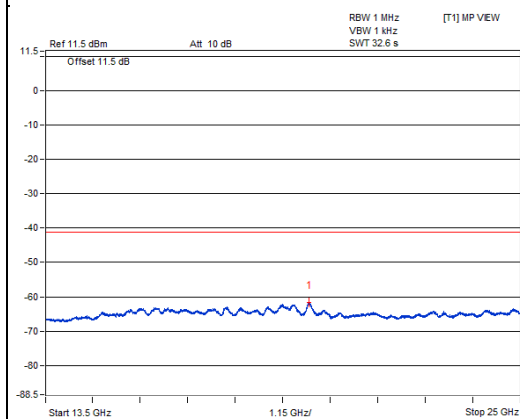
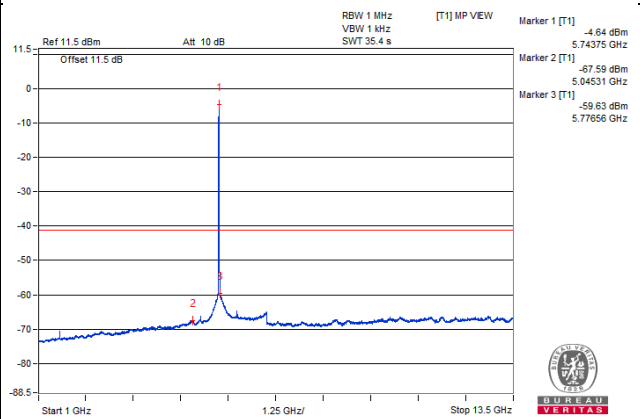
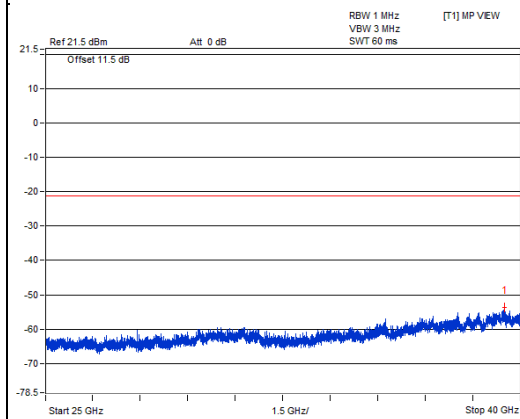
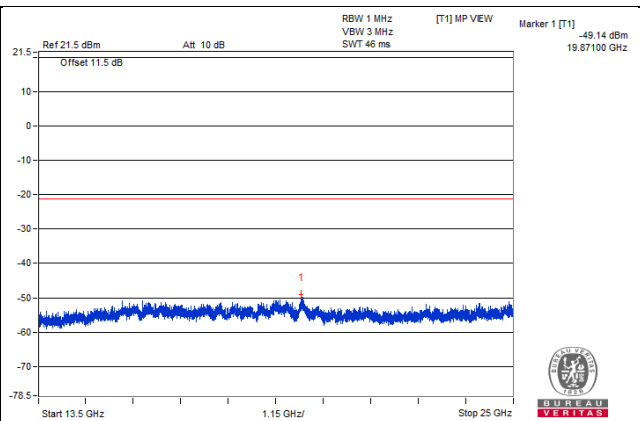
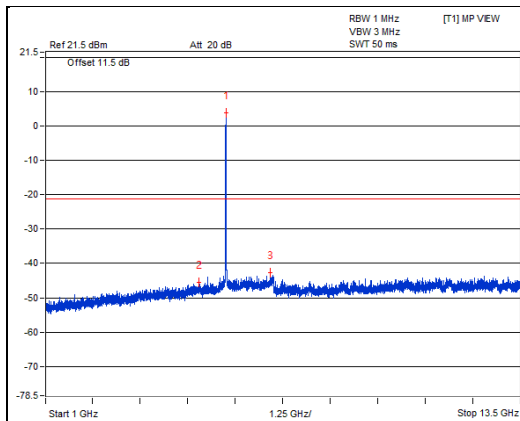
802.11n (HT20) – Channel 149

Conducted spurious emission table

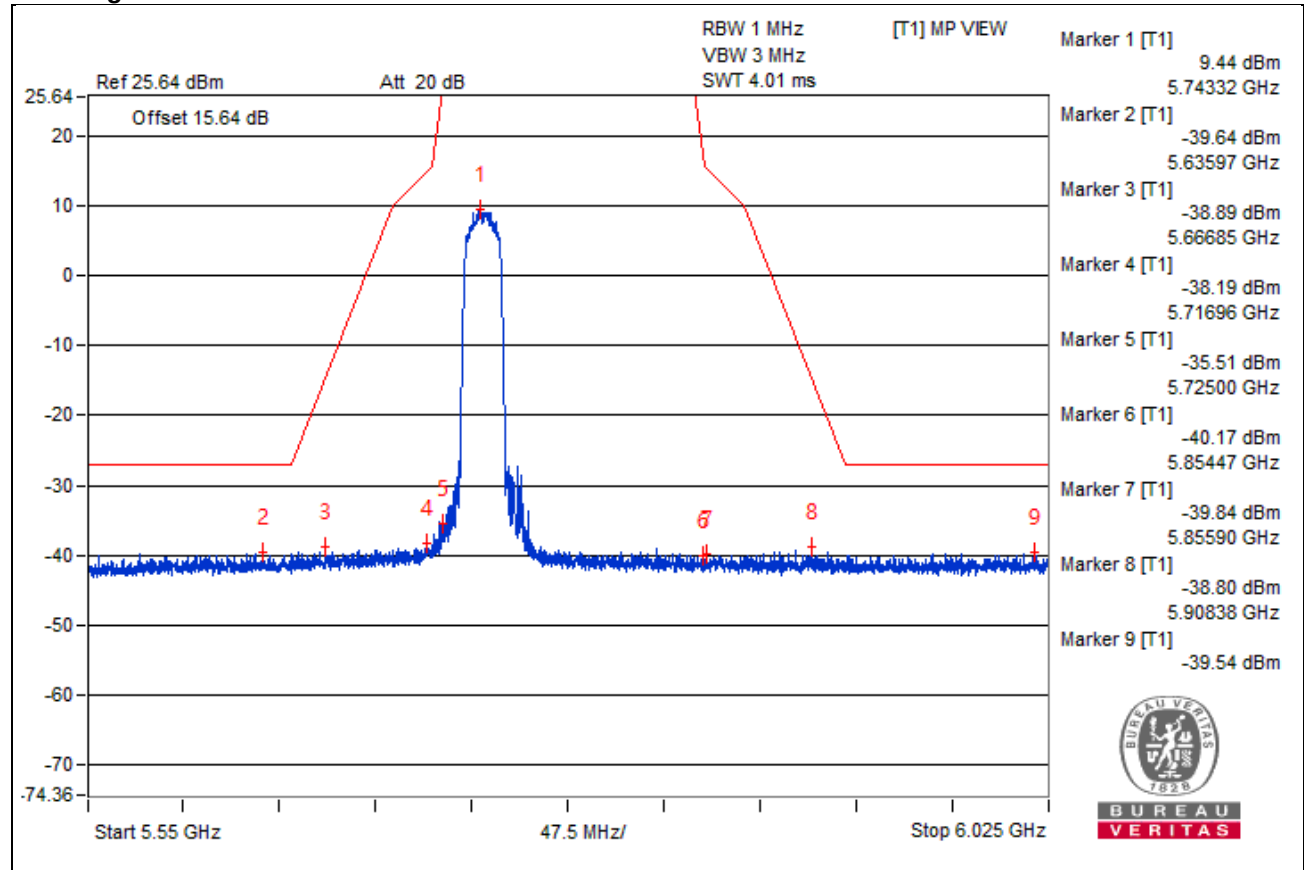
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5743.75 PK	103.03	*		3.83	3.94	7.77
2	5026.56 PK	53.64	74	-20.36	-45.56	3.94	-41.62
3	6921.87 PK	56.39	68.2	-11.81	-42.81	3.94	-38.87
4	19871 PK	50.06	74	-23.94	-49.14	3.94	-45.20
5	39518.12 PK	45.46	74	-28.54	-53.74	3.94	-49.80
6	5743.75 AV	94.56	*		-4.64	3.94	-0.70
7	5045.31 AV	31.61	54	-22.3	-67.59	3.94	-63.65
8	5776.56 AV	39.57	#		-59.63	3.94	-55.69
9	19875.31 AV	37.47	54	-16.53	-61.73	3.94	-57.79
10	39499.37 AV	32.83	54	-21.17	-66.37	3.94	-62.43

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.
3. # : Non-restricted frequency, no limit for average emission.



Bandedge table



Note:

1. The offset including attenuator (10dB), cable loss (2.29 dB) and antenna gain (3.35 dBi).
2. The test results were EIRP.

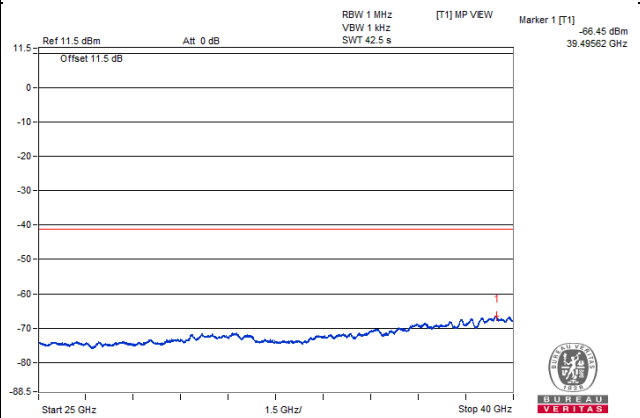
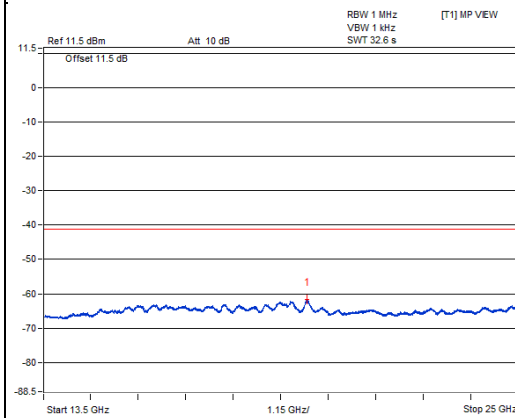
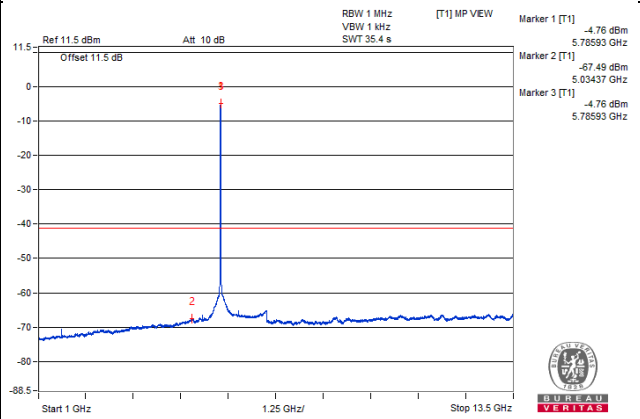
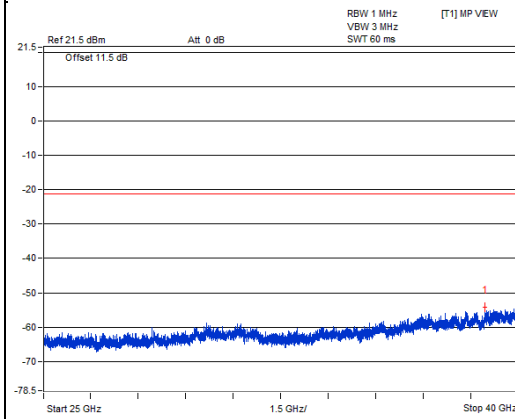
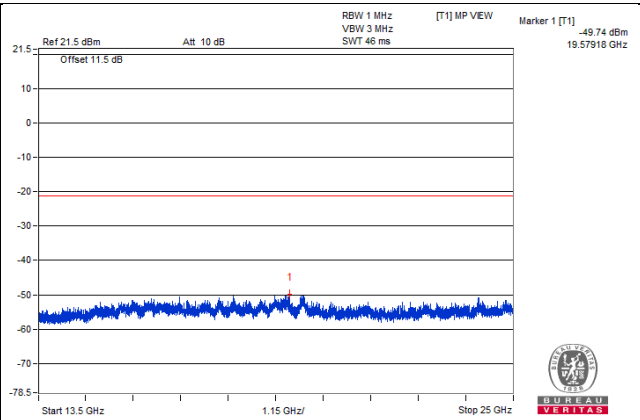
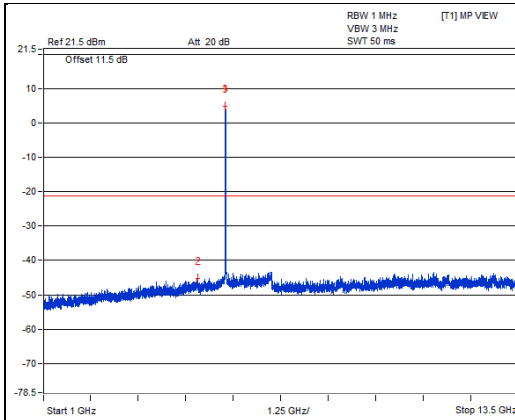
802.11n (HT20) – Channel 157

Conducted spurious emission table

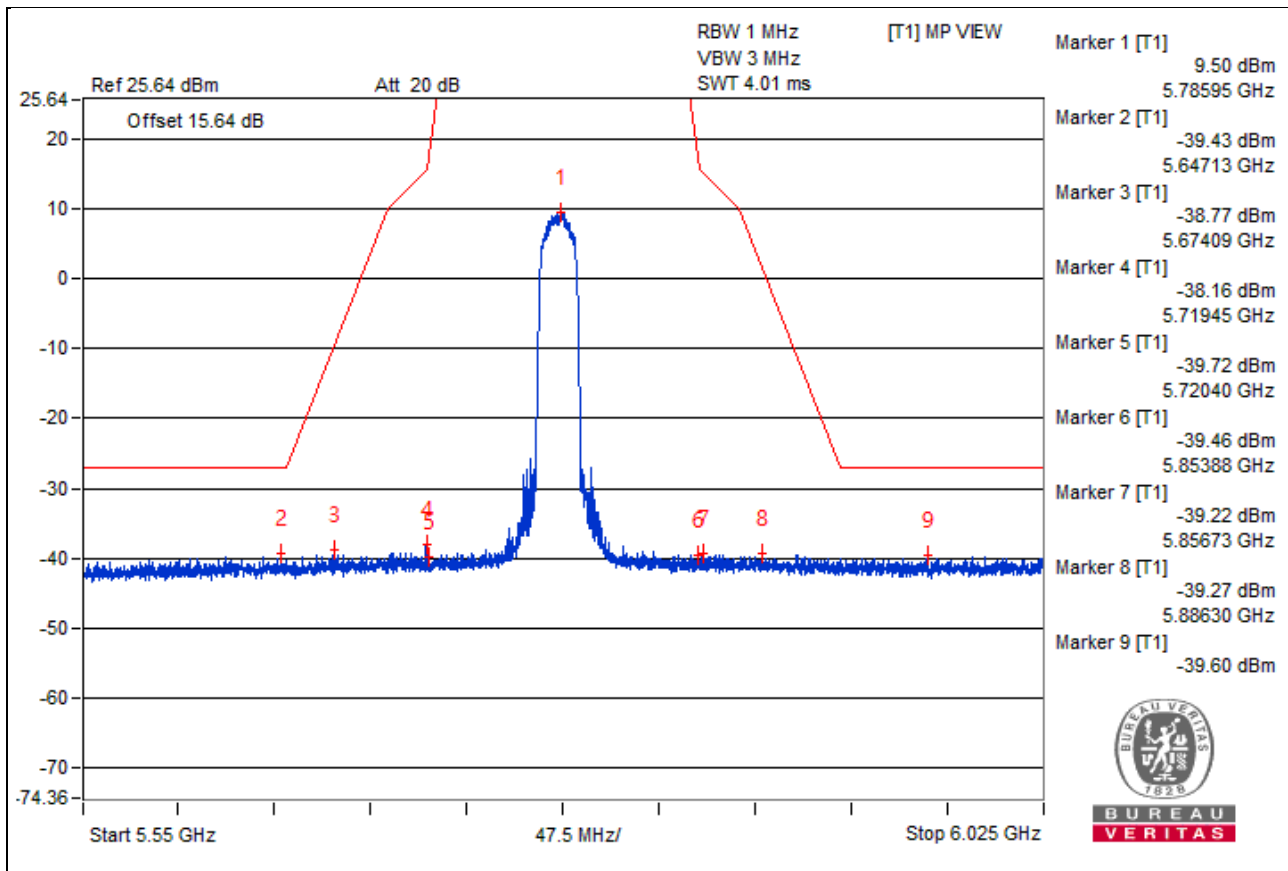
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5782.81 PK	104.03	*		4.83	3.94	8.77
2	5039.06 PK	53.87	74	-20.13	-45.33	3.94	-41.39
3	5782.81 PK	104.03	*		4.83	3.94	8.77
4	19579.18 PK	49.46	74	-24.54	-49.74	3.94	-45.80
5	38959.37 PK	44.93	74	-29.07	-54.27	3.94	-50.33
6	5785.93 AV	94.44	*		-4.76	3.94	-0.82
7	5034.37 AV	31.71	54	-22.29	-67.49	3.94	-63.55
8	5785.93 AV	94.44	*		-4.76	3.94	-0.82
9	19889.68 AV	37.66	54	-16.34	-61.54	3.94	-57.60
10	39495.62 AV	32.75	54	-21.25	-66.45	3.94	-62.51

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.



Bandedge table



Note:

1. The offset including attenuator (10dB), cable loss (2.29 dB) and antenna gain (3.35 dBi).
2. The test results were EIRP.

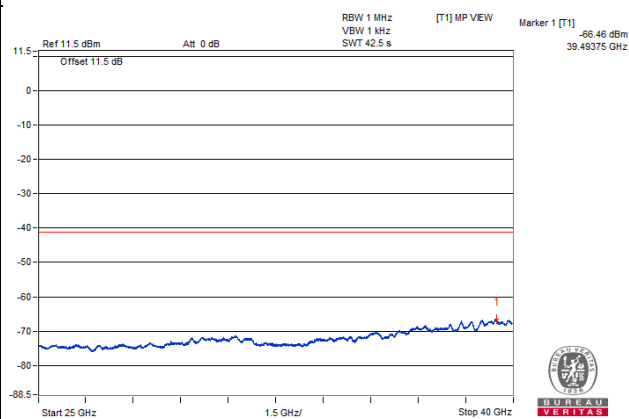
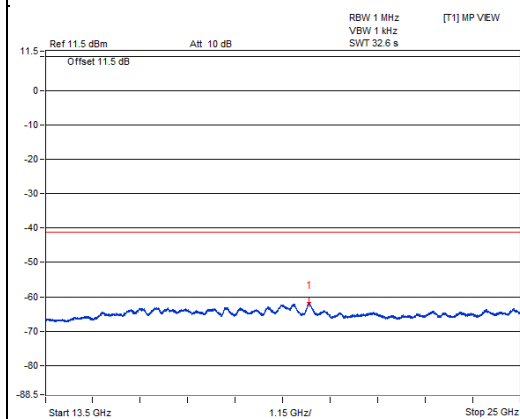
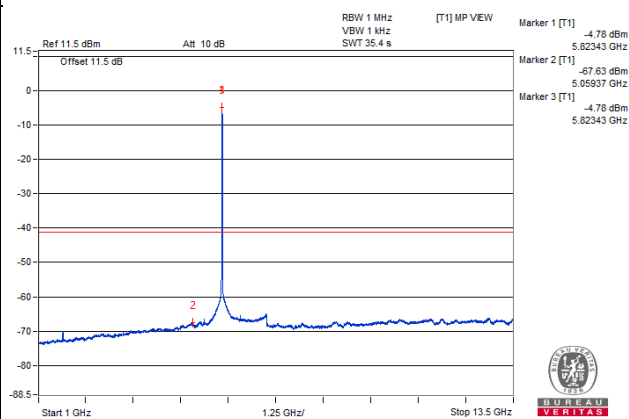
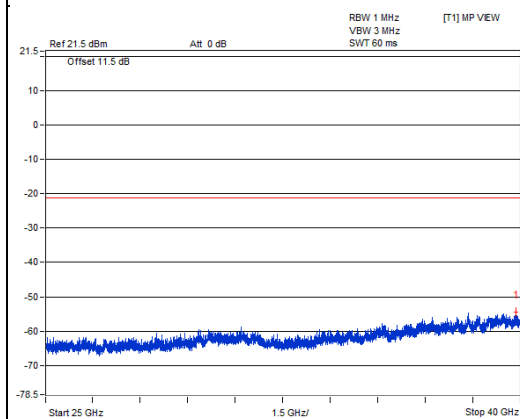
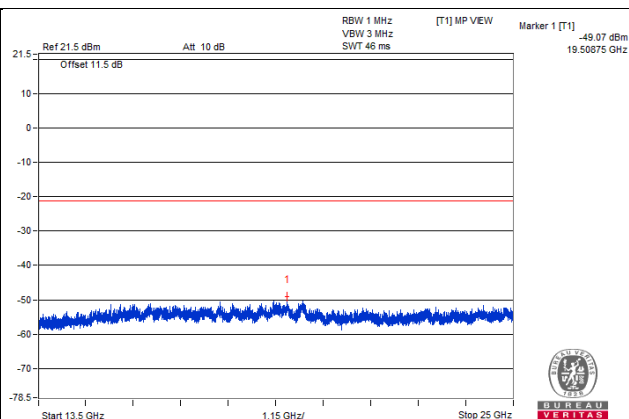
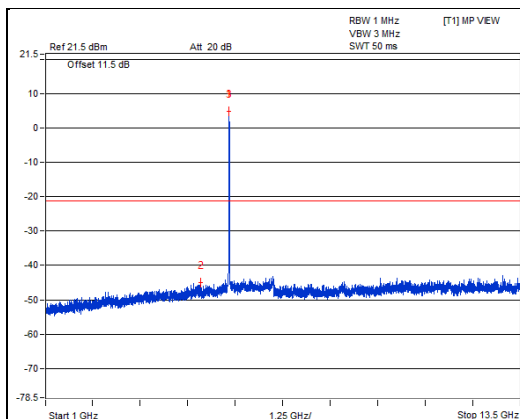
802.11n (HT20) – Channel 165

Conducted spurious emission table

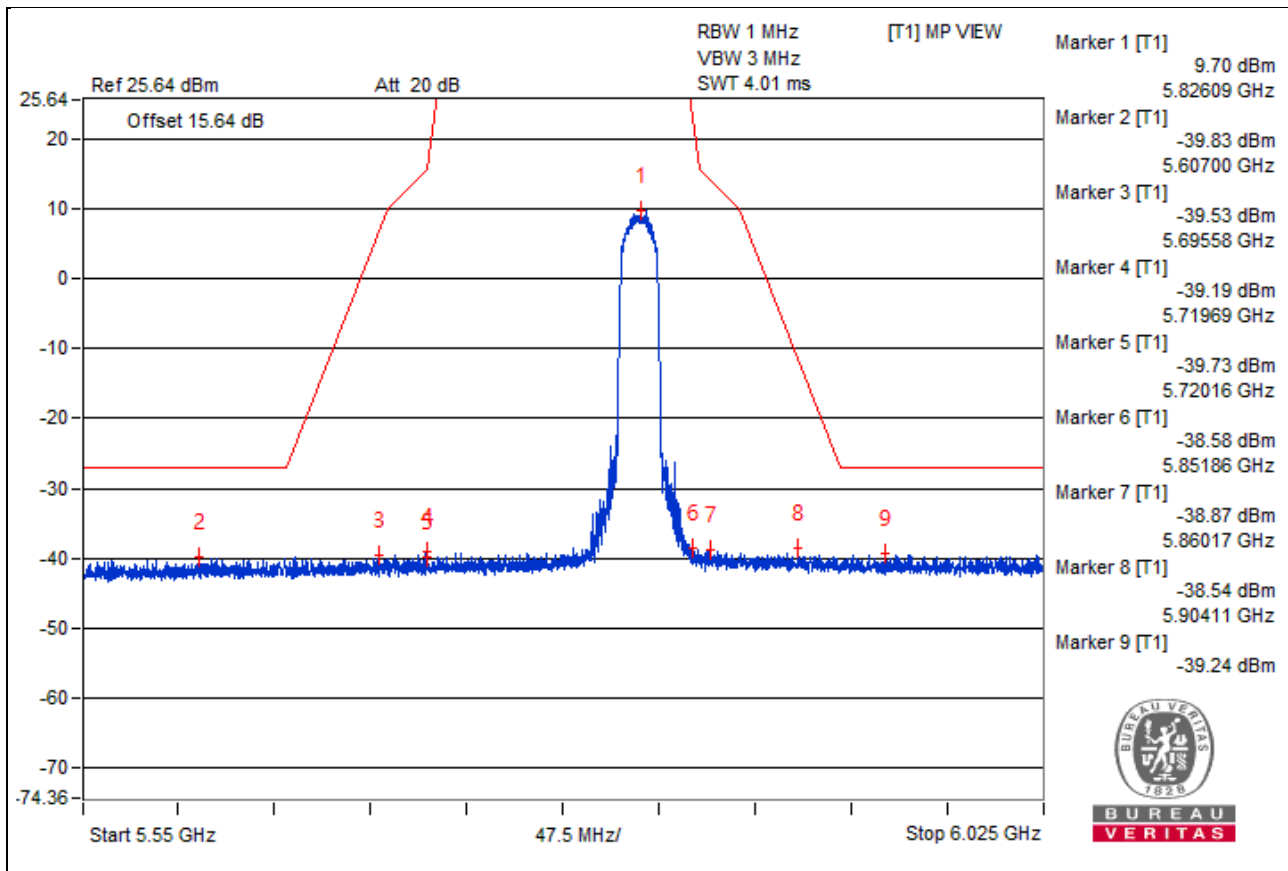
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	5825 PK	104.04	*		4.84	3.94	8.78
2	5062.5 PK	54.11	74	-19.89	-45.09	3.94	-41.15
3	5825 PK	104.04	*		4.84	3.94	8.78
4	19508.75 PK	50.13	74	-23.87	-49.07	3.94	-45.13
5	39878.12 PK	44.78	74	-29.22	-54.42	3.94	-50.48
6	5823.43 AV	94.42	*		-4.78	3.94	-0.84
7	5059.37 AV	31.57	54	-22.43	-67.63	3.94	-63.69
8	5823.43 AV	94.42	*		-4.78	3.94	-0.84
9	19881.06 AV	37.67	54	-16.33	-61.53	3.94	-57.59
10	39493.75 AV	32.74	54	-21.26	-66.46	3.94	-62.52

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. * : Fundamental frequency, the limit was restricted at the output power.



Bandedge table



Note:

1. The offset including attenuator (10dB), cable loss (2.29 dB) and antenna gain (3.35 dBi).
2. The test results were EIRP.

Below 1GHz Data

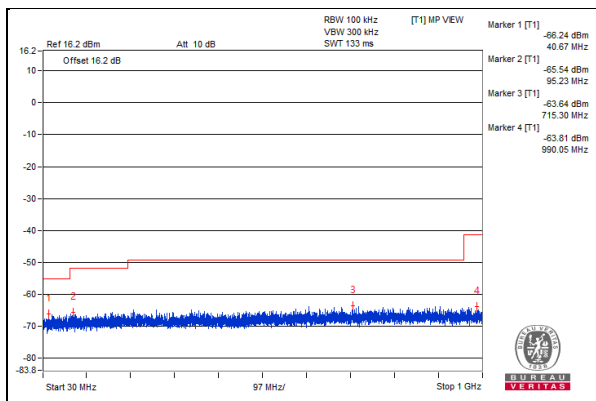
802.11n (HT20) - Channel 48

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	40.67	32.96	#		-66.24	3.94	-62.30
2	95.23	33.66	#		-65.54	3.94	-61.60
3	715.3	35.56	#		-63.64	3.94	-59.70
4	990.05	35.39	54	-18.61	-63.81	3.94	-59.87

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. # : Non-restricted frequency, no limit for average emission.



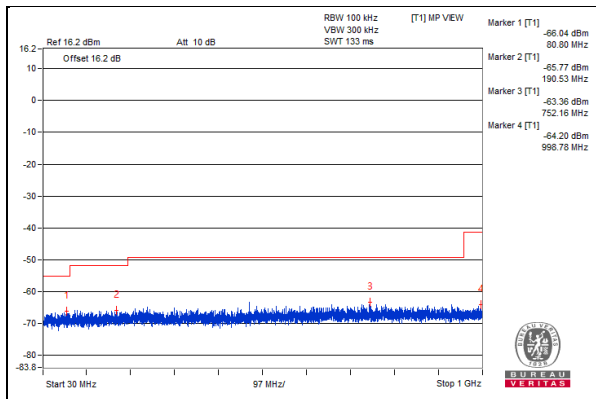
802.11n (HT20) - Channel 165

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	80.8	33.16	#		-66.04	3.94	-62.10
2	190.53	33.43	#		-65.77	3.94	-61.83
3	752.16	35.84	#		-63.36	3.94	-59.42
4	998.78	35	54	-19.00	-64.2	3.94	-60.26

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. # : Non-restricted frequency, no limit for average emission.



Note: Choose worse case from above and set RBW/VBW=120kHz/1MHz to verification.

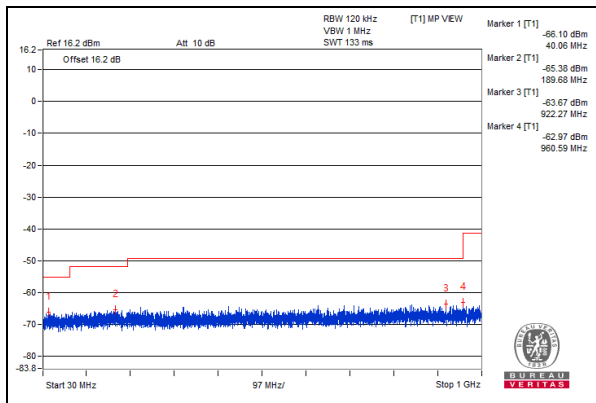
802.11n (HT20) - Channel 165

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	40.06	33.10	#		-66.1	3.94	-62.16
2	189.68	33.82	#		-65.38	3.94	-61.44
3	922.27	35.53	#		-63.67	3.94	-59.73
4	960.59	36.23	46	-9.77	-62.97	3.94	-59.03

Note :

1. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
2. # : Non-restricted frequency, no limit for average emission.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: Apr. 17, 2020

4.2.3 Test Procedure

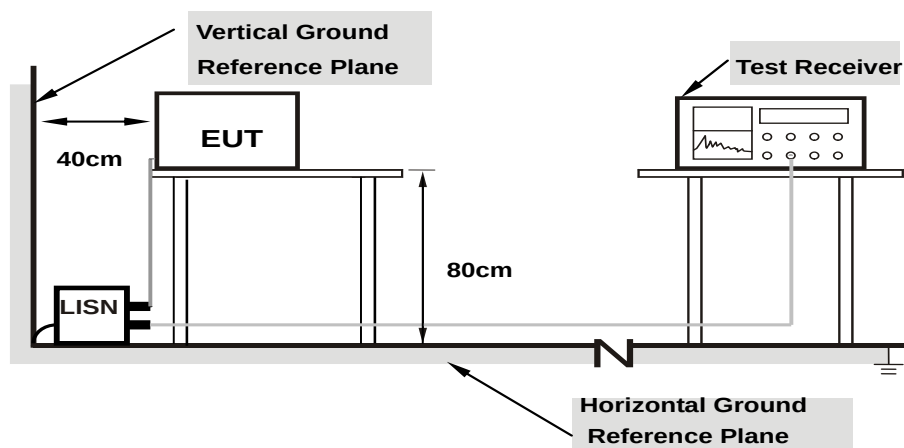
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

Same as 4.1.6.

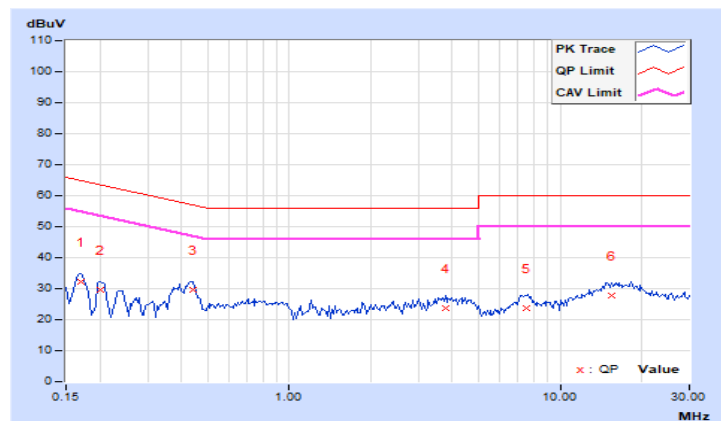
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	9.99	22.37	15.43	32.36	25.42	64.98	54.98	-32.62	-29.56
2	0.20078	9.99	19.46	11.83	29.45	21.82	63.58	53.58	-34.13	-31.76
3	0.43906	10.00	19.76	12.76	29.76	22.76	57.08	47.08	-27.32	-24.32
4	3.75781	10.24	13.57	8.15	23.81	18.39	56.00	46.00	-32.19	-27.61
5	7.47266	10.49	13.06	7.03	23.55	17.52	60.00	50.00	-36.45	-32.48
6	15.58203	11.06	16.66	11.55	27.72	22.61	60.00	50.00	-32.28	-27.39

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

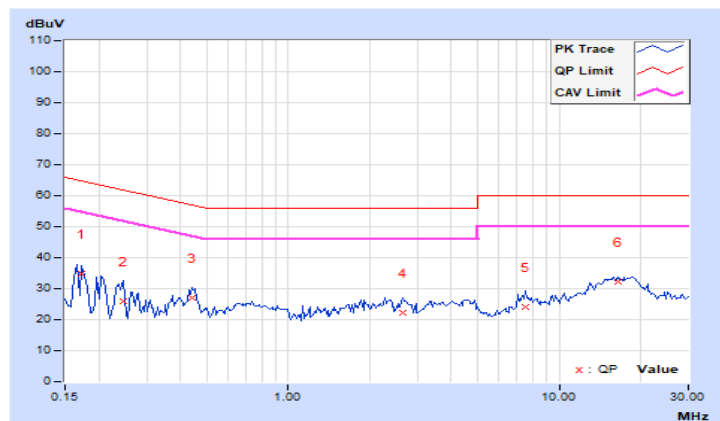


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17344	9.99	24.72	12.31	34.71	22.30	64.79	54.79	-30.08	-32.49
2	0.24766	9.99	15.87	1.99	25.86	11.98	61.84	51.84	-35.98	-39.86
3	0.43906	10.01	17.06	9.20	27.07	19.21	57.08	47.08	-30.01	-27.87
4	2.64844	10.15	12.14	3.91	22.29	14.06	56.00	46.00	-33.71	-31.94
5	7.50781	10.43	13.47	7.77	23.90	18.20	60.00	50.00	-36.10	-31.80
6	16.46875	10.93	21.25	16.53	32.18	27.46	60.00	50.00	-27.82	-22.54

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



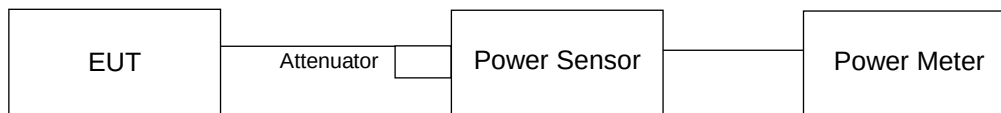
4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

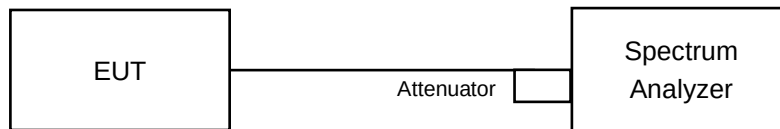
4.3.7 Test Results

802.11n (HT20)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
36	5180	10.162	10.07	30	Pass
40	5200	10.257	10.11	30	Pass
48	5240	10.28	10.12	30	Pass
149	5745	10.28	10.12	30	Pass
157	5785	10.447	10.19	30	Pass
165	5825	10.568	10.24	30	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

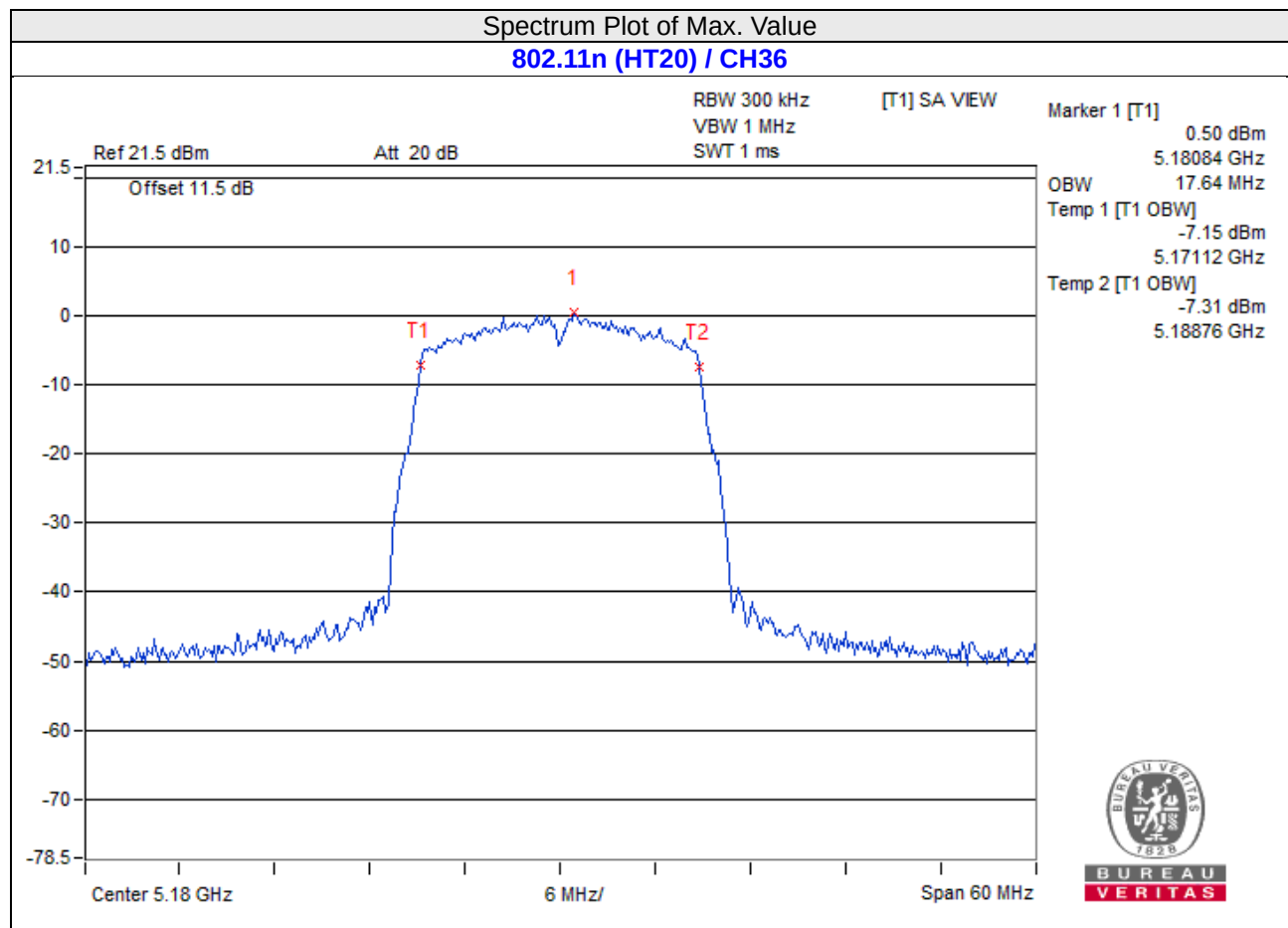
4.4.3 Test Procedure

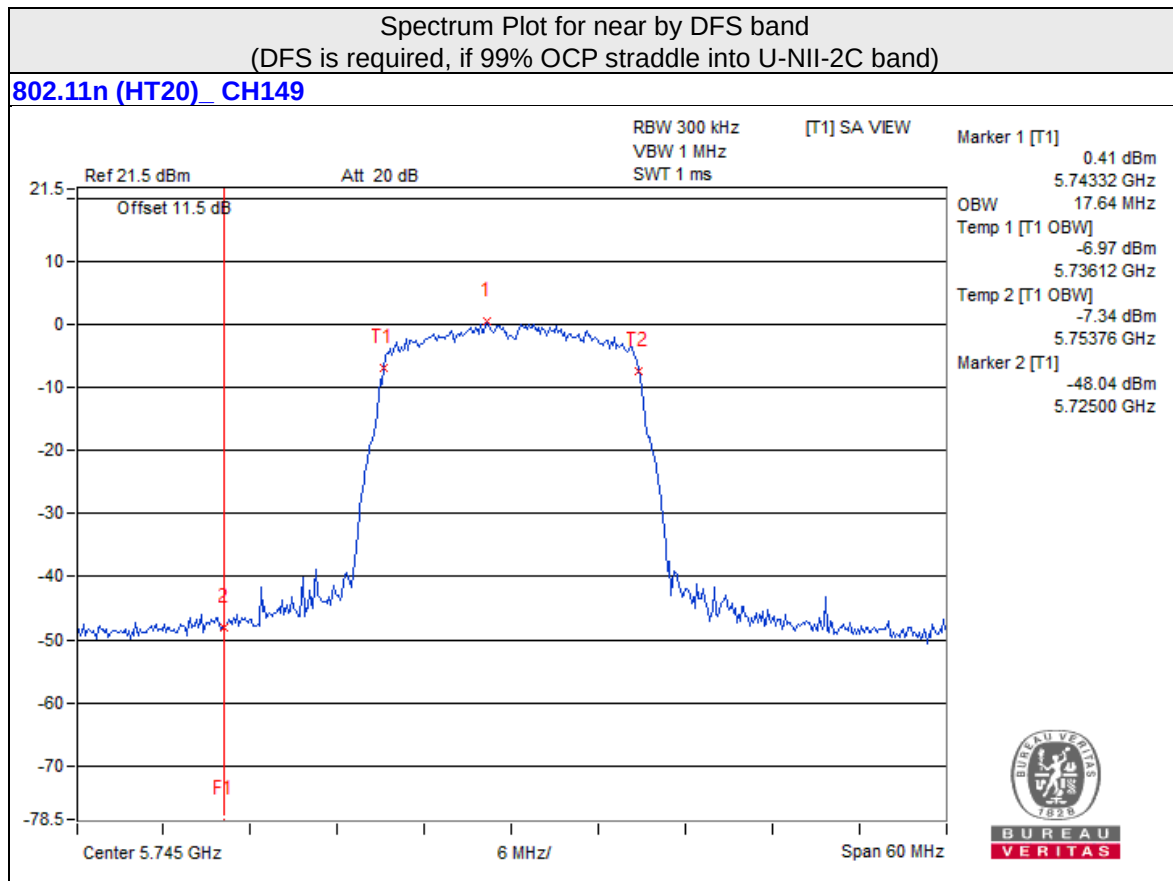
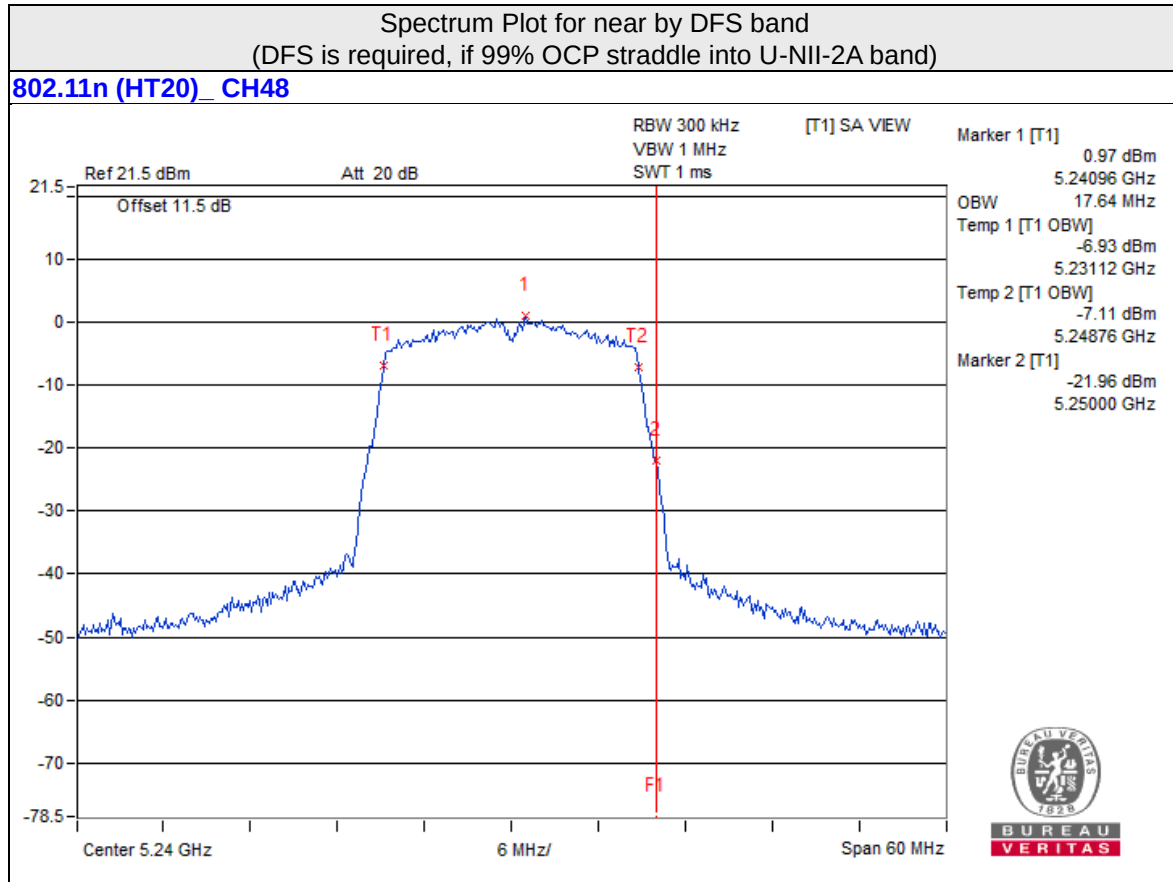
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean power of a given emission.

4.4.4 Test Results

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.64
40	5200	17.64
48	5240	17.64
149	5745	17.64
157	5785	17.64
165	5825	17.64



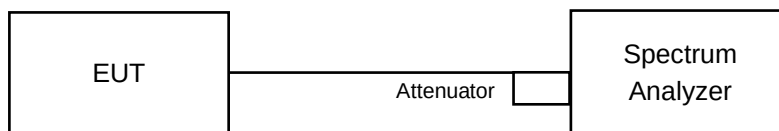


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to "free run".
4. Trace average at least 100 traces in power averaging mode.
In order to facilitate reading the value, changed the detector to view.
5. Record the max value

For U-NII-3 band:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/300\text{ kHz})$
5. Sweep time = auto, trigger set to "free run".
6. Trace average at least 100 traces in power averaging mode.
In order to facilitate reading the value, changed the detector to view.
7. Record the max value and add $10\log(1/\text{duty cycle})$

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

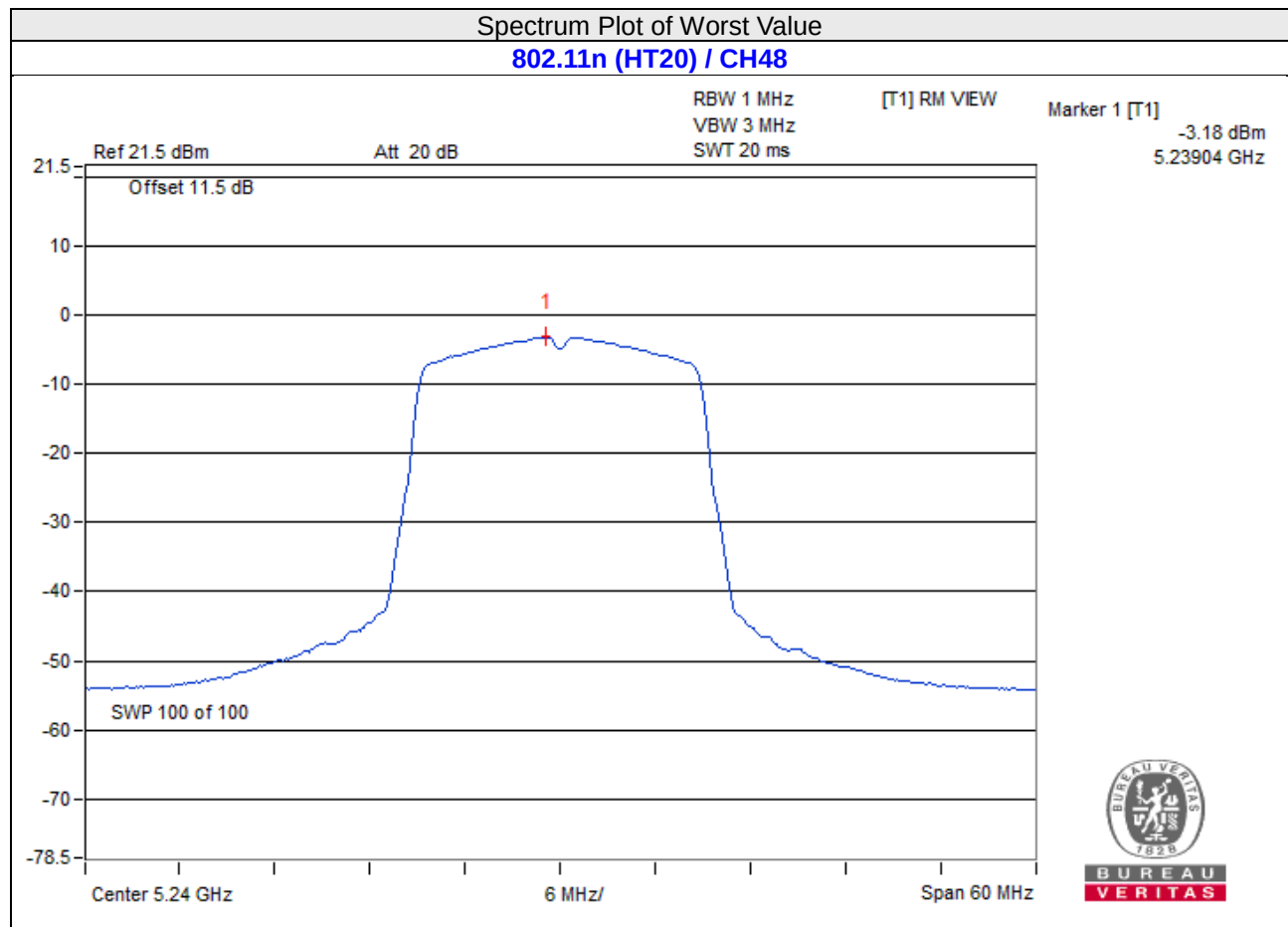
Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11n (HT20)

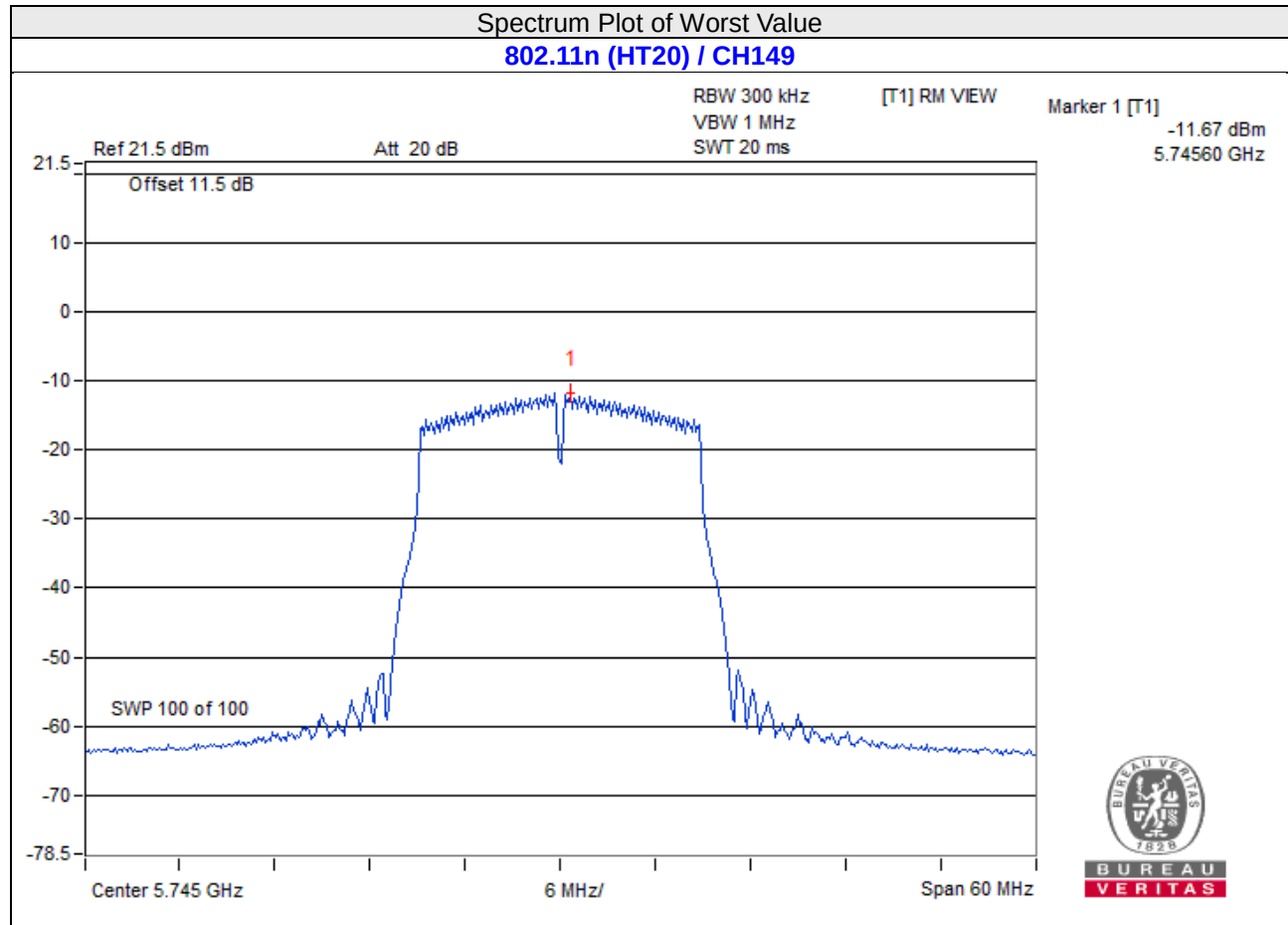
Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	-3.24	17	Pass
40	5200	-3.49	17	Pass
48	5240	-3.18	17	Pass



For U-NII-3:

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	-11.67	-9.45	30.00	Pass
157	5785	-11.90	-9.68	30.00	Pass
165	5825	-11.82	-9.60	30.00	Pass

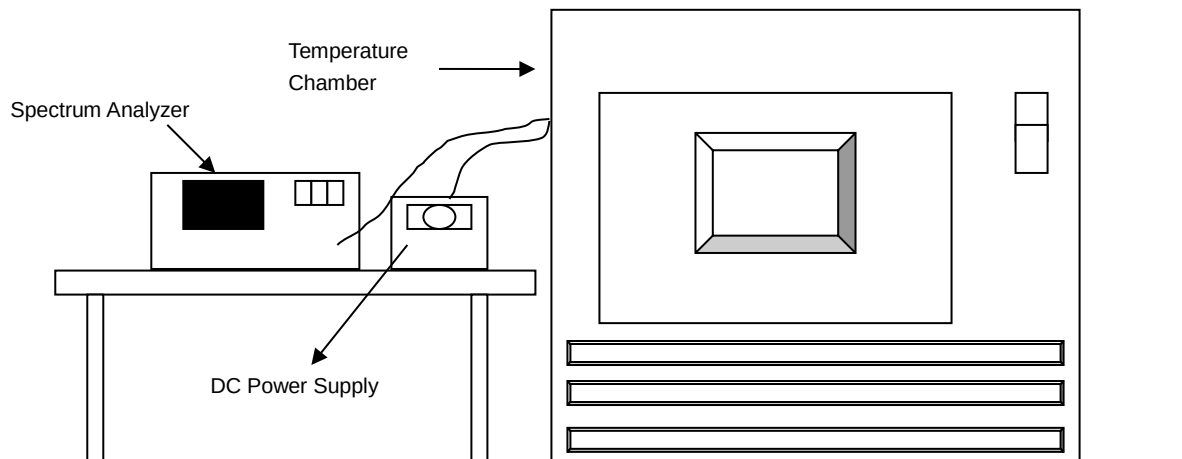


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
60	3.3	5180.0126	PASS	5180.0096	PASS	5180.011	PASS	5180.0125	PASS
50	3.3	5179.9972	PASS	5179.9942	PASS	5179.994	PASS	5179.9958	PASS
40	3.3	5179.9832	PASS	5179.9789	PASS	5179.9786	PASS	5179.9785	PASS
30	3.3	5179.9783	PASS	5179.9782	PASS	5179.9777	PASS	5179.9782	PASS
20	3.3	5179.9976	PASS	5179.9973	PASS	5179.9988	PASS	5179.9965	PASS
10	3.3	5179.9762	PASS	5179.9785	PASS	5179.9749	PASS	5179.9756	PASS
0	3.3	5180.024	PASS	5180.026	PASS	5180.0247	PASS	5180.0262	PASS
-10	3.3	5180.0112	PASS	5180.0105	PASS	5180.0103	PASS	5180.0096	PASS

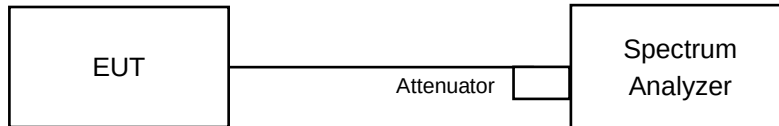
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	3.795	5179.9984	PASS	5179.998	PASS	5179.9984	PASS	5179.9961	PASS
	3.3	5179.9976	PASS	5179.9973	PASS	5179.9988	PASS	5179.9965	PASS
	2.805	5179.9972	PASS	5179.997	PASS	5179.9994	PASS	5179.9958	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. In order to obtain results more easily, change max hold to view as following. It has no effect on the result.

4.7.5 Deviation from Test Standard

No deviation.

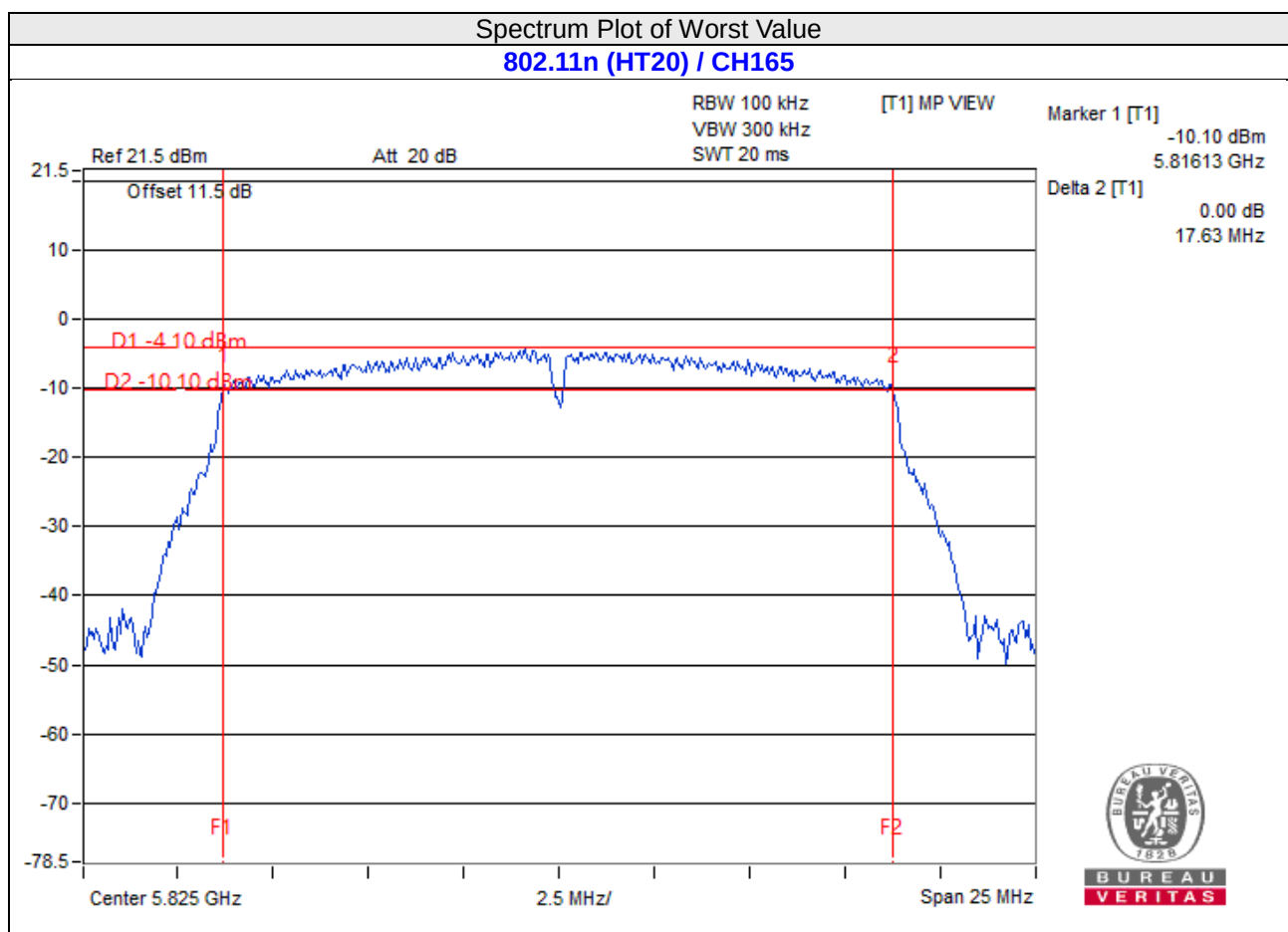
4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.64	0.5	PASS
157	5785	17.63	0.5	PASS
165	5825	17.63	0.5	PASS



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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