FCC Test Report

Report No.: RF191025E02A

FCC ID: UXX-S5A946A

Test Model: S5A947A

Series Model: S5A946A

Received Date: Nov. 01, 2019

Test Date: Nov. 06, 2019 ~ Nov. 28, 2019

Issued Date: Dec. 04, 2019

Applicant: Cradlepoint, Inc

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration / Designation Number: 788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF191025E02A	Original Release	Dec. 04, 2019

1 Certificate of Conformity

Product: Advanced Edge Router

Brand: cradlepoint

Test Model: S5A947A

Series Model: S5A946A

Sample Status: Engineering Sample

Applicant: Cradlepoint, Inc

Test Date: Nov. 06, 2019 ~ Nov. 28, 2019

Standards: 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 RF characteristics under the conditions specified in this report.

Prepared by : Rona Chen , **Date:** Dec. 04, 2019

Rona Chen / Specialist

Approved by : _____ , **Date:** Dec. 04, 2019

Dylan Chiou / Project Engineer

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 -10.28 dB at 0.34577 MHz.
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 -0.5 dB at 10600.00 MHz & 10640.00 MHz & 10620.00 MHz.
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)	6 dB Bandwidth	N/A	Not Applicable (Only U-NII-3 band apply for this test item)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex (MHF) not a standard connector.

Note:

1. 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) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	3.86 dB
	200 MHz ~ 1000 MHz	3.87 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Advanced Edge Router		
Brand	cradlepoint		
Test Model	S5A947A		
Series Model	S5A946A		
Status of EUT	Engineering Sample		
Power Supply Rating	12.0 Vdc (Adapter)		
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA		
Modulation Technology	OFDM, OFDMA		
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 300.0 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps		
Operating Frequency	5260 ~ 5320 MHz, 5500 ~ 5720 MHz		
Number of Channel	5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 5500 ~ 5720 MHz: 12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 6 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 3 for 802.11ac (VHT80), 802.11ax (HE80)		
Output Power	Frequency Range	CDD Mode	Beamforming Mode
	5260 ~ 5320 MHz	236.885 mW	236.885 mW
	5500 ~ 5720 MHz	242.984 mW	232.394 mW
Antenna Type	Refer to Note as below		
Antenna Connector	Refer to Note as below		
Accessory Device	Refer to Note as below		
Data Cable Supplied	N/A		

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF191025E02-1. The difference compared with original report is enabling WLAN 5G U-NII-2A and U-NII-2C. Therefore, the test result of U-NII-2A and U-NII-2C is recorded in this report.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT20)	2TX
802.11ac (VHT40)	2TX
802.11ac (VHT80)	2TX
802.11ax (HE20)	2TX
802.11ax (HE40)	2TX
802.11ax (HE80)	2TX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40, 802.11ac mode for VHT20 / VHT40 / VHT80, and 802.11ax mode for HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n, 802.11ac and 802.11ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

3. All models are listed as below.

Brand	Product Marketing Name (PMN)	Model	Wi-Fi Function	Embedded Radio (WWAN Module)	Number of WWAN Antenna Port
cradlepoint	E300-C18B	S5A946A	Yes	Telit, LM960A18 Contains FCC ID: RI7LM960 Contains IC : 5131A-LM960	4
	E300-C4D	S5A947A	Yes	Quectel, EC25-AF Contains FCC ID: XMR201808EC25AF Contains IC : 10224A-2018EC25AF	2
* The differences compared with different models are embedded WWAN module and number of WWAN antenna port. Above samples had been pre-tested and the worst case was found on model: S5A947A. Therefore, only this S5A947A was as a representative for the final test and recorded in this report.					

4. The WLAN antenna information of EUT is listed as below.

Antenna No.	RF Chain No.	Brand	Model	Antenna Gain (dBi)		Antenna Type	Connecter Type
				2.4G	5G		
Radio 1	WiFi Chain0	Cradlepoint	02102140-06997-1	1.7	3	PCB	i-pex (MHF)
Radio 2	WiFi Chain1		02102140-06997-2	2.5	3.3		

5. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	APD	WA-36N12R	I/P: 100 – 240 Vac, 0.9 A, 50-60 Hz, O/P: 12 Vdc, 3 A 1.5 m non-shielded cable w/o ferrite core
Adapter 2	APD	WA-36A12R	I/P: 100 – 240 Vac, 0.9 A, 50-60 Hz, O/P: 12 Vdc, 3 A 1.5 m non-shielded cable w/o ferrite core
Adapter 3	Ktec	KSA-36W-120300D5	I/P: 100 – 240 Vac, 1 A, 50/60 Hz, O/P: 12 Vdc, 3 A 1.5 m non-shielded cable w/o ferrite core

6. 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 5260 ~ 5320 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency (MHz)
58	5290

For 5500 ~ 5720 MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600	144	5720

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590	142	5710

3 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	138	5690
122	5610		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT + Adapter 1
B	-	√	√	-	EUT + Adapter 2
C	-	√	√	-	EUT + Adapter 3

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11ax (HE20)	52 to 64	52, 60, 64	OFDMA	BPSK	8.6
-		802.11ax (HE40)	54 to 62	54, 62	OFDMA	BPSK	17.2
-		802.11ax (HE80)	58	58	OFDMA	BPSK	36.0
-	5500-5720	802.11a	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.0
-		802.11ax (HE20)	100 to 144	100, 116, 140, 144	OFDMA	BPSK	8.6
-		802.11ax (HE40)	102 to 142	102, 110, 134, 142	OFDMA	BPSK	17.2
-		802.11ax (HE80)	106 to 138	106, 122, 138	OFDMA	BPSK	36.0

Radiated Emission Test (Below 1 GHz):

☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11ax (HE20)	52 to 64	60	OFDMA	BPSK	8.6

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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11ax (HE20)	52 to 64	60	OFDMA	BPSK	8.6

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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11ax (HE20)	52 to 64	52, 60, 64	OFDMA	BPSK	8.6
-		802.11ax (HE40)	54 to 62	54, 62	OFDMA	BPSK	17.2
-		802.11ax (HE80)	58	58	OFDMA	BPSK	36.0
-	5500-5720	802.11a	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.0
-		802.11ax (HE20)	100 to 144	100, 116, 140, 144	OFDMA	BPSK	8.6
-		802.11ax (HE40)	102 to 142	102, 110, 134, 142	OFDMA	BPSK	17.2
-		802.11ax (HE80)	106 to 138	106, 122, 138	OFDMA	BPSK	36.0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Adair Peng
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Titan Hsu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Adair Peng
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Ivan Tseng

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

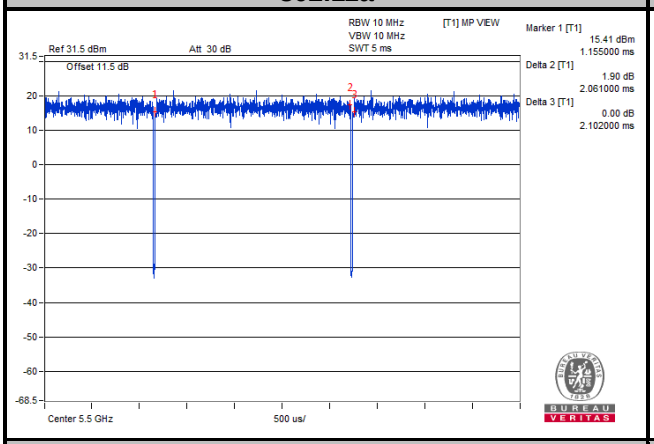
802.11a: Duty cycle of test signal is ≥ 98 %, duty factor is not required.

802.11ax (HE20): Duty cycle = 2.060/2.113 = 0.975, Duty factor = 10 * log(1/0.975) = 0.11

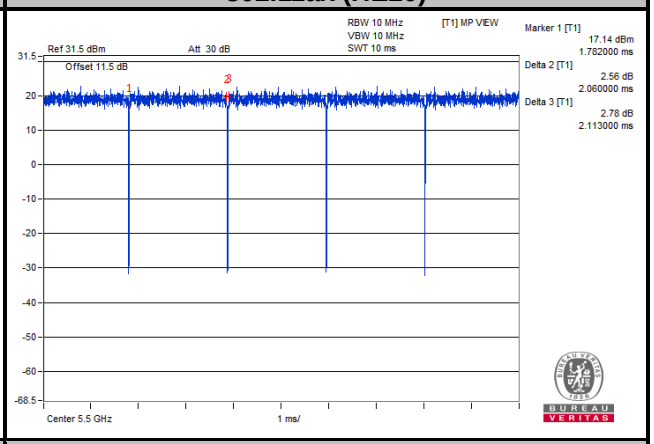
802.11ax (HE40): Duty cycle = 0.942/0.973 = 0.968, Duty factor = 10 * log(1/0.968) = 0.14

802.11ax (HE80): Duty cycle = 0.461/0.480 = 0.960, Duty factor = 10 * log(1/0.960) = 0.18

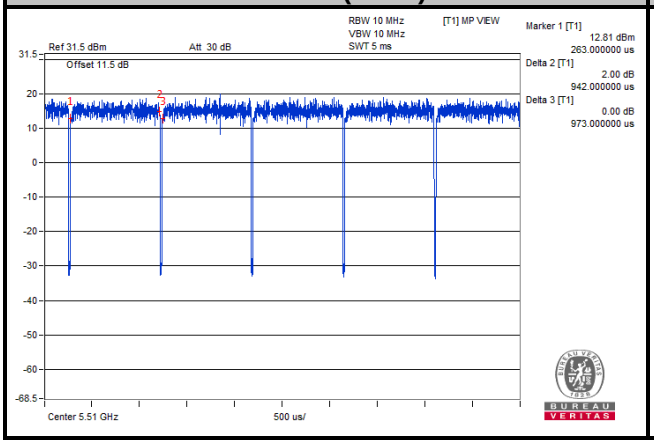
802.11a



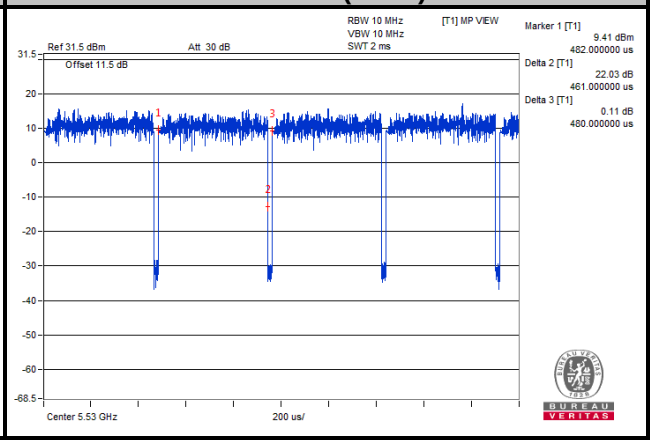
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



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.

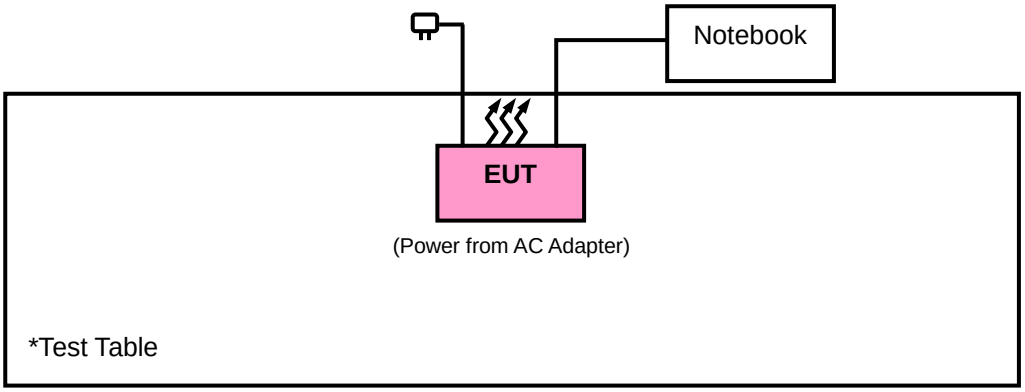
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	DELL	E5410	1HC2XM1	N/A
2.	Adapter 1	APD	WA-36N12R	N/A	N/A
3.	Adapter 2	APD	WA-36A12R	N/A	N/A
4.	Adapter 3	KUANTECH	KSA-36W-120300D5	N/A	N/A

No.	Signal Cable Description of The Above Support Units
1.	6 m LAN cable
2.	1.5 m non-shielded cable w/o ferrite core
3.	1.5 m non-shielded cable w/o ferrite core
4.	1 m non-shielded cable w/o ferrite core

Note:

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards 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 Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output 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

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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Limits of Unwanted Emission Out of the Restricted Bands

Applicable To			Limit	
789033 D02 General UNII Test Procedures New Rules v02r01			Field Strength at 3 m	
			PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	**Applicable To**		**EIRP Limit**	**Equivalent Field Strength at 3 m**
5150~5250 MHz	15.407(b)(1)		PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/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 (dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8 (dBµV/m) *3 PK:122.2 (dBµV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*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:

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

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 30, 2019	May 29, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 22, 2018	Nov. 21, 2019
			Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 20, 2019	Aug. 19, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 27, 2019	Mar. 26, 2020
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 20, 2019	Aug. 19, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 05, 2019	Sep. 04, 2020
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 15, 2019	Jul. 14, 2020
Digital Multimeter Fluke	87-III	70360742	Jun. 27, 2019	Jun. 26, 2020
Temperature & Humidity Chamber	GTH-120-40-CP-A R	MAA1306-019	Sep. 10, 2019	Sep. 09, 2020

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 HwaYa Chamber 3.

4.1.4 Test Procedures

For Radiated Emission below 30 MHz

a. 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.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. 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.
e. 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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. 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.
e. 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.
f. The test-receiver system was set to peak and average detected 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:

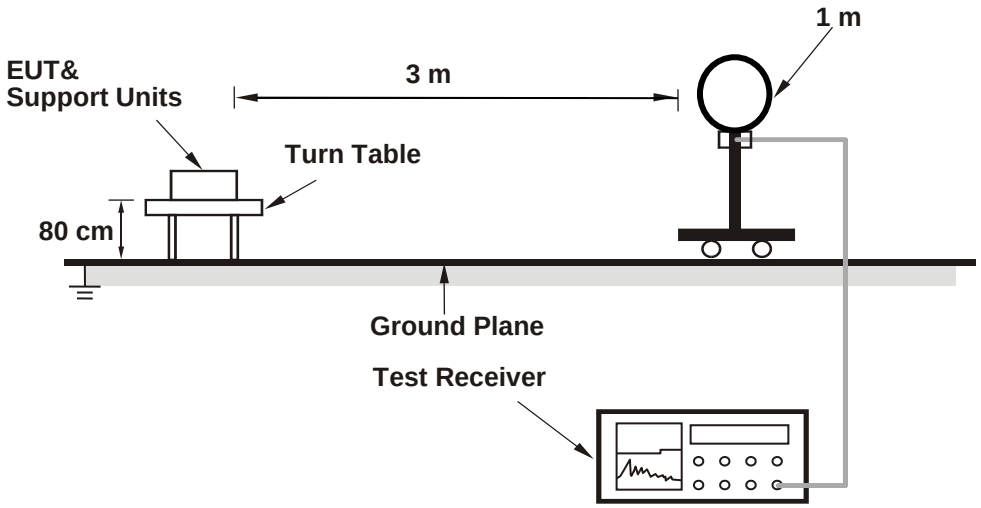
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
   (11a: RBW = 1 MHz, VBW = 1 kHz ; 11ax (HE20): RBW = 1 MHz, VBW = 1 kHz ;
   11ax (HE40): RBW = 1 MHz, VBW = 1 kHz ; 11ax (HE80): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

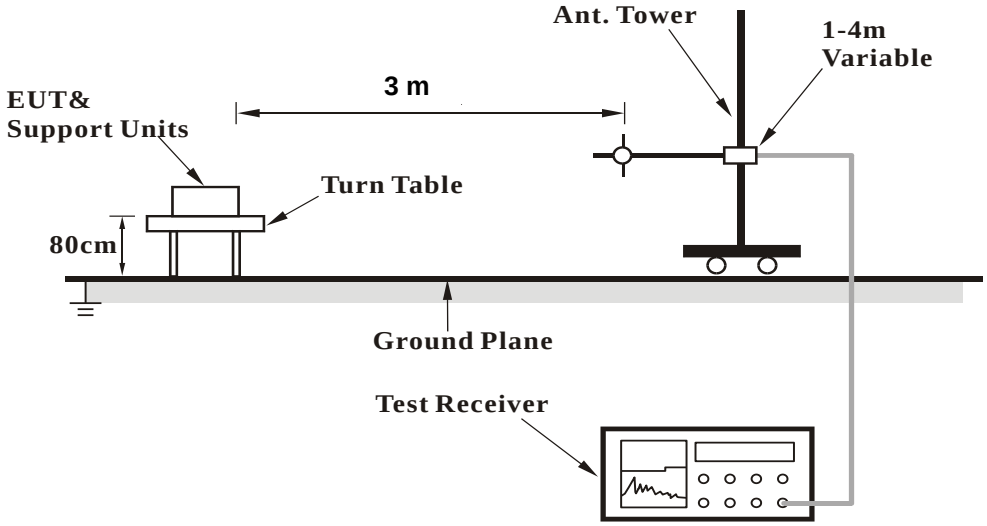
No deviation.

4.1.6 Test Setup

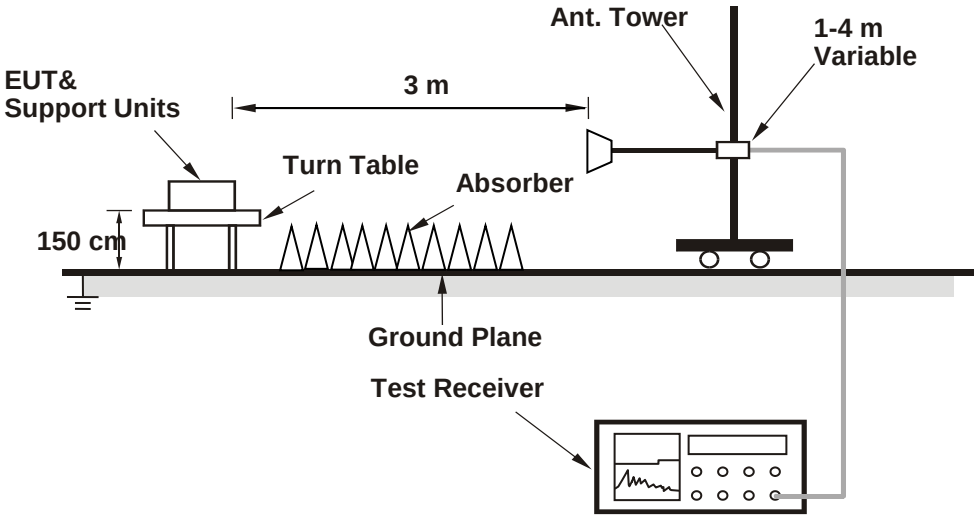
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.7 EUT Operating Conditions

a. Placed the EUT on a testing table.

b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.8 Test Results

Above 1 GHz Data：

Mode A

802.11a

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	55.1 PK	74.0	-18.9	2.97 H	212	50.9	4.2
2	5150.00	43.3 AV	54.0	-10.7	2.97 H	212	39.1	4.2
3	*5260.00	111.7 PK			3.12 H	201	72.6	39.1
4	*5260.00	101.8 AV			3.12 H	201	62.7	39.1
5	#10520.00	61.2 PK	68.2	-7.0	3.85 H	340	42.5	18.7
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	5150.00	56.7 PK	74.0	-17.3	1.41 V	356	52.5	4.2
2	5150.00	43.6 AV	54.0	-10.4	1.41 V	356	39.4	4.2
3	*5260.00	116.7 PK			1.34 V	349	77.6	39.1
4	*5260.00	106.9 AV			1.34 V	349	67.8	39.1
5	#10520.00	63.0 PK	68.2	-5.2	3.69 V	66	44.3	18.7

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5300.00	111.1 PK			3.19 H	212	72.0	39.1
2	*5300.00	99.9 AV			3.19 H	212	60.8	39.1
3	10600.00	62.0 PK	74.0	-12.0	3.93 H	323	42.9	19.1
4	10600.00	52.5 AV	54.0	-1.5	3.93 H	323	33.4	19.1
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	*5300.00	115.0 PK			1.36 V	350	75.9	39.1
2	*5300.00	105.0 AV			1.36 V	350	65.9	39.1
3	10600.00	62.6 PK	74.0	-11.4	3.74 V	62	43.5	19.1
4	10600.00	53.3 AV	54.0	-0.7	3.74 V	62	34.2	19.1

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.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5320.00	111.7 PK			3.04 H	197	72.5	39.2
2	*5320.00	102.3 AV			3.04 H	197	63.1	39.2
3	5350.00	60.0 PK	74.0	-14.0	2.97 H	205	55.9	4.1
4	5350.00	45.7 AV	54.0	-8.3	2.97 H	205	41.6	4.1
5	5395.00	58.1 PK	74.0	-15.9	1.37 H	121	53.7	4.4
6	5395.00	48.6 AV	54.0	-5.4	1.37 H	121	44.2	4.4
7	10640.00	60.2 PK	74.0	-13.8	3.82 H	331	41.3	18.9
8	10640.00	51.1 AV	54.0	-2.9	3.82 H	331	32.2	18.9
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	*5320.00	116.9 PK			1.36 V	345	77.7	39.2
2	*5320.00	107.4 AV			1.36 V	345	68.2	39.2
3	5350.00	62.2 PK	74.0	-11.8	1.40 V	349	58.1	4.1
4	5350.00	48.2 AV	54.0	-5.8	1.40 V	349	44.1	4.1
5	5395.00	59.9 PK	74.0	-14.1	1.12 V	325	55.5	4.4
6	5395.00	51.9 AV	54.0	-2.1	1.12 V	325	47.5	4.4
7	10640.00	61.9 PK	74.0	-12.1	3.70 V	63	43.0	18.9
8	10640.00	53.0 AV	54.0	-1.0	3.70 V	63	34.1	18.9

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5425.00	54.6 PK	74.0	-19.4	2.01 H	119	50.1	4.5
2	5425.00	47.7 AV	54.0	-6.3	2.01 H	119	43.2	4.5
3	5460.00	56.7 PK	74.0	-17.3	2.25 H	150	52.2	4.5
4	5460.00	43.9 AV	54.0	-10.1	2.25 H	150	39.4	4.5
5	#5470.00	56.4 PK	68.2	-11.8	2.31 H	151	51.9	4.5
6	*5500.00	111.1 PK			2.11 H	131	71.3	39.8
7	*5500.00	101.0 AV			2.11 H	131	61.2	39.8
8	11000.00	61.0 PK	74.0	-13.0	1.75 H	191	41.0	20.0
9	11000.00	47.8 AV	54.0	-6.2	1.75 H	191	27.8	20.0
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	5425.00	59.7 PK	74.0	-14.3	3.06 V	55	55.2	4.5
2	5425.00	52.5 AV	54.0	-1.5	3.06 V	55	48.0	4.5
3	5460.00	56.9 PK	74.0	-17.1	1.40 V	215	52.4	4.5
4	5460.00	44.0 AV	54.0	-10.0	1.40 V	215	39.5	4.5
5	#5470.00	61.6 PK	68.2	-6.6	1.42 V	216	57.1	4.5
6	*5500.00	116.3 PK			1.38 V	213	76.5	39.8
7	*5500.00	106.2 AV			1.38 V	213	66.4	39.8
8	11000.00	60.5 PK	74.0	-13.5	3.25 V	93	40.5	20.0
9	11000.00	47.3 AV	54.0	-6.7	3.25 V	93	27.3	20.0

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 116	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5580.00	113.0 PK			2.23 H	133	73.3	39.7
2	*5580.00	103.2 AV			2.23 H	133	63.5	39.7
3	11160.00	60.2 PK	74.0	-13.8	1.94 H	159	41.0	19.2
4	11160.00	47.1 AV	54.0	-6.9	1.94 H	159	27.9	19.2
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	*5580.00	118.1 PK			1.49 V	214	78.4	39.7
2	*5580.00	108.4 AV			1.49 V	214	68.7	39.7
3	11160.00	59.9 PK	74.0	-14.1	3.22 V	89	40.7	19.2
4	11160.00	46.7 AV	54.0	-7.3	3.22 V	89	27.5	19.2

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5700.00	110.2 PK			2.03 H	131	70.4	39.8
2	*5700.00	100.3 AV			2.03 H	131	60.5	39.8
3	#5725.00	59.8 PK	68.2	-8.4	2.31 H	159	55.1	4.7
4	11400.00	60.4 PK	74.0	-13.6	1.91 H	171	41.3	19.1
5	11400.00	47.4 AV	54.0	-6.6	1.91 H	171	28.3	19.1
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	*5700.00	115.3 PK			2.28 V	229	75.5	39.8
2	*5700.00	105.3 AV			2.28 V	229	65.5	39.8
3	#5725.00	64.9 PK	68.2	-3.3	2.34 V	127	60.2	4.7
4	11400.00	60.1 PK	74.0	-13.9	3.02 V	113	41.0	19.1
5	11400.00	47.0 AV	54.0	-7.0	3.02 V	113	27.9	19.1

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5460.00	56.2 PK	74.0	-17.8	1.91 H	130	51.7	4.5
2	5460.00	43.5 AV	54.0	-10.5	1.91 H	130	39.0	4.5
3	#5470.00	56.3 PK	68.2	-11.9	2.10 H	139	51.8	4.5
4	*5720.00	110.8 PK			1.99 H	139	70.8	40.0
5	*5720.00	101.1 AV			1.99 H	139	61.1	40.0
6	#5850.00	56.2 PK	68.2	-12.0	1.93 H	117	50.9	5.3
7	11440.00	60.7 PK	74.0	-13.3	2.01 H	203	41.5	19.2
8	11440.00	49.4 AV	54.0	-4.6	2.01 H	203	30.2	19.2
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	5460.00	56.7 PK	74.0	-17.3	1.82 V	345	52.2	4.5
2	5460.00	43.7 AV	54.0	-10.3	1.82 V	345	39.2	4.5
3	#5470.00	56.9 PK	68.2	-11.3	1.83 V	348	52.4	4.5
4	*5720.00	116.0 PK			1.78 V	349	76.0	40.0
5	*5720.00	106.4 AV			1.78 V	349	66.4	40.0
6	#5850.00	57.4 PK	68.2	-10.8	2.19 V	4	52.1	5.3
7	11440.00	60.4 PK	74.0	-13.6	2.89 V	334	41.2	19.2
8	11440.00	49.0 AV	54.0	-5.0	2.89 V	334	29.8	19.2

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE20)

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	54.4 PK	74.0	-19.6	2.97 H	205	50.2	4.2
2	5150.00	42.7 AV	54.0	-11.3	2.97 H	205	38.5	4.2
3	*5260.00	114.6 PK			3.09 H	206	75.5	39.1
4	*5260.00	101.1 AV			3.09 H	206	62.0	39.1
5	#10520.00	61.4 PK	68.2	-6.8	3.79 H	319	42.7	18.7
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	5150.00	56.2 PK	74.0	-17.8	1.38 V	348	52.0	4.2
2	5150.00	43.2 AV	54.0	-10.8	1.38 V	348	39.0	4.2
3	*5260.00	119.7 PK			1.22 V	352	80.6	39.1
4	*5260.00	106.1 AV			1.22 V	352	67.0	39.1
5	#10520.00	63.0 PK	68.2	-5.2	3.78 V	64	44.3	18.7

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5300.00	113.6 PK			3.13 H	213	74.5	39.1
2	*5300.00	100.1 AV			3.13 H	213	61.0	39.1
3	10600.00	61.1 PK	74.0	-12.9	3.84 H	330	42.0	19.1
4	10600.00	52.0 AV	54.0	-2.0	3.84 H	330	32.9	19.1
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	*5300.00	118.6 PK			1.30 V	349	79.5	39.1
2	*5300.00	105.1 AV			1.30 V	349	66.0	39.1
3	10600.00	62.6 PK	74.0	-11.4	3.66 V	63	43.5	19.1
4	**10600.00**	**53.5 AV**	**54.0**	**-0.5**	**3.66 V**	**63**	**34.4**	**19.1**

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.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5320.00	115.3 PK			3.08 H	204	76.1	39.2
2	*5320.00	101.9 AV			3.08 H	204	62.7	39.2
3	5350.00	59.8 PK	74.0	-14.2	2.97 H	212	55.7	4.1
4	5350.00	45.4 AV	54.0	-8.6	2.97 H	212	41.3	4.1
5	5395.00	58.5 PK	74.0	-15.5	1.20 H	133	54.1	4.4
6	5395.00	48.6 AV	54.0	-5.4	1.20 H	133	44.2	4.4
7	10640.00	60.8 PK	74.0	-13.2	3.80 H	331	41.9	18.9
8	10640.00	51.8 AV	54.0	-2.2	3.80 H	331	32.9	18.9
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	*5320.00	120.4 PK			1.00 V	349	81.2	39.2
2	*5320.00	107.1 AV			1.00 V	349	67.9	39.2
3	5350.00	63.3 PK	74.0	-10.7	1.35 V	353	59.2	4.1
4	5350.00	49.5 AV	54.0	-4.5	1.35 V	353	45.4	4.1
5	5395.00	60.4 PK	74.0	-13.6	1.68 V	326	56.0	4.4
6	5395.00	51.9 AV	54.0	-2.1	1.68 V	326	47.5	4.4
7	10640.00	62.3 PK	74.0	-11.7	3.65 V	65	43.4	18.9
8	**10640.00**	**53.5 AV**	**54.0**	**-0.5**	**3.65 V**	**65**	**34.6**	**18.9**

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5425.00	55.4 PK	74.0	-18.6	1.85 H	144	50.9	4.5
2	5425.00	47.3 AV	54.0	-6.7	1.85 H	144	42.8	4.5
3	5460.00	56.2 PK	74.0	-17.8	1.97 H	123	51.7	4.5
4	5460.00	43.4 AV	54.0	-10.6	1.97 H	123	38.9	4.5
5	#5470.00	56.5 PK	68.2	-11.7	2.05 H	139	52.0	4.5
6	*5500.00	112.8 PK			2.11 H	131	73.0	39.8
7	*5500.00	99.3 AV			2.11 H	131	59.5	39.8
8	11000.00	61.5 PK	74.0	-12.5	1.85 H	177	41.5	20.0
9	11000.00	50.8 AV	54.0	-3.2	1.85 H	177	30.8	20.0
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	5425.00	59.5 PK	74.0	-14.5	3.02 V	55	55.0	4.5
2	5425.00	52.5 AV	54.0	-1.5	3.02 V	55	48.0	4.5
3	5460.00	56.8 PK	74.0	-17.2	2.11 V	231	52.3	4.5
4	5460.00	43.7 AV	54.0	-10.3	2.11 V	231	39.2	4.5
5	#5470.00	57.1 PK	68.2	-11.1	2.15 V	236	52.6	4.5
6	*5500.00	118.0 PK			2.02 V	229	78.2	39.8
7	*5500.00	104.4 AV			2.02 V	229	64.6	39.8
8	11000.00	61.1 PK	74.0	-12.9	2.85 V	233	41.1	20.0
9	11000.00	50.5 AV	54.0	-3.5	2.85 V	233	30.5	20.0

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 116	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5580.00	116.8 PK			2.11 H	131	77.1	39.7
2	*5580.00	103.2 AV			2.11 H	131	63.5	39.7
3	11160.00	60.4 PK	74.0	-13.6	1.71 H	185	41.2	19.2
4	11160.00	49.2 AV	54.0	-4.8	1.71 H	185	30.0	19.2
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	*5580.00	122.1 PK			1.51 V	214	82.4	39.7
2	*5580.00	108.3 AV			1.51 V	214	68.6	39.7
3	11160.00	59.9 PK	74.0	-14.1	2.46 V	236	40.7	19.2
4	11160.00	48.5 AV	54.0	-5.5	2.46 V	236	29.3	19.2

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5700.00	112.9 PK			2.29 H	135	73.1	39.8
2	*5700.00	99.4 AV			2.29 H	135	59.6	39.8
3	#5725.00	60.8 PK	68.2	-7.4	1.87 H	145	56.1	4.7
4	11400.00	60.6 PK	74.0	-13.4	1.91 H	185	41.5	19.1
5	11400.00	49.5 AV	54.0	-4.5	1.91 H	185	30.4	19.1
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	*5700.00	118.0 PK			1.57 V	223	78.2	39.8
2	*5700.00	104.7 AV			1.57 V	223	64.9	39.8
3	#5725.00	66.7 PK	68.2	-1.5	2.11 V	134	62.0	4.7
4	11400.00	60.2 PK	74.0	-13.8	2.91 V	332	41.1	19.1
5	11400.00	49.1 AV	54.0	-4.9	2.91 V	332	30.0	19.1

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5460.00	57.1 PK	74.0	-16.9	2.01 H	163	52.6	4.5
2	5460.00	44.2 AV	54.0	-9.8	2.01 H	163	39.7	4.5
3	#5470.00	56.7 PK	68.2	-11.5	1.97 H	150	52.2	4.5
4	*5720.00	114.3 PK			2.02 H	133	74.3	40.0
5	*5720.00	101.2 AV			2.02 H	133	61.2	40.0
6	#5850.00	56.2 PK	68.2	-12.0	2.35 H	139	50.9	5.3
7	11440.00	61.5 PK	74.0	-12.5	1.79 H	186	42.3	19.2
8	11440.00	49.6 AV	54.0	-4.4	1.79 H	186	30.4	19.2
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	5460.00	57.6 PK	74.0	-16.4	1.88 V	3	53.1	4.5
2	5460.00	44.6 AV	54.0	-9.4	1.88 V	3	40.1	4.5
3	#5470.00	57.8 PK	68.2	-10.4	1.89 V	5	53.3	4.5
4	*5720.00	119.5 PK			1.86 V	1	79.5	40.0
5	*5720.00	106.6 AV			1.86 V	1	66.6	40.0
6	#5850.00	56.9 PK	68.2	-11.3	1.96 V	1	51.6	5.3
7	11440.00	61.0 PK	74.0	-13.0	2.66 V	339	41.8	19.2
8	11440.00	49.2 AV	54.0	-4.8	2.66 V	339	30.0	19.2

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE40)

CHANNEL	TX Channel 54	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	54.5 PK	74.0	-19.5	2.92 H	193	50.3	4.2
2	5150.00	43.3 AV	54.0	-10.7	2.92 H	193	39.1	4.2
3	*5270.00	111.7 PK			3.12 H	204	72.6	39.1
4	*5270.00	98.9 AV			3.12 H	204	59.8	39.1
5	#10540.00	61.5 PK	68.2	-6.7	3.79 H	315	42.7	18.8
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	5150.00	56.4 PK	74.0	-17.6	1.23 V	353	52.2	4.2
2	5150.00	44.3 AV	54.0	-9.7	1.23 V	353	40.1	4.2
3	*5270.00	116.7 PK			1.12 V	349	77.6	39.1
4	*5270.00	104.1 AV			1.12 V	349	65.0	39.1
5	#10540.00	62.9 PK	68.2	-5.3	3.74 V	62	44.1	18.8

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5310.00	110.1 PK			3.14 H	209	70.9	39.2
2	*5310.00	96.4 AV			3.14 H	209	57.2	39.2
3	5350.00	59.5 PK	74.0	-14.5	2.91 H	193	55.4	4.1
4	5350.00	44.5 AV	54.0	-9.5	2.91 H	193	40.4	4.1
5	5385.00	58.1 PK	74.0	-15.9	1.43 H	133	53.7	4.4
6	5385.00	48.6 AV	54.0	-5.4	1.43 H	133	44.2	4.4
7	10620.00	60.7 PK	74.0	-13.3	2.97 H	326	41.7	19.0
8	10620.00	51.7 AV	54.0	-2.3	2.97 H	326	32.7	19.0
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	*5310.00	115.2 PK			1.05 V	349	76.0	39.2
2	*5310.00	102.4 AV			1.05 V	349	63.2	39.2
3	5350.00	62.7 PK	74.0	-11.3	1.30 V	339	58.6	4.1
4	5350.00	48.0 AV	54.0	-6.0	1.30 V	339	43.9	4.1
5	5385.00	59.9 PK	74.0	-14.1	1.15 V	327	55.5	4.4
6	5385.00	51.9 AV	54.0	-2.1	1.15 V	327	47.5	4.4
7	10620.00	62.3 PK	74.0	-11.7	3.63 V	63	43.3	19.0
8	**10620.00**	**53.5 AV**	**54.0**	**-0.5**	**3.63 V**	**63**	**34.5**	**19.0**

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 102	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5435.00	55.6 PK	74.0	-18.4	1.91 H	127	51.1	4.5
2	5435.00	46.8 AV	54.0	-7.2	1.91 H	127	42.3	4.5
3	5460.00	58.6 PK	74.0	-15.4	2.05 H	133	54.1	4.5
4	5460.00	45.0 AV	54.0	-9.0	2.05 H	133	40.5	4.5
5	#5470.00	57.6 PK	68.2	-10.6	1.97 H	142	53.1	4.5
6	*5510.00	108.6 PK			2.18 H	131	68.8	39.8
7	*5510.00	95.3 AV			2.18 H	131	55.5	39.8
8	11020.00	60.5 PK	74.0	-13.5	1.91 H	188	40.7	19.8
9	11020.00	48.8 AV	54.0	-5.2	1.91 H	188	29.0	19.8
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	5435.00	58.7 PK	74.0	-15.3	3.00 V	55	54.2	4.5
2	5435.00	52.5 AV	54.0	-1.5	3.00 V	55	48.0	4.5
3	5460.00	59.9 PK	74.0	-14.1	2.37 V	228	55.4	4.5
4	5460.00	46.4 AV	54.0	-7.6	2.37 V	228	41.9	4.5
5	#5470.00	61.4 PK	68.2	-6.8	2.40 V	230	56.9	4.5
6	*5510.00	113.8 PK			1.51 V	214	74.0	39.8
7	*5510.00	100.6 AV			1.51 V	214	60.8	39.8
8	11020.00	60.1 PK	74.0	-13.9	2.51 V	300	40.3	19.8
9	11020.00	48.5 AV	54.0	-5.5	2.51 V	300	28.7	19.8

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 110	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5550.00	112.9 PK			2.14 H	129	73.2	39.7
2	*5550.00	100.4 AV			2.14 H	129	60.7	39.7
3	11100.00	60.8 PK	74.0	-13.2	1.84 H	188	41.5	19.3
4	11100.00	47.8 AV	54.0	-6.2	1.84 H	188	28.5	19.3
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	*5550.00	118.0 PK			1.49 V	214	78.3	39.7
2	*5550.00	105.6 AV			1.49 V	214	65.9	39.7
3	11100.00	60.6 PK	74.0	-13.4	3.03 V	123	41.3	19.3
4	11100.00	47.5 AV	54.0	-6.5	3.03 V	123	28.2	19.3

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. " * ": Fundamental frequency.

CHANNEL	TX Channel 134	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5670.00	111.7 PK			1.97 H	130	72.0	39.7
2	*5670.00	99.0 AV			1.97 H	130	59.3	39.7
3	#5725.00	61.5 PK	68.2	-6.7	2.23 H	141	56.8	4.7
4	11340.00	60.8 PK	74.0	-13.2	1.91 H	182	41.5	19.3
5	11340.00	47.3 AV	54.0	-6.7	1.91 H	182	28.0	19.3
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	*5670.00	116.8 PK			1.72 V	347	77.1	39.7
2	*5670.00	104.0 AV			1.72 V	347	64.3	39.7
3	#5725.00	66.6 PK	68.2	-1.6	1.49 V	214	61.9	4.7
4	11340.00	60.5 PK	74.0	-13.5	3.02 V	116	41.2	19.3
5	11340.00	47.0 AV	54.0	-7.0	3.02 V	116	27.7	19.3

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 142	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5460.00	56.3 PK	74.0	-17.7	2.13 H	133	51.8	4.5
2	5460.00	44.2 AV	54.0	-9.8	2.13 H	133	39.7	4.5
3	#5470.00	55.8 PK	68.2	-12.4	2.05 H	122	51.3	4.5
4	*5710.00	102.5 PK			2.31 H	135	62.6	39.9
5	*5710.00	89.3 AV			2.31 H	135	49.4	39.9
6	#5850.00	56.0 PK	68.2	-12.2	1.97 H	135	50.7	5.3
7	11420.00	61.1 PK	74.0	-12.9	1.75 H	184	42.0	19.1
8	11420.00	47.6 AV	54.0	-6.4	1.75 H	184	28.5	19.1
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	5460.00	57.0 PK	74.0	-17.0	1.86 V	326	52.5	4.5
2	5460.00	44.5 AV	54.0	-9.5	1.86 V	326	40.0	4.5
3	#5470.00	57.2 PK	68.2	-11.0	1.89 V	330	52.7	4.5
4	*5710.00	107.7 PK			1.78 V	348	67.8	39.9
5	*5710.00	94.4 AV			1.78 V	348	54.5	39.9
6	#5850.00	57.3 PK	68.2	-10.9	2.36 V	360	52.0	5.3
7	11420.00	60.6 PK	74.0	-13.4	3.05 V	116	41.5	19.1
8	11420.00	47.4 AV	54.0	-6.6	3.05 V	116	28.3	19.1

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE80)

CHANNEL	TX Channel 58	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	54.5 PK	74.0	-19.5	2.89 H	201	50.3	4.2
2	5150.00	42.7 AV	54.0	-11.3	2.89 H	201	38.5	4.2
3	*5290.00	105.0 PK			3.10 H	208	65.9	39.1
4	*5290.00	91.7 AV			3.10 H	208	52.6	39.1
5	5350.00	60.4 PK	74.0	-13.6	3.03 H	203	56.3	4.1
6	5350.00	44.0 AV	54.0	-10.0	3.03 H	203	39.9	4.1
7	5365.00	61.5 PK	74.0	-12.5	1.23 H	129	57.3	4.2
8	5365.00	48.4 AV	54.0	-5.6	1.23 H	129	44.2	4.2
9	#10580.00	61.3 PK	68.2	-6.9	3.85 H	320	42.3	19.0
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	5150.00	57.2 PK	74.0	-16.8	1.37 V	334	53.0	4.2
2	5150.00	43.1 AV	54.0	-10.9	1.37 V	334	38.9	4.2
3	*5290.00	110.0 PK			1.35 V	347	70.9	39.1
4	*5290.00	96.8 AV			1.35 V	347	57.7	39.1
5	5350.00	65.3 PK	74.0	-8.7	1.49 V	352	61.2	4.1
6	5350.00	46.6 AV	54.0	-7.4	1.49 V	352	42.5	4.1
7	5365.00	63.2 PK	74.0	-10.8	1.28 V	326	59.0	4.2
8	5365.00	51.7 AV	54.0	-2.3	1.28 V	326	47.5	4.2
9	#10580.00	63.0 PK	68.2	-5.2	3.79 V	63	44.0	19.0

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 106	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5455.00	55.8 PK	74.0	-18.2	2.29 H	141	51.3	4.5
2	5455.00	47.8 AV	54.0	-6.2	2.29 H	141	43.3	4.5
3	5460.00	59.2 PK	74.0	-14.8	2.12 H	131	54.7	4.5
4	5460.00	45.4 AV	54.0	-8.6	2.12 H	131	40.9	4.5
5	#5470.00	59.3 PK	68.2	-8.9	2.03 H	149	54.8	4.5
6	*5530.00	105.8 PK			2.15 H	130	66.0	39.8
7	*5530.00	92.8 AV			2.15 H	130	53.0	39.8
8	#5725.00	54.9 PK	68.2	-13.3	1.90 H	169	50.2	4.7
9	11060.00	60.8 PK	74.0	-13.2	1.69 H	178	41.3	19.5
10	11060.00	47.5 AV	54.0	-6.5	1.69 H	178	28.0	19.5
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	5455.00	60.1 PK	74.0	-13.9	1.13 V	327	55.6	4.5
2	5455.00	53.0 AV	54.0	-1.0	1.13 V	327	48.5	4.5
3	5460.00	60.0 PK	74.0	-14.0	1.21 V	331	55.5	4.5
4	5460.00	46.0 AV	54.0	-8.0	1.21 V	331	41.5	4.5
5	#5470.00	60.1 PK	68.2	-8.1	1.30 V	343	55.6	4.5
6	*5530.00	110.9 PK			1.26 V	210	71.1	39.8
7	*5530.00	97.8 AV			1.26 V	210	58.0	39.8
8	#5725.00	55.5 PK	68.2	-12.7	1.17 V	321	50.8	4.7
9	11060.00	60.4 PK	74.0	-13.6	2.63 V	123	40.9	19.5
10	11060.00	47.0 AV	54.0	-7.0	2.63 V	123	27.5	19.5

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 122	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5460.00	58.6 PK	74.0	-15.4	1.85 H	150	54.1	4.5
2	5460.00	44.7 AV	54.0	-9.3	1.85 H	150	40.2	4.5
3	#5470.00	58.6 PK	68.2	-9.6	1.97 H	144	54.1	4.5
4	*5610.00	74.5 PK			2.29 H	151	70.0	4.5
5	*5610.00	72.1 AV			2.29 H	151	67.6	4.5
6	#5725.00	60.4 PK	68.2	-7.8	1.84 H	139	55.7	4.7
7	#5735.00	59.8 PK	68.2	-8.4	1.87 H	169	55.1	4.7
8	11220.00	60.4 PK	74.0	-13.6	1.81 H	169	41.1	19.3
9	11220.00	47.5 AV	54.0	-6.5	1.81 H	169	28.2	19.3
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	5460.00	59.2 PK	74.0	-14.8	1.97 V	337	54.7	4.5
2	5460.00	45.5 AV	54.0	-8.5	1.97 V	337	41.0	4.5
3	#5470.00	59.0 PK	68.2	-9.2	2.21 V	355	54.5	4.5
4	*5610.00	114.8 PK			1.47 V	0	75.0	39.8
5	*5610.00	102.5 AV			1.47 V	0	62.7	39.8
6	#5725.00	63.7 PK	68.2	-4.5	2.03 V	359	59.0	4.7
7	#5735.00	62.6 PK	68.2	-5.6	1.91 V	348	57.9	4.7
8	11220.00	59.9 PK	74.0	-14.1	2.51 V	131	40.6	19.3
9	11220.00	47.1 AV	54.0	-6.9	2.51 V	131	27.8	19.3

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 138	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5460.00	56.3 PK	74.0	-17.7	1.97 H	161	51.8	4.5
2	5460.00	43.0 AV	54.0	-11.0	1.97 H	161	38.5	4.5
3	#5470.00	56.5 PK	68.2	-11.7	2.01 H	150	52.0	4.5
4	*5690.00	109.7 PK			2.22 H	150	69.9	39.8
5	*5690.00	97.0 AV			2.22 H	150	57.2	39.8
6	#5825.00	59.6 PK	68.2	-8.6	2.13 H	128	54.4	5.2
7	11380.00	60.6 PK	74.0	-13.4	1.77 H	180	41.5	19.1
8	11380.00	47.0 AV	54.0	-7.0	1.77 H	180	27.9	19.1
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	5460.00	56.5 PK	74.0	-17.5	1.61 V	150	52.0	4.5
2	5460.00	43.4 AV	54.0	-10.6	1.61 V	150	38.9	4.5
3	#5470.00	56.6 PK	68.2	-11.6	1.57 V	141	52.1	4.5
4	*5690.00	114.8 PK			1.84 V	1	75.0	39.8
5	*5690.00	102.3 AV			1.84 V	1	62.5	39.8
6	#5825.00	60.7 PK	68.2	-7.5	1.44 V	108	55.5	5.2
7	11380.00	59.8 PK	74.0	-14.2	2.37 V	110	40.7	19.1
8	11380.00	46.6 AV	54.0	-7.4	2.37 V	110	27.5	19.1

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1 GHz Worst-Case Data:

Mode A

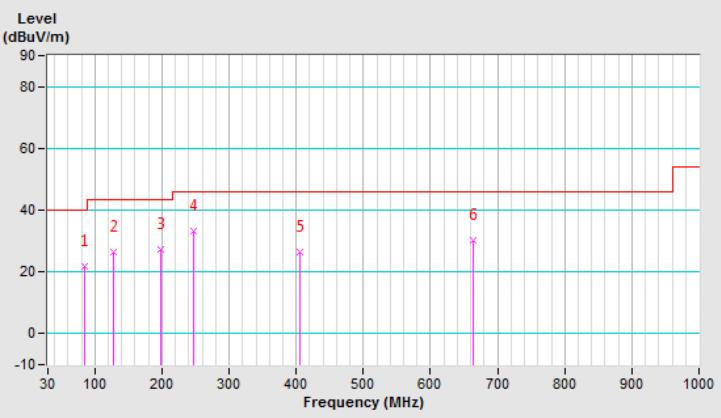
802.11ax (HE20)

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	84.83	21.6 QP	40.0	-18.4	1.50 H	245	35.5	-13.9
2	127.00	26.6 QP	43.5	-16.9	1.00 H	101	37.0	-10.4
3	197.29	27.2 QP	43.5	-16.3	1.00 H	70	38.8	-11.6
4	246.49	33.3 QP	46.0	-12.7	2.00 H	217	42.9	-9.6
5	405.35	26.3 QP	46.0	-19.7	1.00 H	217	30.6	-4.3
6	664.01	30.3 QP	46.0	-15.7	1.50 H	237	28.7	1.6

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 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.

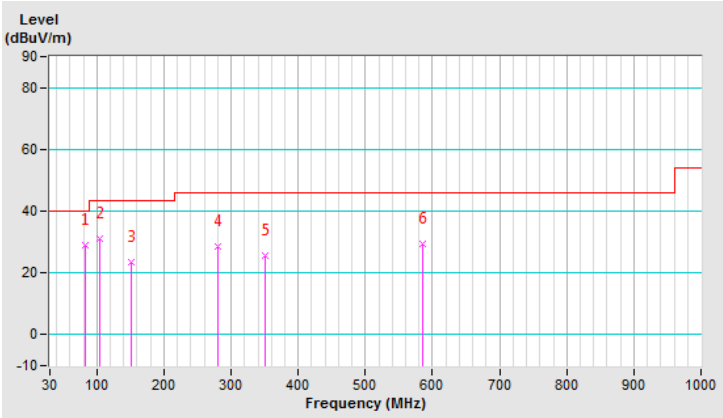


CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	83.42	28.9 QP	40.0	-11.1	1.50 V	311	42.7	-13.8
2	104.51	31.3 QP	43.5	-12.2	1.00 V	340	43.7	-12.4
3	150.90	23.4 QP	43.5	-20.1	2.00 V	17	32.0	-8.6
4	280.23	28.7 QP	46.0	-17.3	1.00 V	145	36.7	-8.0
5	350.52	25.6 QP	46.0	-20.4	1.00 V	248	31.8	-6.2
6	585.29	29.3 QP	46.0	-16.7	1.50 V	283	28.7	0.6

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 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.



Mode B

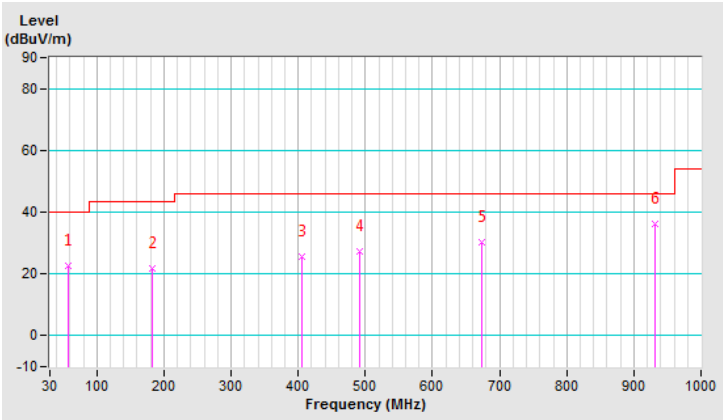
802.11ax (HE20)

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	56.71	22.5 QP	40.0	-17.5	1.50 H	339	31.6	-9.1
2	181.83	21.9 QP	43.5	-21.6	1.00 H	59	32.0	-10.1
3	405.35	25.6 QP	46.0	-20.4	2.00 H	93	29.9	-4.3
4	491.10	27.2 QP	46.0	-18.8	1.00 H	187	28.8	-1.6
5	672.45	30.4 QP	46.0	-15.6	1.00 H	22	28.7	1.7
6	931.12	36.1 QP	46.0	-9.9	1.50 H	29	30.9	5.2

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.

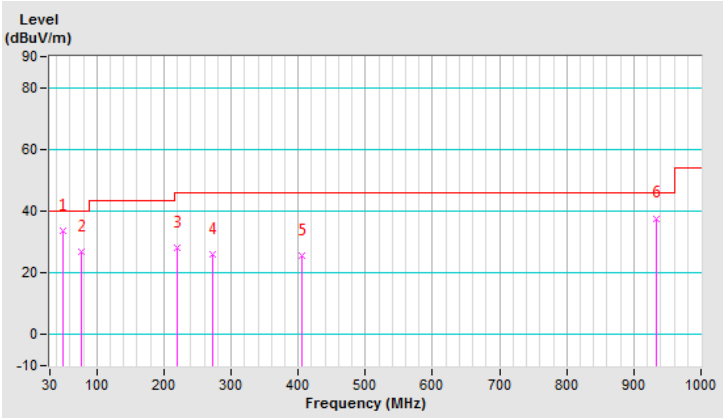


CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	49.68	33.8 QP	40.0	-6.2	2.00 V	248	42.6	-8.8
2	76.39	26.8 QP	40.0	-13.2	1.00 V	344	39.2	-12.4
3	219.78	28.2 QP	46.0	-17.8	2.00 V	204	39.5	-11.3
4	271.80	26.1 QP	46.0	-19.9	1.00 V	331	34.4	-8.3
5	405.35	25.5 QP	46.0	-20.5	1.50 V	22	29.8	-4.3
6	933.93	37.7 QP	46.0	-8.3	1.00 V	22	32.6	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.



Mode C

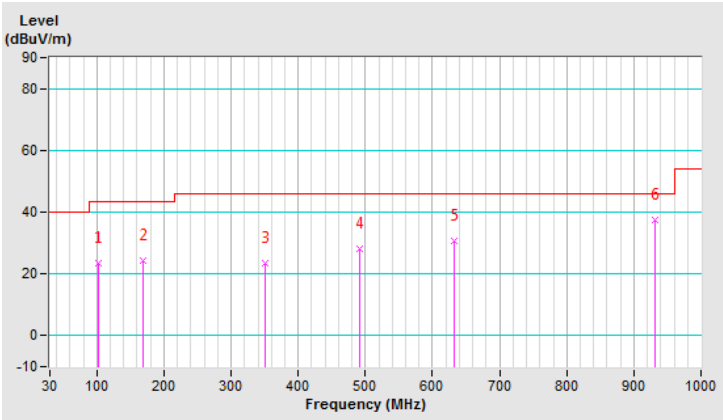
802.11ax (HE20)

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	103.10	23.3 QP	43.5	-20.2	2.00 H	157	36.0	-12.7
2	169.17	24.3 QP	43.5	-19.2	1.50 H	19	33.2	-8.9
3	350.52	23.4 QP	46.0	-22.6	1.50 H	7	29.6	-6.2
4	491.10	28.0 QP	46.0	-18.0	1.50 H	356	29.6	-1.6
5	633.09	30.7 QP	46.0	-15.3	1.50 H	323	29.1	1.6
6	931.12	37.6 QP	46.0	-8.4	1.00 H	241	32.4	5.2

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.

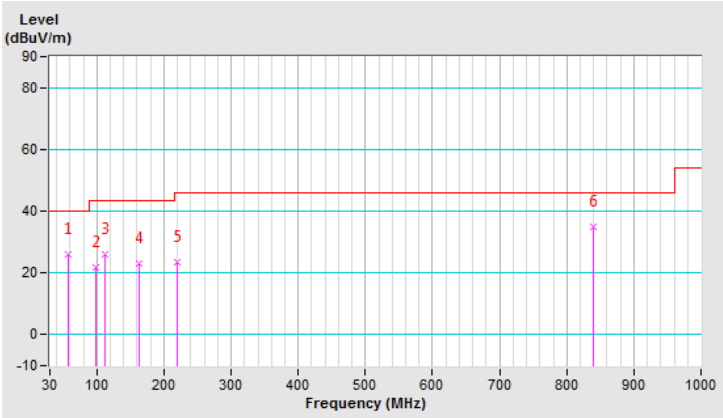


CHANNEL	TX Channel 60	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	56.71	26.1 QP	40.0	-13.9	2.00 V	302	35.2	-9.1
2	97.48	21.7 QP	43.5	-21.8	1.50 V	42	35.3	-13.6
3	112.94	26.0 QP	43.5	-17.5	1.50 V	42	37.6	-11.6
4	162.14	23.0 QP	43.5	-20.5	1.50 V	247	31.6	-8.6
5	219.78	23.3 QP	46.0	-22.7	1.00 V	123	34.6	-11.3
6	839.74	34.9 QP	46.0	-11.1	1.50 V	192	31.4	3.5

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 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.



4.2 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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

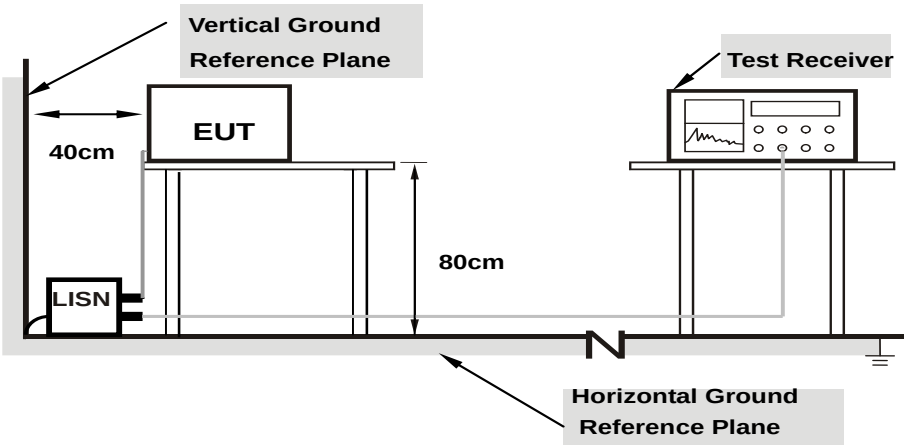
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) 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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

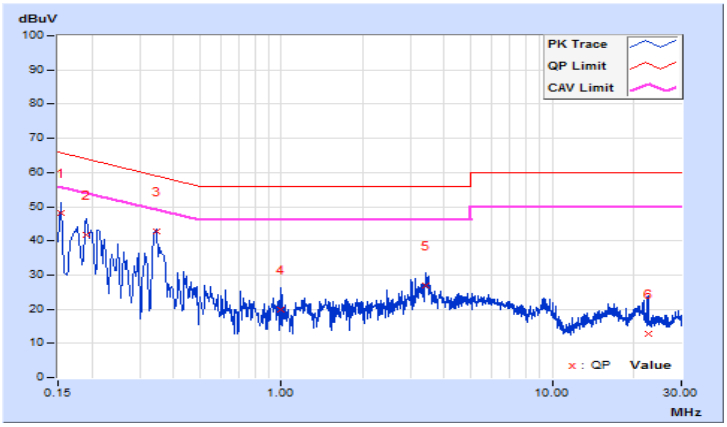
Mode A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.67	38.64	24.21	48.31	33.88	65.78	55.78	-17.47	-21.90
2	0.19000	9.66	32.14	21.90	41.80	31.56	64.04	54.04	-22.24	-22.48
3	**0.34577**	**9.68**	**32.92**	**29.10**	**42.60**	**38.78**	**59.06**	**49.06**	**-16.46**	**-10.28**
4	1.00200	9.73	10.17	6.74	19.90	16.47	56.00	46.00	-36.10	-29.53
5	3.42600	9.82	17.11	6.15	26.93	15.97	56.00	46.00	-29.07	-30.03
6	22.62594	10.00	2.87	1.11	12.87	11.11	60.00	50.00	-47.13	-38.89

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

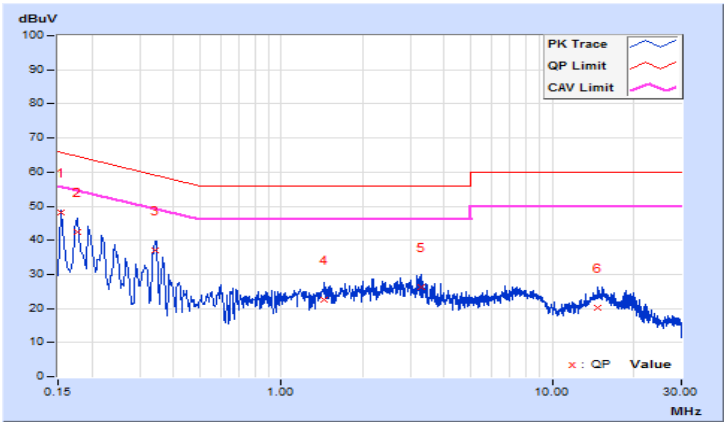


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.64	38.63	25.39	48.27	35.03	65.78	55.78	-17.51	-20.75
2	0.17754	9.64	32.81	17.58	42.45	27.22	64.60	54.60	-22.15	-27.38
3	0.34200	9.65	27.38	26.04	37.03	35.69	59.15	49.15	-22.12	-13.46
4	1.44200	9.72	12.86	3.95	22.58	13.67	56.00	46.00	-33.42	-32.33
5	3.27400	9.79	16.40	7.43	26.19	17.22	56.00	46.00	-29.81	-28.78
6	14.73400	9.99	10.25	5.04	20.24	15.03	60.00	50.00	-39.76	-34.97

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



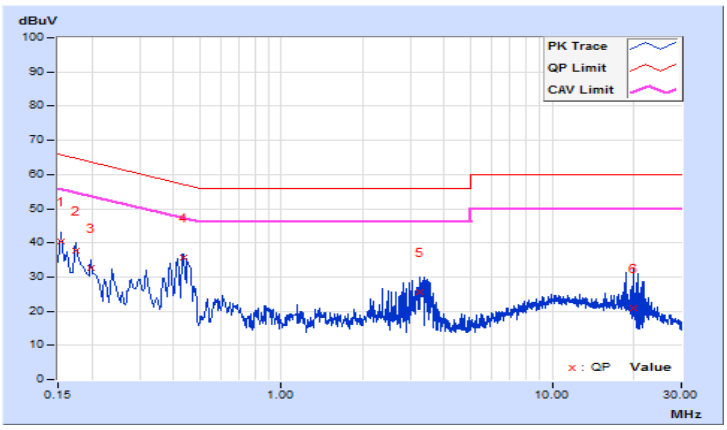
Mode B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.67	30.60	22.04	40.27	31.71	65.78	55.78	-25.51	-24.07
2	0.17400	9.67	27.88	19.45	37.55	29.12	64.77	54.77	-27.22	-25.65
3	0.19800	9.66	22.97	14.65	32.63	24.31	63.69	53.69	-31.06	-29.38
4	0.43370	9.69	25.89	25.02	35.58	34.71	57.18	47.18	-21.60	-12.47
5	3.25000	9.82	15.63	5.82	25.45	15.64	56.00	46.00	-30.55	-30.36
6	19.93000	9.98	10.77	1.30	20.75	11.28	60.00	50.00	-39.25	-38.72

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

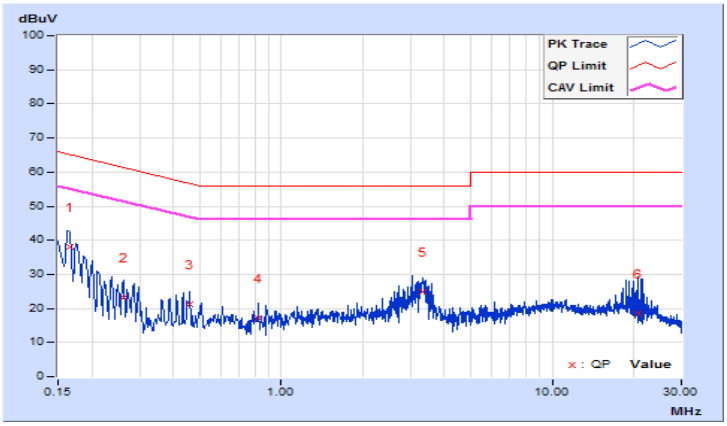


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16600	9.64	28.25	16.93	37.89	26.57	65.16	55.16	-27.27	-28.59
2	0.26152	9.65	13.63	2.20	23.28	11.85	61.38	51.38	-38.10	-39.53
3	0.45800	9.66	11.60	4.70	21.26	14.36	56.73	46.73	-35.47	-32.37
4	0.82200	9.69	7.32	3.24	17.01	12.93	56.00	46.00	-38.99	-33.07
5	3.32600	9.79	15.02	6.10	24.81	15.89	56.00	46.00	-31.19	-30.11
6	20.80200	10.06	8.56	2.39	18.62	12.45	60.00	50.00	-41.38	-37.55

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



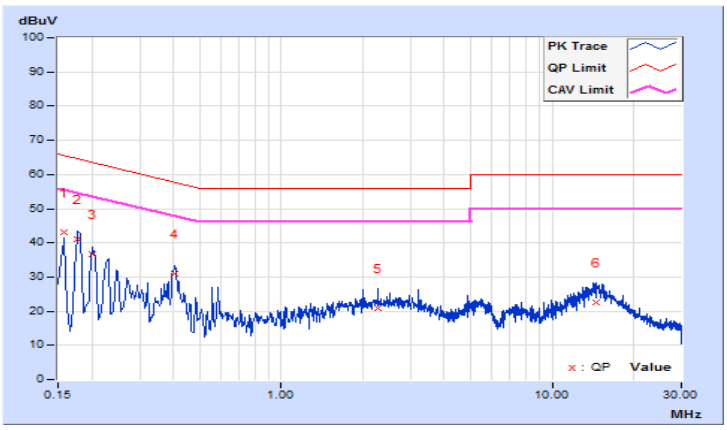
Mode C

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.67	33.52	18.55	43.19	28.22	65.57	55.57	-22.38	-27.35
2	0.17800	9.66	31.39	16.01	41.05	25.67	64.58	54.58	-23.53	-28.91
3	0.20200	9.66	26.88	12.72	36.54	22.38	63.53	53.53	-26.99	-31.15
4	0.40498	9.69	21.30	13.94	30.99	23.63	57.75	47.75	-26.76	-24.12
5	2.27000	9.79	11.05	4.83	20.84	14.62	56.00	46.00	-35.16	-31.38
6	14.62200	9.96	12.50	6.11	22.46	16.07	60.00	50.00	-37.54	-33.93

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

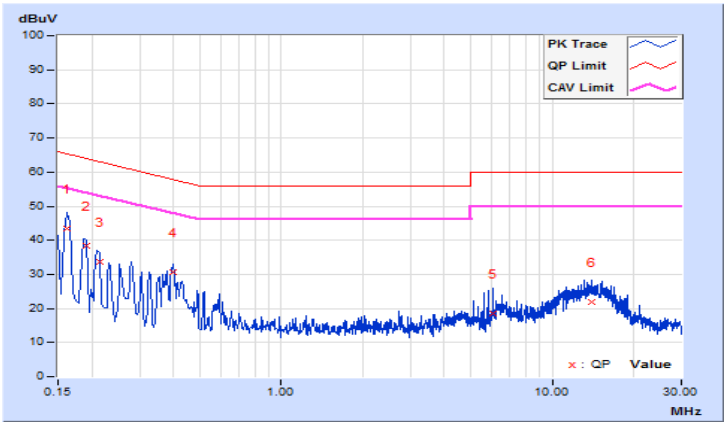


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 67%RH
Tested by	Adair Peng	Test Date	2019/11/28

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16200	9.64	33.90	18.04	43.54	27.68	65.36	55.36	-21.82	-27.68
2	0.19000	9.64	28.59	12.62	38.23	22.26	64.04	54.04	-25.81	-31.78
3	0.21400	9.64	24.13	9.72	33.77	19.36	63.05	53.05	-29.28	-33.69
4	0.39800	9.66	21.14	15.89	30.80	25.55	57.90	47.90	-27.10	-22.35
5	6.04600	9.84	8.78	1.55	18.62	11.39	60.00	50.00	-41.38	-38.61
6	13.99000	9.97	11.76	4.13	21.73	14.10	60.00	50.00	-38.27	-35.90

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 ≦ 125 mW (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)
		Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A	√		250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C	√		250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-3	-		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

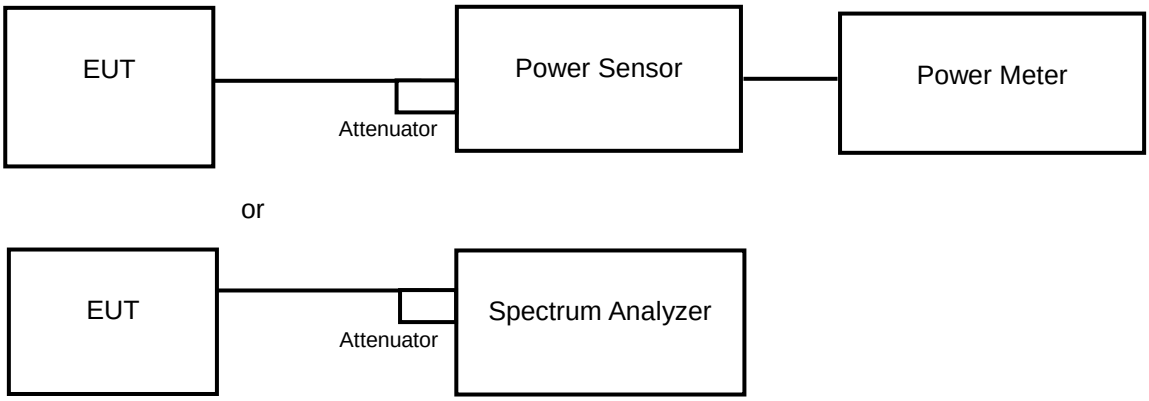
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20 MHz channel widths with $N_{ANT} \geq 5$.

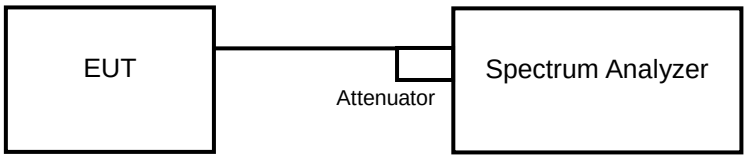
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<802.11a, 802.11ax (HE20), 802.11ax (HE40)>

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.

<802.11ac (VHT80)>

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99 % occupied bandwidth) of the signal.
b. Set sweep trigger to “free run”.
c. Set RBW = 1 MHz.
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ 2 Span / RBW.
f. Sweep time ≤ (number of points in sweep) * T
g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
h. Detector = RMS.
i. Trace mode = max hold.
j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

26 dB Bandwidth

a. Set RBW = approximately 1 % of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

Power Output:

CDD Mode:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	20.42	20.40	219.802	23.42	23.91	Pass
60	5300	20.26	20.72	224.202	23.51	23.89	Pass
64	5320	20.43	20.47	221.837	23.46	23.90	Pass
100	5500	18.77	18.83	151.72	21.81	23.91	Pass
116	5580	20.07	20.00	201.625	23.05	23.91	Pass
140	5700	20.20	19.98	204.254	23.10	23.91	Pass
144	5720 (U-NII-2C)	16.71	17.20	99.362	19.97	22.72	Pass
144	5720 (U-NII-3)	10.82	5.62	16.725	12.23	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (19.72) = 23.94 dBm < 24 dBm.
2. 11 dBm + 10log (19.77) = 23.96 dBm < 24 dBm.
3. 11 dBm + 10log (19.80) = 23.96 dBm < 24 dBm.
4. 11 dBm + 10log (19.67) = 23.93 dBm < 24 dBm.
5. 11 dBm + 10log (19.62) = 23.92 dBm < 24 dBm.
6. 11 dBm + 10log (19.58) = 23.91 dBm < 24 dBm.
7. 11 dBm + 10log (5725.00 – 5709.95) = 22.77 dBm < 24 dBm.

Chain 1

1. 11 dBm + 10log (19.55) = 23.91 dBm < 24 dBm.
2. 11 dBm + 10log (19.47) = 23.89 dBm < 24 dBm.
3. 11 dBm + 10log (19.52) = 23.90 dBm < 24 dBm.
4. 11 dBm + 10log (19.57) = 23.91 dBm < 24 dBm.
5. 11 dBm + 10log (19.55) = 23.91 dBm < 24 dBm.
6. 11 dBm + 10log (19.55) = 23.91 dBm < 24 dBm.
7. 11 dBm + 10log (5725.00 – 5710.14) = 22.72 dBm < 24 dBm.

802.11ax (HE20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	20.67	20.55	230.182	23.62	24	Pass
60	5300	20.61	20.83	236.14	23.73	24	Pass
64	5320	20.71	20.76	236.885	23.75	24	Pass
100	5500	18.22	18.38	135.239	21.31	24	Pass
116	5580	20.91	20.78	242.984	23.86	24	Pass
140	5700	20.70	20.42	227.644	23.57	24	Pass
144	5720 (U-NII-2C)	14.29	13.76	51.923	17.15	22.98	Pass
144	5720 (U-NII-3)	11.33	12.91	35.438	15.49	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (21.47) = 24.31 dBm > 24 dBm.
2. 11 dBm + 10log (21.91) = 24.40 dBm > 24 dBm.
3. 11 dBm + 10log (21.45) = 24.31 dBm > 24 dBm.
4. 11 dBm + 10log (21.58) = 24.34 dBm > 24 dBm.
5. 11 dBm + 10log (21.72) = 24.36 dBm > 24 dBm.
6. 11 dBm + 10log (21.45) = 24.31 dBm > 24 dBm.
7. 11 dBm + 10log (5725.00 – 5709.17) = 22.99 dBm < 24 dBm.

Chain 1

1. 11 dBm + 10log (21.53) = 24.33 dBm > 24 dBm.
2. 11 dBm + 10log (21.63) = 24.35 dBm > 24 dBm.
3. 11 dBm + 10log (21.25) = 24.27 dBm > 24 dBm.
4. 11 dBm + 10log (21.33) = 24.28 dBm > 24 dBm.
5. 11 dBm + 10log (21.41) = 24.30 dBm > 24 dBm.
6. 11 dBm + 10log (21.39) = 24.30 dBm > 24 dBm.
7. 11 dBm + 10log (5725.00 – 5709.20) = 22.98 dBm < 24 dBm.

802.11ax (HE40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	20.60	20.81	235.319	23.72	24	Pass
62	5310	18.92	19.02	157.782	21.98	24	Pass
102	5510	15.81	15.85	76.566	18.84	24	Pass
110	5550	20.78	20.52	232.394	23.66	24	Pass
134	5670	20.31	20.42	217.553	23.38	24	Pass
142	5710 (U-NII-2C)	16.53	17.40	103.221	20.14	24	Pass
142	5710 (U-NII-3)	5.68	4.97	7.116	8.52	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (42.18) = 27.25 dBm > 24 dBm.
2. 11 dBm + 10log (42.08) = 27.24 dBm > 24 dBm.
3. 11 dBm + 10log (42.18) = 27.25 dBm > 24 dBm.
4. 11 dBm + 10log (42.21) = 27.25 dBm > 24 dBm.
5. 11 dBm + 10log (42.01) = 27.23 dBm > 24 dBm.
6. 11 dBm + 10log (5725.00 – 5688.86) = 26.57 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (42.17) = 27.25 dBm > 24 dBm.
2. 11 dBm + 10log (42.11) = 27.24 dBm > 24 dBm.
3. 11 dBm + 10log (42.43) = 27.27 dBm > 24 dBm.
4. 11 dBm + 10log (42.07) = 27.23 dBm > 24 dBm.
5. 11 dBm + 10log (42.22) = 27.25 dBm > 24 dBm.
6. 11 dBm + 10log (5725.00 – 5688.70) = 26.59 dBm > 24 dBm.

802.11ax (HE80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
58	5290	16.55	16.78	92.829	19.68	24	Pass
106	5530	15.61	15.57	72.45	18.60	24	Pass
122	5610	20.77	20.03	220.092	23.43	24	Pass
138	5690 (U-NII-2C)	16.25	16.45	89.885	19.54	24	Pass
138	5690 (U-NII-3)	2.53	2.44	3.718	5.70	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (82.58) = 30.16 dBm > 24 dBm.
2. 11 dBm + 10log (83.20) = 30.20 dBm > 24 dBm.
3. 11 dBm + 10log (83.08) = 30.19 dBm > 24 dBm.
4. 11 dBm + 10log (5725.00 – 5647.96) = 29.86 dBm > 24 dBm.

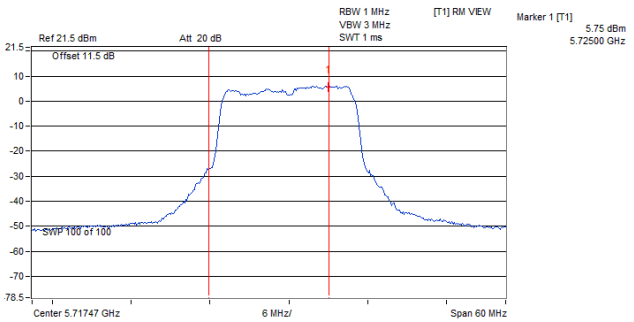
Chain 1

1. 11 dBm + 10log (83.27) = 30.20 dBm > 24 dBm.
2. 11 dBm + 10log (82.79) = 30.17 dBm > 24 dBm.
3. 11 dBm + 10log (83.08) = 30.19 dBm > 24 dBm.
4. 11 dBm + 10log (5725.00 – 5648.61) = 29.83 dBm > 24 dBm.

Spectrum Plot of Straddle Channel

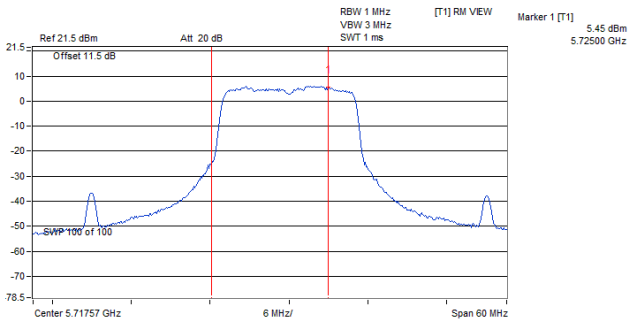
802.11a_Ch 144 (5720 MHz) (U-NII-2C)

Chain 0



TX Channel Bandwidth 15.05 MHz Power 16.71 dBm

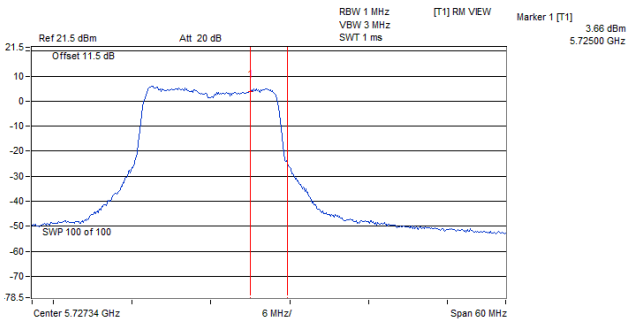
Chain 1



TX Channel Bandwidth 14.86 MHz Power 17.2 dBm

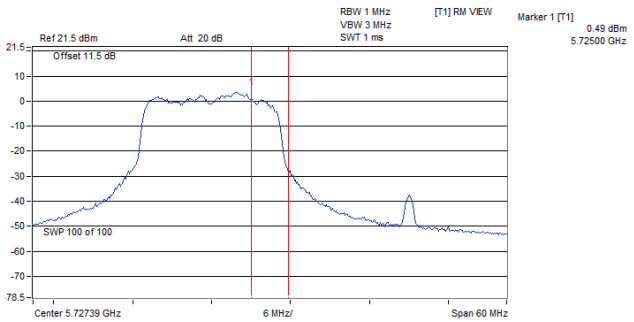
802.11a_Ch 144 (5720 MHz) (U-NII-3)

Chain 0



TX Channel Bandwidth 4.69 MHz Power 10.82 dBm

Chain 1

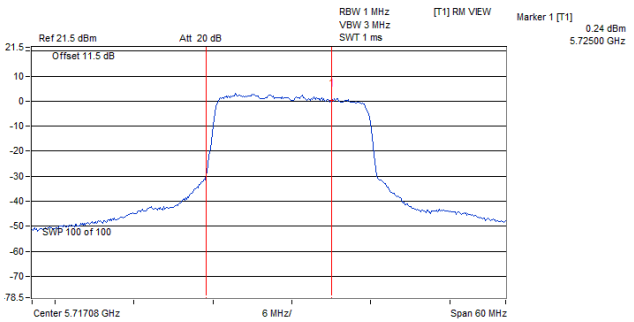


TX Channel Bandwidth 4.79 MHz Power 5.62 dBm

Spectrum Plot of Straddle Channel

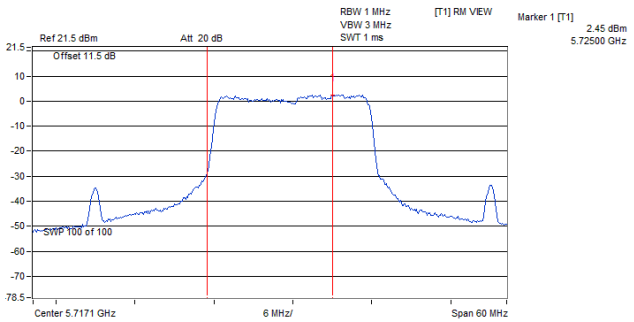
802.11ax (HE20)_Ch 144 (5720 MHz) (U-NII-2C)

Chain 0



TX Channel Bandwidth 15.83 MHz Power 14.29 dBm

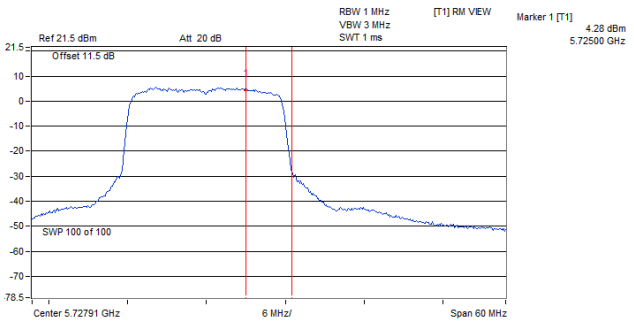
Chain 1



TX Channel Bandwidth 15.8 MHz Power 13.76 dBm

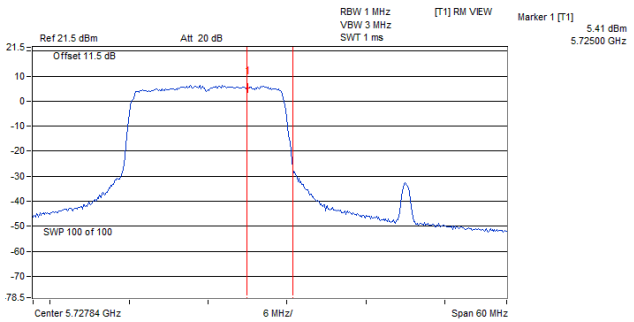
802.11ax (HE20)_Ch 144 (5720 MHz) (U-NII-3)

Chain 0



TX Channel Bandwidth 5.82 MHz Power 11.33 dBm

Chain 1

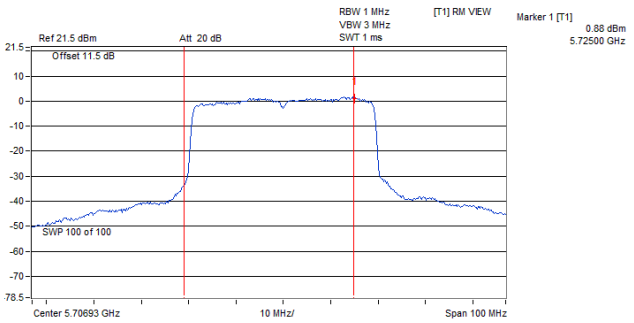


TX Channel Bandwidth 5.68 MHz Power 12.91 dBm

Spectrum Plot of Straddle Channel

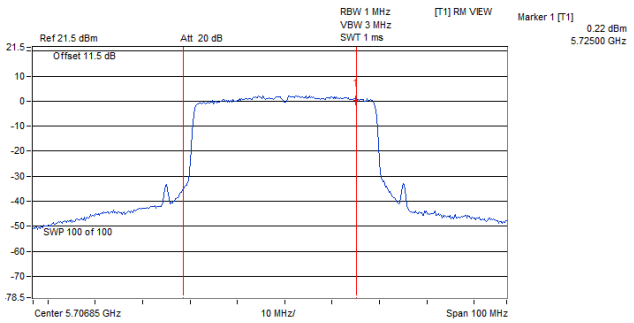
802.11ax (HE40)_Ch 142 (5710 MHz) (U-NII-2C)

Chain 0



TX Channel Bandwidth 36.14 MHz Power 16.53 dBm

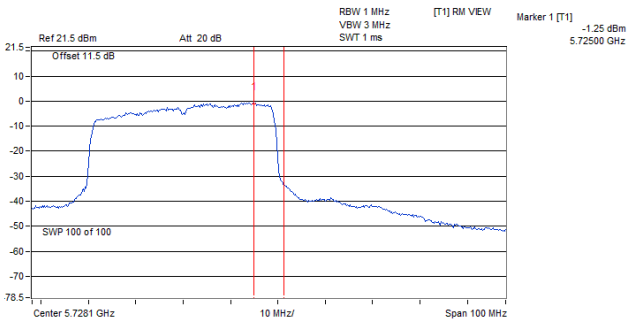
Chain 1



TX Channel Bandwidth 36.3 MHz Power 17.4 dBm

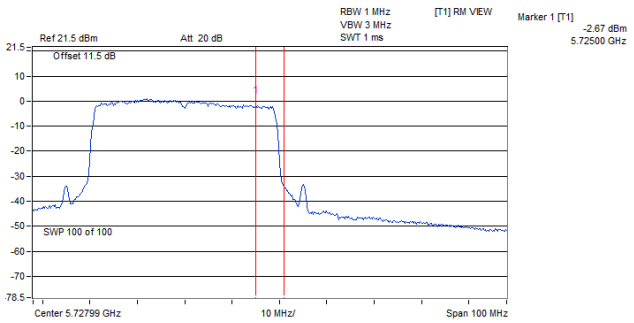
802.11ax (HE40)_Ch 142 (5710 MHz) (U-NII-3)

Chain 0



TX Channel Bandwidth 6.21 MHz Power 5.68 dBm

Chain 1

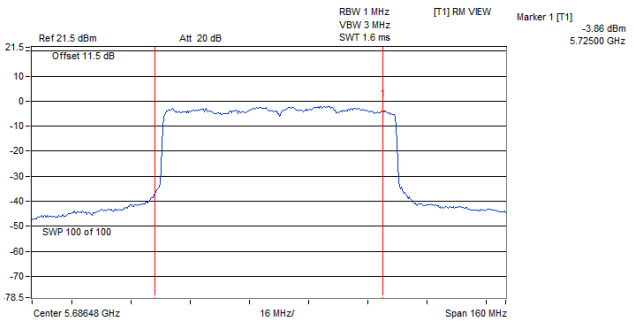


TX Channel Bandwidth 5.98 MHz Power 4.97 dBm

Spectrum Plot of Straddle Channel

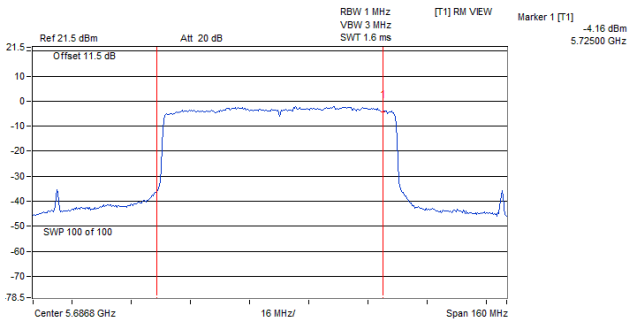
802.11ax (HE80)_Ch 138 (5690 MHz) (U-NII-2C)

Chain 0



TX Channel Bandwidth 77.04 MHz Power 16.25 dBm

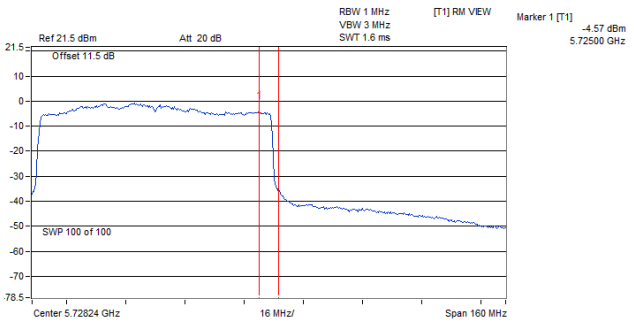
Chain 1



TX Channel Bandwidth 76.39 MHz Power 16.45 dBm

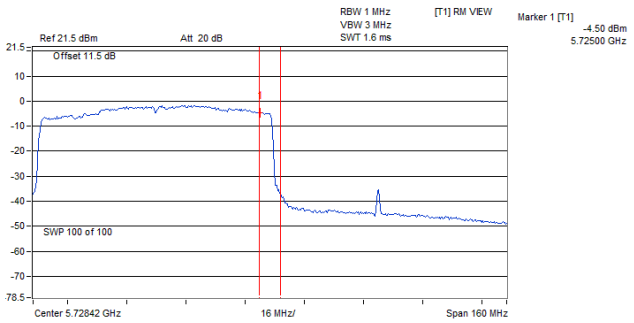
802.11ax (HE80)_Ch 138 (5690 MHz) (U-NII-3)

Chain 0



TX Channel Bandwidth 6.48 MHz Power 2.53 dBm

Chain 1



TX Channel Bandwidth 6.84 MHz Power 2.44 dBm

Beamforming Mode:

802.11ax (HE20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	20.67	20.55	230.182	23.62	23.84	Pass
60	5300	20.61	20.83	236.14	23.73	23.84	Pass
64	5320	20.71	20.76	236.885	23.75	23.84	Pass
100	5500	18.22	18.38	135.239	21.31	23.84	Pass
116	5580	20.52	20.34	220.863	23.44	23.84	Pass
140	5700	20.70	20.42	227.644	23.57	23.84	Pass
144	5720 (U-NII-2C)	14.29	13.76	51.923	17.15	22.98	Pass
144	5720 (U-NII-3)	11.33	12.91	35.438	15.49	29.84	Pass

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi >6 dBi, so the output power limit shall be reduced to 24-(6.16-6) = 23.84 dBm.

* Determined Limit means compare the minimum value after 24dBm and 11 dBm+10 log(26 dB bandwidth)

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (21.47) = 24.31 dBm > 24 dBm.
2. 11 dBm + 10log (21.91) = 24.40 dBm > 24 dBm.
3. 11 dBm + 10log (21.45) = 24.31 dBm > 24 dBm.
4. 11 dBm + 10log (21.58) = 24.34 dBm > 24 dBm.
5. 11 dBm + 10log (21.72) = 24.36 dBm > 24 dBm.
6. 11 dBm + 10log (21.45) = 24.31 dBm > 24 dBm.
7. 11 dBm + 10log (5725.00 – 5709.17) = 22.99 dBm < 24 dBm.

Chain 1

1. 11 dBm + 10log (21.53) = 24.33 dBm > 24 dBm.
2. 11 dBm + 10log (21.63) = 24.35 dBm > 24 dBm.
3. 11 dBm + 10log (21.25) = 24.27 dBm > 24 dBm.
4. 11 dBm + 10log (21.33) = 24.28 dBm > 24 dBm.
5. 11 dBm + 10log (21.41) = 24.30 dBm > 24 dBm.
6. 11 dBm + 10log (21.39) = 24.30 dBm > 24 dBm.
7. 11 dBm + 10log (5725.00 – 5709.20) = 22.98 dBm < 24 dBm.

802.11ax (HE40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	20.60	20.81	235.319	23.72	23.84	Pass
62	5310	18.92	19.02	157.782	21.98	23.84	Pass
102	5510	15.81	15.85	76.566	18.84	23.84	Pass
110	5550	20.78	20.52	232.394	23.66	23.84	Pass
134	5670	20.31	20.42	217.553	23.38	23.84	Pass
142	5710 (U-NII-2C)	16.53	17.40	103.221	20.14	23.84	Pass
142	5710 (U-NII-3)	5.68	4.97	7.116	8.52	29.84	Pass

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi >6 dBi, so the output power limit shall be reduced to 24-(6.16-6) = 23.84 dBm.

* Determined Limit means compare the minimum value after 24dBm and 11 dBm+10 log(26 dB bandwidth)

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (42.18) = 27.25 dBm > 24 dBm.
2. 11 dBm + 10log (42.08) = 27.24 dBm > 24 dBm.
3. 11 dBm + 10log (42.18) = 27.25 dBm > 24 dBm.
4. 11 dBm + 10log (42.21) = 27.25 dBm > 24 dBm.
5. 11 dBm + 10log (42.01) = 27.23 dBm > 24 dBm.
6. 11 dBm + 10log (5725.00 – 5688.86) = 26.57 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (42.17) = 27.25 dBm > 24 dBm.
2. 11 dBm + 10log (42.11) = 27.24 dBm > 24 dBm.
3. 11 dBm + 10log (42.43) = 27.27 dBm > 24 dBm.
4. 11 dBm + 10log (42.07) = 27.23 dBm > 24 dBm.
5. 11 dBm + 10log (42.22) = 27.25 dBm > 24 dBm.
6. 11 dBm + 10log (5725.00 – 5688.70) = 26.59 dBm > 24 dBm.

802.11ax (HE80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
58	5290	16.55	16.78	92.829	19.68	23.84	Pass
106	5530	15.61	15.57	72.45	18.60	23.84	Pass
122	5610	20.77	20.03	220.092	23.43	23.84	Pass
138	5690 (U-NII-2C)	16.25	16.45	89.885	19.54	23.84	Pass
138	5690 (U-NII-3)	2.53	2.44	3.718	5.70	29.84	Pass

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi >6 dBi, so the output power limit shall be reduced to 24-(6.16-6) = 23.84 dBm.

* Determined Limit means compare the minimum value after 24dBm and 11 dBm+10 log(26 dB bandwidth)

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (82.58) = 30.16 dBm > 24 dBm.
2. 11 dBm + 10log (83.20) = 30.20 dBm > 24 dBm.
3. 11 dBm + 10log (83.08) = 30.19 dBm > 24 dBm.
4. 11 dBm + 10log (5725.00 – 5647.96) = 29.86 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (83.27) = 30.20 dBm > 24 dBm.
2. 11 dBm + 10log (82.79) = 30.17 dBm > 24 dBm.
3. 11 dBm + 10log (83.08) = 30.19 dBm > 24 dBm.
4. 11 dBm + 10log (5725.00 – 5648.61) = 29.83 dBm > 24 dBm.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	19.72	19.55
60	5300	19.77	19.47
64	5320	19.80	19.52
100	5500	19.67	19.57
116	5580	19.62	19.55
140	5700	19.58	19.55
144	5720 (U-NII-2C)	15.05	14.86

802.11ax (HE20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.47	21.53
60	5300	21.91	21.63
64	5320	21.45	21.25
100	5500	21.58	21.33
116	5580	21.72	21.41
140	5700	21.45	21.39
144	5720 (U-NII-2C)	15.83	15.80

802.11ax (HE40)

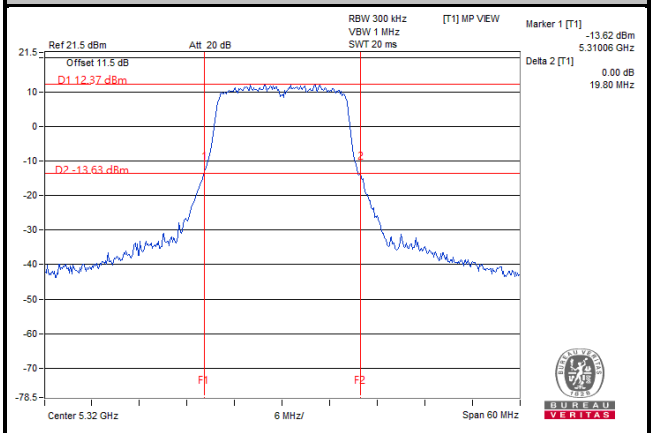
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	42.18	42.17
62	5310	42.08	42.11
102	5510	42.18	42.43
110	5550	42.21	42.07
134	5670	42.01	42.22
142	5710 (U-NII-2C)	36.14	36.30

802.11ax (HE80)

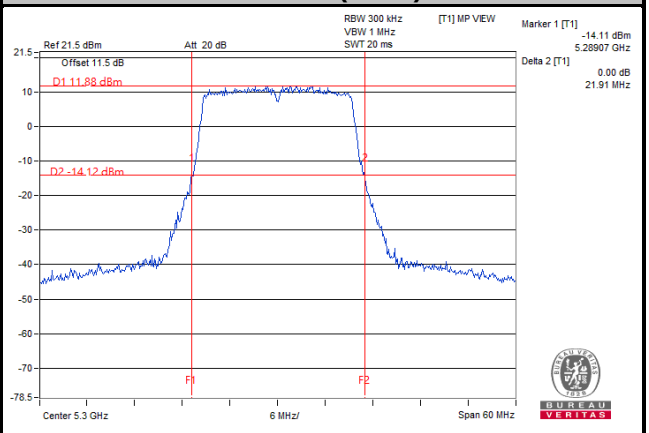
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	82.58	83.27
106	5530	83.20	82.79
122	5610	83.08	83.08
138	5690 (U-NII-2C)	77.04	76.39

Spectrum Plot of Worst Value

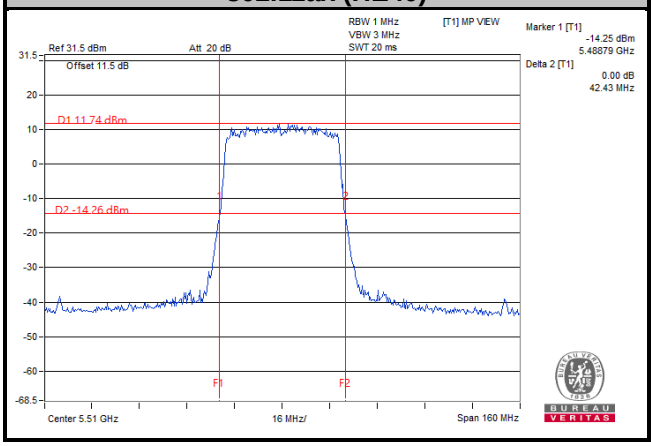
802.11a



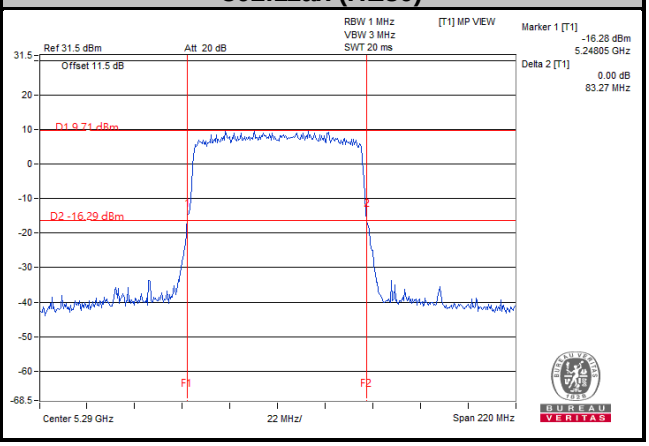
802.11ax (HE20)



802.11ax (HE40)

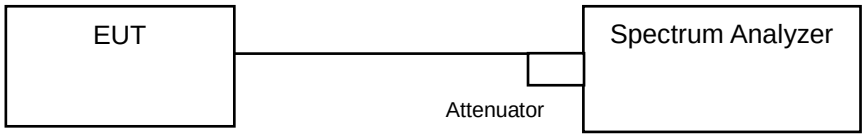


802.11ax (HE80)



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

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	16.44	16.44
60	5300	16.44	16.44
64	5320	16.44	16.44
100	5500	16.44	16.44
116	5580	16.44	16.44
140	5700	16.44	16.44
144	5720 (U-NII-2C)	13.28	13.28

802.11ax (HE20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	18.84	18.96
60	5300	19.08	18.96
64	5320	19.08	18.96
100	5500	18.96	18.96
116	5580	18.84	18.96
140	5700	18.96	18.84
144	5720 (U-NII-2C)	14.48	14.48

802.11ax (HE40)

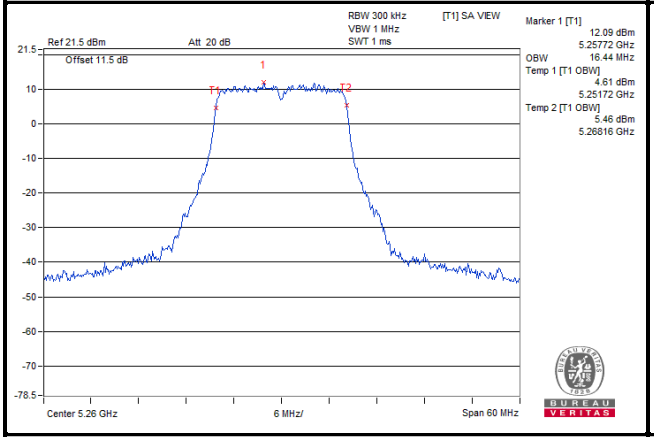
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	38.04	38.04
62	5310	38.16	38.04
102	5510	38.04	38.04
110	5550	38.04	38.04
134	5670	38.04	38.16
142	5710 (U-NII-2C)	34.08	34.08

802.11ax (HE80)

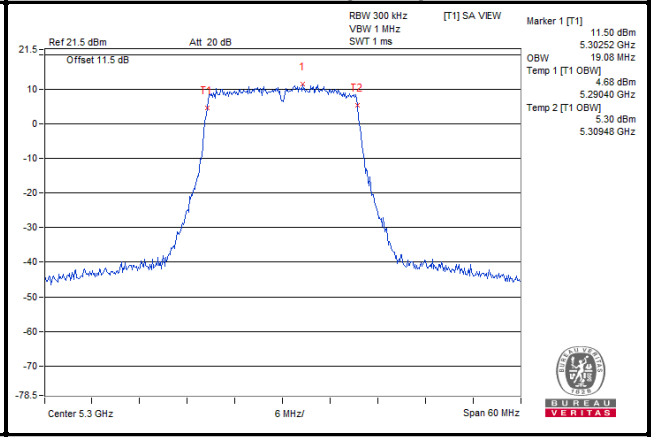
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	77.28	77.04
106	5530	77.28	77.52
122	5610	77.28	77.04
138	5690 (U-NII-2C)	73.88	73.64

Spectrum Plot of Worst Value

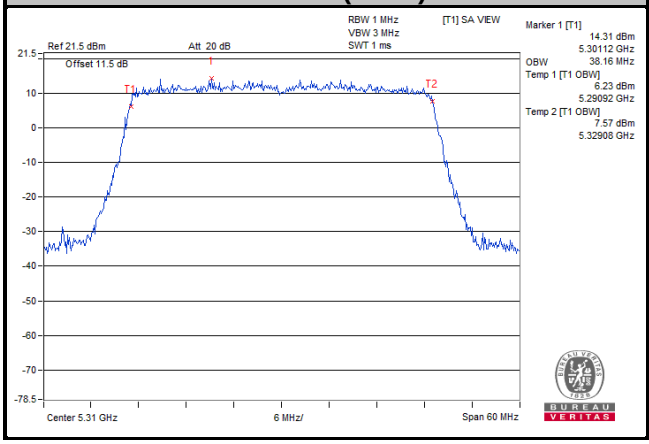
802.11a



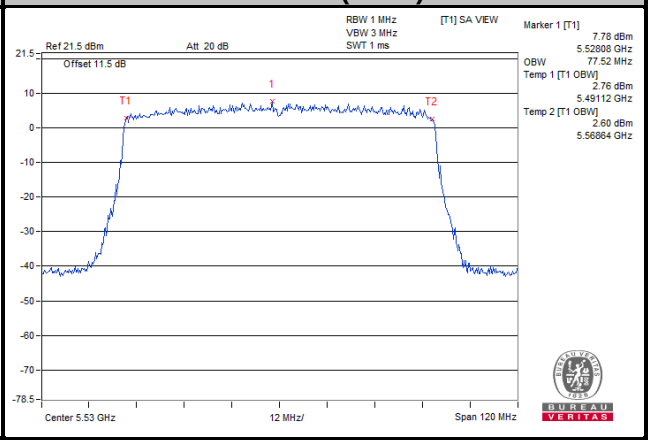
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)

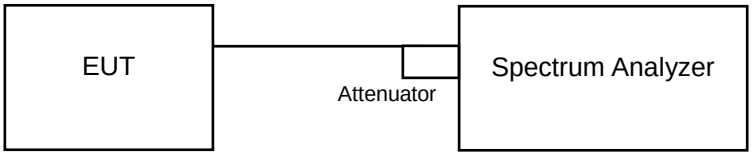


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-2A, U-NII-2C band:

<802.11a>

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 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

<802.11ax (HE20), 802.11ax (HE40), 802.11ax (80)>

Using method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 RBW, 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 = 10log(500 kHz / 300 kHz).
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

For U-NII-2A, U-NII-2C Band

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
52	5260	7.26	7.06	10.17	10.84	Pass
60	5300	5.54	6.04	8.81	10.84	Pass
64	5320	7.32	7.49	10.42	10.84	Pass
100	5500	5.22	5.33	8.29	10.84	Pass
116	5580	6.99	6.80	9.91	10.84	Pass
140	5700	7.41	7.14	10.29	10.84	Pass
144	5720 (U-NII-2C)	7.41	7.17	10.30	10.84	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi > 6, so the power density limit shall be reduced to 11-(6.16-6) = 10.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
52	5260	4.93	6.40	0.11	8.85	10.84	Pass
60	5300	4.18	5.57	0.11	8.05	10.84	Pass
64	5320	6.16	5.92	0.11	9.16	10.84	Pass
100	5500	2.86	3.66	0.11	6.40	10.84	Pass
116	5580	6.82	5.06	0.11	9.15	10.84	Pass
140	5700	6.46	6.20	0.11	9.45	10.84	Pass
144	5720 (U-NII-2C)	6.81	5.83	0.11	9.47	10.84	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi > 6, so the power density limit shall be reduced to 11-(6.16-6) = 10.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
54	5270	2.82	3.66	0.14	6.41	10.84	Pass
62	5310	1.66	1.93	0.14	4.95	10.84	Pass
102	5510	-1.82	-1.59	0.14	1.45	10.84	Pass
110	5550	3.56	3.15	0.14	6.51	10.84	Pass
134	5670	3.06	2.65	0.14	6.01	10.84	Pass
142	5710 (U-NII-2C)	3.27	3.95	0.14	6.77	10.84	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi > 6, so the power density limit shall be reduced to 11-(6.16-6) = 10.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

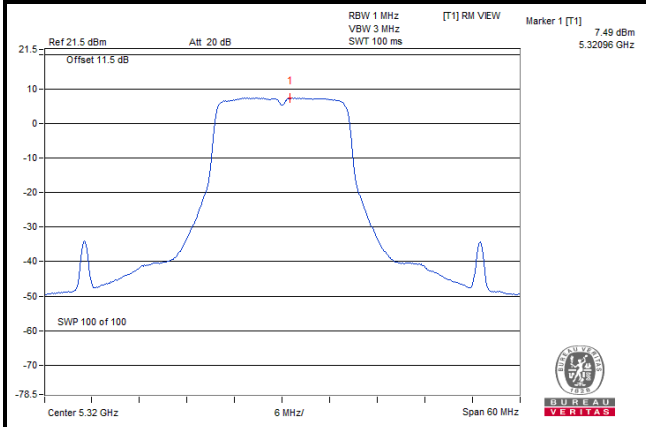
Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
58	5290	-3.87	-3.28	0.18	-0.37	10.84	Pass
106	5530	-4.70	-4.52	0.18	-1.42	10.84	Pass
122	5610	0.38	-0.45	0.18	3.18	10.84	Pass
138	5690 (U-NII-2C)	1.26	0.54	0.18	4.11	10.84	Pass

Note:

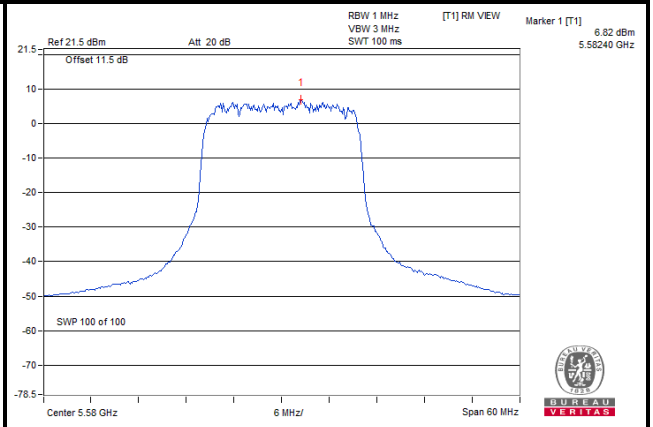
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ = 6.16 dBi > 6, so the power density limit shall be reduced to 11-(6.16-6) = 10.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

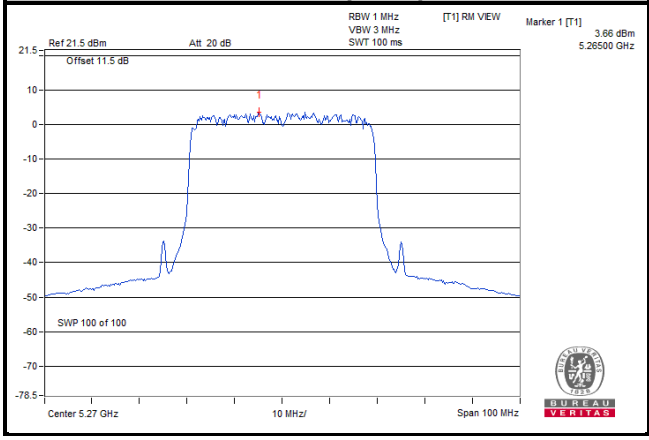
802.11a



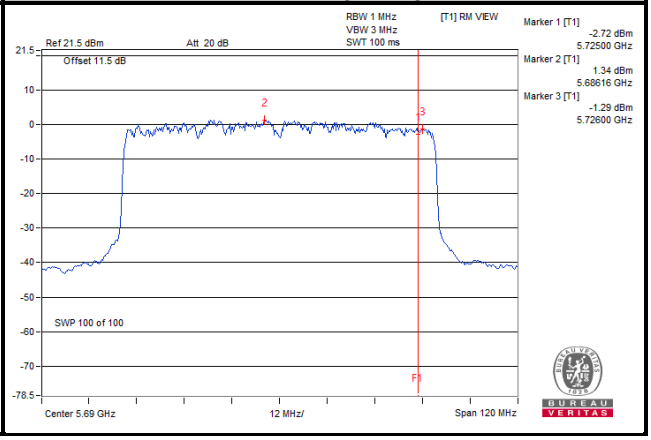
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



For U-NII-3 Band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	144	5720 (U-NII-3)	-1.61	0.61	3.01	0.27	3.89	29.84	Pass
1	144	5720 (U-NII-3)	-1.41	0.81	3.01	0.27	4.09	29.84	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi , so the power density limit shall be reduced to 30-(6.16-6) = 29.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	144	5720 (U-NII-3)	-2.70	-0.48	3.01	0.29	2.82	30	Pass
1	144	5720 (U-NII-3)	-3.10	-0.88	3.01	0.29	2.42	30	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi , so the power density limit shall be reduced to 30-(6.16-6) = 29.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	142	5710 (U-NII-3)	-6.24	-4.02	3.01	0.17	-0.84	30	Pass
1	142	5710 (U-NII-3)	-6.97	-4.75	3.01	0.17	-1.57	30	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi , so the power density limit shall be reduced to 30-(6.16-6) = 29.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	138	5690 (U-NII-3)	-10.01	-7.79	3.01	0.21	-4.57	30	Pass
1	138	5690 (U-NII-3)	-10.50	-8.28	3.01	0.21	-5.06	30	Pass

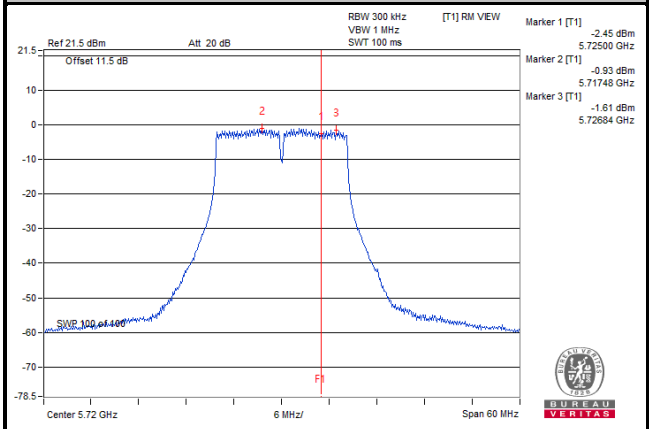
Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}] = 6.16 > 6$ dBi , so the power density limit shall be reduced to 30-(6.16-6) = 29.84 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

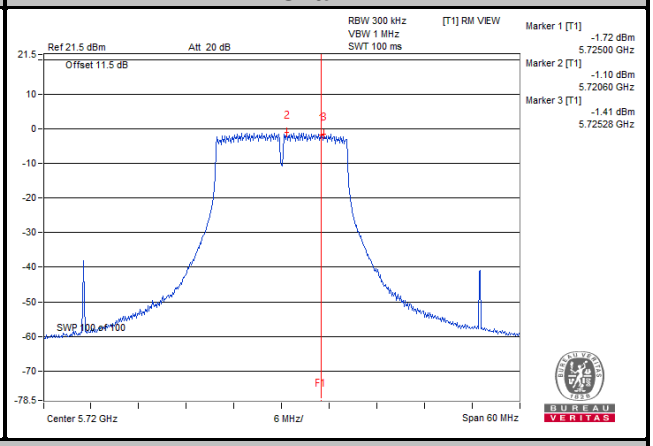
Spectrum Plot of Worst Value

802.11a

Chain 0

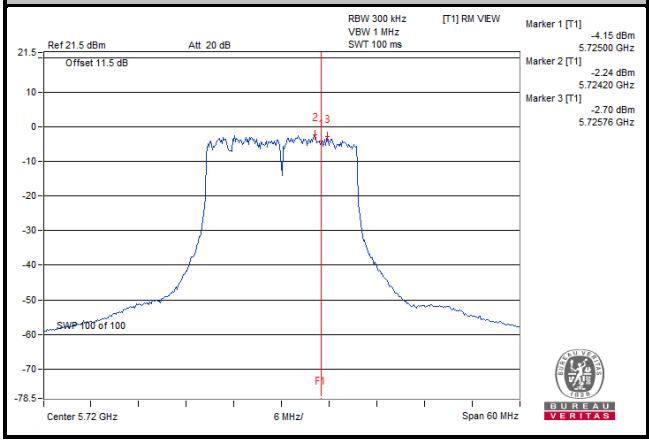


Chain 1

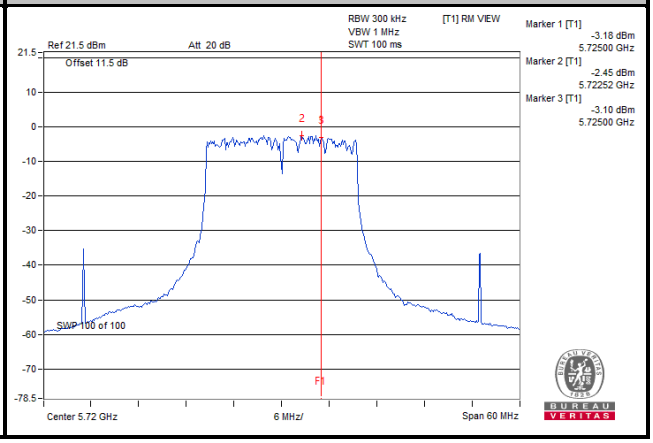


802.11ax (HE20)

Chain 0



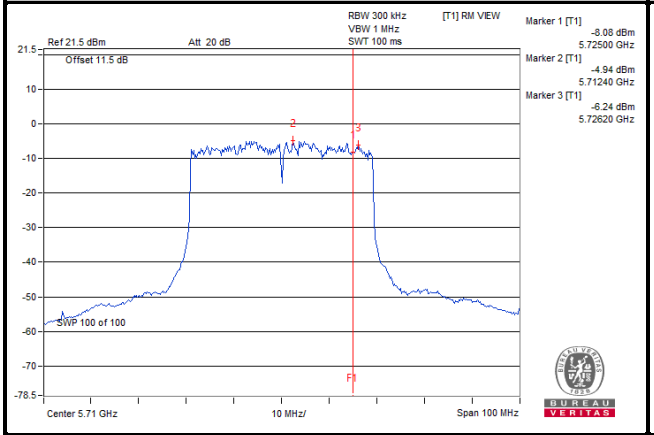
Chain 1



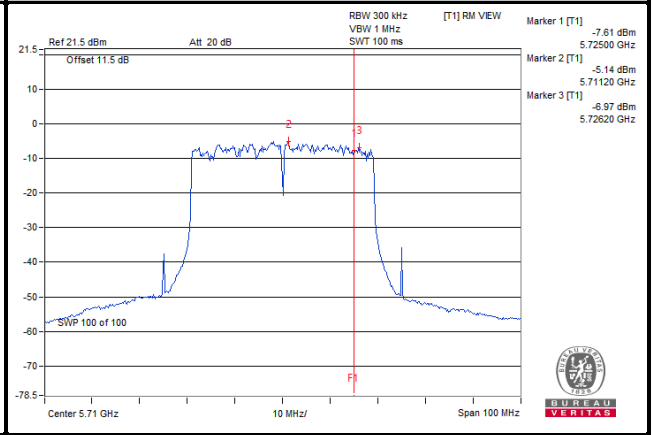
Spectrum Plot of Worst Value

802.11ax (HE40)

Chain 0

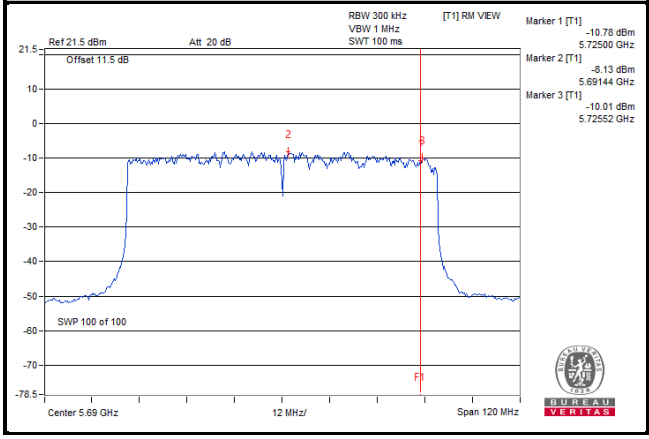


Chain 1

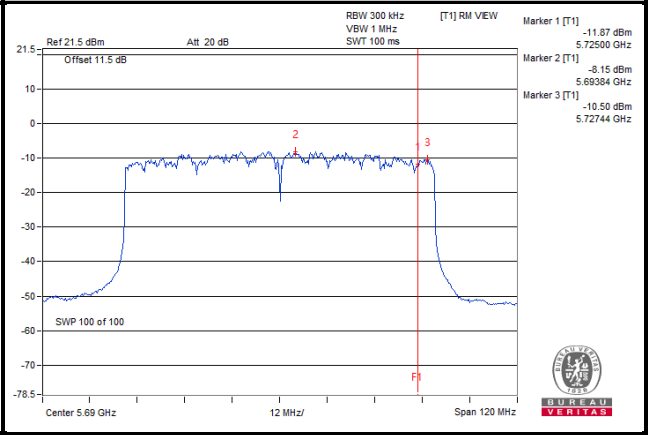


802.11ax (HE80)

Chain 0



Chain 1

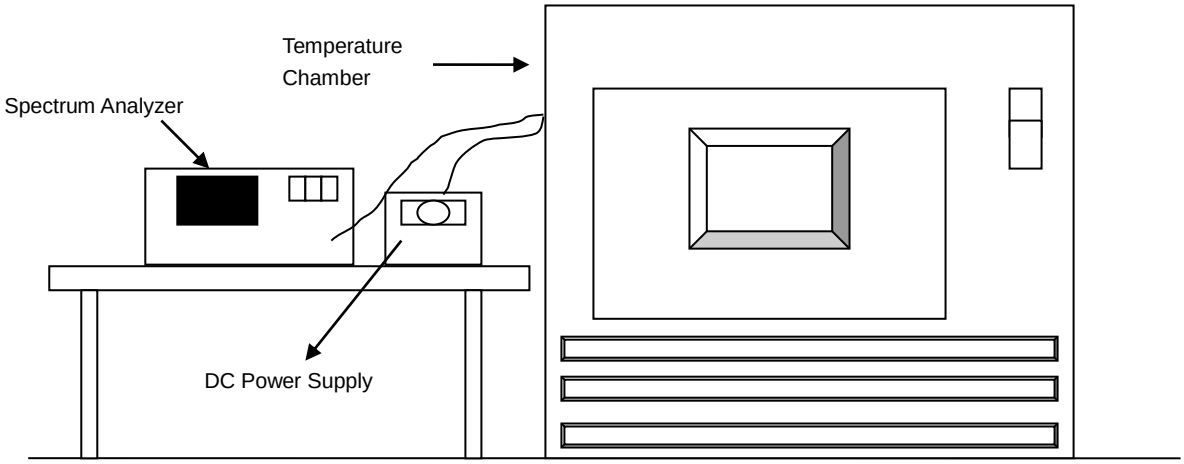


4.6 Frequency Stability

4.6.1 Limit 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 4.1.3 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. 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.
e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
f. 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: 5260 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
60	120	5259.9912	PASS	5259.993	PASS	5259.993	PASS	5259.9908	PASS
50	120	5260.0167	PASS	5260.0116	PASS	5260.0151	PASS	5260.0138	PASS
40	120	5259.9789	PASS	5259.9797	PASS	5259.9773	PASS	5259.9755	PASS
30	120	5260.0024	PASS	5260.0033	PASS	5260.0028	PASS	5260.0057	PASS
20	120	5260.0203	PASS	5260.0211	PASS	5260.0165	PASS	5260.0196	PASS
10	120	5260.0274	PASS	5260.0274	PASS	5260.028	PASS	5260.0239	PASS
0	120	5260.0219	PASS	5260.0263	PASS	5260.0256	PASS	5260.0225	PASS
-10	120	5259.9897	PASS	5259.9866	PASS	5259.9855	PASS	5259.985	PASS
-20	120	5259.9867	PASS	5259.9862	PASS	5259.9852	PASS	5259.9832	PASS

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5260.02	PASS	5260.0211	PASS	5260.0171	PASS	5260.0205	PASS
	120	5260.0203	PASS	5260.0211	PASS	5260.0165	PASS	5260.0196	PASS
	102	5260.0208	PASS	5260.0207	PASS	5260.017	PASS	5260.0206	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.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
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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