FCC Test Report

Report No.:	RF190725E05
FCC ID:	PY319200445
Test Model:	RAX20
Series Model:	RAX15
Received Date:	July 25, 2019
Test Date:	July 29 to Aug. 06, 2019
Issued Date:	Aug. 12, 2019
Applicant:	NETGEAR, Inc.
Address:	350 East Plumeria Drive San Jose, CA 95134
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF190725E05	Original release.	Aug. 12, 2019

1 Certificate of Conformity

Product:	AX1800 Wi-Fi Router
Brand:	NETGEAR
Test Model:	RAX20
Series Model:	RAX15
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	July 29 to Aug. 06, 2019
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** Aug. 12, 2019

Phoenix Huang / Specialist

Approved by : , **Date:** Aug. 12, 2019

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.74dB at 0.31016MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX1800 Wi-Fi Router
Brand	NETGEAR
Test Model	RAX20
Series Model	RAX15
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT20/40 mode 1024QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 866.7Mbps 802.11ax: up to 1201Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462 GHz **5GHz:** 5.18~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2
Output Power	**Non-Beamforming Mode:** **2.412 ~ 2.462 GHz:** 980.128 mW **5.18 ~ 5.24 GHz:** 867.058 mW **5.745 ~ 5.825 GHz:** 931.038 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 799.892 mW **5.18 ~ 5.24 GHz:** 867.058 mW **5.745 ~ 5.825 GHz:** 928.632 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ45 cable x 1 (Unshielded, 1.8m)

Note:

1. The EUT has two model names which are identical to each other in all aspects except for the followings:

Brand Name	Model Name	Description
NETGEAR	RAX20	For different marketing
NETGEAR	RAX15	
Note: From the above models, model: RAX20 was selected as representative model for the test and its data was recorded in this report.		

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN 5GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

3. The EUT must be supplied one power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	2ABL030F 1 NA	332-10758-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.8m
2	NETGEAR	AD2067F10	332-10797-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.8m
Note: From the above adapters, the AC Power Conducted Emissions and Radiated Emissions worse case was found in **Adapter 1**. Therefore only the test data of the mode was recorded in this report.				

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

Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain 0	2.36	2.4~2.4835	Dipole	i-pex(MHF)	140
		3.38	5.15~5.25			
		2.94	5.25~5.35			
		2.25	5.47~5.725			
		2.12	5.725~5.85			
2	Chain 1	1.86	2.4~2.4835	Dipole	i-pex(MHF)	210
		3.39	5.15~5.25			
		2.8	5.25~5.35			
		1.83	5.47~5.725			
		1.65	5.725~5.85			

5. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and Non-Beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz) and 802.11ax mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20 and 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

7 channels are provided for 802.11n (HT40), VHT40 and 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

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

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

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.

Non-Beamforming Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

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.

Non-Beamforming Mode					
Mode	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
VHT20 (Output power only)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40 (Output power only)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0
Beamforming Mode					
Mode	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
VHT20 (Output power only)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40 (Output power only)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Test Condition:

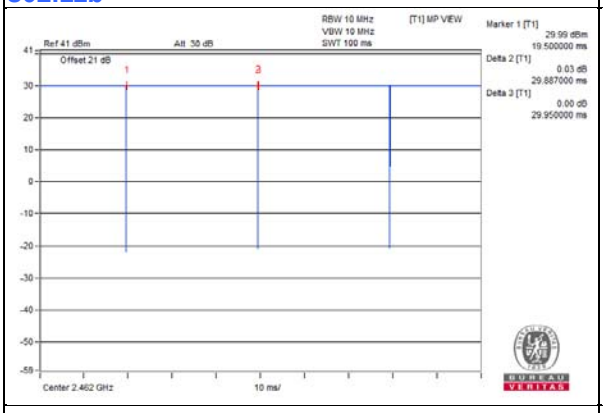
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	20deg. C, 70%RH	120Vac, 60Hz	Tank Wu
RE<1G	23deg. C, 67%RH	120Vac, 60Hz	Ryan Chen
PLC	23deg. C, 76%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

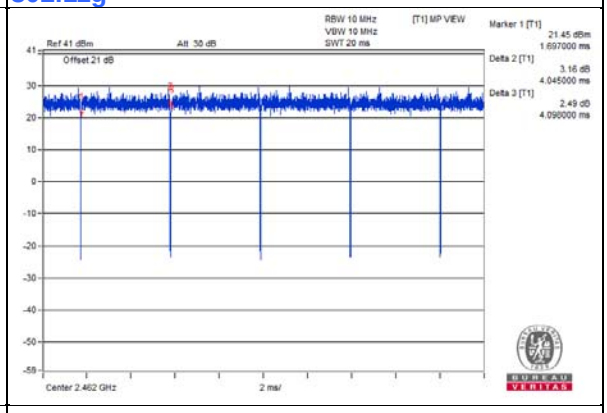
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 29.887 ms/29.95 ms = 0.998
802.11g: Duty cycle = 4.045 ms/4.098 ms = 0.987
VHT20: Duty cycle = 3.76 ms/3.797 ms = 0.99
VHT40: Duty cycle = 1.829 ms/1.86 ms = 0.983
802.11ax 2.4G HE20 Duty cycle = 2.879 ms/2.918 ms = 0.987
802.11ax 2.4G HE40 Duty cycle = 1.462 ms/1.509 ms = 0.969, Duty factor = 10 * log (1/Duty cycle) = 0.14

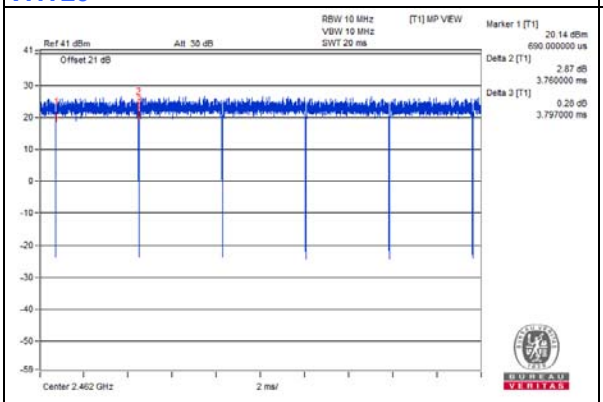
802.11b



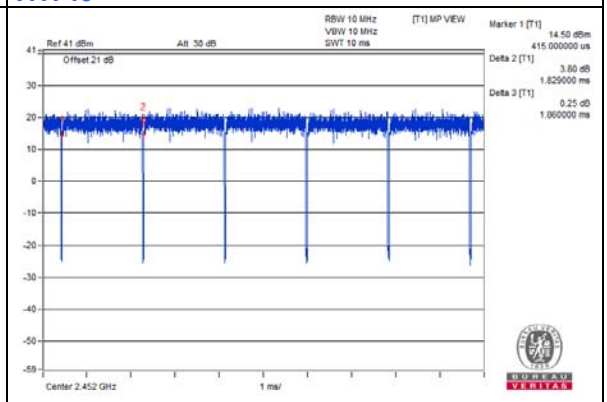
802.11g



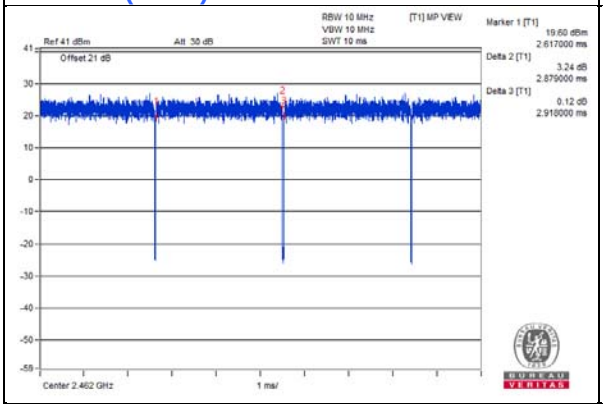
VHT20



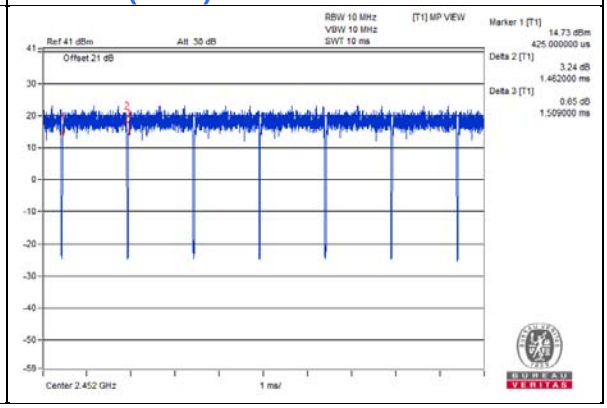
VHT40



802.11ax (HE20)



802.11ax (HE40)



3.4 Description of Support Units

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

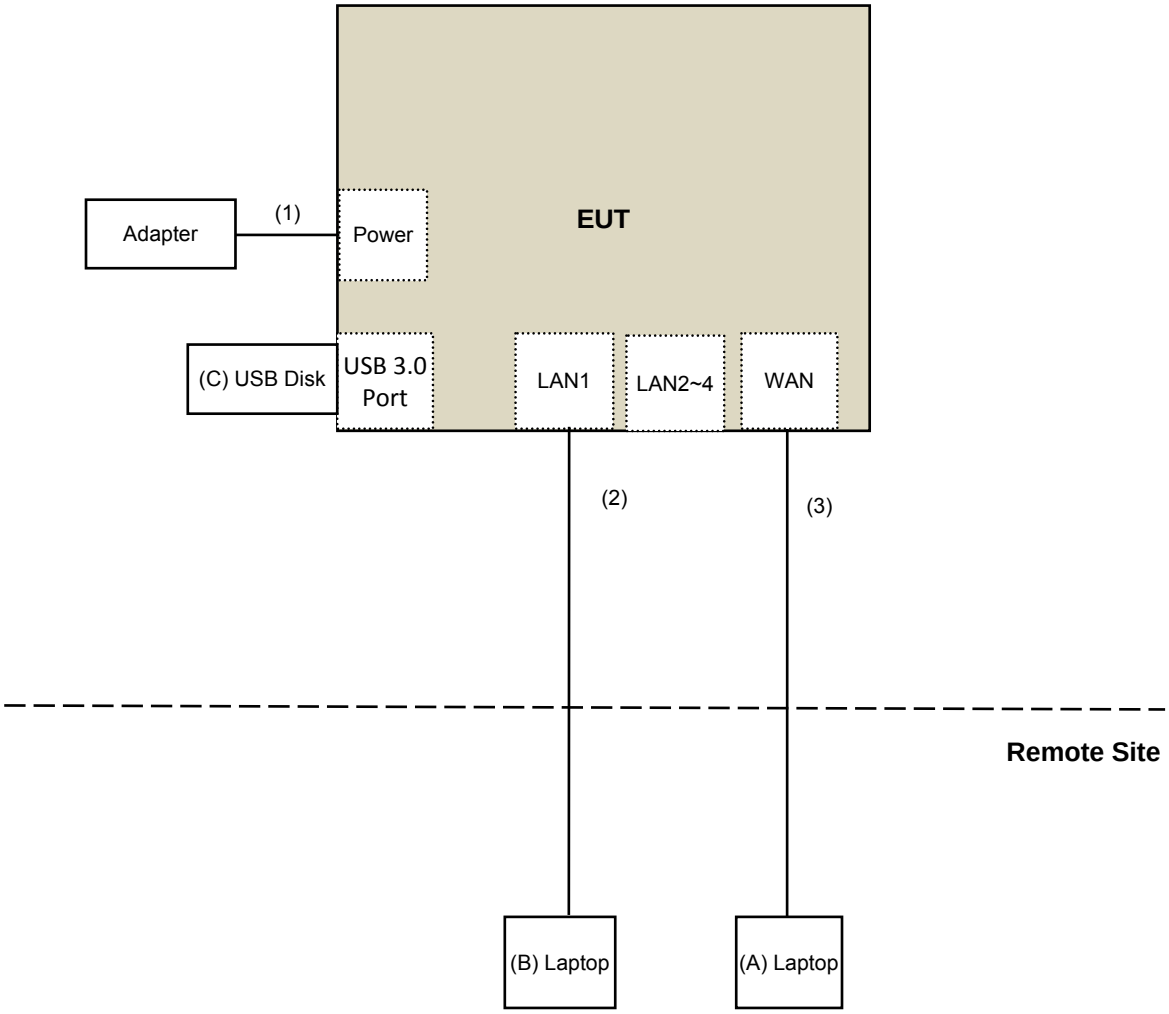
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	81A4	YD02YN2A	PD93165NGU	Provided by Lab
B.	Laptop	Lenovo	81A4	YD02YN22	PD93165NGU	Provided by Lab
C.	USB Disk	SanDisk	USB 3.0 Flash Drive	NA	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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. Other emissions shall be at least 30dB below the highest level of the desired power:

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 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 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 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: July 29 to Aug. 06, 2019

4.1.3 Test Procedures

For Radiated emission below 30MHz

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 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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 detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

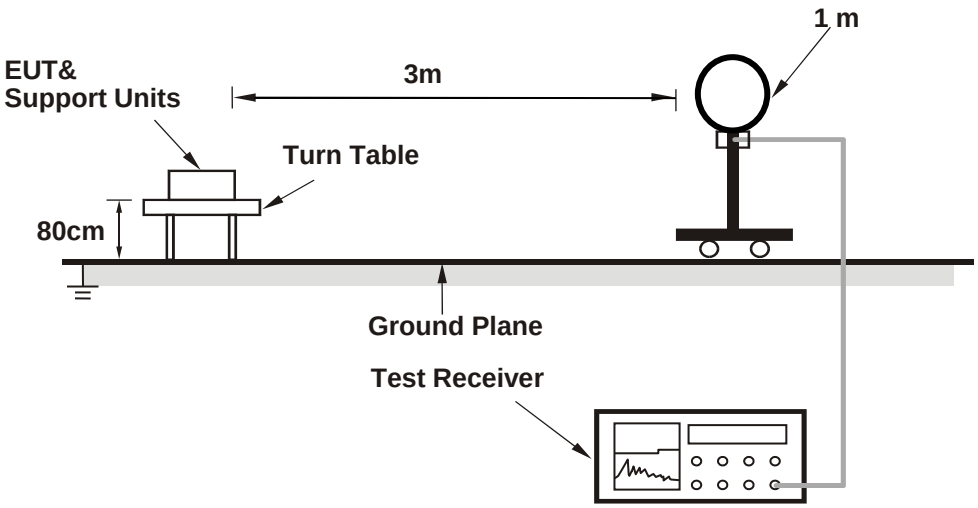
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

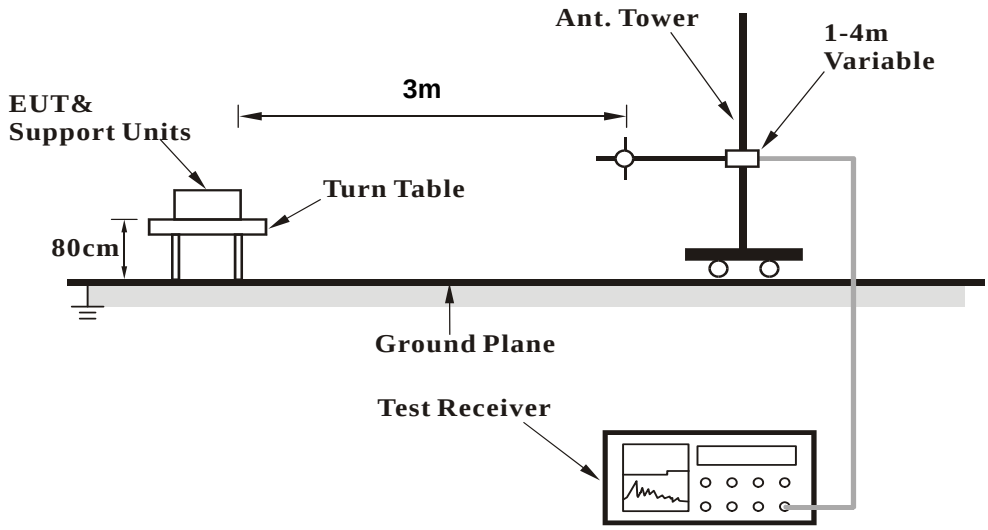
No deviation.

4.1.5 Test Setup

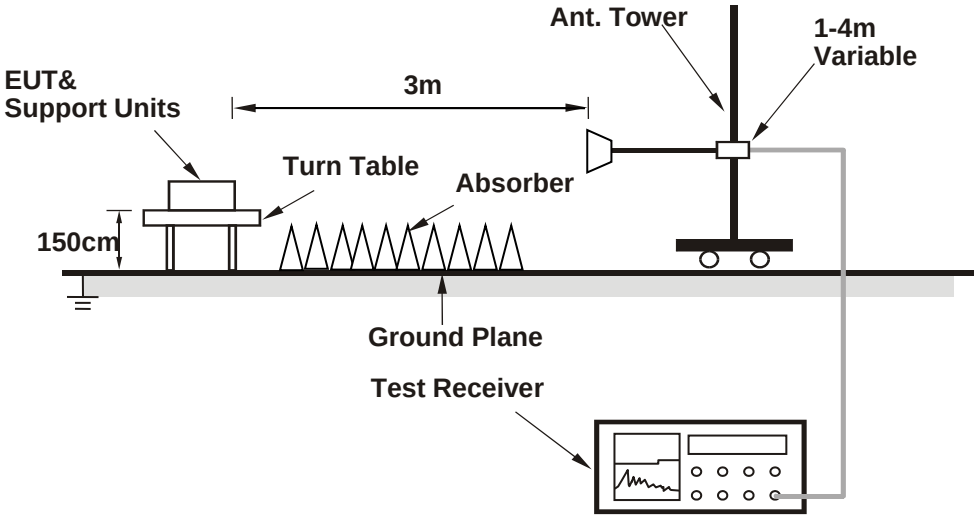
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (accessMTool_REL_3_1_0_1) has been activated to set the EUT under transmission condition continuously.

4.1.7 Test Results

Above 1GHz Data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	61.1 PK	74.0	-12.9	1.53 H	335	62.7	-1.6
2	2390.00	48.6 AV	54.0	-5.4	1.53 H	335	50.2	-1.6
3	*2412.00	110.5 PK			1.53 H	335	112.2	-1.7
4	*2412.00	107.0 AV			1.53 H	335	108.7	-1.7
5	4824.00	44.3 PK	74.0	-29.7	2.16 H	176	42.0	2.3
6	4824.00	42.3 AV	54.0	-11.7	2.16 H	176	40.0	2.3
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	2390.00	66.5 PK	74.0	-7.5	2.63 V	337	68.1	-1.6
2	2390.00	53.8 AV	54.0	-0.2	2.63 V	337	55.4	-1.6
3	*2412.00	121.8 PK			2.63 V	337	123.5	-1.7
4	*2412.00	118.3 AV			2.63 V	337	120.0	-1.7
5	4824.00	46.2 PK	74.0	-27.8	1.74 V	222	43.9	2.3
6	4824.00	44.3 AV	54.0	-9.7	1.74 V	222	42.0	2.3

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 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.9 PK	74.0	-13.1	1.78 H	343	62.5	-1.6
2	2390.00	47.7 AV	54.0	-6.3	1.78 H	343	49.3	-1.6
3	*2437.00	113.2 PK			1.78 H	343	115.0	-1.8
4	*2437.00	109.9 AV			1.78 H	343	111.7	-1.8
5	2483.50	60.5 PK	74.0	-13.5	1.78 H	343	62.2	-1.7
6	2483.50	47.3 AV	54.0	-6.7	1.78 H	343	49.0	-1.7
7	4874.00	48.3 PK	74.0	-25.7	2.23 H	192	45.9	2.4
8	4874.00	46.4 AV	54.0	-7.6	2.23 H	192	44.0	2.4
9	7311.00	48.1 PK	74.0	-25.9	1.90 H	250	38.9	9.2
10	7311.00	41.7 AV	54.0	-12.3	1.90 H	250	32.5	9.2
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	2390.00	65.9 PK	74.0	-8.1	2.28 V	352	67.5	-1.6
2	2390.00	52.8 AV	54.0	-1.2	2.28 V	352	54.4	-1.6
3	*2437.00	124.6 PK			2.28 V	352	126.4	-1.8
4	*2437.00	121.2 AV			2.28 V	352	123.0	-1.8
5	2483.50	66.5 PK	74.0	-7.5	2.28 V	352	68.2	-1.7
6	2483.50	52.6 AV	54.0	-1.4	2.28 V	352	54.3	-1.7
7	4874.00	50.7 PK	74.0	-23.3	1.63 V	234	48.3	2.4
8	4874.00	48.9 AV	54.0	-5.1	1.63 V	234	46.5	2.4
9	7311.00	49.3 PK	74.0	-24.7	2.34 V	237	40.1	9.2
10	7311.00	43.0 AV	54.0	-11.0	2.34 V	237	33.8	9.2

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 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2362.00	61.6 PK	74.0	-12.4	1.69 H	320	63.2	-1.6
2	2362.00	48.6 AV	54.0	-5.4	1.69 H	320	50.2	-1.6
3	*2462.00	110.6 PK			1.69 H	320	112.4	-1.8
4	*2462.00	107.2 AV			1.69 H	320	109.0	-1.8
5	2483.50	61.8 PK	74.0	-12.2	1.69 H	320	63.5	-1.7
6	2483.50	48.7 AV	54.0	-5.3	1.69 H	320	50.4	-1.7
7	4924.00	47.0 PK	74.0	-27.0	2.19 H	212	44.5	2.5
8	4924.00	45.2 AV	54.0	-8.8	2.19 H	212	42.7	2.5
9	7386.00	44.9 PK	74.0	-29.1	1.93 H	256	35.5	9.4
10	7386.00	38.1 AV	54.0	-15.9	1.93 H	256	28.7	9.4
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	2362.00	66.2 PK	74.0	-7.8	2.52 V	337	67.8	-1.6
2	2362.00	53.4 AV	54.0	-0.6	2.52 V	337	55.0	-1.6
3	*2462.00	121.7 PK			2.52 V	337	123.5	-1.8
4	*2462.00	118.4 AV			2.52 V	337	120.2	-1.8
5	2483.50	67.5 PK	74.0	-6.5	2.52 V	337	69.2	-1.7
6	2483.50	53.6 AV	54.0	-0.4	2.52 V	337	55.3	-1.7
7	4924.00	48.0 PK	74.0	-26.0	1.53 V	229	45.5	2.5
8	4924.00	46.2 AV	54.0	-7.8	1.53 V	229	43.7	2.5
9	7386.00	46.2 PK	74.0	-27.8	2.26 V	247	36.8	9.4
10	7386.00	39.8 AV	54.0	-14.2	2.26 V	247	30.4	9.4

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.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	60.2 PK	74.0	-13.8	1.63 H	321	61.8	-1.6
2	2390.00	47.6 AV	54.0	-6.4	1.63 H	321	49.2	-1.6
3	*2412.00	110.6 PK			1.63 H	321	112.3	-1.7
4	*2412.00	97.2 AV			1.63 H	321	98.9	-1.7
5	4824.00	42.8 PK	74.0	-31.2	2.44 H	186	40.5	2.3
6	4824.00	40.9 AV	54.0	-13.1	2.44 H	186	38.6	2.3
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	2390.00	73.2 PK	74.0	-0.8	2.48 V	333	74.8	-1.6
2	2390.00	53.6 AV	54.0	-0.4	2.48 V	333	55.2	-1.6
3	*2412.00	116.9 PK			2.48 V	333	118.6	-1.7
4	*2412.00	108.6 AV			2.48 V	333	110.3	-1.7
5	4824.00	43.1 PK	74.0	-30.9	1.59 V	236	40.8	2.3
6	4824.00	41.3 AV	54.0	-12.7	1.59 V	236	39.0	2.3

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 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2388.00	59.7 PK	74.0	-14.3	1.77 H	326	61.3	-1.6
2	2388.00	47.2 AV	54.0	-6.8	1.77 H	326	48.8	-1.6
3	*2437.00	115.9 PK			1.77 H	326	117.7	-1.8
4	*2437.00	102.5 AV			1.77 H	326	104.3	-1.8
5	2483.50	60.0 PK	74.0	-14.0	1.77 H	326	61.7	-1.7
6	2483.50	47.5 AV	54.0	-6.5	1.77 H	326	49.2	-1.7
7	4874.00	47.4 PK	74.0	-26.6	2.15 H	206	45.0	2.4
8	4874.00	45.4 AV	54.0	-8.6	2.15 H	206	43.0	2.4
9	7311.00	45.3 PK	74.0	-28.7	2.31 H	216	36.1	9.2
10	7311.00	38.3 AV	54.0	-15.7	2.31 H	216	29.1	9.2
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	2388.00	71.2 PK	74.0	-2.8	3.10 V	313	72.8	-1.6
2	2388.00	52.9 AV	54.0	-1.1	3.10 V	313	54.5	-1.6
3	*2437.00	121.8 PK			3.10 V	313	123.6	-1.8
4	*2437.00	113.8 AV			3.10 V	313	115.6	-1.8
5	2483.50	71.8 PK	74.0	-2.2	3.10 V	313	73.5	-1.7
6	2483.50	53.3 AV	54.0	-0.7	3.10 V	313	55.0	-1.7
7	4874.00	48.3 PK	74.0	-25.7	1.63 V	220	45.9	2.4
8	4874.00	46.4 AV	54.0	-7.6	1.63 V	220	44.0	2.4
9	7311.00	46.3 PK	74.0	-27.7	2.30 V	254	37.1	9.2
10	7311.00	39.9 AV	54.0	-14.1	2.30 V	254	30.7	9.2

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 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	*2462.00	112.7 PK			1.73 H	333	114.5	-1.8
2	*2462.00	98.4 AV			1.73 H	333	100.2	-1.8
3	2483.50	59.4 PK	74.0	-14.6	1.73 H	333	61.1	-1.7
4	2483.50	46.8 AV	54.0	-7.2	1.73 H	333	48.5	-1.7
5	4924.00	45.4 PK	74.0	-28.6	2.13 H	201	42.9	2.5
6	4924.00	43.2 AV	54.0	-10.8	2.13 H	201	40.7	2.5
7	7386.00	44.8 PK	74.0	-29.2	2.12 H	222	35.4	9.4
8	7386.00	37.6 AV	54.0	-16.4	2.12 H	222	28.2	9.4
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	*2462.00	116.9 PK			2.06 V	35	118.7	-1.8
2	*2462.00	109.5 AV			2.06 V	35	111.3	-1.8
3	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**2.06 V**	**35**	**75.6**	**-1.7**
4	2483.50	52.5 AV	54.0	-1.5	2.06 V	35	54.2	-1.7
5	4924.00	46.7 PK	74.0	-27.3	1.86 V	233	44.2	2.5
6	4924.00	44.6 AV	54.0	-9.4	1.86 V	233	42.1	2.5
7	7386.00	45.9 PK	74.0	-28.1	2.21 V	263	36.5	9.4
8	7386.00	38.7 AV	54.0	-15.3	2.21 V	263	29.3	9.4

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.

802.11ax (HE20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	60.2 PK	74.0	-13.8	1.67 H	300	61.8	-1.6
2	2390.00	47.6 AV	54.0	-6.4	1.67 H	300	49.2	-1.6
3	*2412.00	108.2 PK			1.67 H	300	109.9	-1.7
4	*2412.00	94.9 AV			1.67 H	300	96.6	-1.7
5	4824.00	45.9 PK	74.0	-28.1	2.21 H	213	43.6	2.3
6	4824.00	43.6 AV	54.0	-10.4	2.21 H	213	41.3	2.3
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	2390.00	70.1 PK	74.0	-3.9	2.49 V	331	71.7	-1.6
2	2390.00	53.6 AV	54.0	-0.4	2.49 V	331	55.2	-1.6
3	*2412.00	117.1 PK			2.49 V	331	118.8	-1.7
4	*2412.00	106.2 AV			2.49 V	331	107.9	-1.7
5	4824.00	46.4 PK	74.0	-27.6	1.91 V	244	44.1	2.3
6	4824.00	44.3 AV	54.0	-9.7	1.91 V	244	42.0	2.3

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 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	1.88 H	309	61.7	-1.6
2	2390.00	47.5 AV	54.0	-6.5	1.88 H	309	49.1	-1.6
3	*2437.00	115.9 PK			1.88 H	309	117.7	-1.8
4	*2437.00	101.6 AV			1.88 H	309	103.4	-1.8
5	2483.50	60.5 PK	74.0	-13.5	1.88 H	309	62.2	-1.7
6	2483.50	47.9 AV	54.0	-6.1	1.88 H	309	49.6	-1.7
7	4874.00	46.8 PK	74.0	-27.2	2.10 H	233	44.4	2.4
8	4874.00	44.6 AV	54.0	-9.4	2.10 H	233	42.2	2.4
9	7311.00	47.1 PK	74.0	-26.9	1.90 H	248	37.9	9.2
10	7311.00	39.9 AV	54.0	-14.1	1.90 H	248	30.7	9.2
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	2390.00	71.1 PK	74.0	-2.9	2.84 V	318	72.7	-1.6
2	2390.00	53.1 AV	54.0	-0.9	2.84 V	318	54.7	-1.6
3	*2437.00	123.6 PK			2.84 V	318	125.4	-1.8
4	*2437.00	112.6 AV			2.84 V	318	114.4	-1.8
5	2483.50	72.9 PK	74.0	-1.1	2.84 V	318	74.6	-1.7
6	2483.50	53.4 AV	54.0	-0.6	2.84 V	318	55.1	-1.7
7	4874.00	47.6 PK	74.0	-26.4	1.73 V	241	45.2	2.4
8	4874.00	45.3 AV	54.0	-8.7	1.73 V	241	42.9	2.4
9	7311.00	47.8 PK	74.0	-26.2	2.26 V	247	38.6	9.2
10	7311.00	40.5 AV	54.0	-13.5	2.26 V	247	31.3	9.2

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 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	*2462.00	110.9 PK			1.63 H	288	112.7	-1.8
2	*2462.00	97.5 AV			1.63 H	288	99.3	-1.8
3	2483.50	59.6 PK	74.0	-14.4	1.63 H	288	61.3	-1.7
4	2483.50	46.8 AV	54.0	-7.2	1.63 H	288	48.5	-1.7
5	4924.00	45.0 PK	74.0	-29.0	2.08 H	236	42.5	2.5
6	4924.00	42.6 AV	54.0	-11.4	2.08 H	236	40.1	2.5
7	7386.00	45.8 PK	74.0	-28.2	1.79 H	234	36.4	9.4
8	7386.00	38.5 AV	54.0	-15.5	1.79 H	234	29.1	9.4
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	*2462.00	118.9 PK			2.68 V	316	120.7	-1.8
2	*2462.00	108.4 AV			2.68 V	316	110.2	-1.8
3	2483.50	73.1 PK	74.0	-0.9	2.68 V	316	74.8	-1.7
4	2483.50	53.3 AV	54.0	-0.7	2.68 V	316	55.0	-1.7
5	4924.00	46.2 PK	74.0	-27.8	1.83 V	254	43.7	2.5
6	4924.00	43.9 AV	54.0	-10.1	1.83 V	254	41.4	2.5
7	7386.00	47.5 PK	74.0	-26.5	2.34 V	266	38.1	9.4
8	7386.00	40.1 AV	54.0	-13.9	2.34 V	266	30.7	9.4

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.

802.11ax (HE40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	59.4 PK	74.0	-14.6	1.59 H	257	61.0	-1.6
2	2390.00	46.3 AV	54.0	-7.7	1.59 H	257	47.9	-1.6
3	*2422.00	100.1 PK			1.59 H	257	101.8	-1.7
4	*2422.00	89.5 AV			1.59 H	257	91.2	-1.7
5	4844.00	44.2 PK	74.0	-29.8	2.05 H	277	42.0	2.2
6	4844.00	41.8 AV	54.0	-12.2	2.05 H	277	39.6	2.2
7	7266.00	44.9 PK	74.0	-29.1	1.54 H	223	35.9	9.0
8	7266.00	37.5 AV	54.0	-16.5	1.54 H	223	28.5	9.0
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	2390.00	63.6 PK	74.0	-10.4	2.54 V	352	65.2	-1.6
2	2390.00	53.5 AV	54.0	-0.5	2.54 V	352	55.1	-1.6
3	*2422.00	111.2 PK			2.54 V	352	112.9	-1.7
4	*2422.00	100.7 AV			2.54 V	352	102.4	-1.7
5	4844.00	45.5 PK	74.0	-28.5	1.76 V	264	43.3	2.2
6	4844.00	43.0 AV	54.0	-11.0	1.76 V	264	40.8	2.2
7	7266.00	46.0 PK	74.0	-28.0	2.43 V	277	37.0	9.0
8	7266.00	38.6 AV	54.0	-15.4	2.43 V	277	29.6	9.0

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 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.1 PK	74.0	-11.9	1.73 H	299	63.7	-1.6
2	2390.00	48.9 AV	54.0	-5.1	1.73 H	299	50.5	-1.6
3	*2437.00	105.3 PK			1.73 H	299	107.1	-1.8
4	*2437.00	94.6 AV			1.73 H	299	96.4	-1.8
5	2483.50	60.8 PK	74.0	-13.2	1.73 H	299	62.5	-1.7
6	2483.50	47.6 AV	54.0	-6.4	1.73 H	299	49.3	-1.7
7	4874.00	46.6 PK	74.0	-27.4	2.07 H	279	44.2	2.4
8	4874.00	44.0 AV	54.0	-10.0	2.07 H	279	41.6	2.4
9	7311.00	47.0 PK	74.0	-27.0	1.59 H	229	37.8	9.2
10	7311.00	39.8 AV	54.0	-14.2	1.59 H	229	30.6	9.2
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	2390.00	65.7 PK	74.0	-8.3	2.89 V	318	67.3	-1.6
2	2390.00	53.6 AV	54.0	-0.4	2.89 V	318	55.2	-1.6
3	*2437.00	115.4 PK			2.89 V	318	117.2	-1.8
4	*2437.00	105.7 AV			2.89 V	318	107.5	-1.8
5	2483.50	70.1 PK	74.0	-3.9	2.89 V	318	71.8	-1.7
6	2483.50	52.7 AV	54.0	-1.3	2.89 V	318	54.4	-1.7
7	4874.00	47.5 PK	74.0	-26.5	1.64 V	277	45.1	2.4
8	4874.00	44.9 AV	54.0	-9.1	1.64 V	277	42.5	2.4
9	7311.00	47.9 PK	74.0	-26.1	2.22 V	256	38.7	9.2
10	7311.00	40.6 AV	54.0	-13.4	2.22 V	256	31.4	9.2

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 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	*2452.00	104.2 PK			1.66 H	300	106.0	-1.8
2	*2452.00	93.5 AV			1.66 H	300	95.3	-1.8
3	2483.50	61.2 PK	74.0	-12.8	1.66 H	300	62.9	-1.7
4	2483.50	48.0 AV	54.0	-6.0	1.66 H	300	49.7	-1.7
5	4904.00	46.5 PK	74.0	-27.5	1.99 H	245	44.0	2.5
6	4904.00	43.5 AV	54.0	-10.5	1.99 H	245	41.0	2.5
7	7356.00	46.8 PK	74.0	-27.2	1.67 H	246	37.6	9.2
8	7356.00	39.5 AV	54.0	-14.5	1.67 H	246	30.3	9.2
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	*2452.00	115.3 PK			2.77 V	316	117.1	-1.8
2	*2452.00	104.5 AV			2.77 V	316	106.3	-1.8
3	2483.50	64.7 PK	74.0	-9.3	2.77 V	316	66.4	-1.7
4	2483.50	53.3 AV	54.0	-0.7	2.77 V	316	55.0	-1.7
5	4904.00	47.2 PK	74.0	-26.8	1.92 V	261	44.7	2.5
6	4904.00	44.6 AV	54.0	-9.4	1.92 V	261	42.1	2.5
7	7356.00	47.5 PK	74.0	-26.5	2.44 V	280	38.3	9.2
8	7356.00	40.2 AV	54.0	-13.8	2.44 V	280	31.0	9.2

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.

Below 1GHz Data:

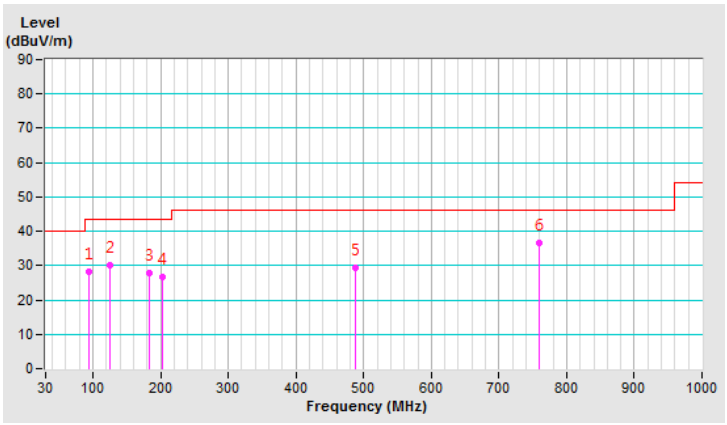
802.11b

CHANNEL	TX Channel 11	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	94.55	28.2 QP	43.5	-15.3	2.50 H	254	40.9	-12.7
2	125.01	30.1 QP	43.5	-13.4	2.50 H	77	39.5	-9.4
3	182.63	27.8 QP	43.5	-15.7	1.50 H	101	37.4	-9.6
4	202.85	26.7 QP	43.5	-16.8	1.50 H	356	37.0	-10.3
5	487.52	29.4 QP	46.0	-16.6	2.00 H	360	31.4	-2.0
6	759.03	36.5 QP	46.0	-9.5	1.00 H	155	32.8	3.7

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 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.

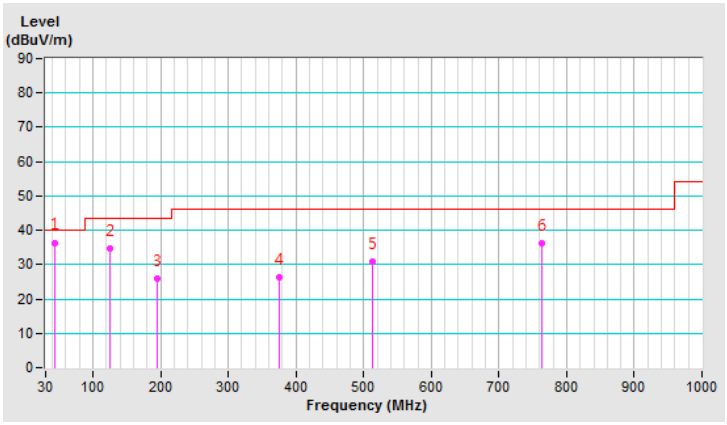


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.99	36.4 QP	40.0	-3.6	1.00 V	216	44.7	-8.3
2	125.01	34.6 QP	43.5	-8.9	1.00 V	276	44.0	-9.4
3	194.80	26.0 QP	43.5	-17.5	1.00 V	162	36.3	-10.3
4	375.05	26.3 QP	46.0	-19.7	1.50 V	81	31.2	-4.9
5	512.53	30.8 QP	46.0	-15.2	1.00 V	263	32.1	-1.3
6	762.52	36.1 QP	46.0	-9.9	1.50 V	264	32.4	3.7

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 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 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Aug. 02, 2019

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.

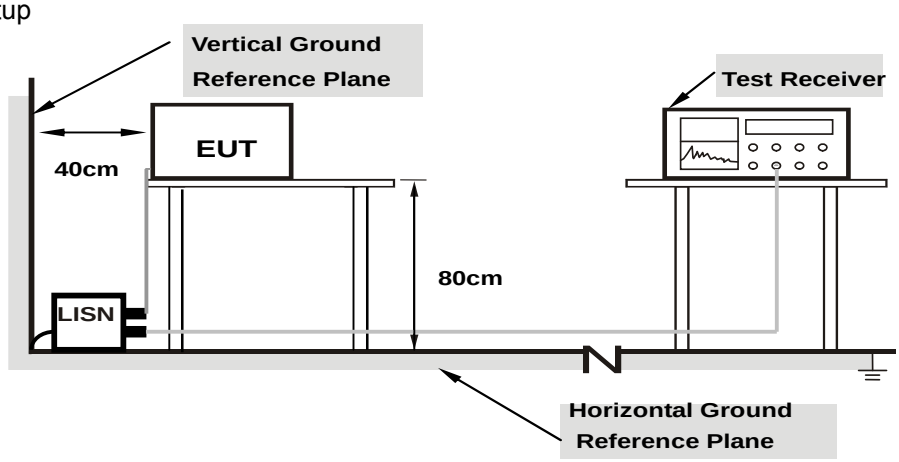
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

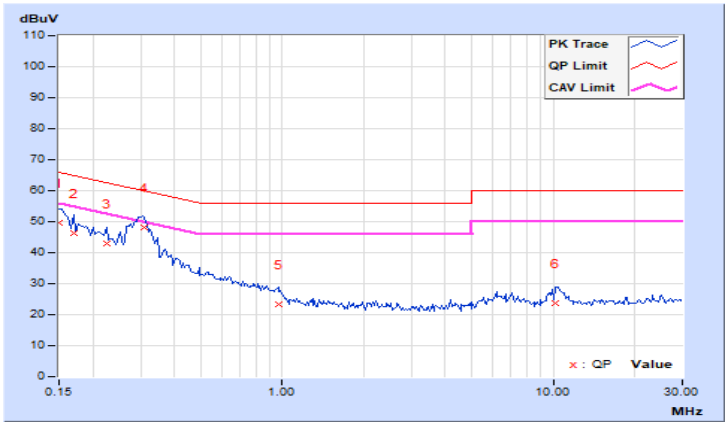
4.2.7 Test Results

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

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	0.15000	9.96	39.51	25.77	49.47	35.73	66.00	56.00	-16.53	-20.27
2	0.16953	9.97	36.38	23.35	46.35	33.32	64.98	54.98	-18.63	-21.66
3	0.22422	9.97	33.00	23.60	42.97	33.57	62.66	52.66	-19.69	-19.09
4	**0.31016**	**9.98**	**38.25**	**30.25**	**48.23**	**40.23**	**59.97**	**49.97**	**-11.74**	**-9.74**
5	0.97031	10.03	13.15	7.24	23.18	17.27	56.00	46.00	-32.82	-28.73
6	10.13672	10.65	12.94	6.63	23.59	17.28	60.00	50.00	-36.41	-32.72

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

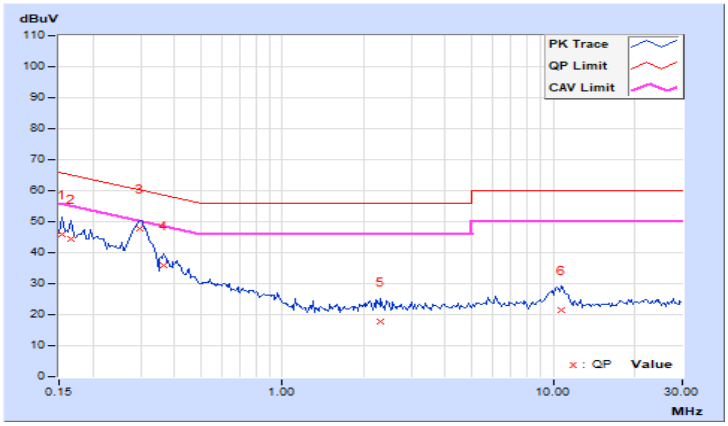


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15391	9.95	36.10	25.89	46.05	35.84	65.79	55.79	-19.74	-19.95
2	0.16562	9.95	34.45	23.97	44.40	33.92	65.18	55.18	-20.78	-21.26
3	0.29844	9.96	37.97	30.41	47.93	40.37	60.29	50.29	-12.36	-9.92
4	0.36484	9.97	25.82	15.59	35.79	25.56	58.62	48.62	-22.83	-23.06
5	2.30859	10.11	7.80	1.92	17.91	12.03	56.00	46.00	-38.09	-33.97
6	10.70313	10.59	10.94	4.91	21.53	15.50	60.00	50.00	-38.47	-34.50

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

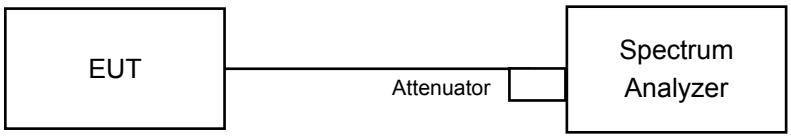


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

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 Result

CDD Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	7.11	7.11	0.5	Pass
6	2437	7.07	7.08	0.5	Pass
11	2462	7.10	7.10	0.5	Pass

802.11g

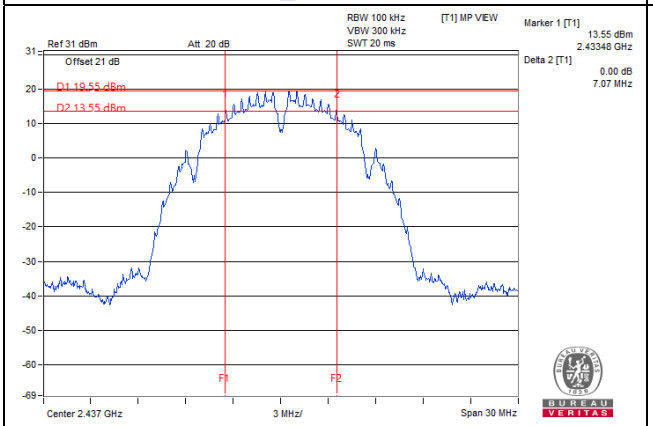
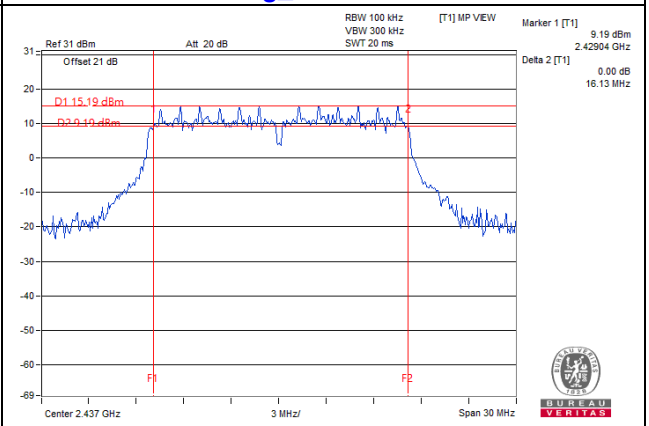
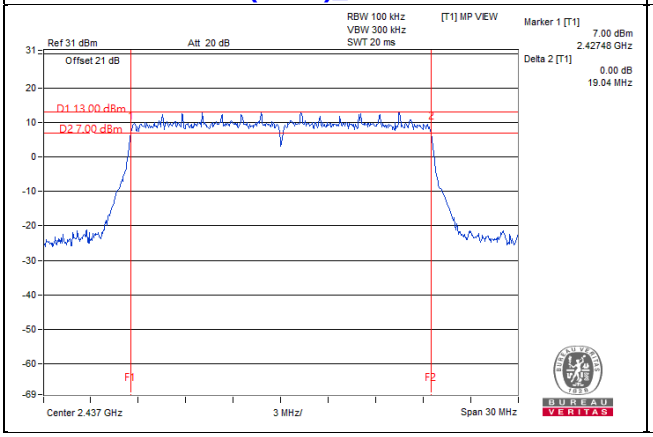
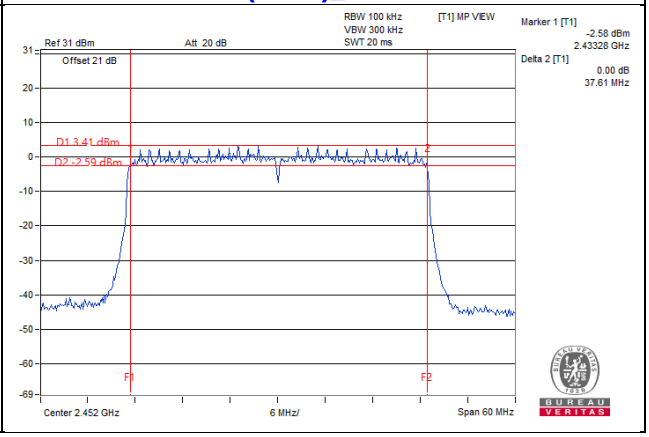
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.35	16.43	0.5	Pass
6	2437	16.13	16.43	0.5	Pass
11	2462	16.35	16.42	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	19.10	19.07	0.5	Pass
6	2437	19.07	19.04	0.5	Pass
11	2462	19.15	19.05	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.94	37.73	0.5	Pass
6	2437	39.91	37.72	0.5	Pass
9	2452	37.95	37.61	0.5	Pass

Spectrum Plot of Worst Value	
802.11b_Chain 0 / CH6	**802.11g_Chain 0 / CH6**
	
802.11ax (HE20)_Chain 1 / CH6	**802.11ax (HE40)_Chain 1 / CH9**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

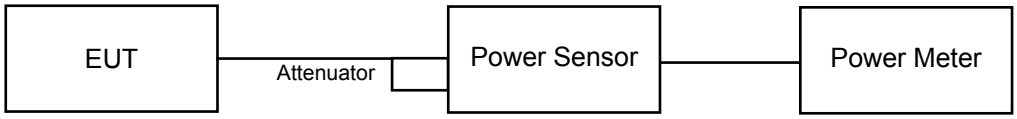
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output 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.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

Non-Beamforming Mode

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	25.45	25.44	700.697	28.46	30	Pass
6	2437	26.85	26.83	966.12	29.85	30	Pass
11	2462	27.22	26.56	980.128	29.91	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.39	20.65	225.541	23.53	30	Pass
6	2437	26.11	25.97	803.686	29.05	30	Pass
11	2462	21.71	21.61	293.129	24.67	30	Pass

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.73	18.94	152.988	21.85	30	Pass
6	2437	26.03	26.01	799.892	29.03	30	Pass
11	2462	20.55	20.43	223.909	23.50	30	Pass

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.26	16.04	82.446	19.16	30	Pass
6	2437	20.66	20.42	226.567	23.55	30	Pass
9	2452	19.71	19.60	184.742	22.67	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.73	18.94	152.988	21.85	30	Pass
6	2437	26.03	26.01	799.892	29.03	30	Pass
11	2462	20.55	20.43	223.909	23.50	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.26	16.04	82.446	19.16	30	Pass
6	2437	20.66	20.42	226.567	23.55	30	Pass
9	2452	19.71	19.60	184.742	22.67	30	Pass

Beamforming Mode

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.73	18.94	152.988	21.85	30	Pass
6	2437	26.03	26.01	799.892	29.03	30	Pass
11	2462	20.55	20.43	223.909	23.50	30	Pass

Note: 1. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.12dBi < 6dBi, so the power limit shall not be reduced.

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.26	16.04	82.446	19.16	30	Pass
6	2437	20.66	20.42	226.567	23.55	30	Pass
9	2452	19.71	19.60	184.742	22.67	30	Pass

Note: 1. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.12dBi < 6dBi, so the power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.73	18.94	152.988	21.85	30	Pass
6	2437	26.03	26.01	799.892	29.03	30	Pass
11	2462	20.55	20.43	223.909	23.50	30	Pass

Note: 1. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.12dBi < 6dBi, so the power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.26	16.04	82.446	19.16	30	Pass
6	2437	20.66	20.42	226.567	23.55	30	Pass
9	2452	19.71	19.60	184.742	22.67	30	Pass

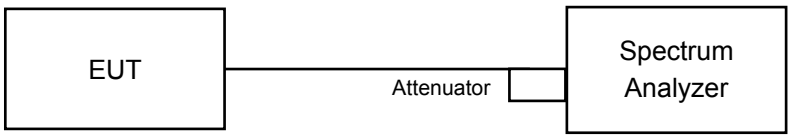
Note: 1. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.12dBi < 6dBi, so the power limit shall not be reduced.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For 802.11ax (HE40):

a. Measure the duty cycle (x).
b. Set instrument center frequency to DTS channel center frequency.
c. Set span to at least 1.5 times the OBW.
d. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz..
e. Set VBW ≥3 x RBW.
f. Detector = power averaging (RMS) or sample detector (when RMS not available).
g. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h. Sweep time = auto couple.
i. Do not use sweep triggering. Allow sweep to “free run”.
j. Employ trace averaging (RMS) mode over a minimum of 100 traces.
k. Use the peak marker function to determine the maximum amplitude level.
l. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

For Other Modulation Mode:

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-6.33	3.01	-3.32	8	Pass
	6	2437	-5.19	3.01	-2.18	8	Pass
	11	2462	-4.95	3.01	-1.94	8	Pass
1	1	2412	-6.89	3.01	-3.88	8	Pass
	6	2437	-5.61	3.01	-2.60	8	Pass
	11	2462	-6.31	3.01	-3.30	8	Pass

Note: 1. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.12dBi < 6dBi, so the power density limit shall not be reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-6.49	3.01	-3.48	8	Pass
	6	2437	0.47	3.01	3.48	8	Pass
	11	2462	-5.18	3.01	-2.17	8	Pass
1	1	2412	-14.46	3.01	-11.45	8	Pass
	6	2437	-7.91	3.01	-4.90	8	Pass
	11	2462	-13.79	3.01	-10.78	8	Pass

Note: 1. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.12dBi < 6dBi, so the power density limit shall not be reduced.

802.11ax (HE20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-16.30	3.01	-13.29	8	Pass
	6	2437	-9.40	3.01	-6.39	8	Pass
	11	2462	-15.69	3.01	-12.68	8	Pass
1	1	2412	-15.90	3.01	-12.89	8	Pass
	6	2437	-10.36	3.01	-7.35	8	Pass
	11	2462	-16.22	3.01	-13.21	8	Pass

Note: 1. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.12dBi < 6dBi, so the power density limit shall not be reduced.

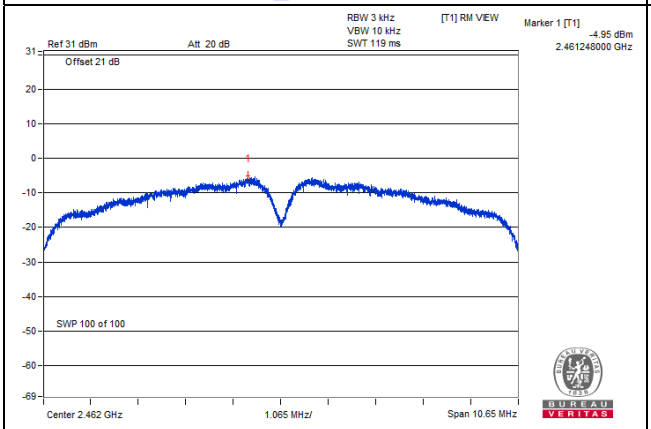
802.11ax (HE40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-20.32	3.01	0.12	-17.17	8	Pass
	6	2437	-16.04	3.01	0.12	-12.89	8	Pass
	9	2452	-18.96	3.01	0.12	-15.81	8	Pass
1	3	2422	-20.21	3.01	0.12	-17.06	8	Pass
	6	2437	-16.72	3.01	0.12	-13.57	8	Pass
	9	2452	-19.35	3.01	0.12	-16.20	8	Pass

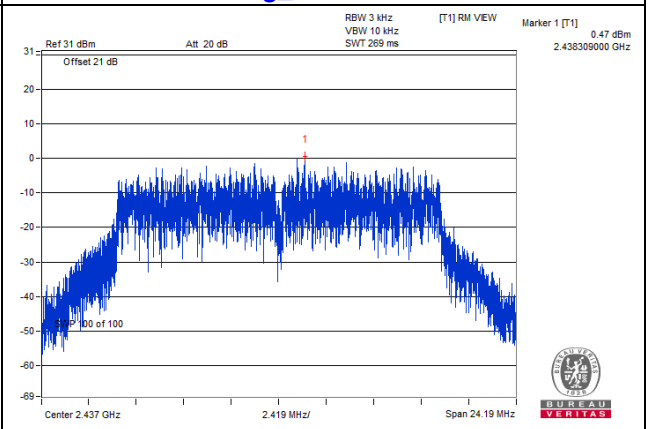
Note: 1. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.12dBi < 6dBi, so the power density limit shall not be reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

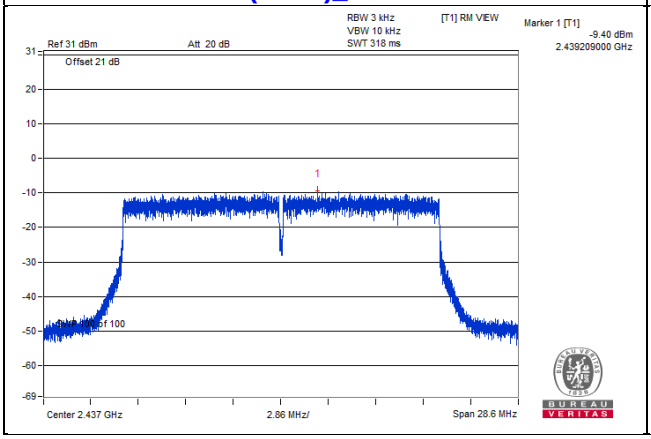
802.11b_Chain 0 / CH11



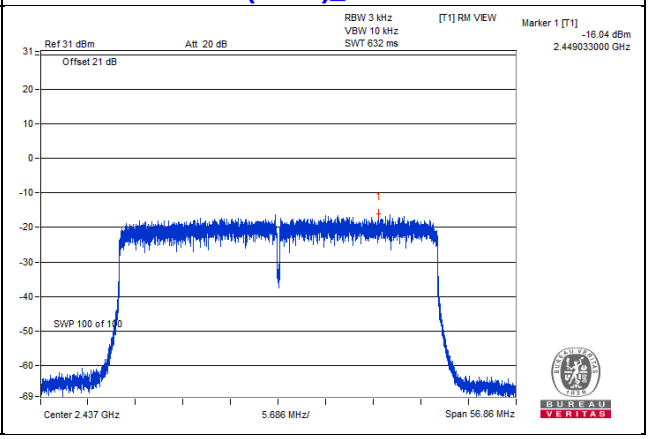
802.11g_Chain 0 / CH6



802.11ax (HE20)_Chain 0 / CH6



802.11ax (HE40)_Chain 0 / CH6

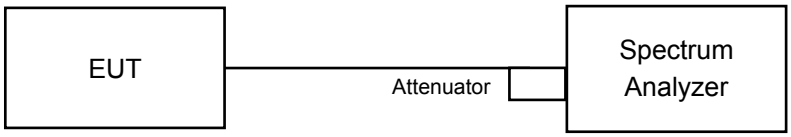


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

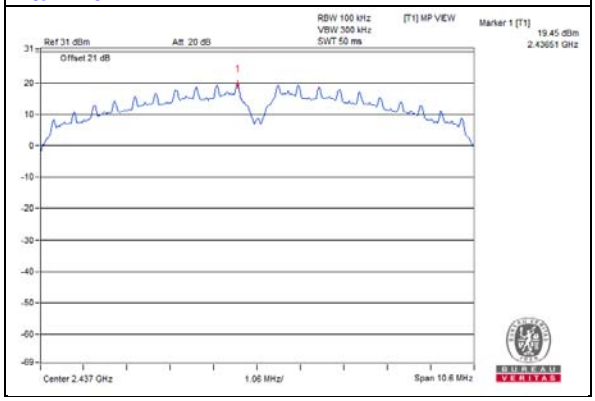
Same as Item 4.3.6

4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

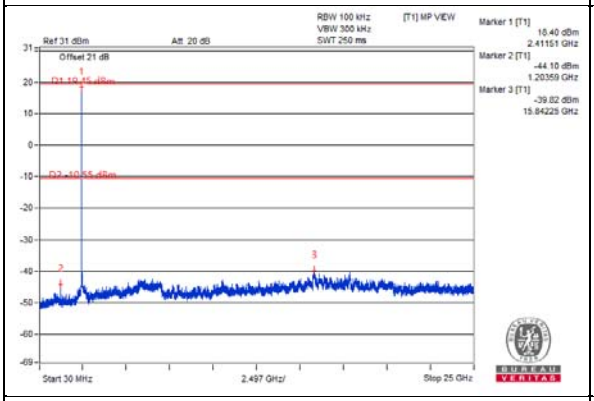
802.11b

Maximum REF

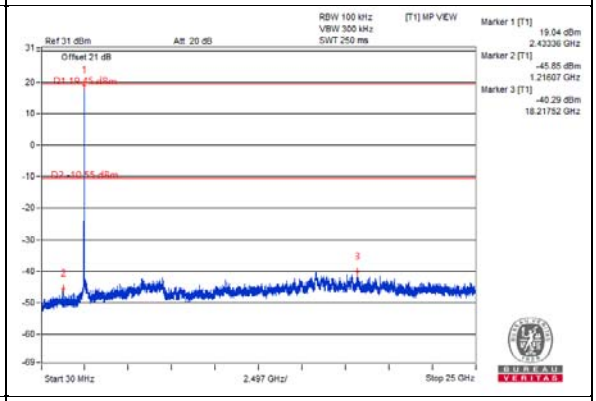


Chain 0

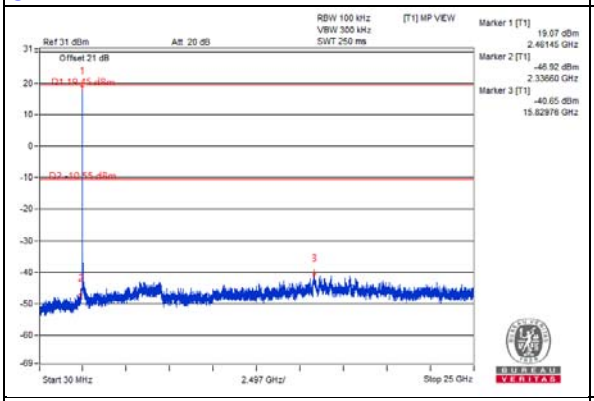
CH 1



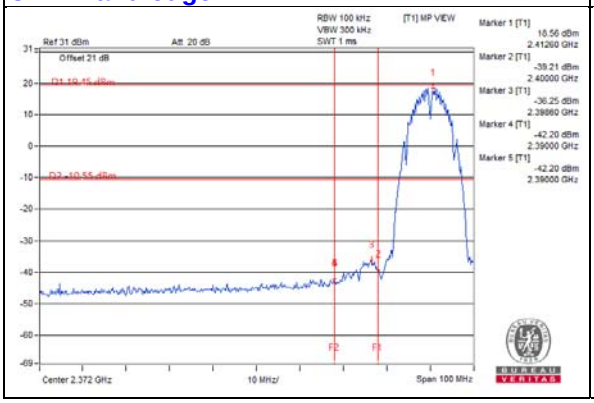
CH 6



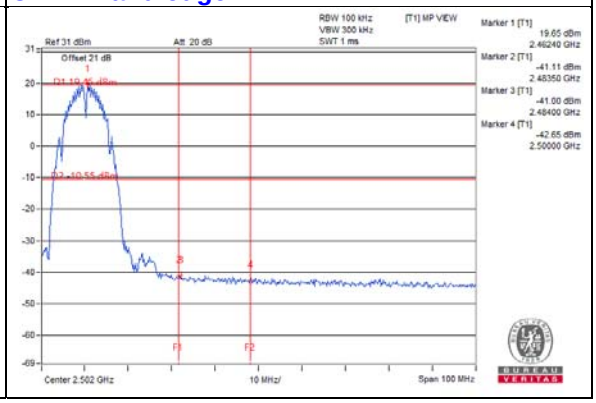
CH 11



CH 1 Band edge

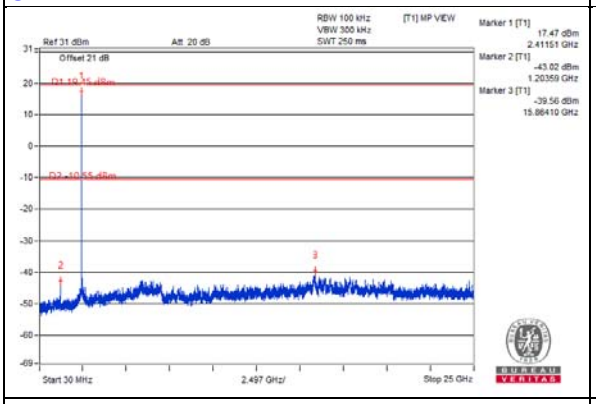


CH 11 Band edge

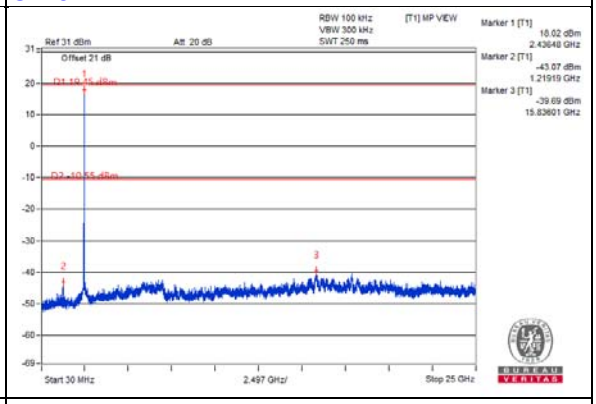


Chain 1

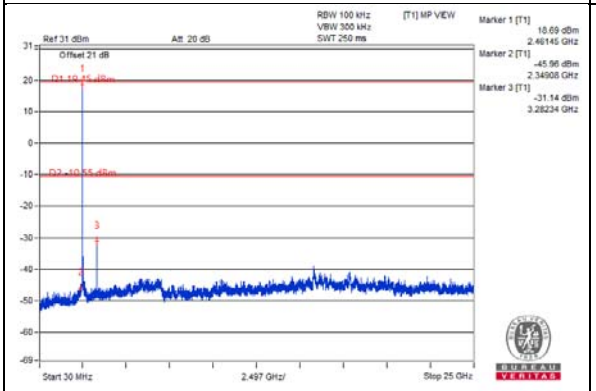
CH 1



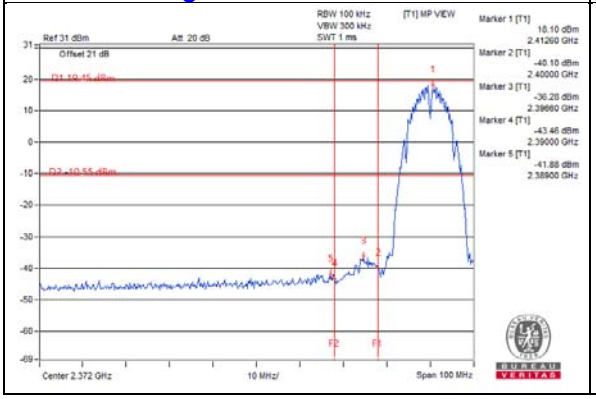
CH 6



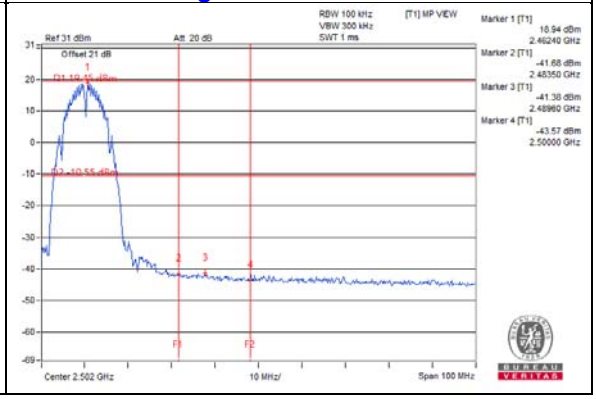
CH 11



CH 1 Band edge

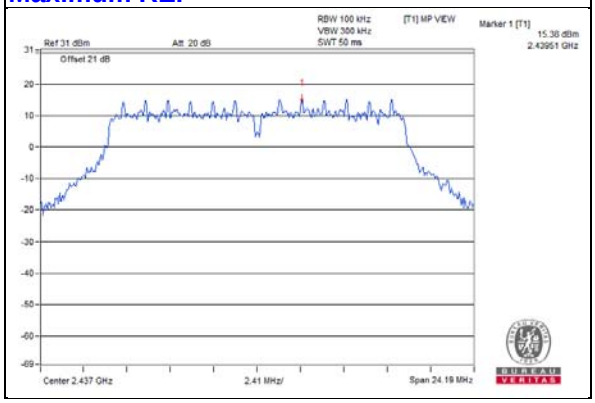


CH 11 Band edge



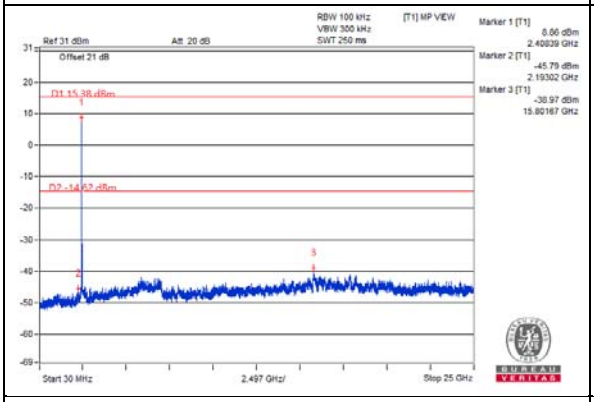
802.11g

Maximum REF

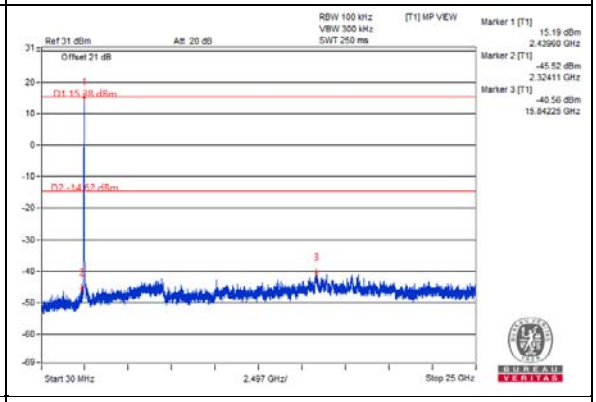


Chain 0

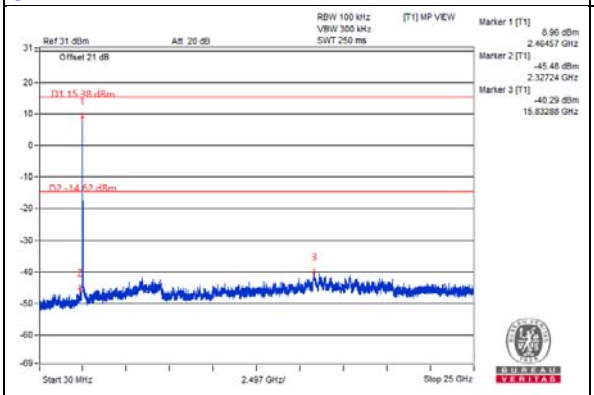
CH 1



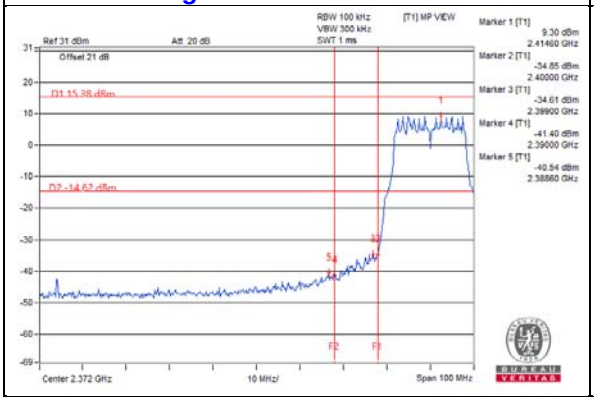
CH 6



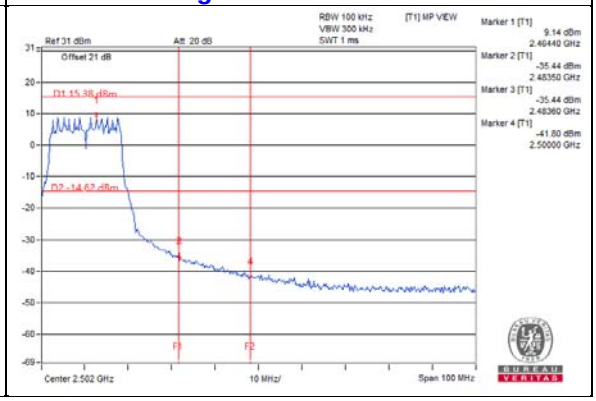
CH 11



CH 1 Band edge

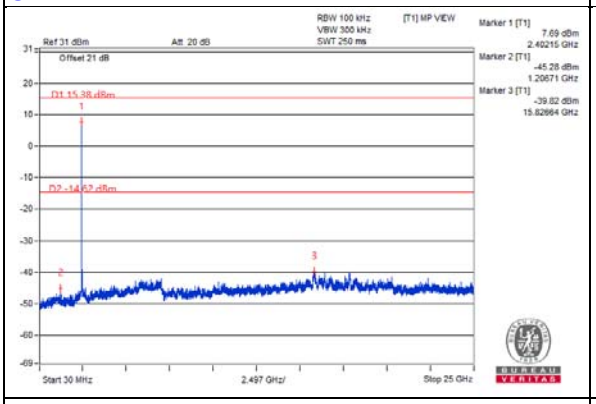


CH 11 Band edge

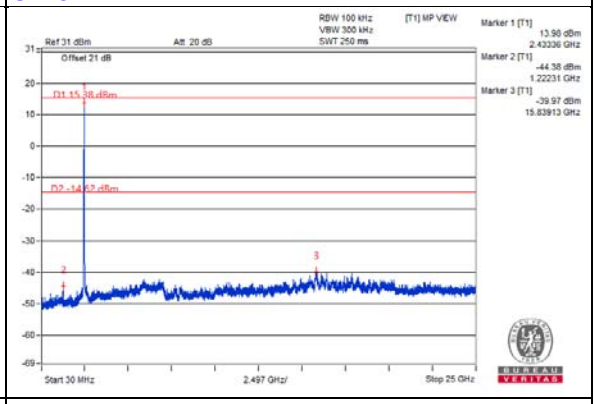


Chain 1

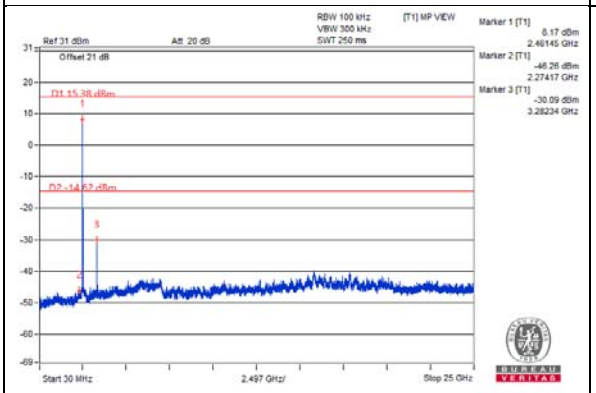
CH 1



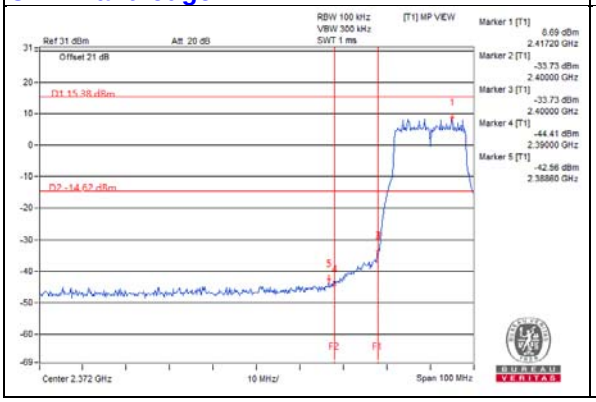
CH 6



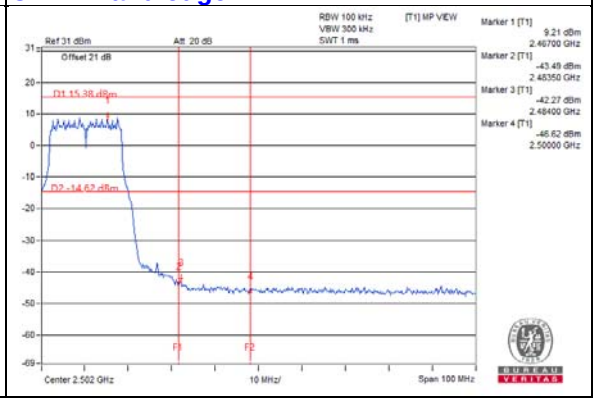
CH 11



CH 1 Band edge

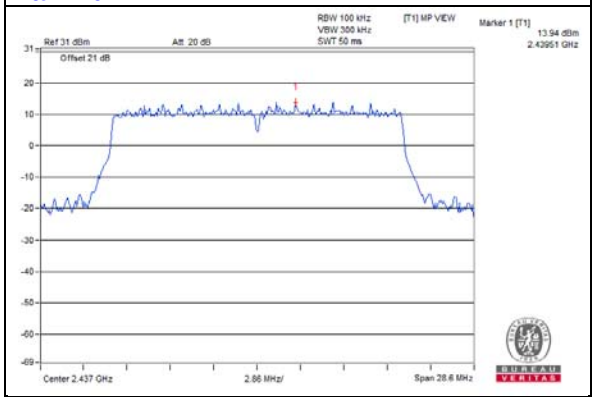


CH 11 Band edge



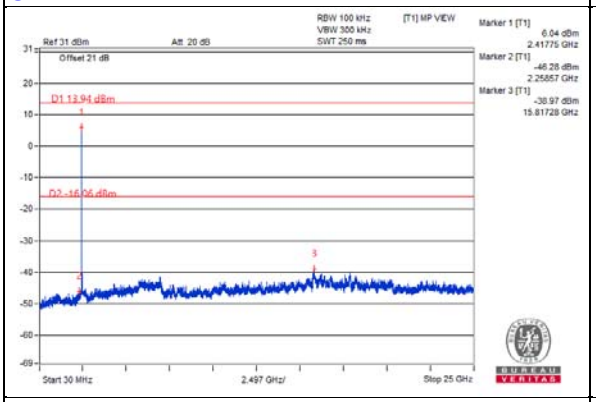
802.11ax (HE20)

Maximum REF

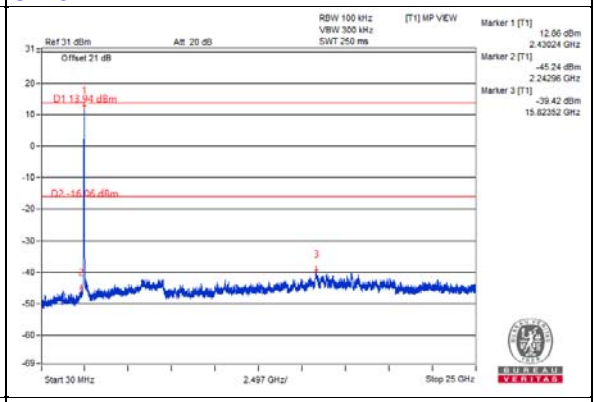


Chain 0

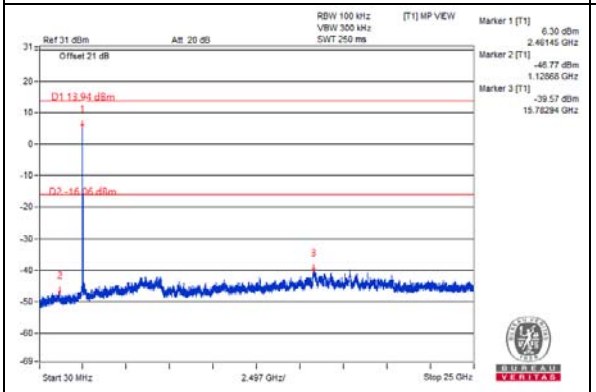
CH 1



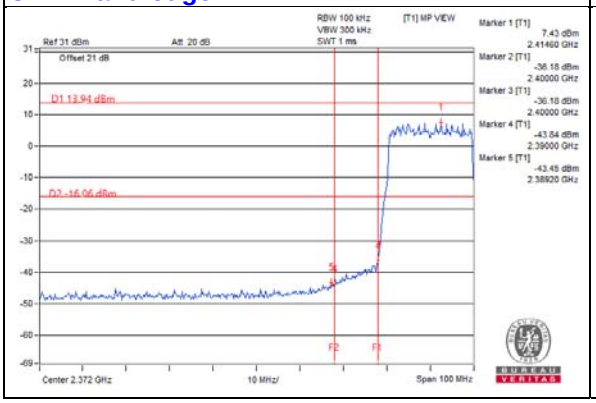
CH 6



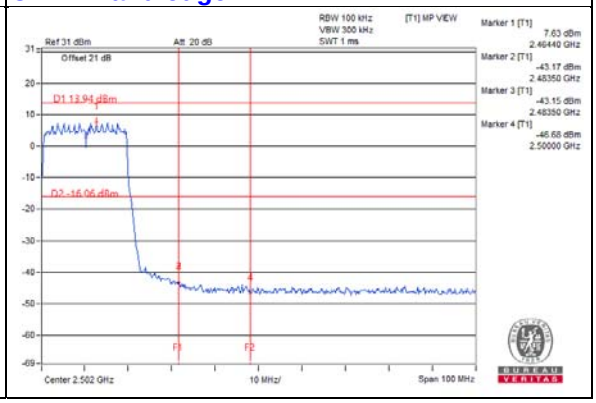
CH 11



CH 1 Band edge

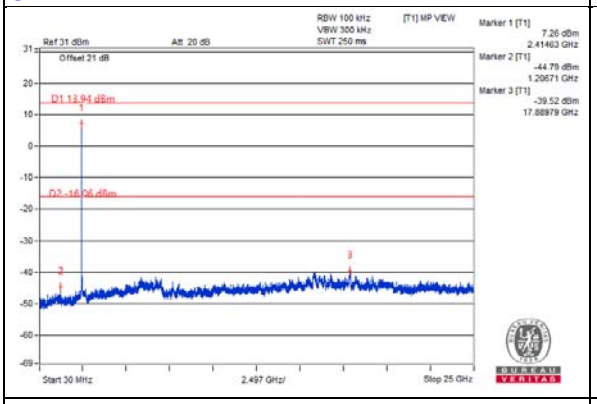


CH 11 Band edge

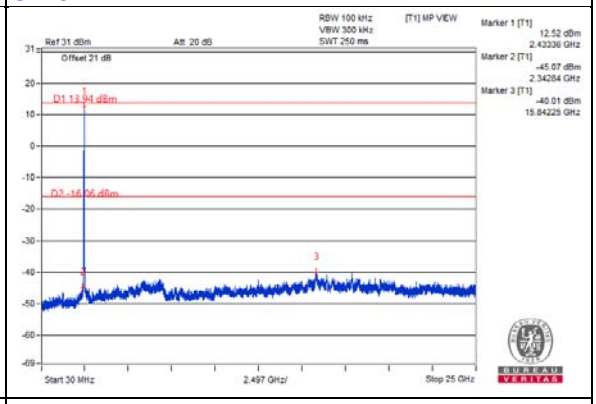


Chain 1

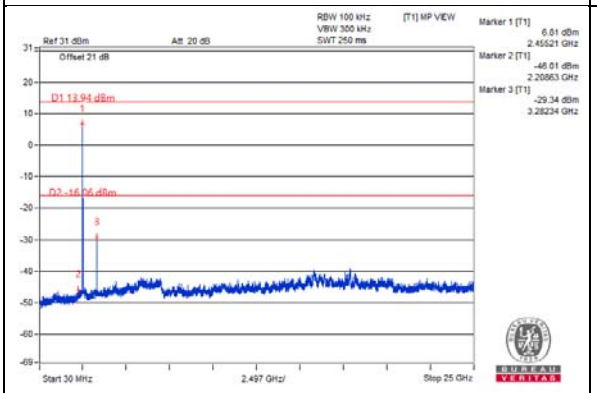
CH 1



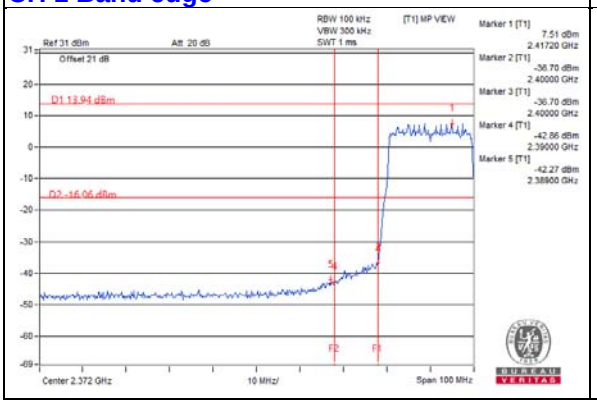
CH 6



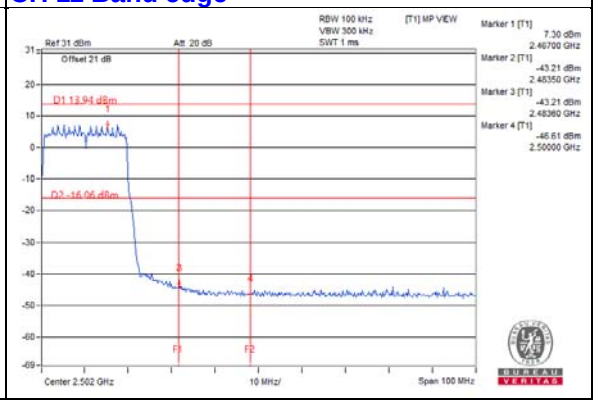
CH 11



CH 1 Band edge

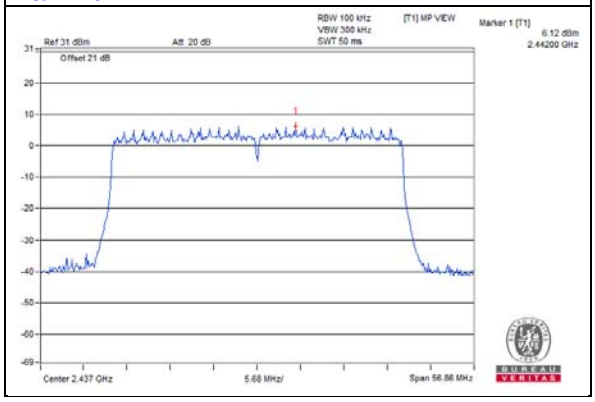


CH 11 Band edge



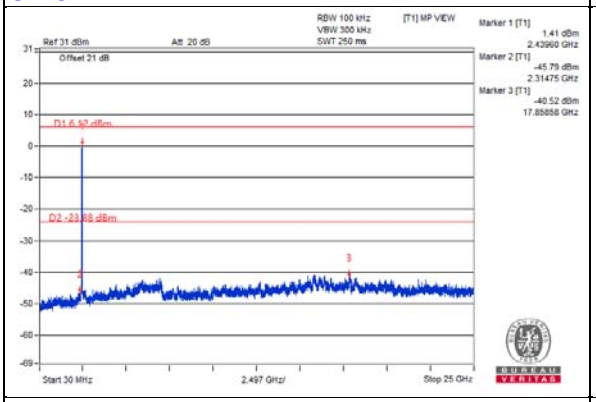
802.11ax (HE40)

Maximum REF

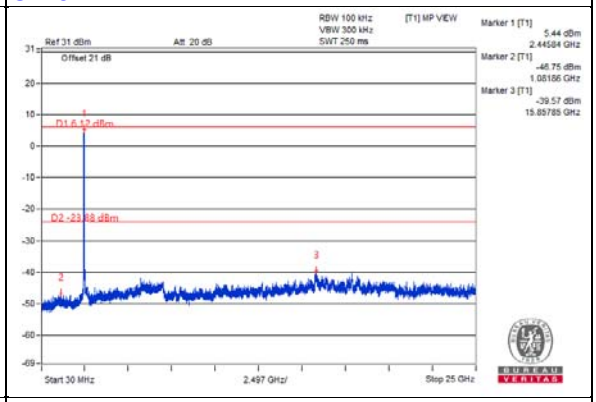


Chain 0

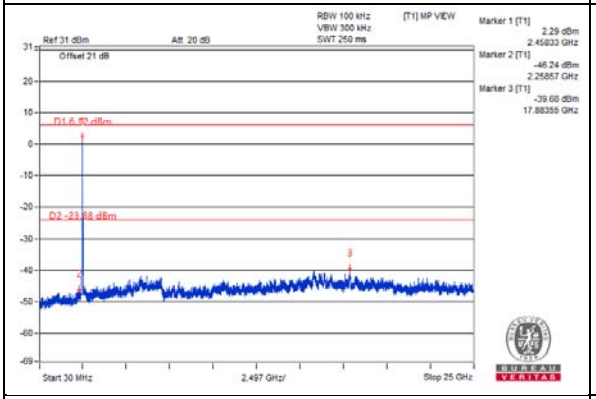
CH 3



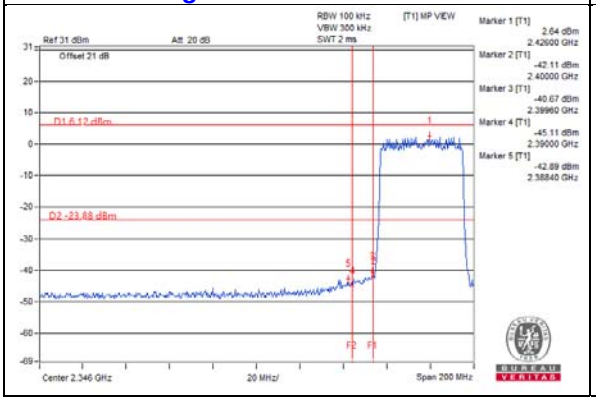
CH 6



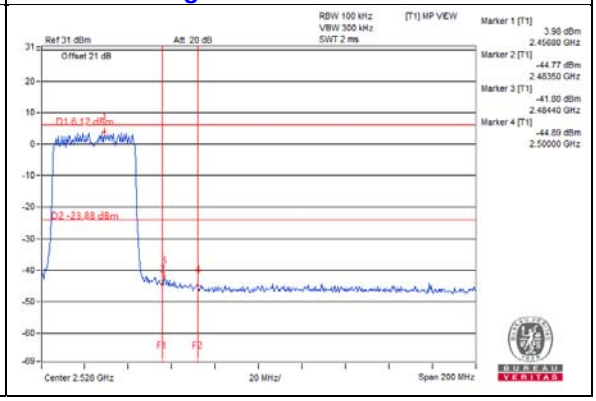
CH 9



CH 3 Band edge

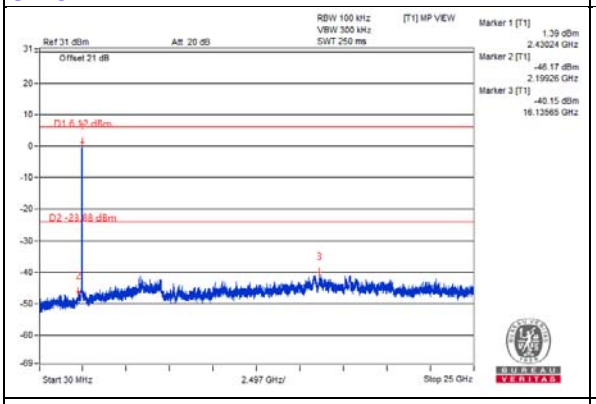


CH 9 Band edge

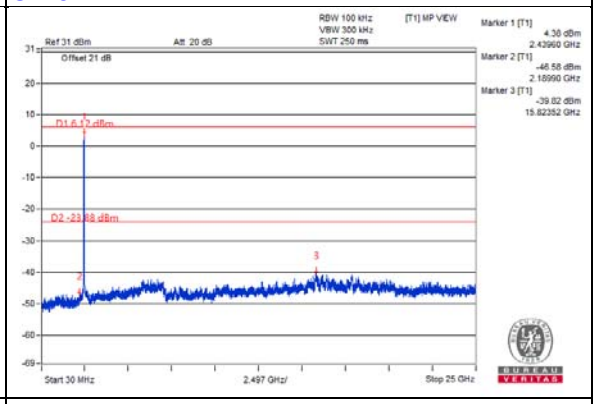


Chain 1

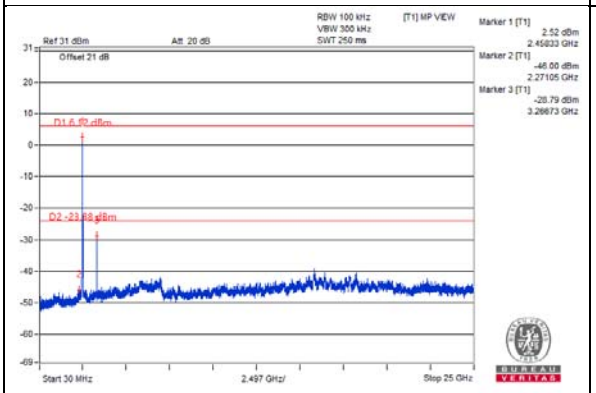
CH 3



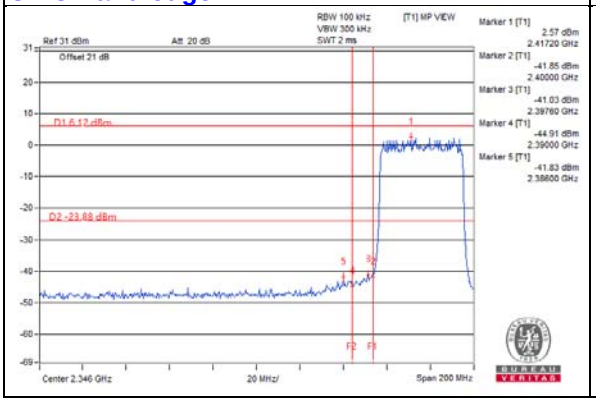
CH 6



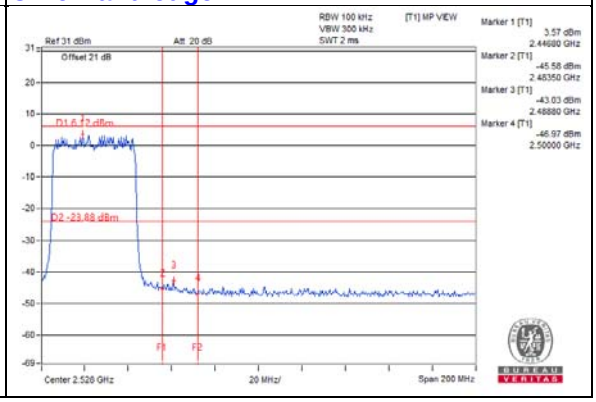
CH 9



CH 3 Band edge



CH 9 Band edge



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:

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Web Site: www.bureauveritas-adt.com

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

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