

FCC Test Report

Report No.: RF190912E02A-1

FCC ID: 2AHBN-AP33

Test Model: AP32, AP32E, AP33

Received Date: Sep. 26, 2019

Test Date: Oct. 04, 2019 to Jan. 22, 2020

Issued Date: Feb. 19, 2020

Applicant: Mist Systems, Inc.

Address: 1601 South De Anza Blvd. Suite 248 Cupertino California United States
95014

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

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

**FCC Registration /
Designation Number:** 723255 / TW2022



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT (WLAN)	7
3.2 Description of Test Modes	13
3.2.1 Test Mode Applicability and Tested Channel Detail	14
3.3 Duty Cycle of Test Signal	18
3.4 Description of Support Units	20
3.4.1 Configuration of System under Test	21
3.5 General Description of Applied Standard and References	23
4 Test Types and Results	24
4.1 Radiated Emission and Bandedge Measurement	24
4.1.1 Limits of Radiated Emission and Bandedge Measurement	24
4.1.2 Test Instruments	25
4.1.3 Test Procedure	29
4.1.4 Deviation from Test Standard	29
4.1.5 Test Setup	30
4.1.6 EUT Operating Condition	31
4.1.7 Test Results (Mode 1)	32
4.1.8 Test Results (Mode 2)	50
4.1.9 Test Results (Mode 3)	68
4.1.10 Test Results (Mode 4)	86
4.1.11 Test Results (Mode 5)	104
4.1.12 Test Results (Mode 6)	122
4.1.13 Test Results (Mode 7)	142
4.1.14 Test Results (Mode 8)	160
4.1.15 Test Results (Mode 9)	178
4.1.16 Test Results (Mode 10)	196
4.1.17 Test Results (Mode 11)	216
4.1.18 Test Results (Mode 12)	236
4.1.19 Test Results (Mode 13)	254
4.1.20 Test Results (Mode 14)	272
4.1.21 Test Results (Mode 15)	290
4.2 Conducted Emission Measurement	310
4.2.1 Limits of Conducted Emission Measurement	310
4.2.2 Test Instruments	310
4.2.3 Test Procedure	311
4.2.4 Deviation from Test Standard	311
4.2.5 Test Setup	311
4.2.6 EUT Operating Condition	311
4.2.7 Test Results	312
4.3 Transmit Power Measurement	314
4.3.1 Limits of Transmit Power Measurement	314
4.3.2 Test Setup	314
4.3.3 Test Instruments	314
4.3.4 Test Procedure	314
4.3.5 Deviation from Test Standard	315
4.3.6 EUT Operating Condition	315
4.3.7 Test Result (Mode 1)	316
4.3.8 Test Result (Mode 2)	320

4.3.9 Test Result (Mode 3)	324
4.3.10 Test Result (Mode 4)	328
4.3.11 Test Result (Mode 5)	330
4.4 Occupied Bandwidth Measurement	332
4.4.1 Test Setup	332
4.4.2 Test Instruments	332
4.4.3 Test Procedure	332
4.4.4 Test Results (Mode 1).....	333
4.4.5 Test Results (Mode 2).....	339
4.4.6 Test Results (Mode 3).....	345
4.4.7 Test Results (Mode 4).....	349
4.4.8 Test Results (Mode 5).....	353
4.5 Peak Power Spectral Density Measurement	357
4.5.1 Limits of Peak Power Spectral Density Measurement	357
4.5.2 Test Setup.....	357
4.5.3 Test Instruments	357
4.5.4 Test Procedure	357
4.5.5 Deviation from Test Standard	358
4.5.6 EUT Operating Condition	358
4.5.7 Test Results (Mode 1).....	359
4.5.8 Test Results (Mode 2).....	365
4.5.9 Test Results (Mode 3).....	371
4.5.10 Test Results (Mode 4).....	377
4.5.11 Test Results (Mode 5).....	381
4.6 Frequency Stability Measurement.....	385
4.6.1 Limits of Frequency Stability Measurement	385
4.6.2 Test Setup.....	385
4.6.3 Test Instruments	385
4.6.4 Test Procedure	385
4.6.5 Deviation from Test Standard	385
4.6.6 EUT Operating Condition	385
4.6.7 Test Results (Mode 4).....	386
4.6.8 Test Results (Mode 5).....	387
4.7 6dB Bandwidth Measurement.....	388
4.7.1 Limits of 6dB Bandwidth Measurement.....	388
4.7.2 Test Setup.....	388
4.7.3 Test Instruments	388
4.7.4 Test Procedure	388
4.7.5 Deviation from Test Standard	388
4.7.6 EUT Operating Condition	388
4.7.7 Test Results (Mode 1).....	389
4.7.8 Test Results (Mode 2).....	391
4.7.9 Test Results (Mode 3).....	393
4.7.10 Test Results (Mode 4).....	395
4.7.11 Test Results (Mode 5).....	397
5 Pictures of Test Arrangements.....	399
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band).....	400
Appendix – Information of the Testing Laboratories	445

Release Control Record

Issue No.	Description	Date Issued
RF190912E02A-1	Original release.	Feb. 19, 2020

1 Certificate of Conformity

Product: Wi-Fi & BLE Array AP

Brand: Mist


Test Model: AP32, AP32E, AP33

Applicant: Mist Systems, Inc.

Test Date: Oct. 04, 2019 to Jan. 22, 2020

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

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

Prepared by :  , **Date:** Feb. 19, 2020
Claire Kuan / Specialist

Approved by :  , **Date:** Feb. 19, 2020
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.72dB at 0.42344MHz.
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 -0.1dB at 5150.00MHz & 5641.05MHz & 5648.79MHz & 5649.68MHz & 17235.00MHz & 17475.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is Ipex and RPSMA Plug not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.

Note:

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0 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 (WLAN)

Product	Wi-Fi & BLE Array AP
Brand	Mist
Test Model	AP32, AP32E, AP33
Power Supply Rating	55Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 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 1733.3Mbps 802.11ax: up to 2401.9Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
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: For 4TX 5.18 ~ 5.24GHz: 493.303 mW 5.745 ~ 5.825GHz: 886.912 mW For 3TX 5.18 ~ 5.24GHz: 424.571 mW 5.745 ~ 5.825GHz: 796.304 mW For 2TX 2.4GHz: 381.986 mW 5.18 ~ 5.24GHz: 394.089 mW 5.745 ~ 5.825GHz: 502.485 mW For 1TX 2.4GHz: 253.513 mW 5.18 ~ 5.24GHz: 212.324 mW 5.745 ~ 5.825GHz: 267.301 mW Beamforming Mode: For 4TX 5.18 ~ 5.24GHz: 248.428 mW 5.745 ~ 5.825GHz: 245.391 mW For 3TX 5.18 ~ 5.24GHz: 329.65 mW 5.745 ~ 5.825GHz: 329.236 mW For 2TX 2.4GHz: 218.316 mW 5.18 ~ 5.24GHz: 372.453 mW 5.745 ~ 5.825GHz: 502.485 mW For Scanning Radio 2.4GHz: 193.642 mW 5.18 ~ 5.24GHz: 86.896 mW 5.745 ~ 5.825GHz: 111.429 mW

Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. All models are listed as below.

Brand	Model	Difference
Mist	AP32	For marketing request 1) Internal antenna 2) BT with omnidirectional antenna
	AP33	For marketing request 1) Internal antenna 2) BT with directional antenna
	AP32E	For marketing request 1) External antenna 2) BT with omnidirectional antenna

Note: Output power is same for all three models and only antenna configurations are different.

2. There are WLAN and Bluetooth technology used for the EUT. The EUT has four radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN - 2.4GHz	(Scanning Radio) WLAN 2.4GHz + 5GHz	WLAN - 5GHz	Bluetooth

3. Simultaneously transmission condition.

Condition	Technology			
1	WLAN - 2.4GHz	(Scanning Radio) WLAN 2.4GHz + 5GHz	WLAN - 5GHz	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

4. The EUT power needs to be supplied from a PoE (only for test, not for sale), the information is as below table:

Brand	Model No.	Spec.
PowerDsine	PD-9001GR/AC	Input: 100-240Vac, 50-60Hz, 0.67A Output: 55Vdc, 0.6A

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

Model: AP32						
Antenna NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
Int Dual Ant 3 (WiFi 5G+BT)	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 1	-	-	4.5 5.4	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 0	-	-	4.6 5.7	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 2	-	-	5.8	5.15~5.85GHz	PIFA	Ipex
Scanning Ant	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Model: AP32E						
Antenna NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
Ext WiFi Dual Ant (2.4+5G)	AccelTex	ATS-OO-245-46-6RPSP-36	4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (2.4+5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (Scanning)			4 6	2.4~2.4835GHz (Scanning) 5.15~5.85GHz (Scanning)	omnidirectional	RPSMA Plug
Int Scanning Ant	-	-	5 6	2.4~2.4835GHz (Scanning) 5.15~5.85GHz (Scanning)	PIFA	Ipex
Int BT Ant	-	-	5	2.4~2.4835GHz	PIFA	Ipex
Model: AP33						
Antenna NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
Int WiFi Dual Ant 0	-	-	3.7 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 1	-	-	4.6 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 2	-	-	6	5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 3	-	-	5.9	5.15~5.85GHz	PIFA	Ipex
Scanning Ant	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
BT Slot_Direct Antenna	-	-	6	2.402~2.480GHz	Slot_Direct	Ipex
BT Array Antenna	-	-	Beam 1 :3.9 Beam 2 :3.9 Beam 3 :4.7 Beam 4 :4.4 Beam 5 :4.8 Beam 6 :5.1 Beam 7 :5.1 Beam 8 :4.2	2.402~2.480GHz	Array Antenna	Ipex

Note: The max. Antenna gain was selected for their final test of Antenna Port Conducted test items.

6. The EUT incorporates a MIMO function.

MODULATION MODE	Radio 1 - 2.4GHz Band		Radio 2 - 2.4GHz Band	
	TX & RX CONFIGURATION		TX & RX CONFIGURATION	
802.11b	2TX	2RX	1TX	1RX
802.11g	2TX	2RX	1TX	1RX
802.11n (HT20)	2TX	2RX	1TX	1RX
802.11n (HT40)	2TX	2RX	1TX	1RX
VHT20	2TX	2RX	1TX	1RX
VHT40	2TX	2RX	1TX	1RX
802.11ax (HE20)	2TX	2RX	1TX	1RX
802.11ax (HE40)	2TX	2RX	1TX	1RX
MODULATION MODE	Radio 3 - 5GHz Band		Radio 2 - 5GHz Band	
	TX & RX CONFIGURATION		TX & RX CONFIGURATION	
802.11a	4TX	4RX	1TX	1RX
802.11n (HT20)	4TX	4RX	1TX	1RX
802.11n (HT40)	4TX	4RX	1TX	1RX
802.11ac (VHT20)	4TX	4RX	1TX	1RX
802.11ac (VHT40)	4TX	4RX	1TX	1RX
802.11ac (VHT80)	4TX	4RX	1TX	1RX
802.11ax (HE20)	4TX	4RX	1TX	1RX
802.11ax (HE40)	4TX	4RX	1TX	1RX
802.11ax (HE80)	4TX	4RX	1TX	1RX

Note:

- All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
- 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.
- The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz, 80MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz), therefore the manufacturer will control the power for 802.11n/ac mode power for is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

7. The EUT was pre-tested under the following modes:

➤ **For Radiated Emission (Above 1GHz) test**

EUT Model No.: AP32					
Pre-test Mode	Test item	Mode	Polarity	Remark	
1	RSE above 1GHz	Scanning Radio	X-Y	-	
2	RSE above 1GHz	Scanning Radio	X-Z	Worst-Test Results Mode 5	
3	RSE above 1GHz	Scanning Radio	Y-Z	-	
EUT Model No.: AP32E					
Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	1TX	Y-Z	0	Worst-Test Results Mode 9
2	RSE above 1GHz	1TX	Y-Z	1	-
3	RSE above 1GHz	1TX	Y-Z	2	-
4	RSE above 1GHz	1TX	Y-Z	3	-
5	RSE above 1GHz	1TX	X-Y	0	-
6	RSE above 1GHz	1TX	X-Z	0	-

Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	2TX	Y-Z	0+1	-
2	RSE above 1GHz	2TX	Y-Z	0+2	Worst-Test Results Mode 8
3	RSE above 1GHz	2TX	Y-Z	0+3	-
4	RSE above 1GHz	2TX	Y-Z	1+2	-
5	RSE above 1GHz	2TX	Y-Z	1+3	-
6	RSE above 1GHz	2TX	Y-Z	2+3	-
7	RSE above 1GHz	2TX	X-Z	0+2	-
8	RSE above 1GHz	2TX	Y-Z	0+2	-
Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	3TX	X-Z	0+1+2	-
2	RSE above 1GHz	3TX	X-Z	0+1+3	-
3	RSE above 1GHz	3TX	X-Y	0+2+3	-
4	RSE above 1GHz	3TX	X-Z	1+2+3	-
5	RSE above 1GHz	3TX	X-Z	0+1+2	-
6	RSE above 1GHz	3TX	Y-Z	0+1+2	Worst-Test Results Mode 7
Pre-test Mode	Test item	Mode	Polarity	Remark	
1	RSE above 1GHz	4TX	X-Y	-	
2	RSE above 1GHz	4TX	X-Z	-	
3	RSE above 1GHz	4TX	Y-Z	Worst-Test Results Mode 6	
Pre-test Mode	Test item	Mode	Polarity	Remark	
1	RSE above 1GHz	Scanning Radio	X-Y	Worst-Test Results Mode 10	
2	RSE above 1GHz	Scanning Radio	X-Z	-	
3	RSE above 1GHz	Scanning Radio	Y-Z	-	
EUT Model No.: AP33					
Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	1TX	X-Y	0	-
2	RSE above 1GHz	1TX	X-Y	1	-
3	RSE above 1GHz	1TX	X-Y	2	-
4	RSE above 1GHz	1TX	X-Y	3	-
5	RSE above 1GHz	1TX	X-Z	1	Worst-Test Results Mode 14
6	RSE above 1GHz	1TX	Y-Z	1	-
Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	2TX	X-Y	0+1	-
2	RSE above 1GHz	2TX	X-Y	0+2	-
3	RSE above 1GHz	2TX	X-Y	0+3	-
4	RSE above 1GHz	2TX	X-Y	1+2	-
5	RSE above 1GHz	2TX	X-Y	1+3	-
6	RSE above 1GHz	2TX	X-Y	2+3	-
7	RSE above 1GHz	2TX	X-Z	2+3	-
8	RSE above 1GHz	2TX	Y-Z	2+3	Worst-Test Results Mode 13

Pre-test Mode	Test item	Mode	Polarity	Transmitter Chain	Remark
1	RSE above 1GHz	3TX	X-Y	0+1+2	-
2	RSE above 1GHz	3TX	X-Y	0+1+3	-
3	RSE above 1GHz	3TX	X-Y	0+2+3	-
4	RSE above 1GHz	3TX	X-Y	1+2+3	-
5	RSE above 1GHz	3TX	X-Z	0+2+3	-
6	RSE above 1GHz	3TX	Y-Z	0+2+3	Worst-Test Results Mode 12
Pre-test Mode	Test item	Mode	Polarity	Remark	
1	RSE above 1GHz	4TX	X-Y	-	
2	RSE above 1GHz	4TX	X-Z	Worst-Test Results Mode 11	
3	RSE above 1GHz	4TX	Y-Z	-	
Pre-test Mode	Test item	Mode	Polarity	Remark	
1	RSE above 1GHz	Scanning Radio	X-Y	Worst-Test Results Mode 15	
2	RSE above 1GHz	Scanning Radio	X-Z	-	
3	RSE above 1GHz	Scanning Radio	Y-Z	-	

➤ **For Radiated Emission (Below 1GHz) test**

Pre-test Mode	Test item	Model No.	Polarity	Remark
1	RSE below 1GHz	AP32	X-Y	-
2	RSE below 1GHz	AP33	X-Y	-
3	RSE below 1GHz	AP33	X-Z	Worst-Test Results Mode 11
4	RSE below 1GHz	AP33	Y-Z	-
5	RSE below 1GHz	AP32E	X-Y	-
6	RSE below 1GHz	AP32E	X-Z	-
7	RSE below 1GHz	AP32E	Y-Z	Worst-Test Results Mode 6

➤ **For AC Power Conducted Emission test**

Pre-test Mode	Test item	Model No.	Remark
1	AC Power Conducted	AP32	Worst-Test Results Mode 1
2	AC Power Conducted	AP32E	-
3	AC Power Conducted	AP33	-

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE \geq 1G	RE $<$ 1G	PLC	APCM	
1	√	-	√	√	Model: AP32 with 4TX
2	√	-	-	√	Model: AP32 with 3TX
3	√	-	-	√	Model: AP32 with 2TX
4	√	-	-	√	Model: AP32 with 1TX
5	√	-	-	√	Model: AP32 with Scanning Radio
6	√	√	-	-	Model: AP32E with 4TX
7	√	-	-	-	Model: AP32E with 3TX
8	√	-	-	-	Model: AP32E with 2TX
9	√	-	-	-	Model: AP32E with 1TX
10	√	√	-	-	Model: AP32E with Scanning Radio
11	√	√	-	-	Model: AP33 with 4TX
12	√	-	-	-	Model: AP33 with 3TX
13	√	-	-	-	Model: AP33 with 2TX
14	√	-	-	-	Model: AP33 with 1TX
15	√	√	-	-	Model: AP33 with Scanning Radio

Where **RE \geq 1G**: Radiated Emission above 1GHz
PLC: Power Line Conducted Emission

RE $<$ 1G: Radiated Emission below 1GHz
APCM: Antenna Port Conducted Measurement

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							
Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
1~15	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6Mb/s
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
	802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
	802.11ax (HE80)		155	155	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							
Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
6, 10, 11, 15	802.11ax (HE40)	5180-5240 5745-5825	38 to 46 151 to 159	159	OFDMA	BPSK	MCS0

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							
Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
1	802.11ax (HE40)	5180-5240 5745-5825	38 to 46 151 to 159	159	OFDMA	BPSK	MCS0

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 (Frequency Stability test only)

Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
4, 5	802.11a	5180-5240 5745-5825	36 to 48 149 to 165	36	OFDM	-	-

Non-Beamforming Mode (Other test items)

Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
1~5	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6Mb/s
	802.11ac (VHT20) (Output power only)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0
	802.11ac (VHT40) (Output power only)		38 to 46	38, 46	OFDM	BPSK	MCS0
	802.11ac (VHT80) (Output power only)		42	42	OFDM	BPSK	MCS0
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
	802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s
	802.11ac (VHT20) (Output power only)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
	802.11ac (VHT40) (Output power only)		151 to 159	151, 159	OFDM	BPSK	MCS0
	802.11ac (VHT80) (Output power only)		155	155	OFDM	BPSK	MCS0
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
	802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0

Beamforming Mode (output power test only)

Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
1~5	802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	MCS0
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	MCS0
	802.11ac (VHT80)		42	42	OFDM	BPSK	MCS0
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
	802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
	802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	MCS0
	802.11ac (VHT80)		155	155	OFDM	BPSK	MCS0
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
	802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE \geq 1G	23deg. C, 67%RH	120Vac, 60Hz	Kevin Ko
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Kevin Ko
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

For Radio 2:

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

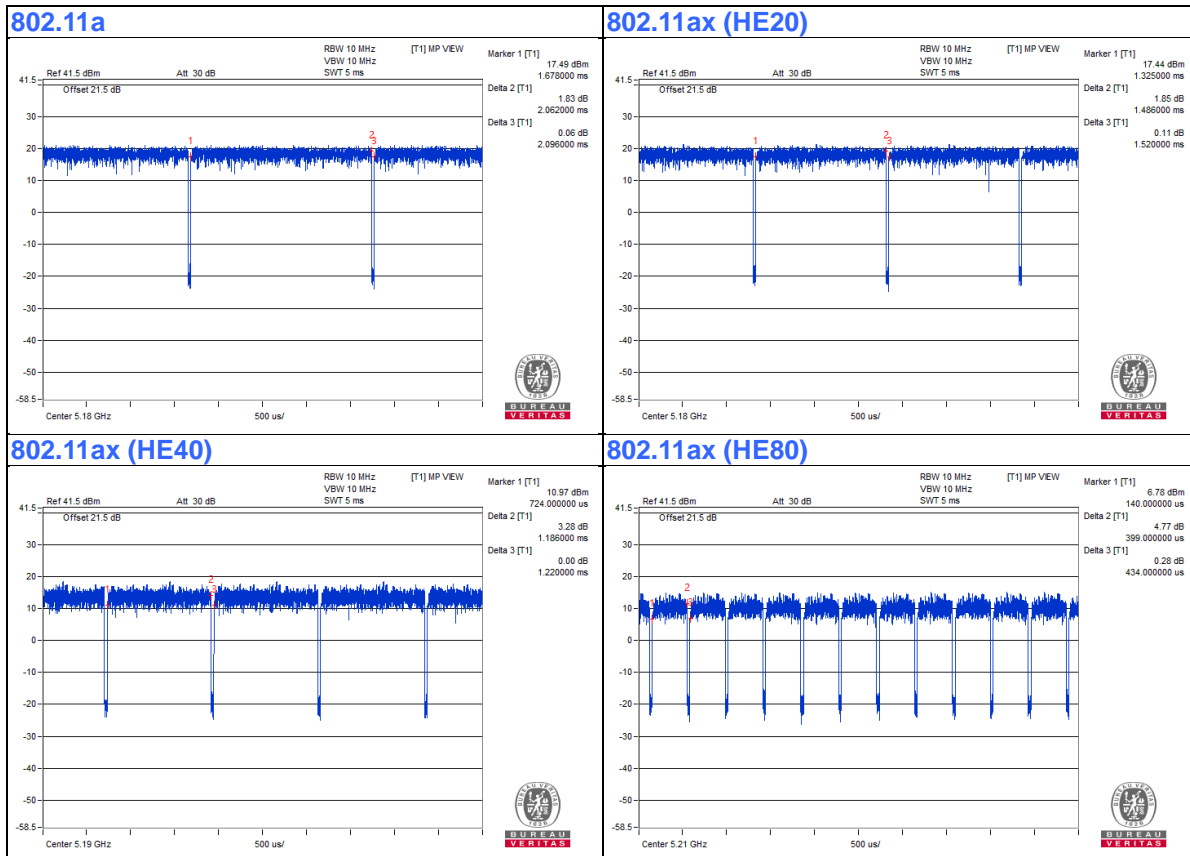
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = 2.062 ms/2.096 ms = 0.984

802.11ax (HE20): Duty cycle = 1.486 ms/1.52 ms = 0.978, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.10$

802.11ax (HE40): Duty cycle = 1.186 ms/1.22 ms = 0.972, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.12$

802.11ax (HE80): Duty cycle = 0.399 ms/0.434 ms = 0.919, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.37$



For Radio 3:

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

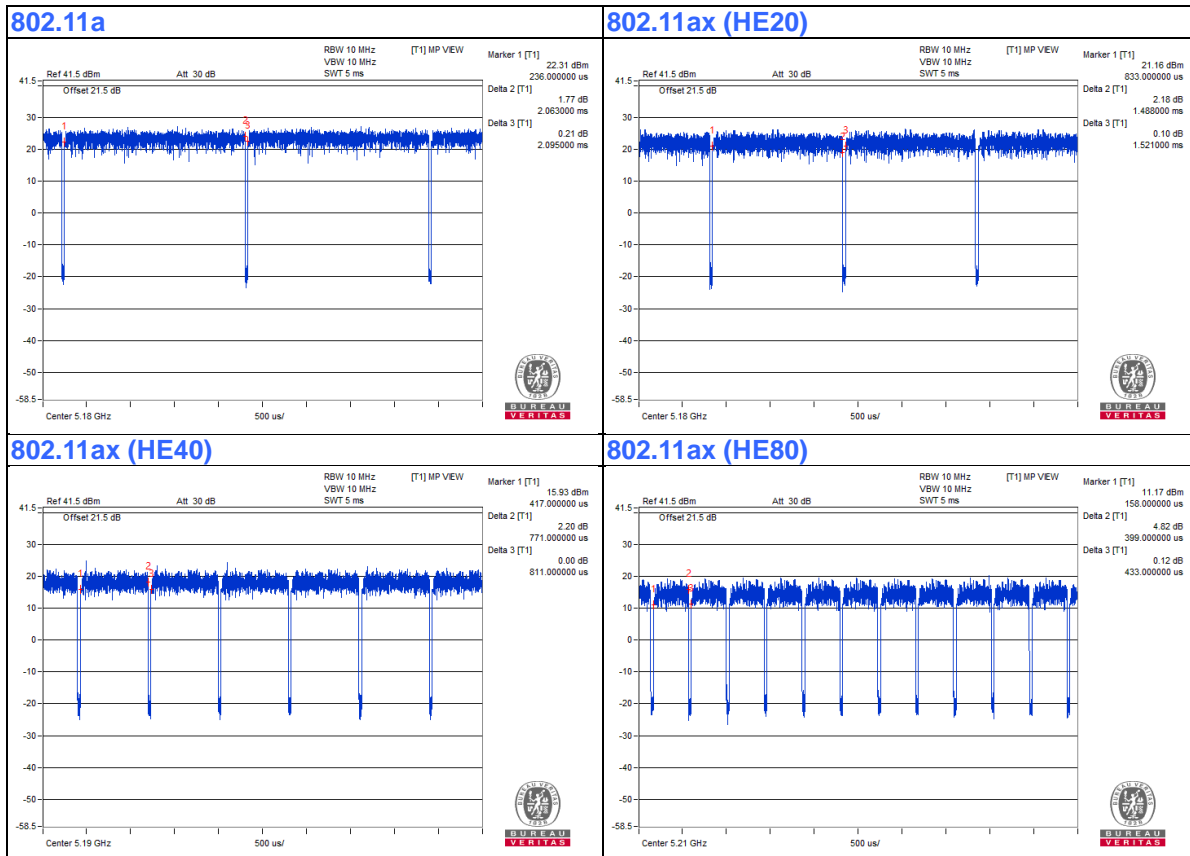
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = 2.063 ms/2.095 ms = 0.985

802.11ax (HE20): Duty cycle = 1.488 ms/1.521 ms = 0.978, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.10$

802.11ax (HE40): Duty cycle = 0.771 ms/0.811 ms = 0.951, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.22$

802.11ax (HE80): Duty cycle = 0.399 ms/0.433 ms = 0.921, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.36$



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	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	PoE Adapter	PowerDsine	PD-9001GR/AC	NA	NA	Supplied by client
D.	Ipod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab

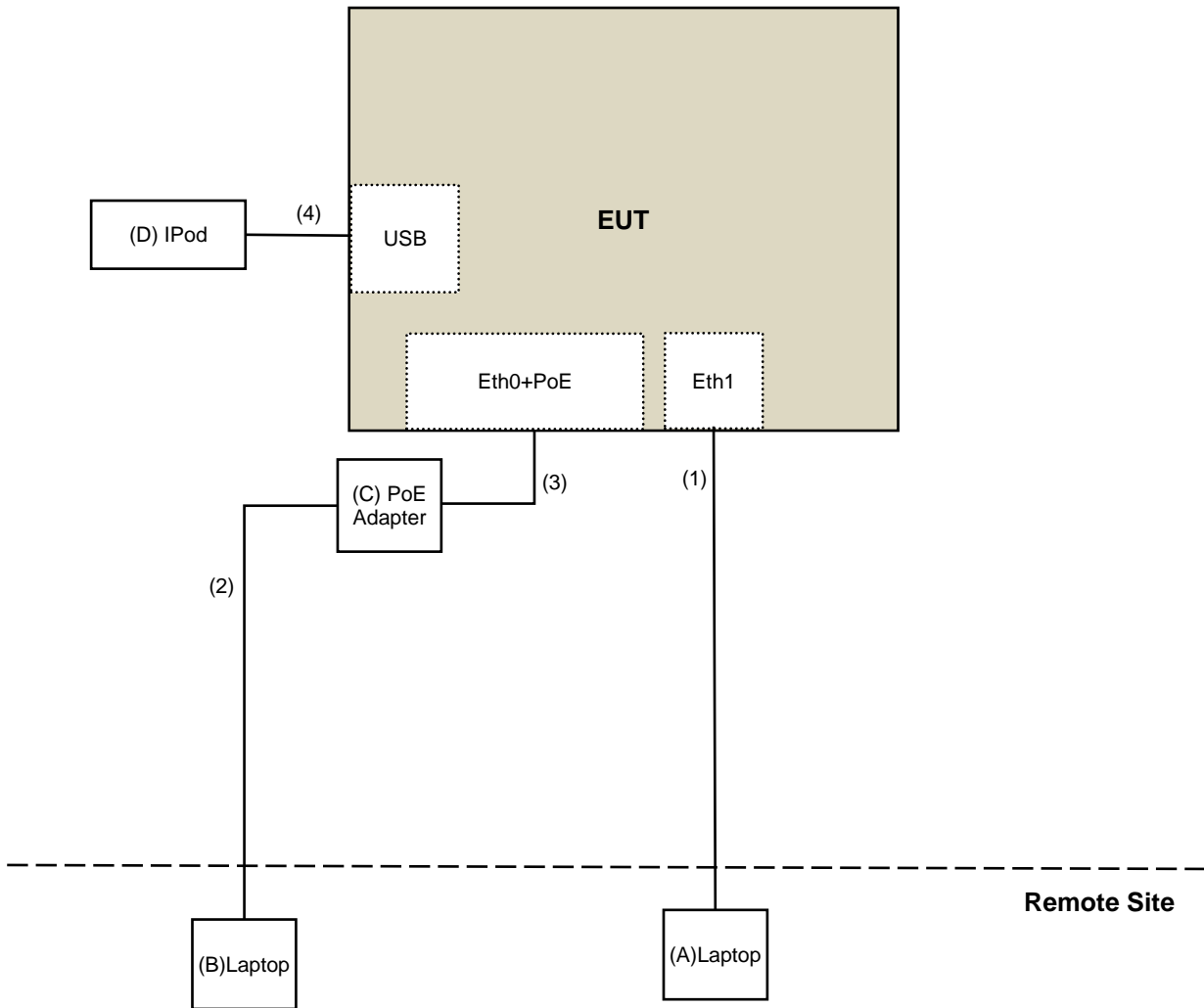
Note:

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

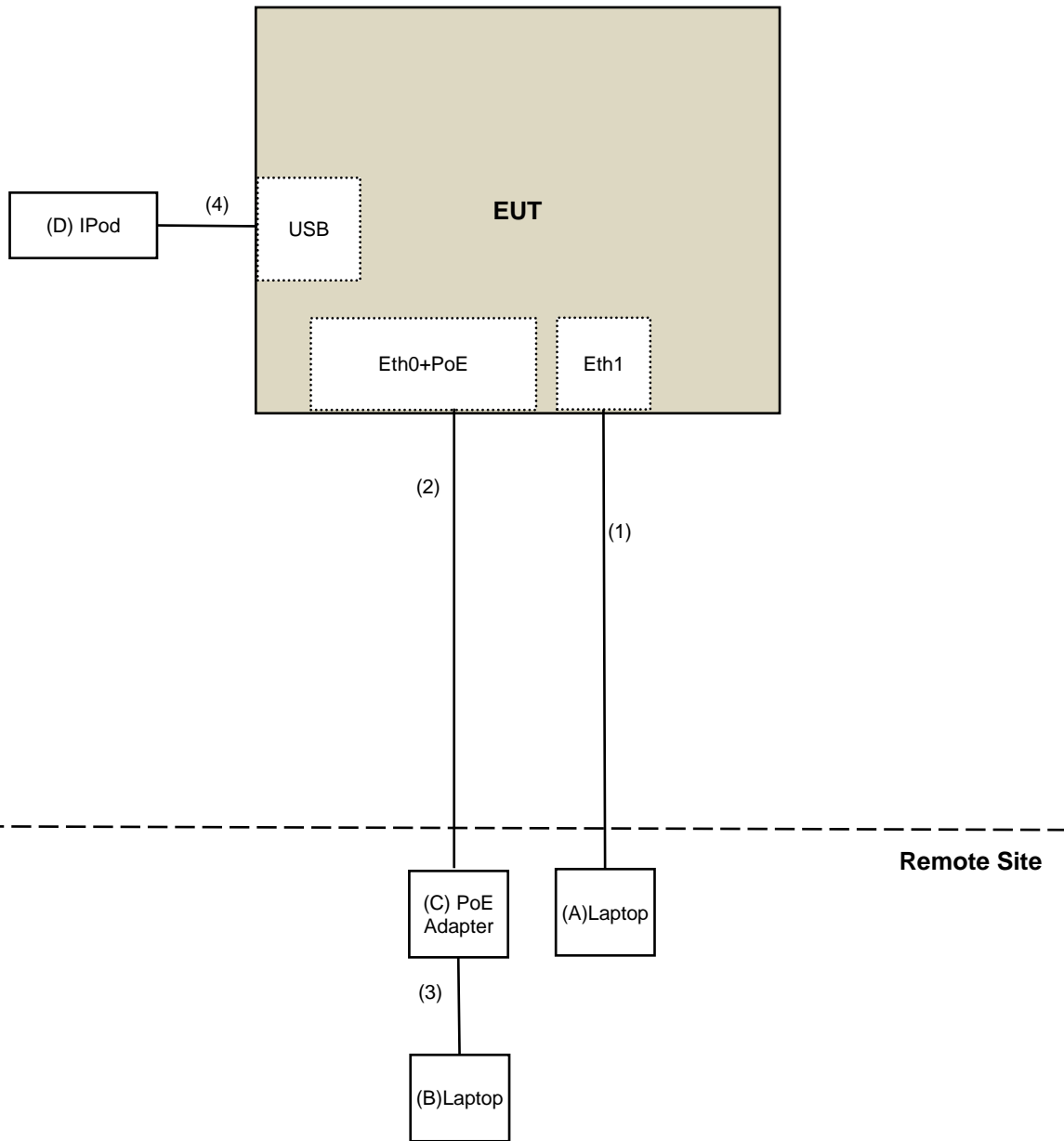
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	1.5	No	0	Provided by Lab
4.	USB Cable	1	0.1	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test

For conducted emission test:



For other test items:



3.5 General Description of Applied Standard and References

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

Test Standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test 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 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 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}
	<input type="checkbox"/> 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:

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

4.1.2 Test Instruments

For Model: AP33 3TX, 2TX, 1TX, SC / Model: AP32E 4TX OOB test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Oct. 04 to 09, 2019

For Model: AP32E 3TX, 2TX, 1TX OOB test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Dec. 06 to 18, 2019

For radiated emission below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMC1	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Jan. 17 to 18, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
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
AC Power Source Extech Electronics	6205	1440452	NA	NA
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Jan. 18 to 22, 2020

4.1.3 Test Procedure

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:

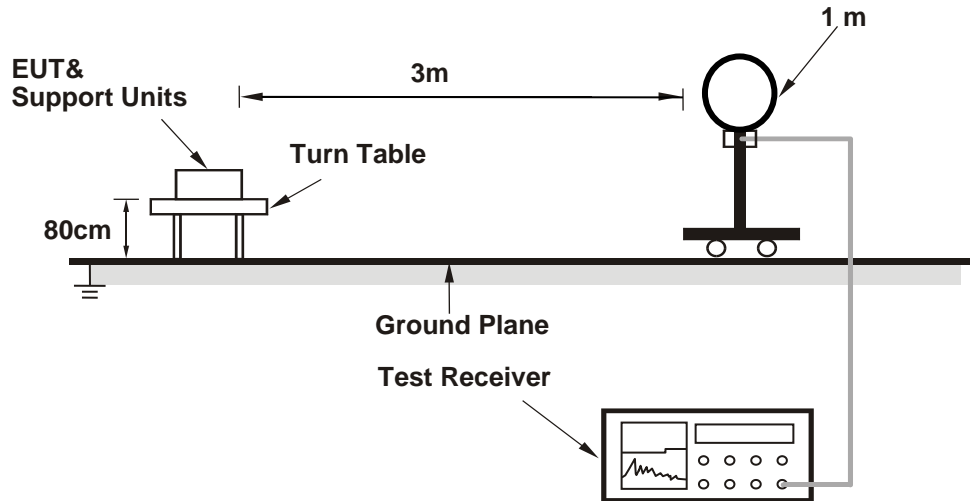
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

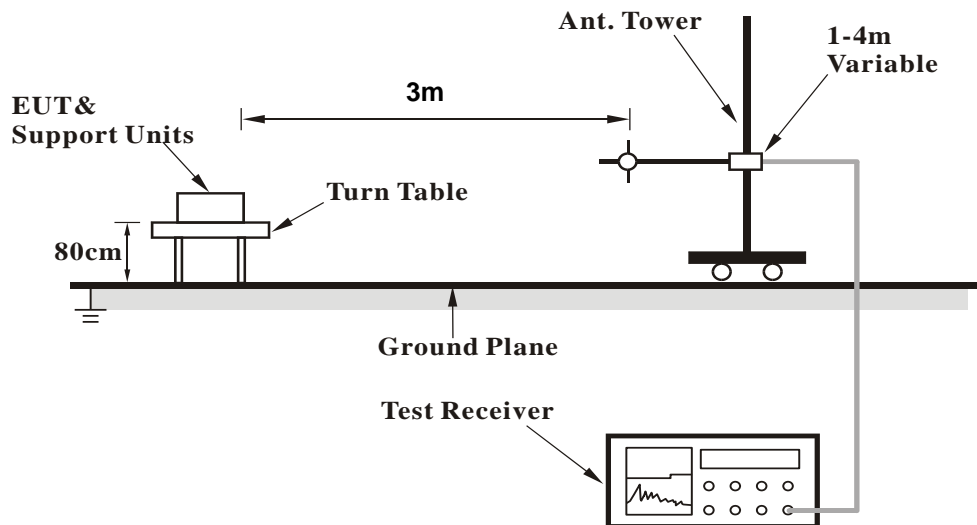
No deviation.

4.1.5 Test Setup

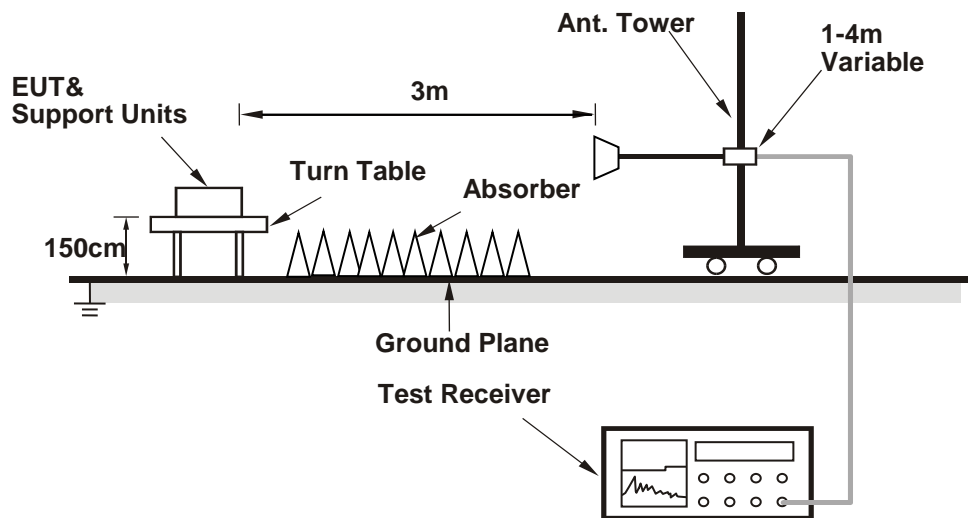
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (AccessMTool REL_3_1_0_3) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

ABOVE 1GHz DATA

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.7 PK	74.0	-6.3	1.52 H	39	64.7	3.0
2	5150.00	48.4 AV	54.0	-5.6	1.52 H	39	45.4	3.0
3	*5180.00	117.7 PK			1.52 H	39	114.8	2.9
4	*5180.00	108.2 AV			1.52 H	39	105.3	2.9
5	#10360.00	45.9 PK	68.2	-22.3	4.00 H	180	33.9	12.0
6	15540.00	43.1 PK	74.0	-30.9	1.59 H	201	30.1	13.0
7	15540.00	35.0 AV	54.0	-19.0	1.59 H	201	22.0	13.0

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	72.9 PK	74.0	-1.1	1.55 V	357	69.9	3.0
2	5150.00	53.2 AV	54.0	-0.8	1.55 V	357	50.2	3.0
3	*5180.00	119.1 PK			1.56 V	332	116.2	2.9
4	*5180.00	110.1 AV			1.56 V	332	107.2	2.9
5	#10360.00	45.9 PK	68.2	-22.3	3.87 V	191	33.9	12.0
6	15540.00	44.8 PK	74.0	-29.2	3.24 V	165	31.8	13.0
7	15540.00	36.7 AV	54.0	-17.3	3.24 V	165	23.7	13.0

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.2 PK	74.0	-4.8	1.42 H	33	66.2	3.0
2	5150.00	49.0 AV	54.0	-5.0	1.42 H	33	46.0	3.0
3	*5200.00	121.8 PK			1.42 H	33	119.0	2.8
4	*5200.00	112.0 AV			1.42 H	33	109.2	2.8
5	5350.00	54.7 PK	74.0	-19.3	1.42 H	33	52.1	2.6
6	5350.00	40.0 AV	54.0	-14.0	1.42 H	33	37.4	2.6
7	#10400.00	45.6 PK	68.2	-22.6	3.95 H	178	33.5	12.1
8	15600.00	46.6 PK	74.0	-27.4	1.43 H	200	33.7	12.9
9	15600.00	38.1 AV	54.0	-15.9	1.43 H	200	25.2	12.9

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	5150.00	70.6 PK	74.0	-3.4	1.38 V	360	67.6	3.0
2	5150.00	52.2 AV	54.0	-1.8	1.38 V	360	49.2	3.0
3	*5200.00	122.1 PK			1.38 V	360	119.3	2.8
4	*5200.00	112.7 AV			1.38 V	360	109.9	2.8
5	5350.00	59.0 PK	74.0	-15.0	1.38 V	360	56.4	2.6
6	5350.00	45.4 AV	54.0	-8.6	1.38 V	360	42.8	2.6
7	#10400.00	45.8 PK	68.2	-22.4	3.98 V	162	33.7	12.1
8	15600.00	46.4 PK	74.0	-27.6	3.26 V	189	33.5	12.9
9	15600.00	37.9 AV	54.0	-16.1	3.26 V	189	25.0	12.9

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.8 PK	74.0	-19.2	1.53 H	46	51.8	3.0
2	5150.00	40.0 AV	54.0	-14.0	1.53 H	46	37.0	3.0
3	*5240.00	121.5 PK			1.53 H	46	118.9	2.6
4	*5240.00	111.6 AV			1.53 H	46	109.0	2.6
5	5350.00	55.1 PK	74.0	-18.9	1.53 H	46	52.5	2.6
6	5350.00	40.3 AV	54.0	-13.7	1.53 H	46	37.7	2.6
7	#10480.00	46.5 PK	68.2	-21.7	3.95 H	189	34.0	12.5
8	15720.00	45.6 PK	74.0	-28.4	1.52 H	215	33.4	12.2
9	15720.00	37.7 AV	54.0	-16.3	1.52 H	215	25.5	12.2

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	5150.00	58.4 PK	74.0	-15.6	1.36 V	354	55.4	3.0
2	5150.00	46.1 AV	54.0	-7.9	1.36 V	354	43.1	3.0
3	*5240.00	123.5 PK			1.36 V	354	120.9	2.6
4	*5240.00	113.8 AV			1.36 V	354	111.2	2.6
5	5350.00	58.9 PK	74.0	-15.1	1.36 V	354	56.3	2.6
6	5350.00	46.5 AV	54.0	-7.5	1.36 V	354	43.9	2.6
7	#10480.00	46.1 PK	68.2	-22.1	4.00 V	189	33.6	12.5
8	15720.00	46.5 PK	74.0	-27.5	3.24 V	169	34.3	12.2
9	15720.00	37.7 AV	54.0	-16.3	3.24 V	169	25.5	12.2

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5618.77	58.2 PK	68.2	-10.0	2.17 H	308	55.1	3.1
2	*5745.00	121.8 PK			2.17 H	308	118.5	3.3
3	*5745.00	111.6 AV			2.17 H	308	108.3	3.3
4	#5970.19	55.2 PK	68.2	-13.0	2.17 H	308	51.4	3.8
5	11490.00	53.0 PK	74.0	-21.0	1.89 H	144	40.4	12.6
6	11490.00	40.2 AV	54.0	-13.8	1.89 H	144	27.6	12.6
7	#17235.00	68.0 PK	68.2	-0.2	3.42 H	120	51.2	16.8

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	#5642.89	58.5 PK	68.2	-9.7	1.27 V	353	55.4	3.1
2	*5745.00	121.7 PK			1.27 V	353	118.4	3.3
3	*5745.00	110.1 AV			1.27 V	353	106.8	3.3
4	#5939.25	56.4 PK	68.2	-11.8	1.27 V	353	52.5	3.9
5	11490.00	52.9 PK	74.0	-21.1	3.96 V	187	40.3	12.6
6	11490.00	40.9 AV	54.0	-13.1	3.96 V	187	28.3	12.6
7	#17235.00	64.0 PK	68.2	-4.2	3.18 V	192	47.2	16.8

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5571.09	57.5 PK	68.2	-10.7	1.96 H	316	54.5	3.0
2	*5785.00	123.1 PK			1.96 H	316	119.7	3.4
3	*5785.00	111.5 AV			1.96 H	316	108.1	3.4
4	#5949.12	56.9 PK	68.2	-11.3	1.96 H	316	53.1	3.8
5	11570.00	52.2 PK	74.0	-21.8	1.86 H	132	40.0	12.2
6	11570.00	39.9 AV	54.0	-14.1	1.86 H	132	27.7	12.2
7	#17355.00	67.9 PK	68.2	-0.3	1.62 H	111	51.3	16.6

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	#5605.47	56.9 PK	68.2	-11.3	1.33 V	358	53.9	3.0
2	*5785.00	122.2 PK			1.33 V	358	118.8	3.4
3	*5785.00	110.7 AV			1.33 V	358	107.3	3.4
4	#5941.14	56.8 PK	68.2	-11.4	1.33 V	358	52.9	3.9
5	11570.00	52.9 PK	74.0	-21.1	3.95 V	196	40.7	12.2
6	11570.00	40.5 AV	54.0	-13.5	3.95 V	196	28.3	12.2
7	#17355.00	64.2 PK	68.2	-4.0	3.22 V	182	47.6	16.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5645.17	57.7 PK	68.2	-10.5	2.01 H	321	54.6	3.1
2	*5825.00	122.6 PK			2.01 H	321	119.0	3.6
3	*5825.00	111.2 AV			2.01 H	321	107.6	3.6
4	#5977.19	56.0 PK	68.2	-12.2	2.01 H	321	52.3	3.7
5	11650.00	53.0 PK	74.0	-21.0	1.78 H	153	40.6	12.4
6	11650.00	40.5 AV	54.0	-13.5	1.78 H	153	28.1	12.4
7	#17475.00	67.5 PK	68.2	-0.7	1.68 H	124	50.5	17.0

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	#5640.27	57.9 PK	68.2	-10.3	1.37 V	337	54.8	3.1
2	*5825.00	121.6 PK			1.37 V	337	118.0	3.6
3	*5825.00	110.2 AV			1.37 V	337	106.6	3.6
4	#5947.01	57.9 PK	68.2	-10.3	1.37 V	337	54.1	3.8
5	11650.00	53.5 PK	74.0	-20.5	3.99 V	178	41.1	12.4
6	11650.00	41.0 AV	54.0	-13.0	3.99 V	178	28.6	12.4
7	#17475.00	63.9 PK	68.2	-4.3	3.28 V	172	46.9	17.0

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.

802.11ax (HE20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.0 PK	74.0	-2.0	1.37 H	51	69.0	3.0
2	5150.00	49.0 AV	54.0	-5.0	1.37 H	51	46.0	3.0
3	*5180.00	118.9 PK			1.37 H	51	116.0	2.9
4	*5180.00	106.2 AV			1.37 H	51	103.3	2.9
5	#10360.00	45.0 PK	68.2	-23.2	3.94 H	204	33.0	12.0
6	15540.00	45.1 PK	74.0	-28.9	1.36 H	205	32.1	13.0
7	15540.00	36.9 AV	54.0	-17.1	1.36 H	205	23.9	13.0

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	73.3 PK	74.0	-0.7	1.48 V	357	70.3	3.0
2	5150.00	53.3 AV	54.0	-0.7	1.48 V	357	50.3	3.0
3	*5180.00	119.7 PK			1.48 V	357	116.8	2.9
4	*5180.00	107.0 AV			1.48 V	357	104.1	2.9
5	#10360.00	44.9 PK	68.2	-23.3	3.90 V	192	32.9	12.0
6	15540.00	45.9 PK	74.0	-28.1	3.07 V	191	32.9	13.0
7	15540.00	37.2 AV	54.0	-16.8	3.07 V	191	24.2	13.0

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.4 PK	74.0	-4.6	1.45 H	14	66.4	3.0
2	5150.00	49.5 AV	54.0	-4.5	1.45 H	14	46.5	3.0
3	*5200.00	117.8 PK			1.45 H	14	115.0	2.8
4	*5200.00	108.6 AV			1.45 H	14	105.8	2.8
5	#10400.00	46.5 PK	68.2	-21.7	3.96 H	222	34.4	12.1
6	15600.00	45.4 PK	74.0	-28.6	1.46 H	205	32.5	12.9
7	15600.00	37.0 AV	54.0	-17.0	1.46 H	205	24.1	12.9

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	5150.00	73.2 PK	74.0	-0.8	1.45 V	346	70.2	3.0
2	5150.00	50.8 AV	54.0	-3.2	1.45 V	346	47.8	3.0
3	*5200.00	123.1 PK			1.45 V	346	120.3	2.8
4	*5200.00	111.1 AV			1.45 V	346	108.3	2.8
5	#10400.00	45.7 PK	68.2	-22.5	3.84 V	166	33.6	12.1
6	15600.00	47.3 PK	74.0	-26.7	3.28 V	197	34.4	12.9
7	15600.00	38.7 AV	54.0	-15.3	3.28 V	197	25.8	12.9

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.2 PK	74.0	-18.8	1.53 H	26	52.2	3.0
2	5150.00	40.5 AV	54.0	-13.5	1.53 H	26	37.5	3.0
3	*5240.00	117.5 PK			1.53 H	26	114.9	2.6
4	*5240.00	108.4 AV			1.53 H	26	105.8	2.6
5	5350.00	54.7 PK	74.0	-19.3	1.53 H	26	52.1	2.6
6	5350.00	39.5 AV	54.0	-14.5	1.53 H	26	36.9	2.6
7	#10480.00	45.4 PK	68.2	-22.8	3.93 H	194	32.9	12.5
8	15720.00	46.8 PK	74.0	-27.2	1.44 H	220	34.6	12.2
9	15720.00	38.1 AV	54.0	-15.9	1.44 H	220	25.9	12.2

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	5150.00	57.0 PK	74.0	-17.0	1.47 V	343	54.0	3.0
2	5150.00	44.6 AV	54.0	-9.4	1.47 V	343	41.6	3.0
3	*5240.00	122.1 PK			1.47 V	343	119.5	2.6
4	*5240.00	110.5 AV			1.47 V	343	107.9	2.6
5	5350.00	56.8 PK	74.0	-17.2	1.47 V	343	54.2	2.6
6	5350.00	44.1 AV	54.0	-9.9	1.47 V	343	41.5	2.6
7	#10480.00	45.4 PK	68.2	-22.8	3.93 V	199	32.9	12.5
8	15720.00	46.4 PK	74.0	-27.6	3.20 V	180	34.2	12.2
9	15720.00	37.6 AV	54.0	-16.4	3.20 V	180	25.4	12.2

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5635.00	58.1 PK	68.2	-10.1	2.36 H	313	55.0	3.1
2	*5745.00	122.1 PK			2.36 H	313	118.8	3.3
3	*5745.00	112.2 AV			2.36 H	313	108.9	3.3
4	#5953.49	56.1 PK	68.2	-12.1	2.36 H	313	52.3	3.8
5	11490.00	52.1 PK	74.0	-21.9	1.64 H	141	39.5	12.6
6	11490.00	41.6 AV	54.0	-12.4	1.64 H	141	29.0	12.6
7	#17235.00	67.8 PK	68.2	-0.4	3.42 H	122	51.0	16.8

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	#5639.40	58.0 PK	68.2	-10.2	1.50 V	336	54.9	3.1
2	*5745.00	120.1 PK			1.50 V	336	116.8	3.3
3	*5745.00	110.1 AV			1.50 V	336	106.8	3.3
4	#6004.61	56.4 PK	68.2	-11.8	1.50 V	336	52.6	3.8
5	11490.00	53.3 PK	74.0	-20.7	3.89 V	173	40.7	12.6
6	11490.00	41.0 AV	54.0	-13.0	3.89 V	173	28.4	12.6
7	#17235.00	63.8 PK	68.2	-4.4	3.31 V	170	47.0	16.8

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5649.19	55.5 PK	68.2	-12.7	1.80 H	292	52.3	3.2
2	*5785.00	122.9 PK			1.80 H	292	119.5	3.4
3	*5785.00	111.3 AV			1.80 H	292	107.9	3.4
4	#5938.72	55.8 PK	68.2	-12.4	1.80 H	292	51.9	3.9
5	11570.00	52.2 PK	74.0	-21.8	1.65 H	139	40.0	12.2
6	11570.00	41.5 AV	54.0	-12.5	1.65 H	139	29.3	12.2
7	#17355.00	68.0 PK	68.2	-0.2	3.48 H	127	51.4	16.6

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	#5556.28	58.3 PK	68.2	-9.9	1.47 V	342	55.3	3.0
2	*5785.00	121.1 PK			1.47 V	342	117.7	3.4
3	*5785.00	110.4 AV			1.47 V	342	107.0	3.4
4	#5942.78	55.9 PK	68.2	-12.3	1.47 V	342	52.0	3.9
5	11570.00	53.8 PK	74.0	-20.2	3.98 V	195	41.6	12.2
6	11570.00	41.6 AV	54.0	-12.4	3.98 V	195	29.4	12.2
7	#17355.00	64.0 PK	68.2	-4.2	3.31 V	173	47.4	16.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5604.65	57.1 PK	68.2	-11.1	1.96 H	306	54.1	3.0
2	*5825.00	121.1 PK			1.96 H	306	117.5	3.6
3	*5825.00	110.7 AV			1.96 H	306	107.1	3.6
4	#5936.63	55.7 PK	68.2	-12.5	1.96 H	306	51.8	3.9
5	11650.00	52.4 PK	74.0	-21.6	1.70 H	132	40.0	12.4
6	11650.00	41.8 AV	54.0	-12.2	1.70 H	132	29.4	12.4
7	#17475.00	67.9 PK	68.2	-0.3	3.39 H	111	50.9	17.0

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	#5614.28	56.9 PK	68.2	-11.3	1.52 V	354	53.8	3.1
2	*5825.00	121.8 PK			1.52 V	354	118.2	3.6
3	*5825.00	110.0 AV			1.52 V	354	106.4	3.6
4	#5980.14	56.6 PK	68.2	-11.6	1.52 V	354	52.9	3.7
5	11650.00	53.6 PK	74.0	-20.4	3.95 V	178	41.2	12.4
6	11650.00	41.0 AV	54.0	-13.0	3.95 V	178	28.6	12.4
7	#17475.00	64.1 PK	68.2	-4.1	3.29 V	177	47.1	17.0

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.

802.11ax (HE40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.5 PK	74.0	-10.5	1.34 H	16	60.5	3.0
2	5150.00	49.8 AV	54.0	-4.2	1.34 H	16	46.8	3.0
3	*5190.00	112.6 PK			1.34 H	16	109.7	2.9
4	*5190.00	101.0 AV			1.34 H	16	98.1	2.9
5	#10380.00	45.1 PK	68.2	-23.1	3.94 H	189	32.9	12.2
6	15570.00	44.9 PK	74.0	-29.1	1.47 H	220	31.9	13.0
7	15570.00	36.2 AV	54.0	-17.8	1.47 H	220	23.2	13.0

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	66.6 PK	74.0	-7.4	1.36 V	5	63.6	3.0
2	5150.00	53.7 AV	54.0	-0.3	1.36 V	5	50.7	3.0
3	*5190.00	113.9 PK			1.36 V	5	111.0	2.9
4	*5190.00	102.5 AV			1.36 V	5	99.6	2.9
5	#10380.00	45.8 PK	68.2	-22.4	3.87 V	153	33.6	12.2
6	15570.00	46.3 PK	74.0	-27.7	3.34 V	188	33.3	13.0
7	15570.00	37.2 AV	54.0	-16.8	3.34 V	188	24.2	13.0

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 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.0 PK	74.0	-11.0	1.51 H	35	60.0	3.0
2	5150.00	49.7 AV	54.0	-4.3	1.51 H	35	46.7	3.0
3	*5230.00	114.8 PK			1.51 H	35	112.2	2.6
4	*5230.00	105.5 AV			1.51 H	35	102.9	2.6
5	5350.00	56.4 PK	74.0	-17.6	1.51 H	35	53.8	2.6
6	5350.00	43.8 AV	54.0	-10.2	1.51 H	35	41.2	2.6
7	#10460.00	46.6 PK	68.2	-21.6	3.88 H	204	34.2	12.4
8	15690.00	45.8 PK	74.0	-28.2	1.43 H	225	33.4	12.4
9	15690.00	37.9 AV	54.0	-16.1	1.43 H	225	25.5	12.4

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	5150.00	69.3 PK	74.0	-4.7	1.55 V	328	66.3	3.0
2	5150.00	53.7 AV	54.0	-0.3	1.55 V	328	50.7	3.0
3	*5230.00	116.9 PK			1.55 V	328	114.3	2.6
4	*5230.00	107.5 AV			1.55 V	328	104.9	2.6
5	5350.00	58.0 PK	74.0	-16.0	1.55 V	328	55.4	2.6
6	5350.00	46.2 AV	54.0	-7.8	1.55 V	328	43.6	2.6
7	#10460.00	45.2 PK	68.2	-23.0	3.99 V	205	32.8	12.4
8	15690.00	46.6 PK	74.0	-27.4	3.33 V	167	34.2	12.4
9	15690.00	37.3 AV	54.0	-16.7	3.33 V	167	24.9	12.4

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