

FCC Test Report

Report No.: RF180913C25-1

FCC ID: RYK-WPEA252NIRB

Test Model: WPEA-252NIRB

Received Date: Sep. 13, 2018

Test Date: Oct. 04 ~ Oct. 11, 2018

Issued Date: Oct. 24, 2018

Applicant: SparkLAN Communications, Inc.

Address: 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan (R.O.C.)

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /
Designation Number:** 788550 / TW0003



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.....	7
3.2 Description of Test Modes.....	9
3.2.1 Test Mode Applicability and Tested Channel Detail.....	10
3.3 Duty Cycle of Test Signal.....	12
3.4 Description of Support Units.....	13
3.4.1 Configuration of System under Test.....	13
3.5 General Description of Applied Standards.....	13
4 Test Types and Results	14
4.1 Radiated Emission and Bandedge Measurement.....	14
4.1.1 Limits of Radiated Emission and Bandedge Measurement.....	14
4.1.2 Test Instruments.....	15
4.1.3 Test Procedures.....	16
4.1.4 Deviation from Test Standard.....	16
4.1.5 Test Setup.....	17
4.1.6 EUT Operating Conditions.....	18
4.1.7 Test Results.....	19
4.2 Conducted Emission Measurement.....	54
4.2.1 Limits of Conducted Emission Measurement.....	54
4.2.2 Test Instruments.....	54
4.2.3 Test Procedures.....	55
4.2.4 Deviation from Test Standard.....	55
4.2.5 Test Setup.....	55
4.2.6 EUT Operating Conditions.....	55
4.2.7 Test Results.....	56
4.3 Transmit Power Measurement.....	58
4.3.1 Limits of Transmit Power Measurement.....	58
4.3.2 Test Setup.....	58
4.3.3 Test Instruments.....	58
4.3.4 Test Procedure.....	59
4.3.5 Deviation from Test Standard.....	59
4.3.6 EUT Operating Conditions.....	59
4.3.7 Test Result.....	60
4.4 Occupied Bandwidth Measurement.....	66
4.4.1 Test Setup.....	66
4.4.2 Test Instruments.....	66
4.4.3 Test Procedure.....	66
4.4.4 Test Result.....	67
4.5 Peak Power Spectral Density Measurement.....	69
4.5.1 Limits of Peak Power Spectral Density Measurement.....	69
4.5.2 Test Setup.....	69
4.5.3 Test Instruments.....	69
4.5.4 Test Procedures.....	70
4.5.5 Deviation from Test Standard.....	70
4.5.6 EUT Operating Conditions.....	70
4.5.7 Test Results.....	71
4.6 Frequency Stability.....	75
4.6.1 Limits of Frequency Stability Measurement.....	75

4.6.2 Test Setup.....	75
4.6.3 Test Instruments	75
4.6.4 Test Procedure	75
4.6.5 Deviation from Test Standard	76
4.6.6 EUT Operating Condition	76
4.6.7 Test Results	76
4.7 6dB Bandwidth Measurement.....	77
4.7.1 Limits of 6dB Bandwidth Measurement.....	77
4.7.2 Test Setup.....	77
4.7.3 Test Instruments	77
4.7.4 Test Procedure	77
4.7.5 Deviation from Test Standard	77
4.7.6 EUT Operating Condition	77
4.7.7 Test Results	78
5 Pictures of Test Arrangements.....	80
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band).....	81
Appendix – Information on the Testing Laboratories	84

Release Control Record

Issue No.	Description	Date Issued
RF180913C25-1	Original release	Oct. 24, 2018

1 Certificate of Conformity

Product: 802.11a/b/g/n 2T2R Industrial Grade Mini PCIe Module

Brand: SparkLAN

Test Model: WPEA-252NIRB

Sample Status: R & D sample

Applicant: SparkLAN Communications, Inc.

Test Date: Oct. 04 ~ Oct. 11, 2018

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

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

Prepared by : Celine Chou , **Date:** Oct. 24, 2018
Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 24, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.00dB at 0.44325MHz.
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 -1.3dB at 166.52MHz and 500.42MHz.
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 connectors are HRS U.FL at modular side & RP-SMA (M) at antenna side not 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.

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	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11a/b/g/n 2T2R Industrial Grade Mini PCIe Module
Brand	SparkLAN
Test Model	WPEA-252NIRB
Sample Status	R & D sample
Power Supply Rating	3.3Vdc (host)
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
Operating Frequency	5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5700MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20): 4 802.11n (HT40): 2 5260 ~ 5320MHz: 802.11a, 802.11n (HT20): 4 802.11n (HT40): 2 5500 ~ 5700MHz: 802.11a, 802.11n (HT20): 11 802.11n (HT40): 5 5745 ~ 5825MHz: 802.11a, 802.11n (HT20): 5 802.11n (HT40): 2
Output Power	5180 ~ 5240MHz: 42.055mW 5260 ~ 5320MHz: 43.665mW 5500 ~ 5700MHz: 44.218mW 5745 ~ 5825MHz: 44.718mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Antenna
Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

2. The EUT uses following antennas.

No.	Transmitter Circuit	Brand	Model	Antenna Type	2.4G gain with cable loss (dBi)	5G gain with cable loss (dBi)	Connector Type
1	Chain(0) Chain(1)	Sparklan	AD-301N	Dipole	4.4	B1&2: 5.2 B3&4: 5.8	HRS U.FL at modular side & RP-SMA (M) at antenna side
2	Chain(0) Chain(1)	Sparklan	AD-103AG	Dipole	2.02	B1&2: 1.93 B3&4: 2.03	
3	Chain(0) Chain(1)	Sparklan	AD-305N	Dipole	5.0	5.0	
4	Chain(0) Chain(1)	Sparklan	AD-303N	Dipole	3.0	3.0	
5	Chain(0) Chain(1)	Sparklan	AD-302N	Dipole	3.0	2.0	

* The 5dBi with 2.4GHz max. gain is chosen for final tests.

* The 5.8dBi with 5GHz max. gain is chosen for final tests.

3. WLAN 2.4G and 5G technology cannot transmit simultaneously.

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20):

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

For 5260 ~ 5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20):

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

For 5500 ~ 5700MHz:

11 channels are provided for 802.11a, 802.11n (HT20):

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

5 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

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.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11n (HT40)		54 to 62	54, 62	OFDM	13.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	13.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	116	OFDM	6.0
-	802.11a	5260-5320	52 to 64		OFDM	6.0
-	802.11a	5500-5700	100 to 140		OFDM	6.0
-	802.11a	5745-5825	149 to 165		OFDM	6.0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	116	OFDM	6.0
-	802.11a	5260-5320	52 to 64		OFDM	6.0
-	802.11a	5500-5700	100 to 140		OFDM	6.0
-	802.11a	5745-5825	149 to 165		OFDM	6.0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11n (HT40)		54 to 62	54, 62	OFDM	13.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	13.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	26 deg. C, 67% RH	120Vac, 60Hz	Willy Cheng
RE<1G	26 deg. C, 67% RH	120Vac, 60Hz	Willy Cheng
PLC	22 deg. C, 64% RH	120Vac, 60Hz	Willy Cheng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Alan Wu

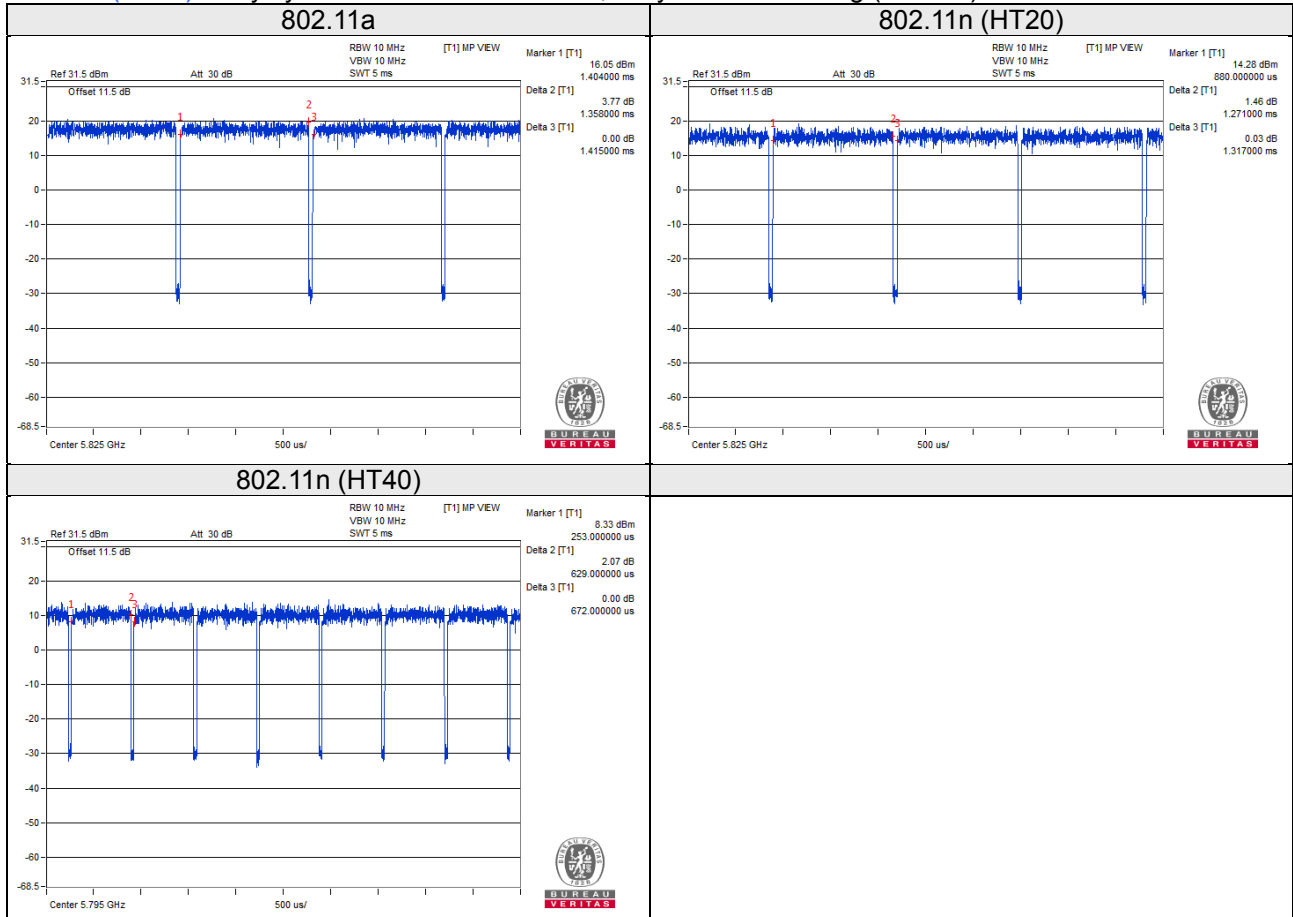
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = $1.358/1.415 = 0.960$, Duty factor = $10 * \log(1/0.960) = 0.18$

802.11n (HT20): Duty cycle = $1.271/1.317 = 0.965$, Duty factor = $10 * \log(1/0.965) = 0.15$

802.11n (HT40): Duty cycle = $0.629/0.672 = 0.936$, Duty factor = $10 * \log(1/0.936) = 0.29$



3.4 Description of Support Units

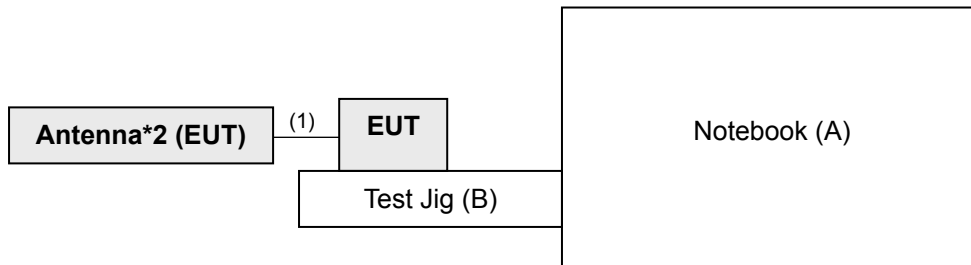
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved	-
B.	Test Jig	NA	NA	NA	NA	Provided by manufacturer

Note: 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.	Antenna cable	2	0.15	Y	0	Provided by manufacturer

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 E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

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.

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 (dBuV/m)	AV: 54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<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(dBuV/m) ^{*1} PK: 105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK: 122.2 (dBuV/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. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2017	Nov. 13, 2018
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519 0004/MY55190007/MY 55210005	Jul. 17, 2018	Jul. 16, 2019

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
 5. The IC Site Registration No. is 7450F-3.

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 detect 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:

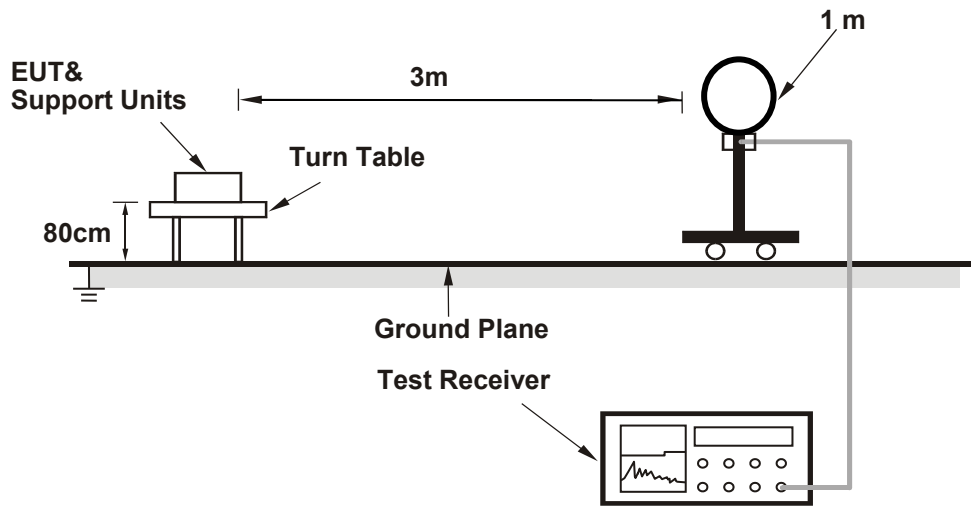
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

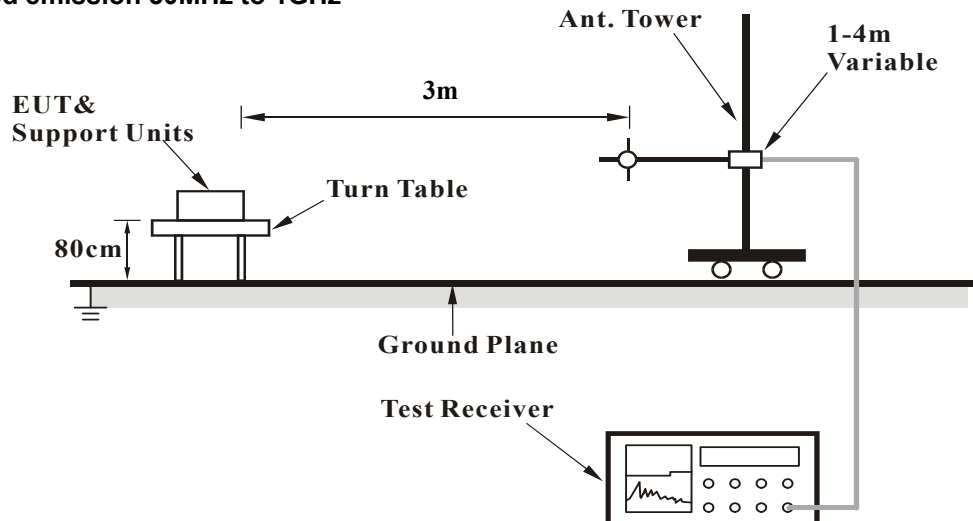
No deviation.

4.1.5 Test Setup

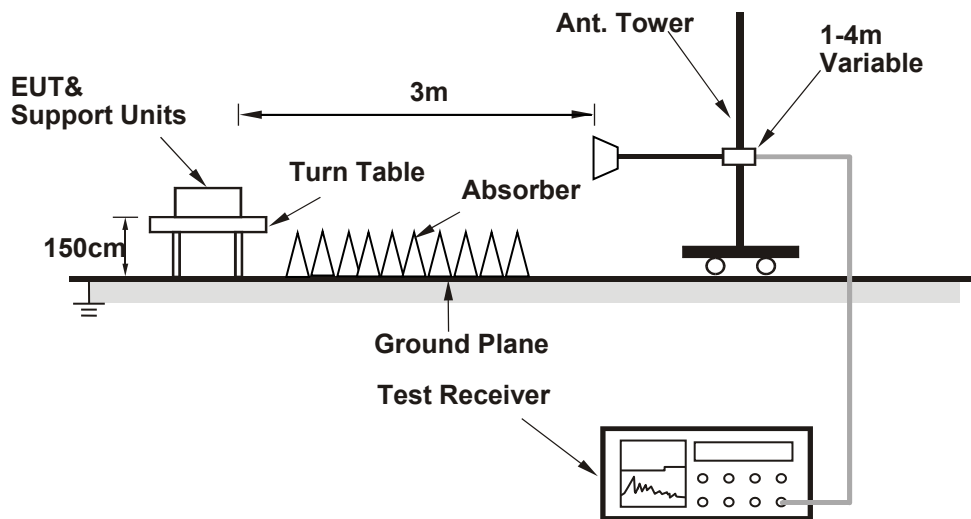
For Radiated emission below 30MHz



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 Conditions

- a. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

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	56.7 PK	74.0	-17.3	1.96 H	251	53.2	3.5
2	5150.00	43.3 AV	54.0	-10.7	1.96 H	251	39.8	3.5
3	*5180.00	96.1 PK			2.20 H	209	56.9	39.2
4	*5180.00	85.0 AV			2.20 H	209	45.8	39.2
5	#10360.00	57.8 PK	68.2	-10.4	3.51 H	186	42.4	15.4
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	58.0 PK	74.0	-16.0	1.54 V	242	54.5	3.5
2	5150.00	42.9 AV	54.0	-11.1	1.54 V	242	39.4	3.5
3	*5180.00	109.1 PK			1.46 V	242	69.9	39.2
4	*5180.00	98.0 AV			1.46 V	242	58.8	39.2
5	#10360.00	57.4 PK	68.2	-10.8	2.38 V	119	42.0	15.4

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 40	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5200.00	96.0 PK			2.05 H	212	56.7	39.3
2	*5200.00	84.6 AV			2.05 H	212	45.3	39.3
3	#10400.00	58.1 PK	68.2	-10.1	2.83 H	165	42.5	15.6

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	*5200.00	108.1 PK			1.55 V	240	68.8	39.3
2	*5200.00	97.1 AV			1.55 V	240	57.8	39.3
3	#10400.00	57.4 PK	68.2	-10.8	1.96 V	231	41.8	15.6

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	*5240.00	95.3 PK			1.00 H	354	56.2	39.1
2	*5240.00	84.2 AV			1.00 H	354	45.1	39.1
3	5350.00	56.2 PK	74.0	-17.8	1.38 H	347	52.5	3.7
4	5350.00	43.5 AV	54.0	-10.5	1.38 H	347	39.8	3.7
5	#10480.00	58.8 PK	68.2	-9.4	3.47 H	239	42.6	16.2

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	*5240.00	108.2 PK			1.46 V	238	69.1	39.1
2	*5240.00	97.0 AV			1.46 V	238	57.9	39.1
3	5350.00	56.0 PK	74.0	-18.0	1.51 V	249	52.3	3.7
4	5350.00	43.1 AV	54.0	-10.9	1.51 V	249	39.4	3.7
5	#10480.00	58.1 PK	68.2	-10.1	2.26 V	187	41.9	16.2

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 52	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	56.3 PK	74.0	-17.7	1.22 H	349	52.8	3.5
2	5150.00	43.4 AV	54.0	-10.6	1.22 H	349	39.9	3.5
3	*5260.00	96.5 PK			1.08 H	353	57.5	39.0
4	*5260.00	85.2 AV			1.08 H	353	46.2	39.0
5	#10520.00	57.8 PK	68.2	-10.4	3.17 H	153	41.5	16.3

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	5150.00	56.1 PK	74.0	-17.9	1.48 V	232	52.6	3.5
2	5150.00	43.1 AV	54.0	-10.9	1.48 V	232	39.6	3.5
3	*5260.00	108.4 PK			1.52 V	211	69.4	39.0
4	*5260.00	97.5 AV			1.52 V	211	58.5	39.0
5	#10520.00	57.2 PK	68.2	-11.0	2.63 V	189	40.9	16.3

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 60	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5300.00	96.5 PK			2.09 H	349	57.5	39.0
2	*5300.00	86.0 AV			2.09 H	349	47.0	39.0
3	10600.00	59.1 PK	74.0	-14.9	2.88 H	205	42.5	16.6
4	10600.00	45.7 AV	54.0	-8.3	2.88 H	205	29.1	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	*5300.00	109.4 PK			1.49 V	245	70.4	39.0
2	*5300.00	98.2 AV			1.49 V	245	59.2	39.0
3	10600.00	58.6 PK	74.0	-15.4	1.93 V	202	42.0	16.6
4	10600.00	45.1 AV	54.0	-8.9	1.93 V	202	28.5	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 64	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5320.00	96.0 PK			1.86 H	351	56.9	39.1
2	*5320.00	85.1 AV			1.86 H	351	46.0	39.1
3	5350.00	56.6 PK	74.0	-17.4	1.99 H	323	52.9	3.7
4	5350.00	43.4 AV	54.0	-10.6	1.99 H	323	39.7	3.7
5	10640.00	59.3 PK	74.0	-14.7	2.87 H	159	42.8	16.5
6	10640.00	45.6 AV	54.0	-8.4	2.87 H	159	29.1	16.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	108.5 PK			1.54 V	270	69.4	39.1
2	*5320.00	97.7 AV			1.54 V	270	58.6	39.1
3	5350.00	56.9 PK	74.0	-17.1	1.66 V	289	53.2	3.7
4	5350.00	43.0 AV	54.0	-11.0	1.66 V	289	39.3	3.7
5	10640.00	58.7 PK	74.0	-15.3	1.87 V	263	42.2	16.5
6	10640.00	45.1 AV	54.0	-8.9	1.87 V	263	28.6	16.5

Remarks:

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

CHANNEL	TX Channel 100	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	5460.00	55.6 PK	74.0	-18.4	1.62 H	241	51.6	4.0
2	5460.00	43.2 AV	54.0	-10.8	1.62 H	241	39.2	4.0
3	#5470.00	56.9 PK	68.2	-11.3	1.59 H	261	52.9	4.0
4	*5500.00	98.8 PK			1.74 H	237	59.2	39.6
5	*5500.00	87.9 AV			1.74 H	237	48.3	39.6
6	11000.00	59.2 PK	74.0	-14.8	3.48 H	174	41.3	17.9
7	11000.00	45.9 AV	54.0	-8.1	3.48 H	174	28.0	17.9

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	5460.00	56.7 PK	74.0	-17.3	1.59 V	240	52.7	4.0
2	5460.00	43.3 AV	54.0	-10.7	1.59 V	240	39.3	4.0
3	#5470.00	58.1 PK	68.2	-10.1	1.62 V	244	54.1	4.0
4	*5500.00	107.6 PK			1.54 V	233	68.0	39.6
5	*5500.00	97.6 AV			1.54 V	233	58.0	39.6
6	11000.00	59.8 PK	74.0	-14.2	2.33 V	202	41.9	17.9
7	11000.00	46.1 AV	54.0	-7.9	2.33 V	202	28.2	17.9

Remarks:

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

CHANNEL	TX Channel 116	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	*5580.00	98.1 PK			1.86 H	238	58.5	39.6
2	*5580.00	87.3 AV			1.86 H	238	47.7	39.6
3	11160.00	58.6 PK	74.0	-15.4	2.96 H	205	41.9	16.7
4	11160.00	45.3 AV	54.0	-8.7	2.96 H	205	28.6	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	109.6 PK			1.64 V	252	70.0	39.6
2	*5580.00	98.5 AV			1.64 V	252	58.9	39.6
3	11160.00	59.4 PK	74.0	-14.6	2.13 V	199	42.7	16.7
4	11160.00	45.9 AV	54.0	-8.1	2.13 V	199	29.2	16.7

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 140	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	*5700.00	94.7 PK			2.21 H	236	55.1	39.6
2	*5700.00	84.2 AV			2.21 H	236	44.6	39.6
3	#5725.00	55.7 PK	68.2	-12.5	2.00 H	219	51.6	4.1
4	11400.00	58.6 PK	74.0	-15.4	3.64 H	278	42.0	16.6
5	11400.00	44.9 AV	54.0	-9.1	3.64 H	278	28.3	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	*5700.00	107.8 PK			1.51 V	261	68.2	39.6
2	*5700.00	96.9 AV			1.51 V	261	57.3	39.6
3	#5725.00	58.0 PK	68.2	-10.2	1.40 V	238	53.9	4.1
4	11400.00	57.7 PK	74.0	-16.3	2.47 V	193	41.1	16.6
5	11400.00	44.0 AV	54.0	-10.0	2.47 V	193	27.4	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	#5626.92	54.0 PK	68.2	-14.2	2.42 H	233	49.8	4.2
2	*5745.00	95.1 PK			2.42 H	238	55.3	39.8
3	*5745.00	84.0 AV			2.42 H	238	44.2	39.8
4	#5969.23	56.8 PK	68.2	-11.4	2.42 H	233	51.9	4.9
5	11490.00	59.0 PK	74.0	-15.0	2.83 H	166	42.2	16.8
6	11490.00	45.5 AV	54.0	-8.5	2.83 H	166	28.7	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	#5625.64	55.8 PK	68.2	-12.4	1.54 V	268	51.6	4.2
2	*5745.00	110.1 PK			1.54 V	268	70.3	39.8
3	*5745.00	99.1 AV			1.54 V	268	59.3	39.8
4	#5925.00	58.0 PK	68.2	-10.2	1.54 V	268	53.1	4.9
5	11490.00	60.1 PK	74.0	-13.9	2.51 V	193	43.3	16.8
6	11490.00	46.3 AV	54.0	-7.7	2.51 V	193	29.5	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	#5649.36	54.0 PK	68.2	-14.2	2.42 H	238	49.7	4.3
2	*5785.00	97.3 PK			2.42 H	238	57.2	40.1
3	*5785.00	85.9 AV			2.42 H	238	45.8	40.1
4	#5982.69	56.7 PK	68.2	-11.5	2.42 H	238	51.7	5.0
5	11570.00	59.6 PK	74.0	-14.4	3.15 H	226	42.6	17.0
6	11570.00	45.3 AV	54.0	-8.7	3.15 H	226	28.3	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	#5605.77	57.2 PK	68.2	-11.0	1.52 V	253	53.0	4.2
2	*5785.00	110.1 PK			1.52 V	253	70.0	40.1
3	*5785.00	99.1 AV			1.52 V	253	59.0	40.1
4	#5976.28	56.9 PK	68.2	-11.3	1.52 V	253	51.9	5.0
5	11570.00	60.8 PK	74.0	-13.2	2.51 V	210	43.8	17.0
6	11570.00	46.9 AV	54.0	-7.1	2.51 V	210	29.9	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	#5615.38	53.9 PK	68.2	-14.3	2.27 H	239	49.7	4.2
2	*5825.00	99.0 PK			2.27 H	239	58.7	40.3
3	*5825.00	87.7 AV			2.27 H	239	47.4	40.3
4	#5951.92	57.1 PK	68.2	-11.1	2.27 H	239	52.3	4.8
5	11650.00	58.3 PK	74.0	-15.7	3.32 H	152	41.7	16.6
6	11650.00	45.1 AV	54.0	-8.9	3.32 H	152	28.5	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	#5620.51	54.1 PK	68.2	-14.1	1.93 V	283	49.9	4.2
2	*5825.00	109.2 PK			1.93 V	283	68.9	40.3
3	*5825.00	98.4 AV			1.93 V	283	58.1	40.3
4	#5971.79	56.1 PK	68.2	-12.1	1.93 V	283	51.1	5.0
5	11650.00	58.8 PK	74.0	-15.2	2.56 V	205	42.2	16.6
6	11650.00	45.7 AV	54.0	-8.3	2.56 V	205	29.1	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.0 PK	74.0	-18.0	1.96 H	173	52.5	3.5
2	5150.00	43.4 AV	54.0	-10.6	1.96 H	173	39.9	3.5
3	*5180.00	96.2 PK			2.32 H	170	57.0	39.2
4	*5180.00	85.8 AV			2.32 H	170	46.6	39.2
5	#10360.00	57.7 PK	68.2	-10.5	2.99 H	257	42.3	15.4

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	55.8 PK	74.0	-18.2	1.52 V	236	52.3	3.5
2	5150.00	43.1 AV	54.0	-10.9	1.52 V	236	39.6	3.5
3	*5180.00	109.7 PK			1.56 V	207	70.5	39.2
4	*5180.00	99.4 AV			1.56 V	207	60.2	39.2
5	#10360.00	57.1 PK	68.2	-11.1	1.88 V	236	41.7	15.4

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 40	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5200.00	96.9 PK			1.23 H	168	57.6	39.3
2	*5200.00	86.4 AV			1.23 H	168	47.1	39.3
3	#10400.00	57.9 PK	68.2	-10.3	2.86 H	192	42.3	15.6

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	*5200.00	110.6 PK			1.68 V	277	71.3	39.3
2	*5200.00	99.9 AV			1.68 V	277	60.6	39.3
3	#10400.00	57.4 PK	68.2	-10.8	2.26 V	203	41.8	15.6

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	*5240.00	95.6 PK			2.11 H	175	56.5	39.1
2	*5240.00	86.2 AV			2.11 H	175	47.1	39.1
3	5350.00	56.0 PK	74.0	-18.0	1.85 H	221	52.3	3.7
4	5350.00	43.5 AV	54.0	-10.5	1.85 H	221	39.8	3.7
5	#10480.00	57.7 PK	68.2	-10.5	2.69 H	231	41.5	16.2

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	*5240.00	109.7 PK			1.60 V	251	70.6	39.1
2	*5240.00	99.8 AV			1.60 V	251	60.7	39.1
3	5350.00	56.3 PK	74.0	-17.7	1.67 V	208	52.6	3.7
4	5350.00	43.6 AV	54.0	-10.4	1.67 V	208	39.9	3.7
5	#10480.00	58.0 PK	68.2	-10.2	1.98 V	237	41.8	16.2

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 52	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	55.3 PK	74.0	-18.7	1.96 H	212	51.8	3.5
2	5150.00	43.2 AV	54.0	-10.8	1.96 H	212	39.7	3.5
3	*5260.00	96.2 PK			1.89 H	175	57.2	39.0
4	*5260.00	85.9 AV			1.89 H	175	46.9	39.0
5	#10520.00	58.9 PK	68.2	-9.3	2.99 H	268	42.6	16.3

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	5150.00	55.1 PK	74.0	-18.9	1.54 V	233	51.6	3.5
2	5150.00	42.9 AV	54.0	-11.1	1.54 V	233	39.4	3.5
3	*5260.00	110.5 PK			1.79 V	277	71.5	39.0
4	*5260.00	100.4 AV			1.79 V	277	61.4	39.0
5	#10520.00	58.2 PK	68.2	-10.0	2.08 V	199	41.9	16.3

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 60	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	*5300.00	97.1 PK			1.87 H	176	58.1	39.0
2	*5300.00	87.0 AV			1.87 H	176	48.0	39.0
3	10600.00	58.9 PK	74.0	-15.1	3.05 H	251	42.3	16.6
4	10600.00	46.0 AV	54.0	-8.0	3.05 H	251	29.4	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	*5300.00	110.2 PK			1.63 V	280	71.2	39.0
2	*5300.00	100.2 AV			1.63 V	280	61.2	39.0
3	10600.00	58.6 PK	74.0	-15.4	1.86 V	173	42.0	16.6
4	10600.00	45.7 AV	54.0	-8.3	1.86 V	173	29.1	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 64	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	*5320.00	97.5 PK			2.03 H	176	58.4	39.1
2	*5320.00	86.9 AV			2.03 H	176	47.8	39.1
3	5350.00	56.0 PK	74.0	-18.0	1.98 H	203	52.3	3.7
4	5350.00	43.3 AV	54.0	-10.7	1.98 H	203	39.6	3.7
5	10640.00	58.6 PK	74.0	-15.4	2.56 H	239	42.1	16.5
6	10640.00	45.3 AV	54.0	-8.7	2.56 H	239	28.8	16.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	110.7 PK			1.63 V	281	71.6	39.1
2	*5320.00	100.4 AV			1.63 V	281	61.3	39.1
3	5350.00	56.4 PK	74.0	-17.6	1.55 V	234	52.7	3.7
4	5350.00	43.5 AV	54.0	-10.5	1.55 V	234	39.8	3.7
5	10640.00	58.8 PK	74.0	-15.2	2.12 V	185	42.3	16.5
6	10640.00	44.9 AV	54.0	-9.1	2.12 V	185	28.4	16.5

Remarks:

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

CHANNEL	TX Channel 100	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	5460.00	56.9 PK	74.0	-17.1	1.82 H	244	52.9	4.0
2	5460.00	43.7 AV	54.0	-10.3	1.82 H	244	39.7	4.0
3	#5470.00	54.5 PK	68.2	-13.7	1.85 H	251	50.5	4.0
4	*5500.00	97.3 PK			1.74 H	237	57.7	39.6
5	*5500.00	87.6 AV			1.74 H	237	48.0	39.6
6	11000.00	60.5 PK	74.0	-13.5	3.17 H	205	42.6	17.9
7	11000.00	46.2 AV	54.0	-7.8	3.17 H	205	28.3	17.9

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	5460.00	57.8 PK	74.0	-16.2	1.72 V	249	53.8	4.0
2	5460.00	44.0 AV	54.0	-10.0	1.72 V	249	40.0	4.0
3	#5470.00	54.8 PK	68.2	-13.4	1.73 V	239	50.8	4.0
4	*5500.00	110.8 PK			1.67 V	257	71.2	39.6
5	*5500.00	100.6 AV			1.67 V	257	61.0	39.6
6	11000.00	60.2 PK	74.0	-13.8	2.39 V	155	42.3	17.9
7	11000.00	45.9 AV	54.0	-8.1	2.39 V	155	28.0	17.9

Remarks:

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

CHANNEL	TX Channel 116	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	*5580.00	97.4 PK			1.25 H	239	57.8	39.6
2	*5580.00	87.1 AV			1.25 H	239	47.5	39.6
3	11160.00	58.8 PK	74.0	-15.2	2.99 H	176	42.1	16.7
4	11160.00	45.3 AV	54.0	-8.7	2.99 H	176	28.6	16.7

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	111.6 PK			1.71 V	256	72.0	39.6
2	*5580.00	100.9 AV			1.71 V	256	61.3	39.6
3	11160.00	59.2 PK	74.0	-14.8	2.06 V	193	42.5	16.7
4	11160.00	45.6 AV	54.0	-8.4	2.06 V	193	28.9	16.7

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 140	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	*5700.00	95.8 PK			2.01 H	241	56.2	39.6
2	*5700.00	85.1 AV			2.01 H	241	45.5	39.6
3	#5725.00	56.3 PK	68.2	-11.9	1.86 H	235	52.2	4.1
4	11400.00	58.0 PK	74.0	-16.0	2.93 H	155	41.4	16.6
5	11400.00	44.7 AV	54.0	-9.3	2.93 H	155	28.1	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	*5700.00	110.3 PK			1.60 V	257	70.7	39.6
2	*5700.00	99.8 AV			1.60 V	257	60.2	39.6
3	#5725.00	57.7 PK	68.2	-10.5	1.54 V	258	53.6	4.1
4	11400.00	57.3 PK	74.0	-16.7	1.87 V	201	40.7	16.6
5	11400.00	43.8 AV	54.0	-10.2	1.87 V	201	27.2	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	#5620.51	54.1 PK	68.2	-14.1	2.37 H	240	49.9	4.2
2	*5745.00	94.5 PK			2.37 H	240	54.7	39.8
3	*5745.00	84.1 AV			2.37 H	240	44.3	39.8
4	#5975.64	57.0 PK	68.2	-11.2	2.37 H	240	52.0	5.0
5	11490.00	58.6 PK	74.0	-15.4	3.18 H	182	41.8	16.8
6	11490.00	44.9 AV	54.0	-9.1	3.18 H	182	28.1	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	#5617.31	55.7 PK	68.2	-12.5	1.63 V	257	51.5	4.2
2	*5745.00	109.4 PK			1.63 V	257	69.6	39.8
3	*5745.00	98.9 AV			1.63 V	257	59.1	39.8
4	#5955.77	57.3 PK	68.2	-10.9	1.63 V	257	52.5	4.8
5	11490.00	58.1 PK	74.0	-15.9	1.96 V	205	41.3	16.8
6	11490.00	44.3 AV	54.0	-9.7	1.96 V	205	27.5	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	#5601.92	53.2 PK	68.2	-15.0	2.42 H	240	49.0	4.2
2	*5785.00	97.5 PK			2.42 H	240	57.4	40.1
3	*5785.00	87.1 AV			2.42 H	240	47.0	40.1
4	#5981.41	56.3 PK	68.2	-11.9	2.42 H	240	51.3	5.0
5	11570.00	58.2 PK	74.0	-15.8	3.54 H	169	41.2	17.0
6	11570.00	45.5 AV	54.0	-8.5	3.54 H	169	28.5	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	#5621.15	55.8 PK	68.2	-12.4	1.71 V	256	51.6	4.2
2	*5785.00	108.8 PK			1.71 V	256	68.7	40.1
3	*5785.00	98.6 AV			1.71 V	256	58.5	40.1
4	#5977.56	58.3 PK	68.2	-9.9	1.71 V	256	53.3	5.0
5	11570.00	58.7 PK	74.0	-15.3	2.03 V	192	41.7	17.0
6	11570.00	45.3 AV	54.0	-8.7	2.03 V	192	28.3	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 165	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5619.23	54.2 PK	68.2	-14.0	1.41 H	237	50.0	4.2
2	*5825.00	99.7 PK			1.41 H	237	59.4	40.3
3	*5825.00	89.5 AV			1.41 H	237	49.2	40.3
4	#5962.18	56.1 PK	68.2	-12.1	1.41 H	237	51.3	4.8
5	11650.00	58.1 PK	74.0	-15.9	2.86 H	173	41.5	16.6
6	11650.00	44.8 AV	54.0	-9.2	2.86 H	173	28.2	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	#5600.00	55.0 PK	68.2	-13.2	1.73 V	258	50.8	4.2
2	*5825.00	109.7 PK			1.73 V	258	69.4	40.3
3	*5825.00	99.2 AV			1.73 V	258	58.9	40.3
4	#5976.92	56.8 PK	68.2	-11.4	1.73 V	258	51.8	5.0
5	11650.00	58.8 PK	74.0	-15.2	2.18 V	209	42.2	16.6
6	11650.00	45.5 AV	54.0	-8.5	2.18 V	209	28.9	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

802.11n (HT40)

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	56.1 PK	74.0	-17.9	1.89 H	175	52.6	3.5
2	5150.00	43.3 AV	54.0	-10.7	1.89 H	175	39.8	3.5
3	*5190.00	92.1 PK			2.12 H	169	52.8	39.3
4	*5190.00	82.5 AV			2.12 H	169	43.2	39.3
5	#10380.00	57.7 PK	68.2	-10.5	2.69 H	215	42.2	15.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.1 PK	74.0	-7.9	1.70 V	281	62.6	3.5
2	5150.00	48.3 AV	54.0	-5.7	1.70 V	281	44.8	3.5
3	*5190.00	106.5 PK			1.63 V	250	67.2	39.3
4	*5190.00	96.7 AV			1.63 V	250	57.4	39.3
5	#10380.00	57.1 PK	68.2	-11.1	2.15 V	186	41.6	15.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
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	*5230.00	92.8 PK			1.28 H	170	53.7	39.1
2	*5230.00	82.7 AV			1.28 H	170	43.6	39.1
3	5350.00	55.4 PK	74.0	-18.6	1.38 H	152	51.7	3.7
4	5350.00	43.5 AV	54.0	-10.5	1.38 H	152	39.8	3.7
5	#10460.00	57.6 PK	68.2	-10.6	2.59 H	231	41.6	16.0

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	*5230.00	106.1 PK			1.74 V	273	67.0	39.1
2	*5230.00	95.9 AV			1.74 V	273	56.8	39.1
3	5350.00	56.9 PK	74.0	-17.1	1.88 V	246	53.2	3.7
4	5350.00	44.3 AV	54.0	-9.7	1.88 V	246	40.6	3.7
5	#10460.00	57.4 PK	68.2	-10.8	2.18 V	164	41.4	16.0

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 54	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	55.3 PK	74.0	-18.7	1.36 H	157	51.8	3.5
2	5150.00	43.3 AV	54.0	-10.7	1.36 H	157	39.8	3.5
3	*5270.00	92.1 PK			1.02 H	172	53.1	39.0
4	*5270.00	82.6 AV			1.02 H	172	43.6	39.0
5	#10540.00	58.4 PK	68.2	-9.8	2.81 H	192	42.0	16.4

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	55.2 PK	74.0	-18.8	1.89 V	288	51.7	3.5
2	5150.00	43.7 AV	54.0	-10.3	1.89 V	288	40.2	3.5
3	*5270.00	106.2 PK			1.72 V	244	67.2	39.0
4	*5270.00	96.3 AV			1.72 V	244	57.3	39.0
5	#10540.00	56.1 PK	68.2	-12.1	2.28 V	265	39.7	16.4

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 62	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5310.00	91.8 PK			1.54 H	243	52.8	39.0
2	*5310.00	82.5 AV			1.54 H	243	43.5	39.0
3	5350.00	55.9 PK	74.0	-18.1	1.61 H	253	52.2	3.7
4	5350.00	43.7 AV	54.0	-10.3	1.61 H	253	40.0	3.7
5	10620.00	59.1 PK	74.0	-14.9	2.96 H	255	42.5	16.6
6	10620.00	46.2 AV	54.0	-7.8	2.96 H	255	29.6	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	*5310.00	106.2 PK			1.48 V	276	67.2	39.0
2	*5310.00	96.0 AV			1.48 V	276	57.0	39.0
3	5350.00	65.4 PK	74.0	-8.6	1.59 V	275	61.7	3.7
4	5350.00	50.5 AV	54.0	-3.5	1.59 V	275	46.8	3.7
5	10620.00	58.5 PK	74.0	-15.5	1.96 V	158	41.9	16.6
6	10620.00	46.0 AV	54.0	-8.0	1.96 V	158	29.4	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 102	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	5460.00	56.2 PK	74.0	-17.8	1.45 H	253	52.2	4.0
2	5460.00	44.3 AV	54.0	-9.7	1.45 H	253	40.3	4.0
3	#5470.00	56.9 PK	68.2	-11.3	1.33 H	254	52.9	4.0
4	*5510.00	92.5 PK			1.04 H	234	52.8	39.7
5	*5510.00	83.4 AV			1.04 H	234	43.7	39.7
6	11020.00	58.4 PK	74.0	-15.6	3.47 H	125	40.8	17.6
7	11020.00	46.2 AV	54.0	-7.8	3.47 H	125	28.6	17.6
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	5460.00	56.3 PK	74.0	-17.7	1.72 V	205	52.3	4.0
2	5460.00	44.8 AV	54.0	-9.2	1.72 V	205	40.8	4.0
3	#5470.00	66.5 PK	68.2	-1.7	1.66 V	227	62.5	4.0
4	*5510.00	107.4 PK			1.80 V	253	67.7	39.7
5	*5510.00	97.9 AV			1.80 V	253	58.2	39.7
6	11020.00	59.5 PK	74.0	-14.5	2.61 V	223	41.9	17.6
7	11020.00	47.1 AV	54.0	-6.9	2.61 V	223	29.5	17.6

Remarks:

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

CHANNEL	TX Channel 110	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	*5550.00	93.6 PK			1.64 H	240	54.0	39.6
2	*5550.00	84.1 AV			1.64 H	240	44.5	39.6
3	11100.00	58.9 PK	74.0	-15.1	3.15 H	153	42.1	16.8
4	11100.00	45.5 AV	54.0	-8.5	3.15 H	153	28.7	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	*5550.00	107.0 PK			1.76 V	261	67.4	39.6
2	*5550.00	97.1 AV			1.76 V	261	57.5	39.6
3	11100.00	59.6 PK	74.0	-14.4	2.01 V	186	42.8	16.8
4	11100.00	46.6 AV	54.0	-7.4	2.01 V	186	29.8	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 134	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	*5670.00	92.3 PK			1.04 H	238	52.5	39.8
2	*5670.00	82.4 AV			1.04 H	238	42.6	39.8
3	#5725.00	54.4 PK	68.2	-13.8	1.28 H	254	50.3	4.1
4	11340.00	58.8 PK	74.0	-15.2	2.98 H	157	42.0	16.8
5	11340.00	45.9 AV	54.0	-8.1	2.98 H	157	29.1	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	*5670.00	106.1 PK			1.75 V	283	66.3	39.8
2	*5670.00	96.2 AV			1.75 V	283	56.4	39.8
3	#5725.00	55.4 PK	68.2	-12.8	1.98 V	294	51.3	4.1
4	11340.00	58.1 PK	74.0	-15.9	1.69 V	236	41.3	16.8
5	11340.00	45.5 AV	54.0	-8.5	1.69 V	236	28.7	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 151	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	#5637.18	54.1 PK	68.2	-14.1	1.50 H	314	49.9	4.2
2	*5755.00	90.0 PK			1.50 H	314	50.2	39.8
3	*5755.00	80.6 AV			1.50 H	314	40.8	39.8
4	#5970.51	56.5 PK	68.2	-11.7	1.50 H	314	51.6	4.9
5	11510.00	59.7 PK	74.0	-14.3	3.24 H	265	42.8	16.9
6	11510.00	46.4 AV	54.0	-7.6	3.24 H	265	29.5	16.9

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	#5603.85	55.0 PK	68.2	-13.2	1.75 V	260	50.8	4.2
2	*5755.00	105.7 PK			1.75 V	260	65.9	39.8
3	*5755.00	95.9 AV			1.75 V	260	56.1	39.8
4	#5995.51	57.0 PK	68.2	-11.2	1.75 V	260	52.0	5.0
5	11510.00	59.4 PK	74.0	-14.6	2.17 V	185	42.5	16.9
6	11510.00	46.2 AV	54.0	-7.8	2.17 V	185	29.3	16.9

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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

CHANNEL	TX Channel 159	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	#5610.90	53.9 PK	68.2	-14.3	1.41 H	306	49.7	4.2
2	*5795.00	92.3 PK			1.41 H	306	52.2	40.1
3	*5795.00	82.5 AV			1.41 H	306	42.4	40.1
4	#5973.08	56.5 PK	68.2	-11.7	1.41 H	306	51.5	5.0
5	11590.00	59.3 PK	74.0	-14.7	3.08 H	251	42.3	17.0
6	11590.00	46.5 AV	54.0	-7.5	3.08 H	251	29.5	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	#5600.00	55.4 PK	68.2	-12.8	1.79 V	259	51.2	4.2
2	*5795.00	105.7 PK			1.79 V	259	65.6	40.1
3	*5795.00	95.9 AV			1.79 V	259	55.8	40.1
4	#5944.87	57.2 PK	68.2	-11.0	1.79 V	259	52.4	4.8
5	11590.00	58.7 PK	74.0	-15.3	1.83 V	216	41.7	17.0
6	11590.00	46.2 AV	54.0	-7.8	1.83 V	216	29.2	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. The other emission levels were very low against the limit
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency
6. " # ": The radiated frequency is out of the restricted band

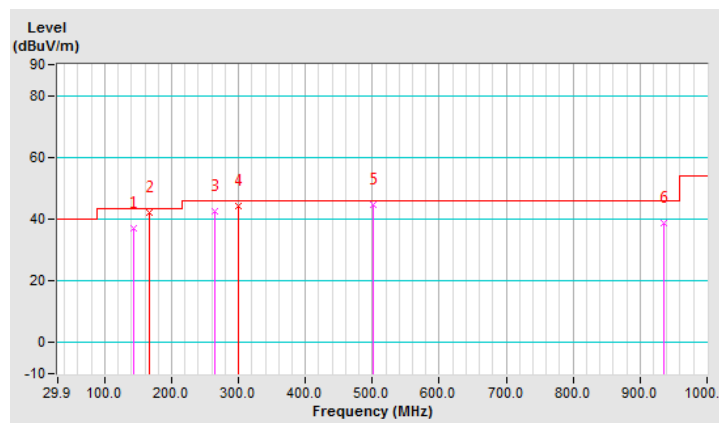
Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 116	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	142.67	37.1 QP	43.5	-6.4	1.99 H	195	46.4	-9.3
2	166.52	42.2 QP	43.5	-1.3	1.48 H	184	51.3	-9.1
3	265.16	42.5 QP	46.0	-3.5	1.00 H	89	51.2	-8.7
4	299.73	44.3 QP	46.0	-1.7	1.00 H	168	51.7	-7.4
5	500.42	44.7 QP	46.0	-1.3	1.49 H	47	48.2	-3.5
6	935.94	38.9 QP	46.0	-7.1	1.99 H	21	34.0	4.9

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
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

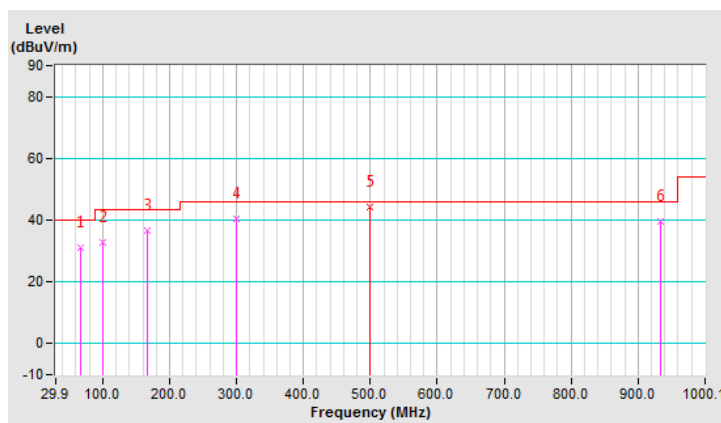


CHANNEL	TX Channel 116	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	66.84	31.1 QP	40.0	-8.9	1.00 V	257	41.6	-10.5
2	99.89	32.6 QP	43.5	-10.9	1.00 V	79	46.3	-13.7
3	166.00	36.8 QP	43.5	-6.7	1.99 V	150	45.8	-9.0
4	300.16	40.6 QP	46.0	-5.4	1.50 V	91	48.0	-7.4
5	499.53	44.1 QP	46.0	-1.9	1.00 V	176	47.6	-3.5
6	933.99	39.6 QP	46.0	-6.4	1.50 V	58	34.7	4.9

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

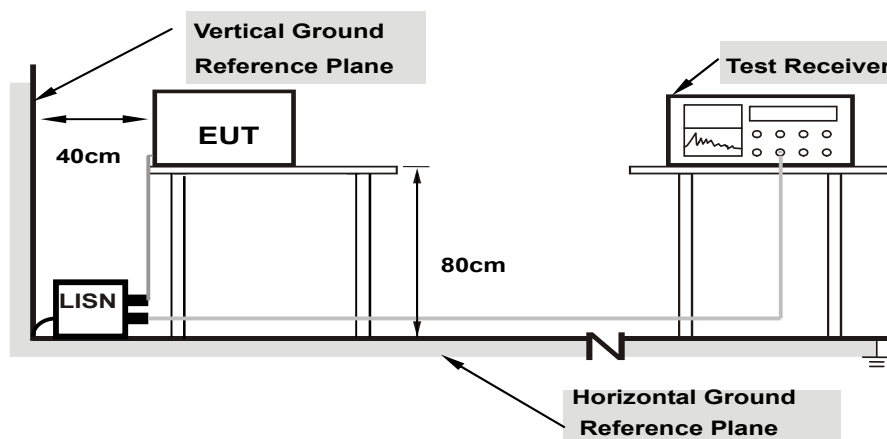
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

Note: 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

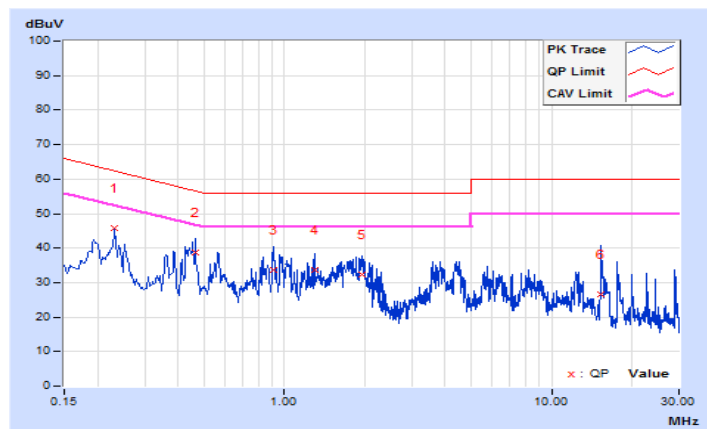
Worst-case data: 802.11a

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.23211	9.67	36.02	21.18	45.69	30.85	62.37
2	0.46280	9.66	29.20	18.79	38.86	28.45	56.64	46.64	-17.78	-18.19
3	0.91245	9.65	24.08	17.14	33.73	26.79	56.00	46.00	-22.27	-19.21
4	1.29954	9.66	23.93	18.02	33.59	27.68	56.00	46.00	-22.41	-18.32
5	1.96424	9.68	22.74	15.72	32.42	25.40	56.00	46.00	-23.58	-20.60
6	15.29734	9.89	16.75	8.61	26.64	18.50	60.00	50.00	-33.36	-31.50

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.

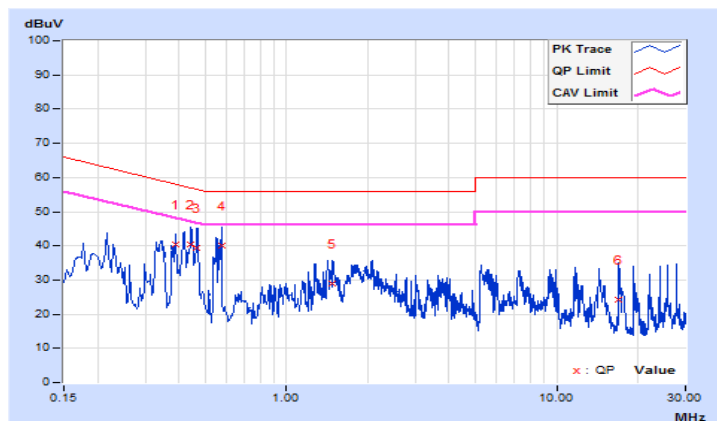


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.38851	9.67	30.60	19.92	40.27	29.59	58.10
2	0.44325	9.67	30.66	21.33	40.33	31.00	57.00	47.00	-16.67	-16.00
3	0.46280	9.67	29.89	14.49	39.56	24.16	56.64	46.64	-17.08	-22.48
4	0.57620	9.66	30.28	13.03	39.94	22.69	56.00	46.00	-16.06	-23.31
5	1.48331	9.66	19.25	13.82	28.91	23.48	56.00	46.00	-27.09	-22.52
6	16.94345	9.97	14.30	5.56	24.27	15.53	60.00	50.00	-35.73	-34.47

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

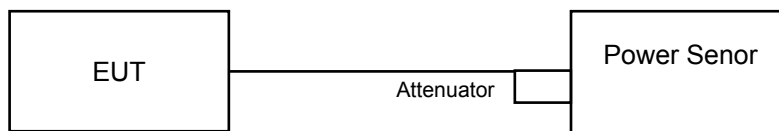
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

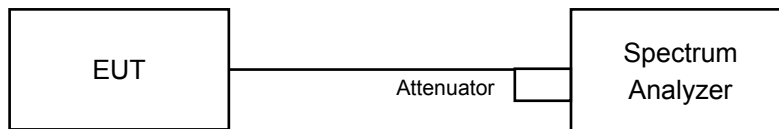
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

For Power Output



For 26dB Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

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

For 26dB Bandwidth

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:
802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	35.237	15.47	24.00	Pass
40	5200	34.594	15.39	24.00	Pass
48	5240	35.400	15.49	24.00	Pass
52	5260	37.325	15.72	24.00	Pass
60	5300	33.189	15.21	24.00	Pass
64	5320	32.509	15.12	24.00	Pass
100	5500	32.063	15.06	24.00	Pass
116	5580	35.400	15.49	24.00	Pass
140	5700	34.356	15.36	24.00	Pass
149	5745	35.075	15.45	30.00	Pass
157	5785	35.318	15.48	30.00	Pass
165	5825	34.119	15.33	30.00	Pass

Note:

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

1. $11\text{dBm} + 10\log(25.02) = 24.98 > 24\text{dBm}$
2. $11\text{dBm} + 10\log(24.88) = 24.95 > 24\text{dBm}$
3. $11\text{dBm} + 10\log(24.56) = 24.90 > 24\text{dBm}$
4. $11\text{dBm} + 10\log(26.89) = 25.29 > 24\text{dBm}$
5. $11\text{dBm} + 10\log(23.67) = 24.74 > 24\text{dBm}$
6. $11\text{dBm} + 10\log(25.02) = 24.98 > 24\text{dBm}$

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	13.55	12.88	42.055	16.24	24.00	Pass
40	5200	13.28	13.09	41.651	16.20	24.00	Pass
48	5240	13.33	12.84	40.759	16.10	24.00	Pass
52	5260	13.64	12.77	42.044	16.24	24.00	Pass
60	5300	13.39	12.75	40.663	16.09	24.00	Pass
64	5320	13.69	13.07	43.665	16.40	24.00	Pass
100	5500	13.21	13.02	40.986	16.13	24.00	Pass
116	5580	12.95	13.20	40.617	16.09	24.00	Pass
140	5700	13.74	13.13	44.218	16.46	24.00	Pass
149	5745	13.11	13.44	42.544	16.29	30.00	Pass
157	5785	12.75	13.56	41.535	16.18	30.00	Pass
165	5825	13.29	13.69	44.718	16.50	30.00	Pass

Note:

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

Chain 0

1. $11\text{dBm} + 10\log(23.50) = 24.71 > 24\text{dBm}$
2. $11\text{dBm} + 10\log(23.56) = 24.72 > 24\text{dBm}$
3. $11\text{dBm} + 10\log(23.85) = 24.77 > 24\text{dBm}$
4. $11\text{dBm} + 10\log(23.96) = 24.79 > 24\text{dBm}$
5. $11\text{dBm} + 10\log(23.49) = 24.70 > 24\text{dBm}$
6. $11\text{dBm} + 10\log(23.77) = 24.76 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log(23.37) = 24.68 > 24\text{dBm}$
2. $11\text{dBm} + 10\log(23.75) = 24.75 > 24\text{dBm}$
3. $11\text{dBm} + 10\log(23.95) = 24.79 > 24\text{dBm}$
4. $11\text{dBm} + 10\log(25.02) = 24.98 > 24\text{dBm}$
5. $11\text{dBm} + 10\log(23.68) = 24.74 > 24\text{dBm}$
6. $11\text{dBm} + 10\log(24.13) = 24.82 > 24\text{dBm}$

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	12.79	12.16	35.455	15.50	24.00	Pass
46	5230	12.43	11.56	31.820	15.03	24.00	Pass
54	5270	12.56	11.95	33.698	15.28	24.00	Pass
62	5310	12.56	11.53	32.253	15.09	24.00	Pass
102	5510	11.94	11.87	31.013	14.92	24.00	Pass
110	5550	12.17	12.02	32.404	15.11	24.00	Pass
134	5670	12.54	12.34	35.087	15.45	24.00	Pass
151	5755	12.23	12.22	33.383	15.24	30.00	Pass
159	5795	11.91	12.37	32.782	15.16	30.00	Pass

Note:

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

Chain 0

1. $11\text{dBm} + 10\log(49.72) = 27.96 > 24\text{dBm}$
2. $11\text{dBm} + 10\log(50.73) = 28.05 > 24\text{dBm}$
3. $11\text{dBm} + 10\log(50.39) = 28.02 > 24\text{dBm}$
4. $11\text{dBm} + 10\log(49.47) = 27.94 > 24\text{dBm}$
5. $11\text{dBm} + 10\log(50.46) = 28.02 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log(50.95) = 28.07 > 24\text{dBm}$
2. $11\text{dBm} + 10\log(50.90) = 28.06 > 24\text{dBm}$
3. $11\text{dBm} + 10\log(49.17) = 27.91 > 24\text{dBm}$
4. $11\text{dBm} + 10\log(50.42) = 28.02 > 24\text{dBm}$
5. $11\text{dBm} + 10\log(51.86) = 28.14 > 24\text{dBm}$

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)
52	5260	25.02
60	5300	24.88
64	5320	24.56
100	5500	26.89
116	5580	23.67
140	5700	25.02

802.11n (HT20)

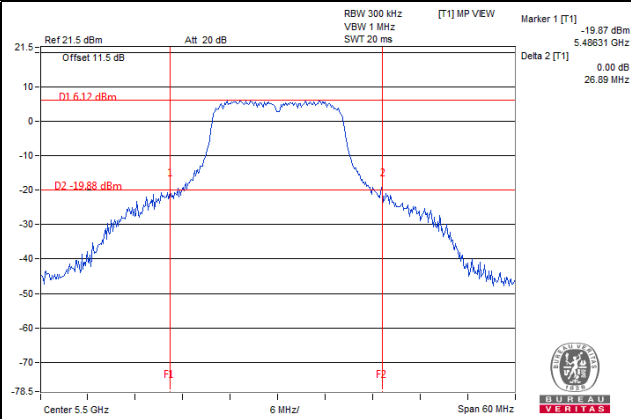
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	23.50	23.37
60	5300	23.56	23.75
64	5320	23.85	23.95
100	5500	23.96	25.02
116	5580	23.49	23.68
140	5700	23.77	24.13

802.11n (HT40)

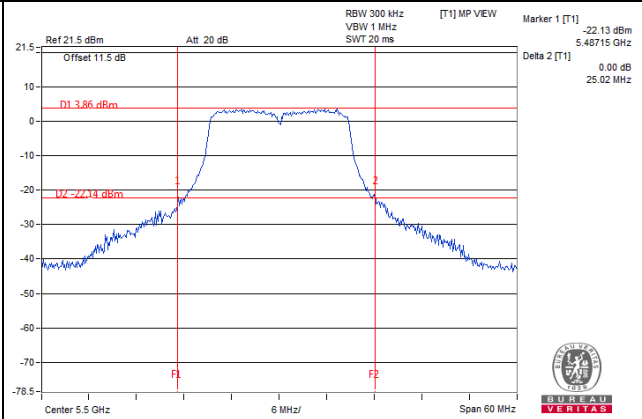
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	49.72	50.95
62	5310	50.73	50.90
102	5510	50.39	49.17
110	5550	49.47	50.42
134	5670	50.46	51.86

Spectrum Plot of Worst Value

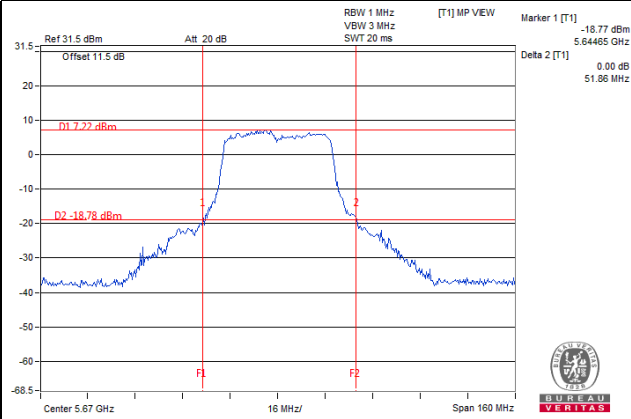
802.11a



802.11n (HT20)



802.11n (HT40)



EUT Maximum Conducted Power

802.11a

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	37.325	15.72
5470~5725	35.400	15.49

802.11n (HT20)

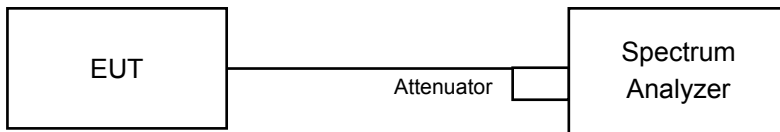
Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	43.665	16.40
5470~5725	44.218	16.46

802.11n (HT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	33.698	15.28
5470~5725	35.087	15.45

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	16.92
40	5200	16.92
48	5240	16.92
52	5260	16.92
60	5300	17.04
64	5320	17.04
100	5500	16.92
116	5580	16.92
140	5700	16.92
149	5745	17.04
157	5785	17.16
165	5825	16.92

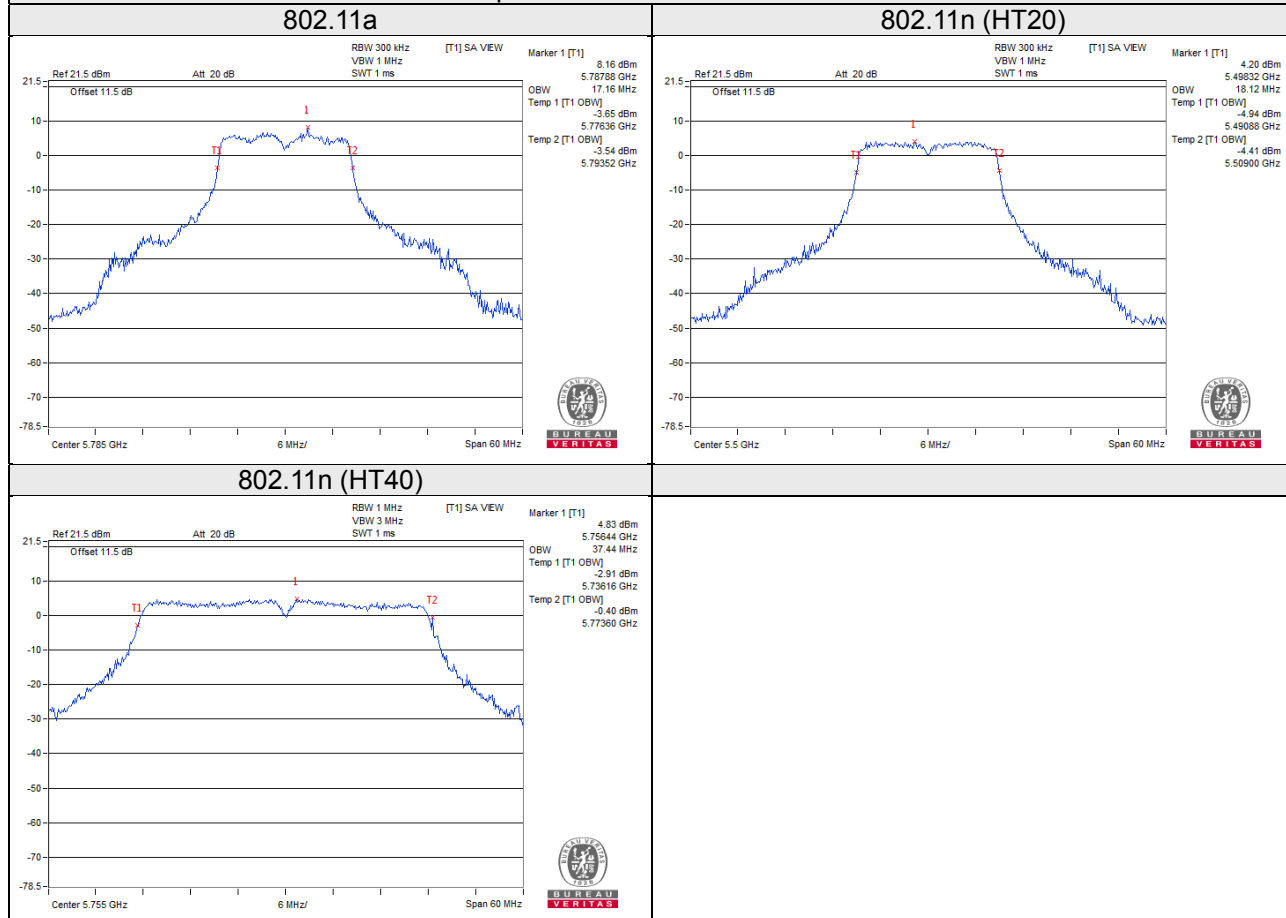
802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.88	17.88
40	5200	18.00	17.88
48	5240	17.88	17.88
52	5260	18.00	17.88
60	5300	17.88	18.00
64	5320	17.88	17.88
100	5500	18.12	18.12
116	5580	17.88	17.88
140	5700	18.12	17.76
149	5745	17.64	17.76
157	5785	17.76	17.76
165	5825	18.00	17.88

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.32	36.96
46	5230	37.32	37.32
54	5270	37.32	37.20
62	5310	37.44	37.20
102	5510	37.44	37.20
110	5550	37.32	36.96
134	5670	37.20	37.20
151	5755	37.44	37.32
159	5795	37.08	37.08

Spectrum Plot of Worst Value

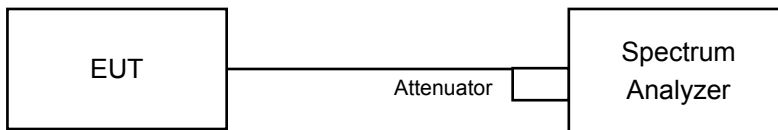


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1, U-NII-2A and U-NII-2C band:

Duty cycle of test signal is < 98%

Using method SA-2

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 1MHz, Set VBW \geq 3 MHz, Detector = RMS
- c. Set Channel power measure = 1MHz
- d. Sweep time = auto, trigger set to "free run".
- e. Trace average at least 100 traces in power averaging mode.
- f. Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

Duty cycle of test signal is < 98%

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW \geq 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1, U-NII-2A and U-NII-2C band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	1.43	0.18	1.61	11.00	Pass
40	5200	1.38	0.18	1.56	11.00	Pass
48	5240	1.94	0.18	2.12	11.00	Pass
52	5260	2.45	0.18	2.63	11.00	Pass
60	5300	2.31	0.18	2.49	11.00	Pass
64	5320	2.06	0.18	2.24	11.00	Pass
100	5500	1.83	0.18	2.01	11.00	Pass
116	5580	1.47	0.18	1.65	11.00	Pass
140	5700	1.98	0.18	2.16	11.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	0.22	-0.70	0.15	2.94	8.19	Pass
40	5200	-0.26	0.01	0.15	3.04	8.19	Pass
48	5240	-0.39	-0.83	0.15	2.56	8.19	Pass
52	5260	0.10	-0.76	0.15	2.85	8.19	Pass
60	5300	-0.61	-0.61	0.15	2.55	8.19	Pass
64	5320	-0.11	-1.21	0.15	2.53	8.19	Pass
100	5500	-0.37	-0.54	0.15	2.71	8.19	Pass
116	5580	-0.52	-0.57	0.15	2.62	8.19	Pass
140	5700	-0.70	-0.26	0.15	2.69	8.19	Pass

Note:

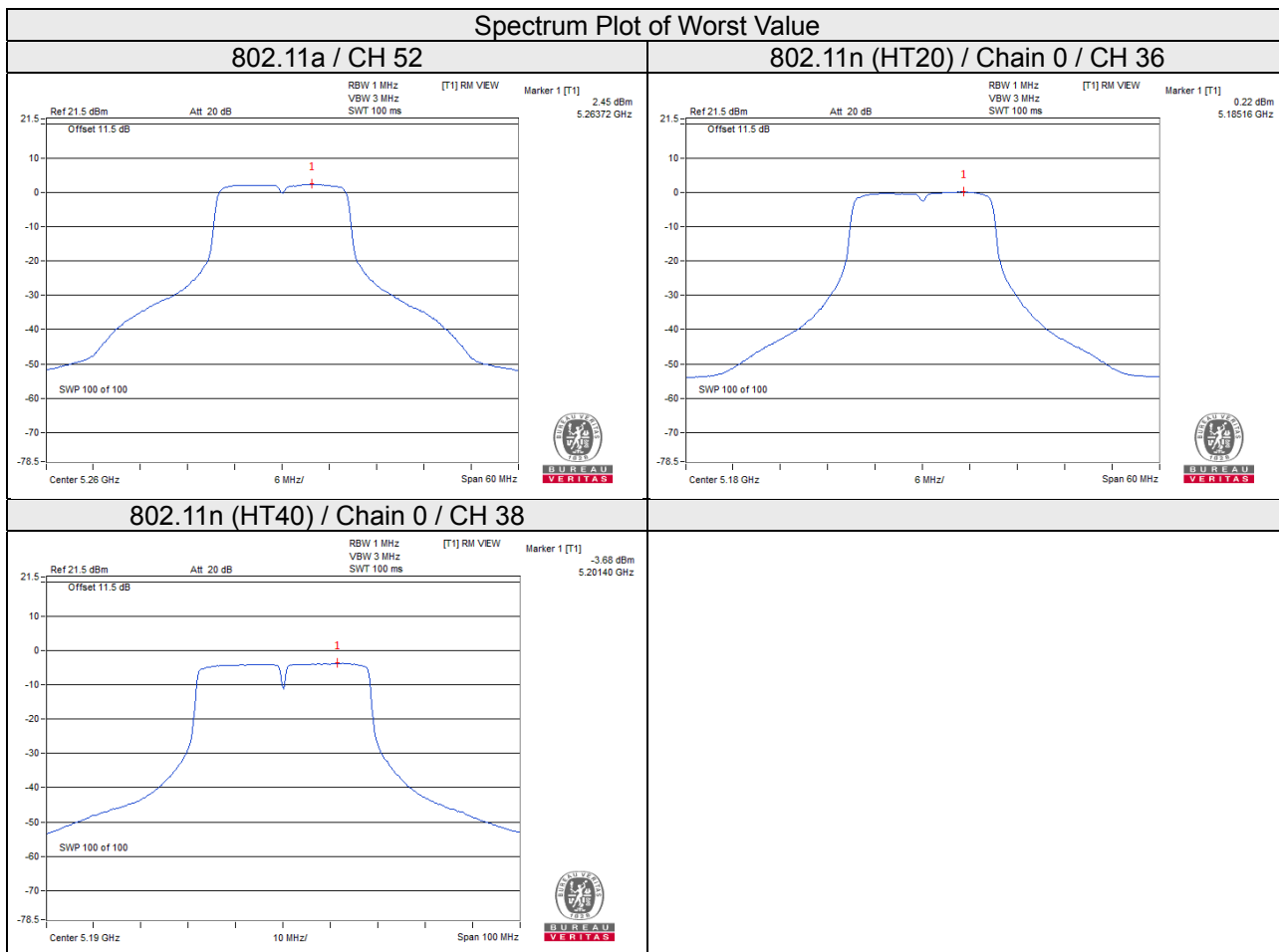
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $5.8\text{dBi} + 10\log(2) = 8.81\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (8.81 - 6) = 8.19\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-3.69	-4.23	0.29	-0.65	8.19	Pass
46	5230	-4.44	-4.22	0.29	-1.03	8.19	Pass
54	5270	-4.36	-4.09	0.29	-0.92	8.19	Pass
62	5310	-4.46	-4.50	0.29	-1.18	8.19	Pass
102	5510	-5.25	-4.58	0.29	-1.60	8.19	Pass
110	5550	-4.84	-4.62	0.29	-1.43	8.19	Pass
134	5670	-4.26	-4.09	0.29	-0.87	8.19	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = 5.8dBi + 10log(2) = 8.81dBi > 6dBi, so the power density limit shall be reduced to 11-(8.81-6) = 8.19dBm.
- Refer to section 3.3 for duty cycle spectrum plot.



For U-NII-3 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor		Duty Factor (dB)	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)				
149	5745	-5.43	-3.21	0.18	-3.03	30.00	Pass
157	5785	-5.48	-3.26	0.18	-3.08	30.00	Pass
165	5825	-5.77	-3.55	0.18	-3.37	30.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-8.95	-6.73	3.01	0.15	-3.57	27.19	Pass
	157	5785	-8.78	-6.56	3.01	0.15	-3.40	27.19	Pass
	165	5825	-7.99	-5.77	3.01	0.15	-2.61	27.19	Pass
1	149	5745	-8.22	-6.00	3.01	0.15	-2.84	27.19	Pass
	157	5785	-8.07	-5.85	3.01	0.15	-2.69	27.19	Pass
	165	5825	-8.48	-6.26	3.01	0.15	-3.10	27.19	Pass

Note:

1. Directional gain = $5.8\text{dBi} + 10\log(2) = 8.81\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.81 - 6) = 27.19\text{dBm}$.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

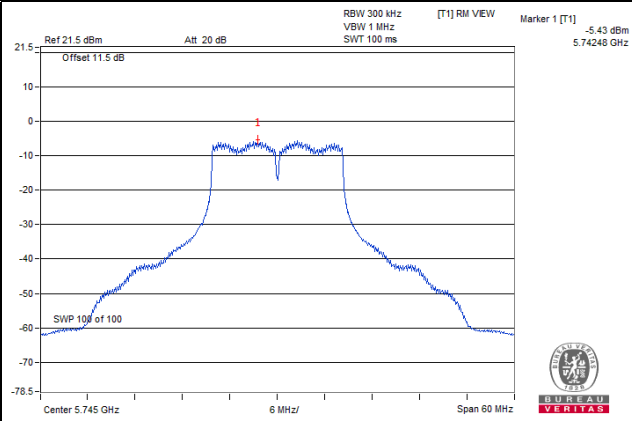
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-13.70	-11.48	3.01	0.29	-8.18	27.19	Pass
	159	5795	-13.07	-10.85	3.01	0.29	-7.55	27.19	Pass
1	151	5755	-13.01	-10.79	3.01	0.29	-7.49	27.19	Pass
	159	5795	-12.62	-10.40	3.01	0.29	-7.10	27.19	Pass

Note:

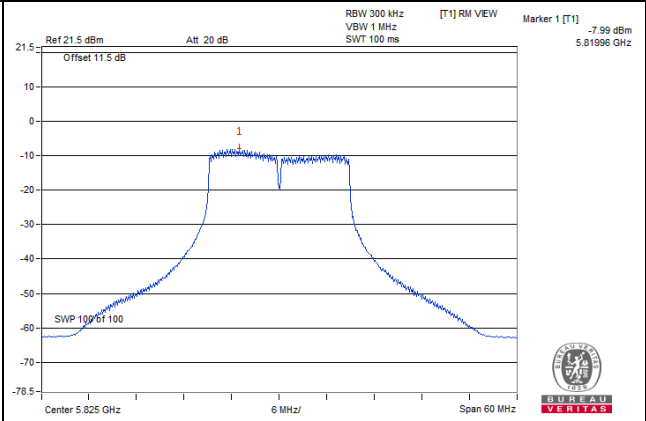
1. Directional gain = $5.8\text{dBi} + 10\log(2) = 8.81\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.81 - 6) = 27.19\text{dBm}$.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

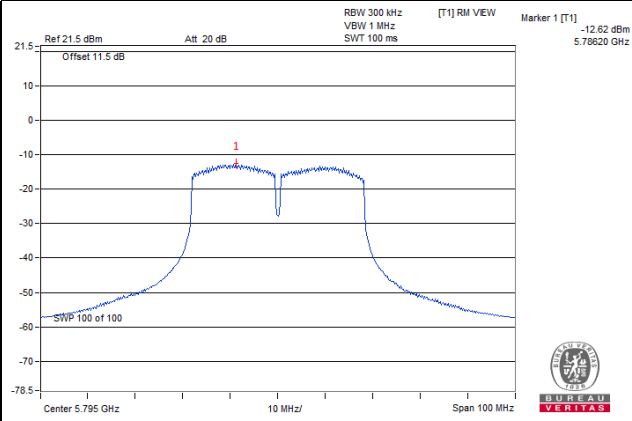
802.11a



802.11n (HT20)



802.11n (HT40)

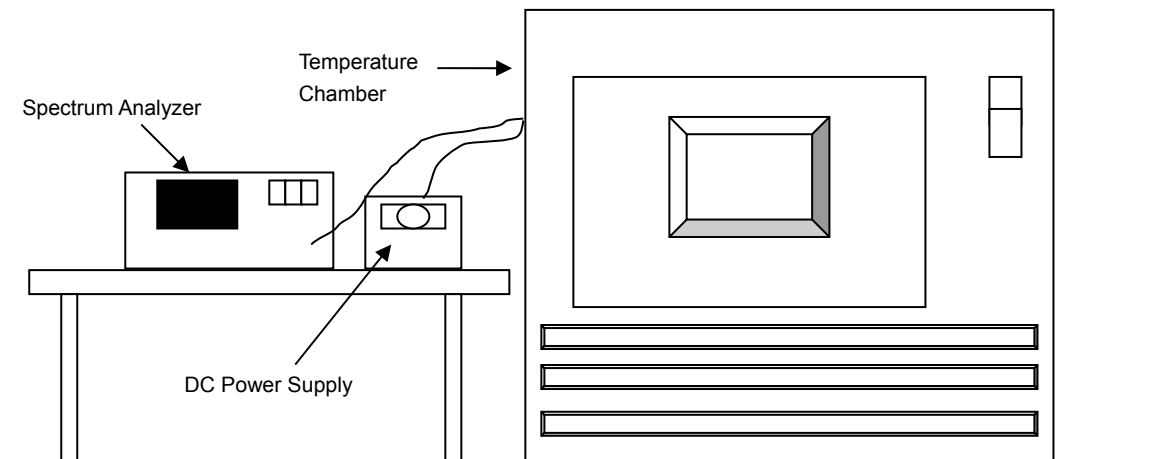


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 11, 2018	Jun. 10, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
DC Power Supply Topward	6603D	700637	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.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
85	3.3	5180.0075	Pass	5180.0093	Pass	5180.0099	Pass	5180.0091	Pass
80	3.3	5179.9921	Pass	5179.9953	Pass	5179.9927	Pass	5179.9946	Pass
70	3.3	5179.976	Pass	5179.9791	Pass	5179.9755	Pass	5179.9757	Pass
60	3.3	5180.0214	Pass	5180.0186	Pass	5180.0167	Pass	5180.0193	Pass
50	3.3	5179.9986	Pass	5180.0013	Pass	5180.0021	Pass	5180.0026	Pass
40	3.3	5180.0214	Pass	5180.0204	Pass	5180.0222	Pass	5180.0201	Pass
30	3.3	5180.0024	Pass	5180.0042	Pass	5180.0013	Pass	5180.0031	Pass
20	3.3	5180.0179	Pass	5180.0182	Pass	5180.0208	Pass	5180.0202	Pass
10	3.3	5180.0068	Pass	5180.0077	Pass	5180.0086	Pass	5180.0042	Pass
0	3.3	5180.0024	Pass	5180.0057	Pass	5180.0043	Pass	5180.0034	Pass
-10	3.3	5180.0173	Pass	5180.0194	Pass	5180.0194	Pass	5180.0169	Pass
-20	3.3	5179.993	Pass	5179.9932	Pass	5179.9936	Pass	5179.9915	Pass
-30	3.3	5180.0238	Pass	5180.0219	Pass	5180.0214	Pass	5180.0238	Pass
-40	3.3	5180.0039	Pass	5180.004	Pass	5180.0076	Pass	5180.0054	Pass

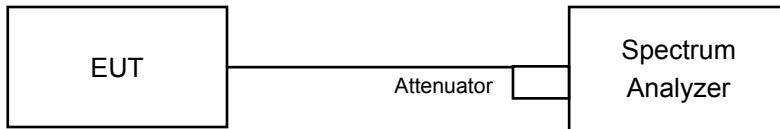
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	3.795	5180.0187	Pass	5180.0175	Pass	5180.02	Pass	5180.0195	Pass
	3.3	5180.0179	Pass	5180.0182	Pass	5180.0208	Pass	5180.0202	Pass
	2.805	5180.018	Pass	5180.0178	Pass	5180.0206	Pass	5180.021	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.37	0.5	Pass
157	5785	16.37	0.5	Pass
165	5825	16.38	0.5	Pass

802.11n (HT20)

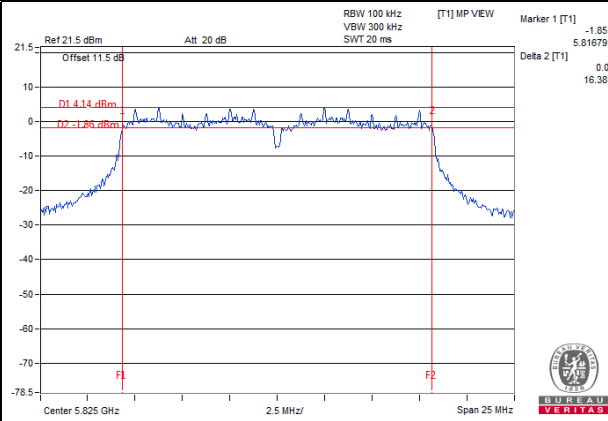
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.18	16.09	0.5	Pass
157	5785	15.49	15.48	0.5	Pass
165	5825	17.33	17.38	0.5	Pass

802.11n (HT40)

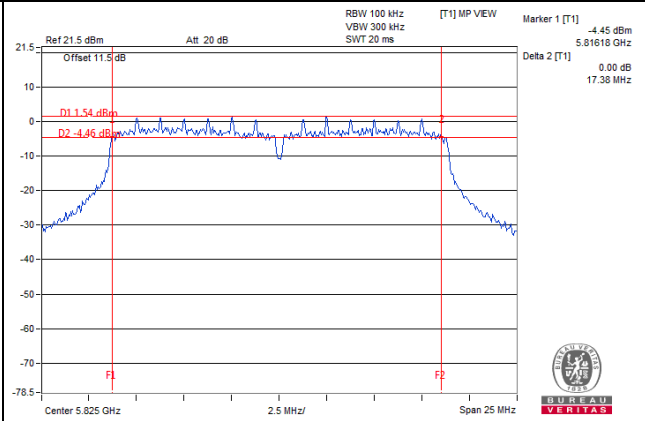
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.05	35.87	0.5	Pass
159	5795	35.56	35.59	0.5	Pass

Spectrum Plot of Worst Value

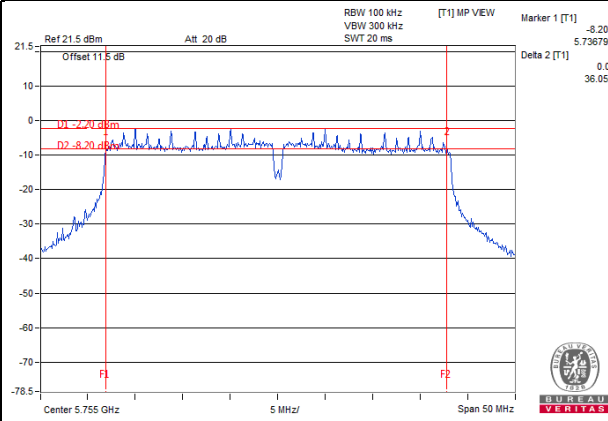
802.11a



802.11n (HT20)



802.11n (HT40)

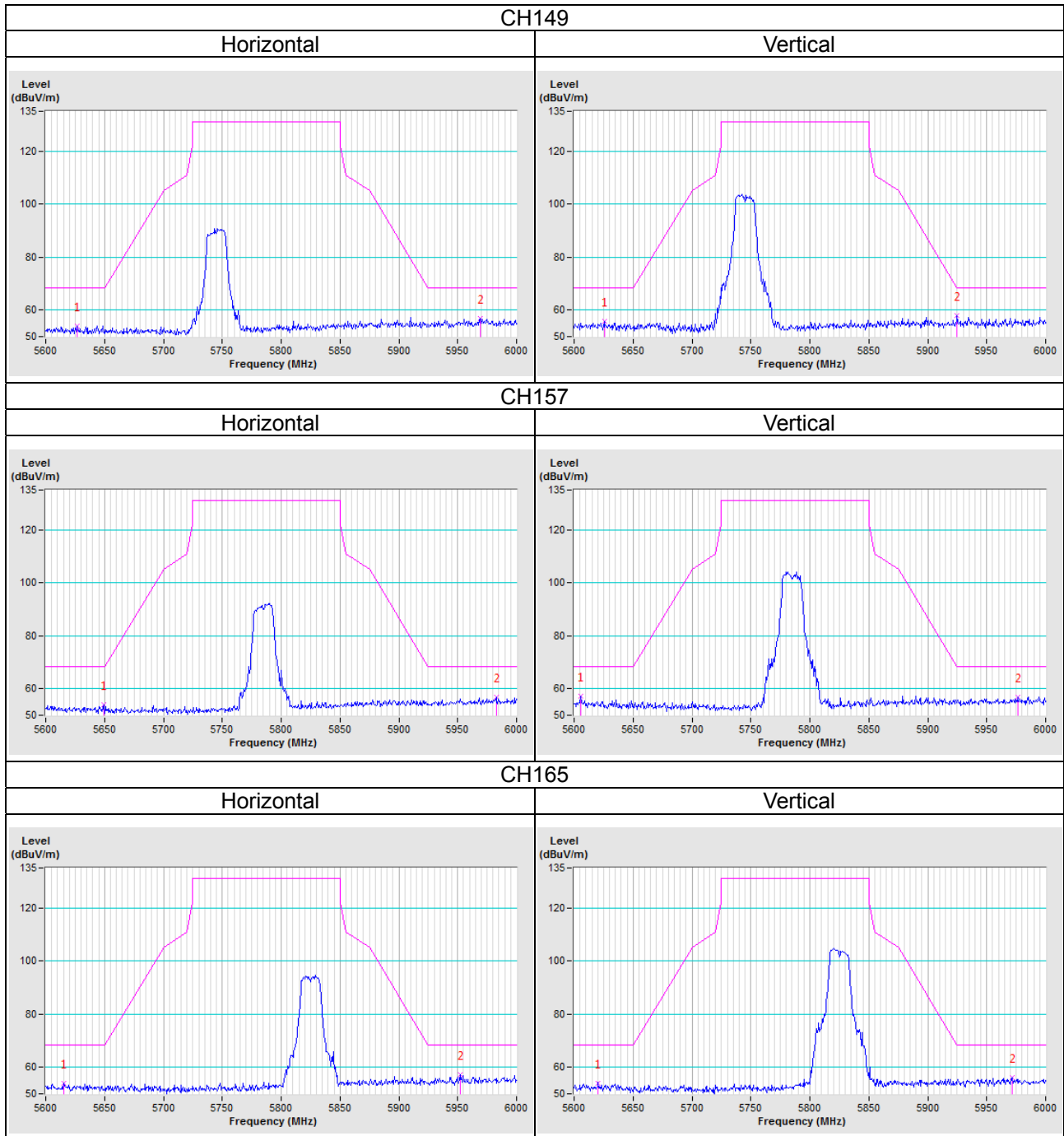


5 Pictures of Test Arrangements

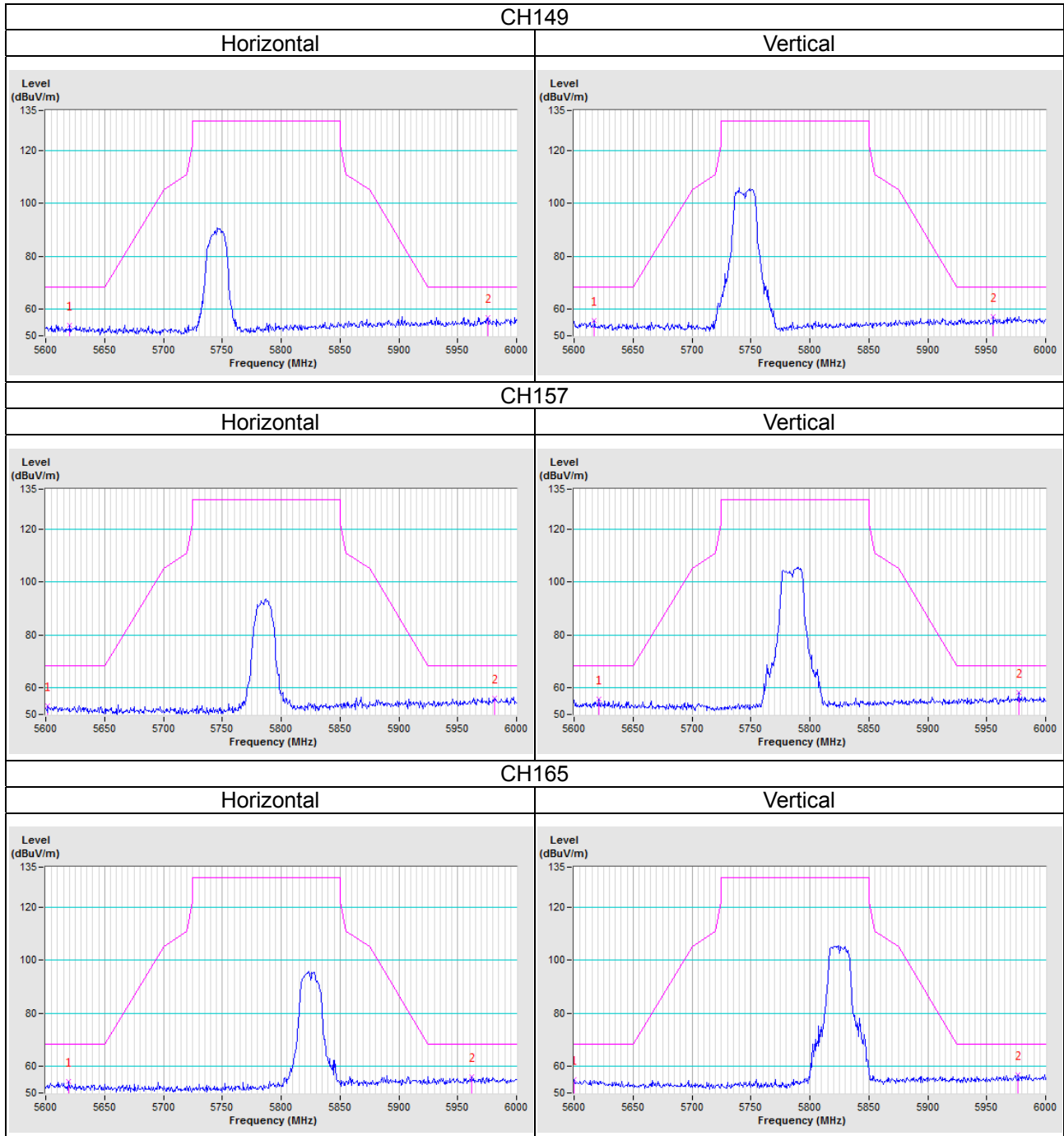
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

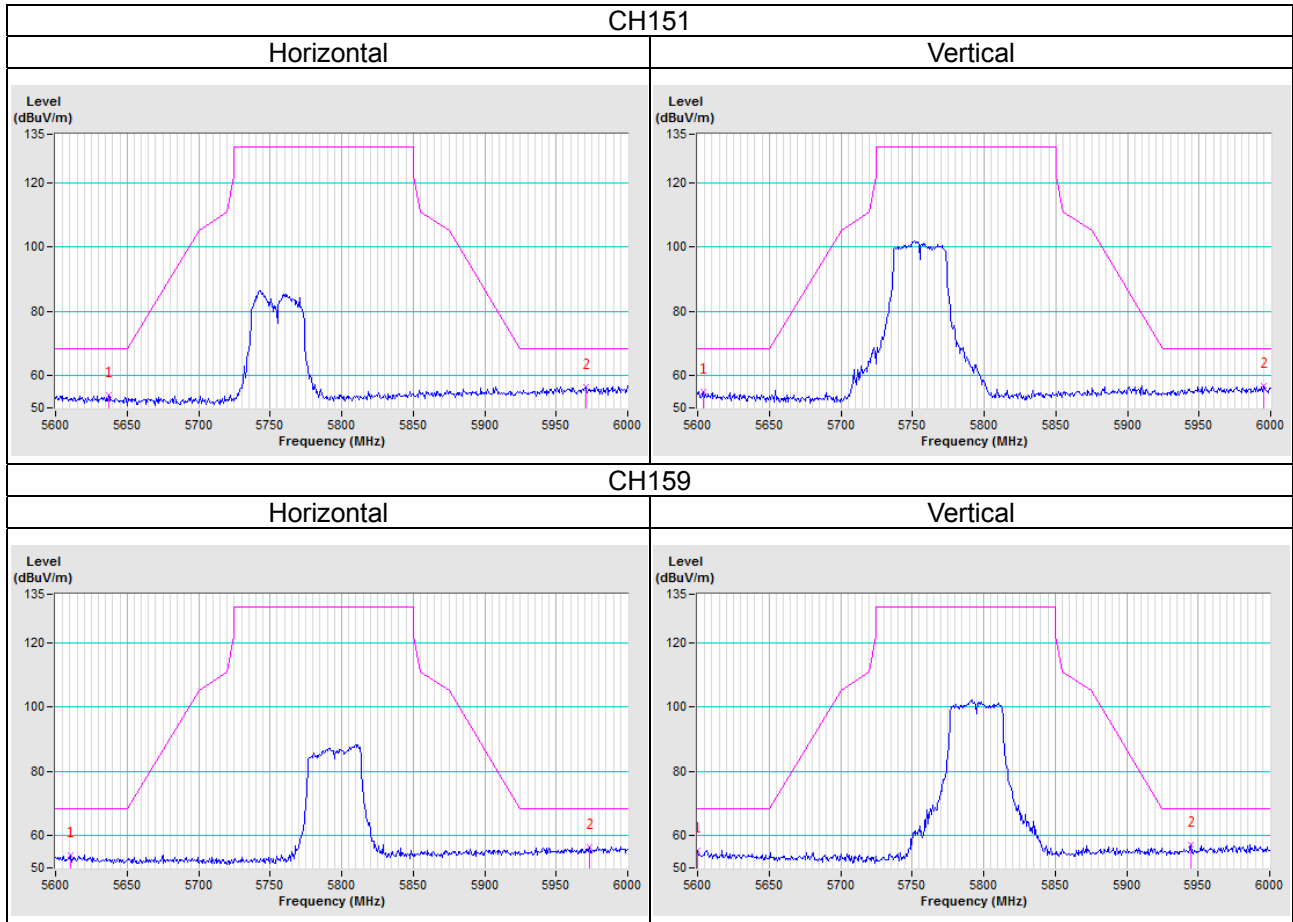
802.11a



802.11n (HT20)



802.11n (HT40)



Appendix – Information on 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 and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---