

FCC Test Report

Report No.: RF161004C22-1

FCC ID: VUI-RCSCON

Test Model: SCON

Received Date: Oct. 04, 2016

Test Date: Oct. 07 ~ Oct. 27, 2016

Issued Date: Nov. 02, 2016

Applicant: PEGATRON Corporation

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Release Control Record

Issue No.	Description	Date Issued
RF161004C22-1	Original release	Nov. 02, 2016

1 Certificate of Conformity

Product: Rear Seat Remote

Brand: AUDI

Test Model: SCON

Sample Status: Engineering sample

Applicant: PEGATRON Corporation

Test Date: Oct. 07 ~ Oct. 27, 2016

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 EMC characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Nov. 02, 2016
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Nov. 02, 2016
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.35dB at 0.46280MHz.
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 -1.5dB at 30.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is MHF not a standard connector.

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

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	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 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	Rear Seat Remote
Brand	AUDI
Test Model	SCON
Sample Status	Engineering sample
Power Supply Rating	24Vdc (DC power supply) 3.8Vdc (Battery)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 65Mbps 802.11ac: up to 390Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	5180 ~ 5240MHz: 12.503mW 5745 ~ 5825MHz: 12.474mW
Antenna Type	5180 ~ 5240MHz: PIFA antenna with 3.10dBi gain 5745 ~ 5825MHz: PIFA antenna with 0.30dBi gain
Antenna Connector	MHF
Accessory Device	Battery
Data Cable Supplied	NA

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX
802.11ac (VHT20)	1TX
802.11ac (VHT40)	1TX
802.11ac (VHT80)	1TX

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

2. The EUT consumes power from the following battery

Model	JS 4HS007P
Power Rating	3.8Vdc, 2700mAh 10.26Wh

3. The following RF Chipset used in the EUT.

RF Chipset Vendor Name	Model Name	SPEC
Broadcom	BCM43353	IEEE 802.11 a/b/g/n/ac

3.2 Description of Test Modes

For 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	58.5

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	40	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	40	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	58.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	23deg. C, 70%RH	24Vdc	Matthew Yang
RE<1G	23deg. C, 70%RH	24Vdc	Matthew Yang
PLC	25deg. C, 70%RH	24Vdc	Matthew Yang
APCM	25deg. C, 70%RH	24Vdc	Jun Wu

3.3 Duty Cycle of Test Signal

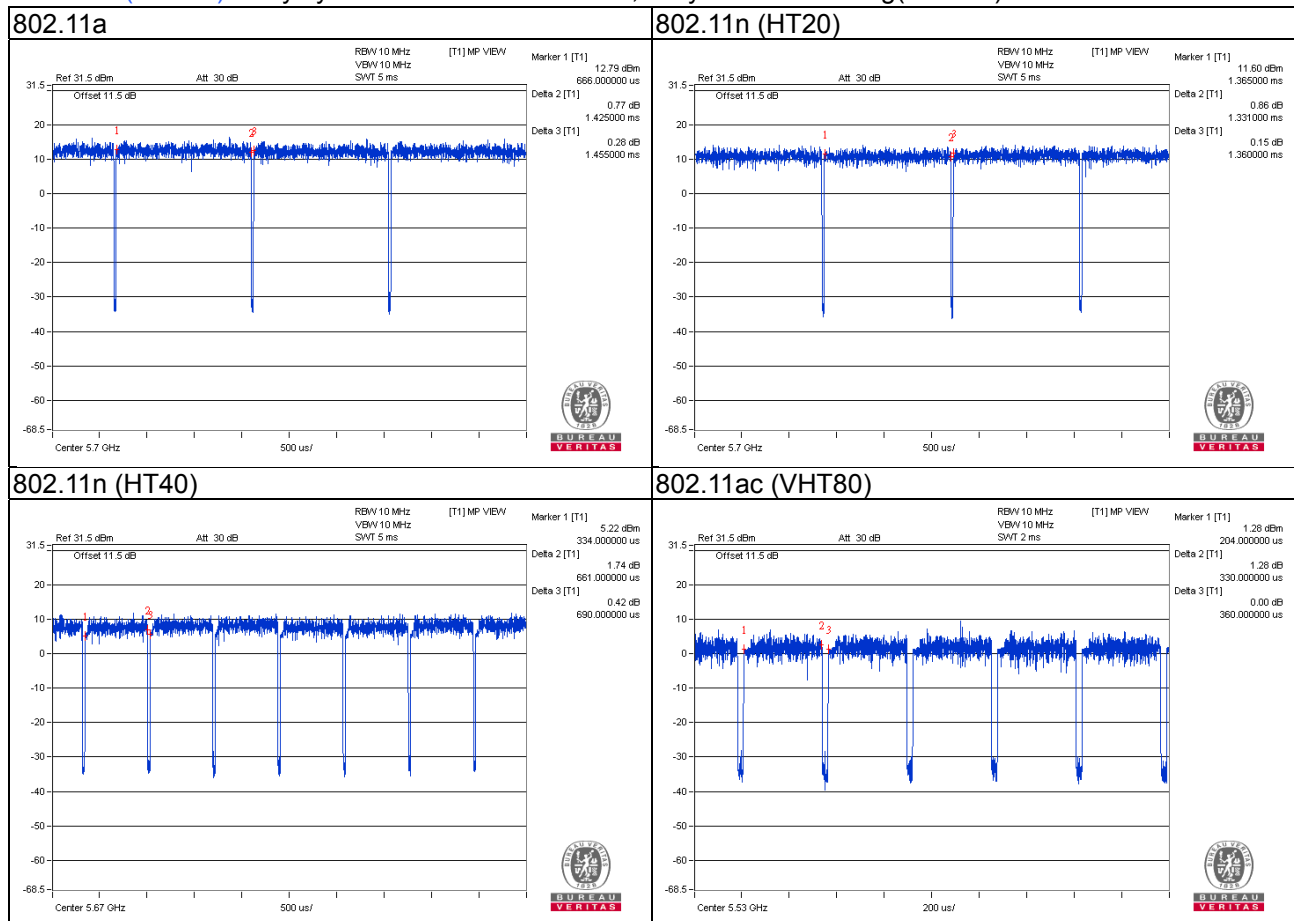
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.425/1.455 = 0.979$, Duty factor = $10 * \log(1/0.979) = 0.09$

802.11n (HT20): Duty cycle = $1.331/1.360 = 0.979$, Duty factor = $10 * \log(1/0.979) = 0.09$

802.11n (HT40): Duty cycle = $0.661/0.690 = 0.958$, Duty factor = $10 * \log(1/0.958) = 0.19$

802.11ac (VHT80): Duty cycle = $0.330/0.360 = 0.917$, Duty factor = $10 * \log(1/0.917) = 0.38$



3.4 Description of Support Units

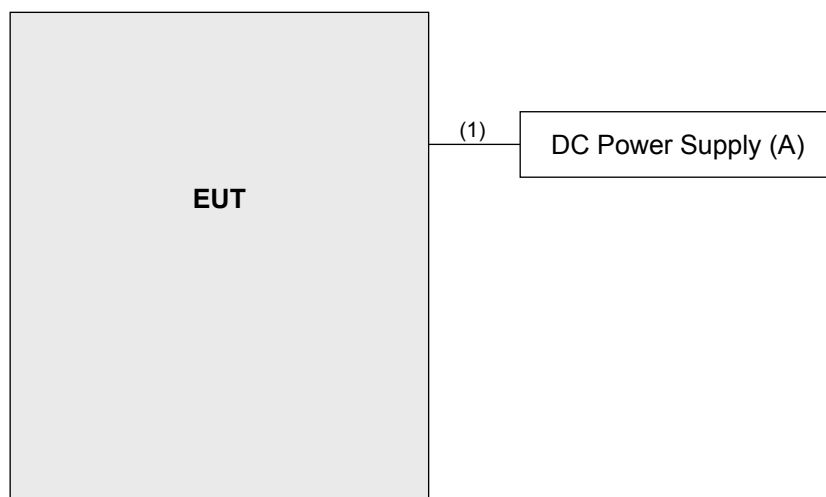
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DC Power Supply	TOPWARD	6303D	802236	NA	-

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.	Power cable	1	1.8	N	0	-

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 v01r03

ANSI C63.10-2013

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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 v01r03			Field Strength at 3m	
			PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBµV/m) ^{*1} PK:105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK:122.2 (dBµV/m) ^{*4}
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.			^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.			^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 24, 2015	Oct. 23, 2016
			Oct. 24, 2016	Oct. 23, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 16, 2016	Aug. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 17, 2015	Oct. 16, 2016
			Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2016	Jun. 07, 2017

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 4.
 3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 460141.
 5. The IC Site Registration No. is IC7450F-4.
 6. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

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. Both X and Y axes 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:

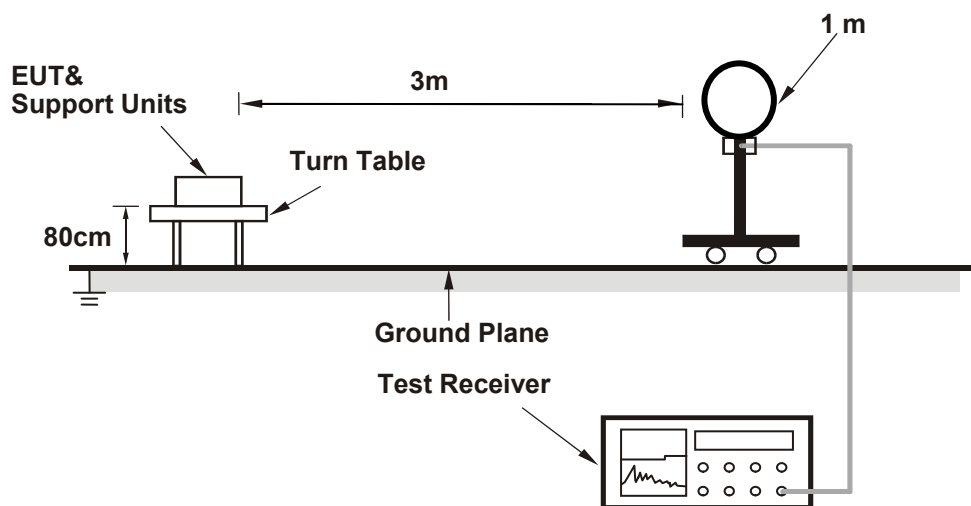
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

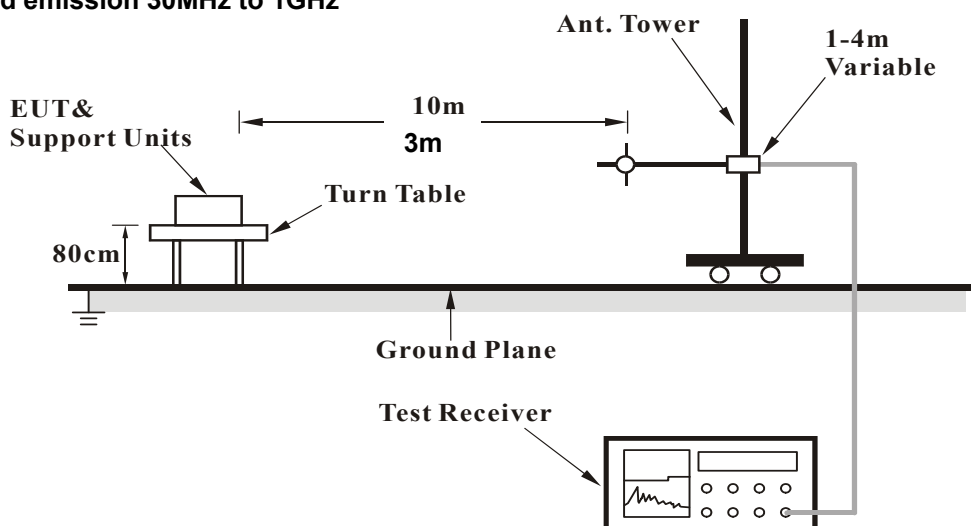
No deviation.

4.1.5 Test Set Up

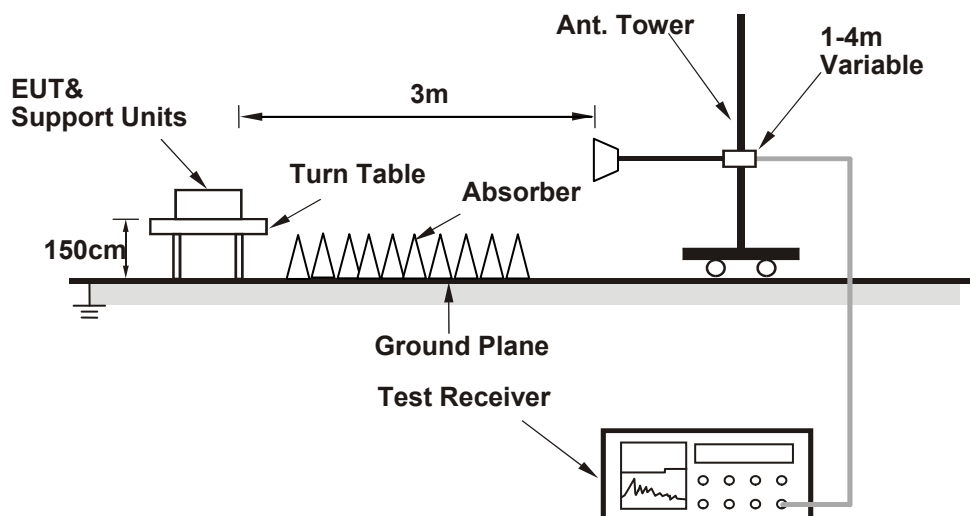
For Radiated emission below 30MHz



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

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

4.1.7 Test Results

Above 1GHz worst-Case 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	58.4 PK	74.0	-15.6	1.24 H	182	52.4	6.0
2	5150.00	44.9 AV	54.0	-9.1	1.24 H	182	38.9	6.0
3	*5180.00	101.1 PK			1.29 H	177	61.0	40.1
4	*5180.00	91.1 AV			1.29 H	177	51.0	40.1
5	#10360.00	59.1 PK	74.0	-14.9	1.10 H	56	41.4	17.7
6	#10360.00	46.2 AV	54.0	-7.8	1.10 H	56	28.5	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.1 PK	74.0	-15.9	1.04 V	80	52.1	6.0
2	5150.00	44.8 AV	54.0	-9.2	1.04 V	80	38.8	6.0
3	*5180.00	100.1 PK			1.01 V	73	60.0	40.1
4	*5180.00	90.0 AV			1.01 V	73	49.9	40.1
5	#10360.00	58.8 PK	74.0	-15.2	1.00 V	205	41.1	17.7
6	#10360.00	46.1 AV	54.0	-7.9	1.00 V	205	28.4	17.7

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 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	101.3 PK			1.37 H	175	61.2	40.1
2	*5200.00	91.2 AV			1.37 H	175	51.1	40.1
3	#10400.00	59.2 PK	74.0	-14.8	1.12 H	59	41.2	18.0
4	#10400.00	46.4 AV	54.0	-7.6	1.12 H	59	28.4	18.0
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	*5200.00	99.8 PK			1.02 V	76	59.7	40.1
2	*5200.00	89.6 AV			1.02 V	76	49.5	40.1
3	#10400.00	59.0 PK	74.0	-15.0	1.00 V	208	41.0	18.0
4	#10400.00	46.3 AV	54.0	-7.7	1.00 V	208	28.3	18.0

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 48	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	*5240.00	99.3 PK			1.07 H	177	59.1	40.2
2	*5240.00	89.5 AV			1.07 H	177	49.3	40.2
3	5350.00	57.7 PK	74.0	-16.3	1.11 H	168	51.5	6.2
4	5350.00	44.8 AV	54.0	-9.2	1.11 H	168	38.6	6.2
5	#10480.00	59.3 PK	74.0	-14.7	1.16 H	49	41.1	18.2
6	#10480.00	46.9 AV	54.0	-7.1	1.16 H	49	28.7	18.2
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	98.1 PK			1.00 V	75	57.9	40.2
2	*5240.00	88.8 AV			1.00 V	75	48.6	40.2
3	5350.00	57.5 PK	74.0	-16.5	1.03 V	82	51.3	6.2
4	5350.00	44.7 AV	54.0	-9.3	1.03 V	82	38.5	6.2
5	#10480.00	59.9 PK	74.0	-14.1	1.00 V	214	41.7	18.2
6	#10480.00	47.1 AV	54.0	-6.9	1.00 V	214	28.9	18.2

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 149	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	#5614.40	58.6 PK	68.2	-9.6	1.02 H	161	52.2	6.4
2	*5745.00	97.7 PK			1.02 H	161	56.8	40.9
3	*5745.00	87.3 AV			1.02 H	161	46.4	40.9
4	#5960.80	58.9 PK	68.2	-9.3	1.02 H	161	51.7	7.2
5	11490.00	63.4 PK	74.0	-10.6	1.32 H	64	42.9	20.5
6	11490.00	50.9 AV	54.0	-3.1	1.32 H	64	30.4	20.5
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	#5622.40	58.6 PK	68.2	-9.6	1.54 V	150	52.2	6.4
2	*5745.00	97.1 PK			1.54 V	150	56.2	40.9
3	*5745.00	86.7 AV			1.54 V	150	45.8	40.9
4	#5959.20	59.9 PK	68.2	-8.3	1.54 V	150	52.7	7.2
5	11490.00	62.0 PK	74.0	-12.0	1.05 V	64	41.5	20.5
6	11490.00	49.2 AV	54.0	-4.8	1.05 V	64	28.7	20.5

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 157	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	#5600.00	59.7 PK	68.2	-8.5	1.09 H	156	53.4	6.3
2	*5785.00	96.8 PK			1.09 H	156	55.8	41.0
3	*5785.00	86.4 AV			1.09 H	156	45.4	41.0
4	#5972.00	61.1 PK	68.2	-7.1	1.09 H	156	53.9	7.2
5	11570.00	62.9 PK	74.0	-11.1	1.25 H	74	42.6	20.3
6	11570.00	50.4 AV	54.0	-3.6	1.25 H	74	30.1	20.3
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	#5608.80	58.3 PK	68.2	-9.9	1.46 V	150	52.0	6.3
2	*5785.00	95.7 PK			1.46 V	150	54.7	41.0
3	*5785.00	85.6 AV			1.46 V	150	44.6	41.0
4	#5998.40	59.2 PK	68.2	-9.0	1.46 V	150	52.0	7.2
5	11570.00	60.8 PK	74.0	-13.2	1.47 V	85	40.5	20.3
6	11570.00	49.0 AV	54.0	-5.0	1.47 V	85	28.7	20.3

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.

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	#5613.60	58.0 PK	68.2	-10.2	1.00 H	156	51.6	6.4
2	*5825.00	97.1 PK			1.00 H	156	55.9	41.2
3	*5825.00	86.4 AV			1.00 H	156	45.2	41.2
4	#5989.60	58.7 PK	68.2	-9.5	1.00 H	156	51.5	7.2
5	11650.00	62.4 PK	74.0	-11.6	1.33 H	226	42.5	19.9
6	11650.00	50.3 AV	54.0	-3.7	1.33 H	226	30.4	19.9
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	#5644.00	59.6 PK	68.2	-8.6	1.60 V	153	53.1	6.5
2	*5825.00	93.7 PK			1.60 V	153	52.5	41.2
3	*5825.00	83.5 AV			1.60 V	153	42.3	41.2
4	#5972.80	58.4 PK	68.2	-9.8	1.60 V	153	51.2	7.2
5	11650.00	61.1 PK	74.0	-12.9	1.33 V	226	41.2	19.9
6	11650.00	48.6 AV	54.0	-5.4	1.33 V	226	28.7	19.9

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.

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	57.5 PK	74.0	-16.5	1.32 H	162	51.5	6.0
2	5150.00	44.3 AV	54.0	-9.7	1.32 H	162	38.3	6.0
3	*5180.00	100.3 PK			1.30 H	175	60.2	40.1
4	*5180.00	89.1 AV			1.30 H	175	49.0	40.1
5	#10360.00	58.8 PK	74.0	-15.2	1.09 H	51	41.1	17.7
6	#10360.00	46.1 AV	54.0	-7.9	1.09 H	51	28.4	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.1 PK	74.0	-16.9	1.07 V	61	51.1	6.0
2	5150.00	44.2 AV	54.0	-9.8	1.07 V	61	38.2	6.0
3	*5180.00	98.7 PK			1.02 V	72	58.6	40.1
4	*5180.00	88.1 AV			1.02 V	72	48.0	40.1
5	#10360.00	58.7 PK	74.0	-15.3	1.00 V	199	41.0	17.7
6	#10360.00	46.0 AV	54.0	-8.0	1.00 V	199	28.3	17.7

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 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	100.5 PK			1.36 H	176	60.4	40.1
2	*5200.00	89.4 AV			1.36 H	176	49.3	40.1
3	#10400.00	59.2 PK	74.0	-14.8	1.12 H	60	41.2	18.0
4	#10400.00	46.6 AV	54.0	-7.4	1.12 H	60	28.6	18.0
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	*5200.00	98.8 PK			1.00 V	74	58.7	40.1
2	*5200.00	88.2 AV			1.00 V	74	48.1	40.1
3	#10400.00	59.2 PK	74.0	-14.8	1.00 V	202	41.2	18.0
4	#10400.00	46.4 AV	54.0	-7.6	1.00 V	202	28.4	18.0

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 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	99.6 PK			1.06 H	174	59.4	40.2
2	*5240.00	88.4 AV			1.06 H	174	48.2	40.2
3	5350.00	57.1 PK	74.0	-16.9	1.08 H	171	50.9	6.2
4	5350.00	44.3 AV	54.0	-9.7	1.08 H	171	38.1	6.2
5	#10480.00	59.1 PK	74.0	-14.9	1.10 H	60	40.9	18.2
6	#10480.00	46.5 AV	54.0	-7.5	1.10 H	60	28.3	18.2
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	98.2 PK			1.00 V	75	58.0	40.2
2	*5240.00	87.4 AV			1.00 V	75	47.2	40.2
3	5350.00	57.0 PK	74.0	-17.0	1.07 V	91	50.8	6.2
4	5350.00	44.2 AV	54.0	-9.8	1.07 V	91	38.0	6.2
5	#10480.00	59.0 PK	74.0	-15.0	1.00 V	203	40.8	18.2
6	#10480.00	46.6 AV	54.0	-7.4	1.00 V	203	28.4	18.2

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 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	#5646.40	58.4 PK	68.2	-9.8	1.01 H	161	51.9	6.5
2	*5745.00	95.4 PK			1.01 H	161	54.5	40.9
3	*5745.00	85.5 AV			1.01 H	161	44.6	40.9
4	#5996.00	58.8 PK	68.2	-9.4	1.01 H	161	51.6	7.2
5	11490.00	63.4 PK	74.0	-10.6	1.33 H	226	42.9	20.5
6	11490.00	50.6 AV	54.0	-3.4	1.33 H	226	30.1	20.5
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	#5640.00	58.6 PK	68.2	-9.6	1.54 V	145	52.1	6.5
2	*5745.00	94.4 PK			1.54 V	145	53.5	40.9
3	*5745.00	83.9 AV			1.54 V	145	43.0	40.9
4	#5955.20	58.5 PK	68.2	-9.7	1.54 V	145	51.3	7.2
5	11490.00	62.0 PK	74.0	-12.0	1.14 V	74	41.5	20.5
6	11490.00	49.2 AV	54.0	-4.8	1.14 V	74	28.7	20.5

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 157	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	#5621.60	58.4 PK	68.2	-9.8	1.09 H	156	52.0	6.4
2	*5785.00	96.3 PK			1.09 H	156	55.3	41.0
3	*5785.00	85.3 AV			1.09 H	156	44.3	41.0
4	#5937.60	58.7 PK	68.2	-9.5	1.09 H	156	51.6	7.1
5	11570.00	62.8 PK	74.0	-11.2	1.32 H	64	42.5	20.3
6	11570.00	50.4 AV	54.0	-3.6	1.32 H	64	30.1	20.3
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	#5623.20	58.9 PK	68.2	-9.3	1.46 V	151	52.4	6.5
2	*5785.00	94.8 PK			1.46 V	151	53.8	41.0
3	*5785.00	83.7 AV			1.46 V	151	42.7	41.0
4	#5926.40	58.7 PK	68.2	-9.5	1.46 V	151	51.6	7.1
5	11570.00	61.5 PK	74.0	-12.5	1.47 V	87	41.2	20.3
6	11570.00	49.0 AV	54.0	-5.0	1.47 V	87	28.7	20.3

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.

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	#5643.20	60.4 PK	68.2	-7.8	1.00 H	155	53.9	6.5
2	*5825.00	96.1 PK			1.00 H	155	54.9	41.2
3	*5825.00	84.6 AV			1.00 H	155	43.4	41.2
4	#5991.20	59.6 PK	68.2	-8.6	1.00 H	155	52.4	7.2
5	11650.00	62.2 PK	74.0	-11.8	1.12 H	206	42.3	19.9
6	11650.00	50.0 AV	54.0	-4.0	1.12 H	206	30.1	19.9
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	#5635.20	58.0 PK	68.2	-10.2	1.38 V	145	51.5	6.5
2	*5825.00	94.1 PK			1.38 V	145	52.9	41.2
3	*5825.00	82.6 AV			1.38 V	145	41.4	41.2
4	#5980.00	59.5 PK	68.2	-8.7	1.38 V	145	52.3	7.2
5	11650.00	60.4 PK	74.0	-13.6	1.05 V	44	40.5	19.9
6	11650.00	48.3 AV	54.0	-5.7	1.05 V	44	28.4	19.9

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.

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	58.6 PK	74.0	-15.4	1.07 H	188	52.6	6.0
2	5150.00	45.1 AV	54.0	-8.9	1.07 H	188	39.1	6.0
3	*5190.00	97.6 PK			1.09 H	177	57.5	40.1
4	*5190.00	86.8 AV			1.09 H	177	46.7	40.1
5	#10380.00	59.2 PK	74.0	-14.8	1.16 H	48	41.4	17.8
6	#10380.00	46.8 AV	54.0	-7.2	1.16 H	48	29.0	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.5 PK	74.0	-16.5	1.05 V	59	51.5	6.0
2	5150.00	45.3 AV	54.0	-8.7	1.05 V	59	39.3	6.0
3	*5190.00	96.7 PK			1.01 V	74	56.6	40.1
4	*5190.00	85.6 AV			1.01 V	74	45.5	40.1
5	#10380.00	59.4 PK	74.0	-14.6	1.00 V	222	41.6	17.8
6	#10380.00	46.9 AV	54.0	-7.1	1.00 V	222	29.1	17.8

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 46	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	*5230.00	97.1 PK			1.00 H	176	56.9	40.2
2	*5230.00	86.7 AV			1.00 H	176	46.5	40.2
3	5350.00	57.0 PK	74.0	-17.0	1.04 H	192	50.8	6.2
4	5350.00	44.7 AV	54.0	-9.3	1.04 H	192	38.5	6.2
5	#10460.00	59.2 PK	74.0	-14.8	1.10 H	50	41.2	18.0
6	#10460.00	46.8 AV	54.0	-7.2	1.10 H	50	28.8	18.0
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	95.8 PK			1.00 V	74	55.6	40.2
2	*5230.00	85.3 AV			1.00 V	74	45.1	40.2
3	5350.00	57.5 PK	74.0	-16.5	1.02 V	58	51.3	6.2
4	5350.00	44.3 AV	54.0	-9.7	1.02 V	58	38.1	6.2
5	#10460.00	59.0 PK	74.0	-15.0	1.00 V	229	41.0	18.0
6	#10460.00	46.6 AV	54.0	-7.4	1.00 V	229	28.6	18.0

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 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	#5612.80	58.5 PK	68.2	-9.7	1.03 H	156	52.2	6.3
2	*5755.00	95.0 PK			1.03 H	156	54.0	41.0
3	*5755.00	83.4 AV			1.03 H	156	42.4	41.0
4	#5948.80	58.5 PK	68.2	-9.7	1.03 H	156	51.3	7.2
5	11510.00	63.0 PK	74.0	-11.0	1.47 H	85	42.6	20.4
6	11510.00	50.5 AV	54.0	-3.5	1.47 H	85	30.1	20.4
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	#5636.00	59.7 PK	68.2	-8.5	1.54 V	149	53.2	6.5
2	*5755.00	92.0 PK			1.54 V	149	51.0	41.0
3	*5755.00	81.7 AV			1.54 V	149	40.7	41.0
4	#5972.80	59.0 PK	68.2	-9.2	1.54 V	149	51.8	7.2
5	11510.00	60.7 PK	74.0	-13.3	1.04 V	74	40.3	20.4
6	11510.00	48.8 AV	54.0	-5.2	1.04 V	74	28.4	20.4

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 159	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	#5648.00	58.3 PK	68.2	-9.9	1.00 H	195	51.8	6.5
2	*5795.00	92.1 PK			1.00 H	195	51.0	41.1
3	*5795.00	81.8 AV			1.00 H	195	40.7	41.1
4	#5953.60	60.0 PK	68.2	-8.2	1.00 H	195	52.8	7.2
5	11590.00	61.7 PK	74.0	-12.3	1.16 H	25	41.5	20.2
6	11590.00	50.3 AV	54.0	-3.7	1.16 H	25	30.1	20.2
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	#5629.60	58.1 PK	68.2	-10.1	1.69 V	150	51.6	6.5
2	*5795.00	92.0 PK			1.69 V	150	50.9	41.1
3	*5795.00	81.6 AV			1.69 V	150	40.5	41.1
4	#5980.00	59.4 PK	68.2	-8.8	1.69 V	150	52.2	7.2
5	11590.00	60.8 PK	74.0	-13.2	1.17 V	41	40.6	20.2
6	11590.00	48.6 AV	54.0	-5.4	1.17 V	41	28.4	20.2

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.

802.11ac (VHT80)

CHANNEL	TX Channel 42	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	57.2 PK	74.0	-16.8	1.01 H	161	51.2	6.0
2	5150.00	44.5 AV	54.0	-9.5	1.01 H	161	38.5	6.0
3	*5210.00	93.1 PK			1.00 H	179	53.0	40.1
4	*5210.00	82.6 AV			1.00 H	179	42.5	40.1
5	5350.00	57.3 PK	74.0	-16.7	1.02 H	165	51.1	6.2
6	5350.00	44.4 AV	54.0	-9.6	1.02 H	165	38.2	6.2
7	#10420.00	59.6 PK	74.0	-14.4	1.15 H	82	41.6	18.0
8	#10420.00	47.2 AV	54.0	-6.8	1.15 H	82	29.2	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.2 PK	74.0	-16.8	1.03 V	85	51.2	6.0
2	5150.00	44.2 AV	54.0	-9.8	1.03 V	85	38.2	6.0
3	*5210.00	91.7 PK			1.00 V	74	51.6	40.1
4	*5210.00	80.8 AV			1.00 V	74	40.7	40.1
5	5350.00	57.6 PK	74.0	-16.4	1.04 V	79	51.4	6.2
6	5350.00	44.3 AV	54.0	-9.7	1.04 V	79	38.1	6.2
7	#10420.00	59.4 PK	74.0	-14.6	1.00 V	248	41.4	18.0
8	#10420.00	47.0 AV	54.0	-7.0	1.00 V	248	29.0	18.0

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 155	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	#5635.20	58.4 PK	68.2	-9.8	1.03 H	156	51.9	6.5
2	*5775.00	89.7 PK			1.03 H	156	48.7	41.0
3	*5775.00	79.5 AV			1.03 H	156	38.5	41.0
4	#5997.60	60.5 PK	68.2	-7.7	1.03 H	156	53.3	7.2
5	11550.00	62.9 PK	74.0	-11.1	1.02 H	11	42.6	20.3
6	11550.00	50.4 AV	54.0	-3.6	1.02 H	11	30.1	20.3
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	#5628.00	58.1 PK	68.2	-10.1	1.62 V	151	51.6	6.5
2	*5775.00	88.8 PK			1.62 V	151	47.8	41.0
3	*5775.00	76.8 AV			1.62 V	151	35.8	41.0
4	#5930.40	59.3 PK	68.2	-8.9	1.62 V	151	52.2	7.1
5	11550.00	60.8 PK	74.0	-13.2	1.32 V	96	40.5	20.3
6	11550.00	48.7 AV	54.0	-5.3	1.32 V	96	28.4	20.3

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.

Below 1GHz Worst-Case Data:

802.11a

CHANNEL	TX Channel 40	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	30.00	23.9 QP	40.0	-16.1	2.00 H	88	39.4	-15.5
2	99.75	20.0 QP	43.5	-23.5	2.00 H	309	38.6	-18.6
3	336.48	27.0 QP	46.0	-19.0	2.00 H	343	38.6	-11.6
4	722.62	34.6 QP	46.0	-11.4	1.00 H	54	38.5	-3.9
5	864.27	32.7 QP	46.0	-13.3	1.00 H	183	34.1	-1.4
6	936.07	30.5 QP	46.0	-15.5	1.00 H	122	30.6	-0.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	38.5 QP	40.0	-1.5	1.00 V	57	54.0	-15.5
2	113.34	24.9 QP	43.5	-18.6	1.50 V	306	41.5	-16.6
3	336.48	26.5 QP	46.0	-19.5	1.00 V	76	38.1	-11.6
4	431.56	24.9 QP	46.0	-21.1	1.00 V	54	34.5	-9.6
5	722.62	33.7 QP	46.0	-12.3	1.50 V	135	37.6	-3.9
6	936.07	31.7 QP	46.0	-14.3	1.00 V	6	31.8	-0.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	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

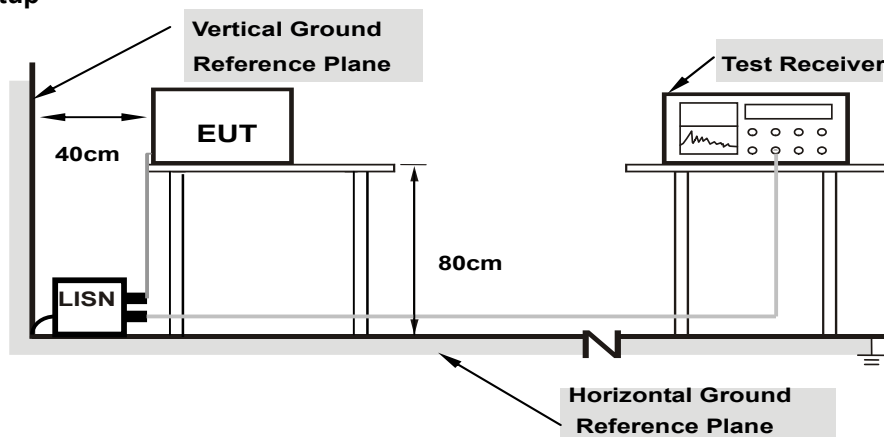
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

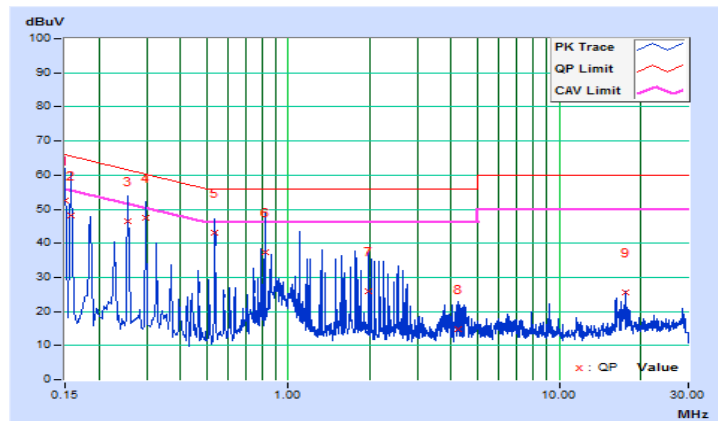
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.15000	10.11	42.38	14.62	52.49	24.73	66.00	56.00	-13.51	-31.27
2	0.15782	10.12	38.19	9.09	48.31	19.21	65.58	55.58	-17.27	-36.37
3	0.25557	10.15	36.18	8.49	46.33	18.64	61.57	51.57	-15.24	-32.93
4	0.29858	10.15	37.49	8.97	47.64	19.12	60.28	50.28	-12.64	-31.16
5	0.53709	10.17	32.88	8.74	43.05	18.91	56.00	46.00	-12.95	-27.09
6	0.81861	10.18	27.09	5.38	37.27	15.56	56.00	46.00	-18.73	-30.44
7	1.98379	10.25	15.54	-1.48	25.79	8.77	56.00	46.00	-30.21	-37.23
8	4.23204	10.38	4.52	-3.61	14.90	6.77	56.00	46.00	-41.10	-39.23
9	17.69417	11.27	14.38	12.22	25.65	23.49	60.00	50.00	-34.35	-26.51

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.

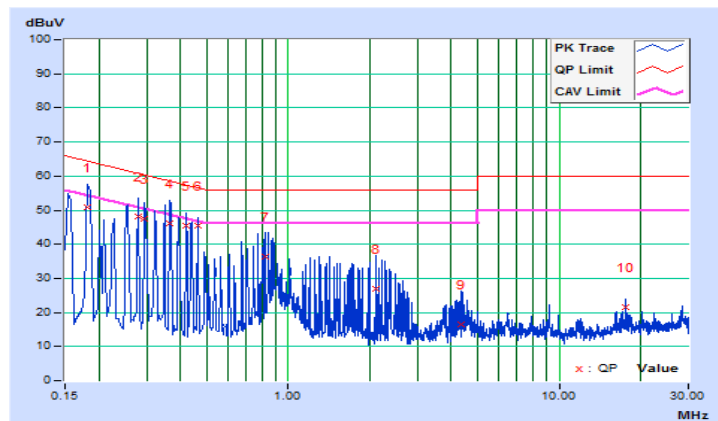


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18128	10.14	40.57	12.90	50.71	23.04	64.43	54.43	-13.72	-31.39
2	0.27903	10.16	38.11	8.96	48.27	19.12	60.84	50.84	-12.57	-31.72
3	0.29506	10.16	37.20	8.69	47.36	18.85	60.38	50.38	-13.02	-31.53
4	0.36526	10.17	35.79	7.10	45.96	17.27	58.61	48.61	-12.65	-31.34
5	0.41979	10.18	35.19	8.77	45.37	18.95	57.45	47.45	-12.08	-28.50
6	0.46280	10.18	35.11	8.59	45.29	18.77	56.64	46.64	-11.35	-27.87
7	0.81861	10.19	26.23	4.52	36.42	14.71	56.00	46.00	-19.58	-31.29
8	2.11673	10.27	16.68	-2.05	26.95	8.22	56.00	46.00	-29.05	-37.78
9	4.32197	10.41	6.06	-3.37	16.47	7.04	56.00	46.00	-39.53	-38.96
10	17.69417	11.38	10.11	7.27	21.49	18.65	60.00	50.00	-38.51	-31.35

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

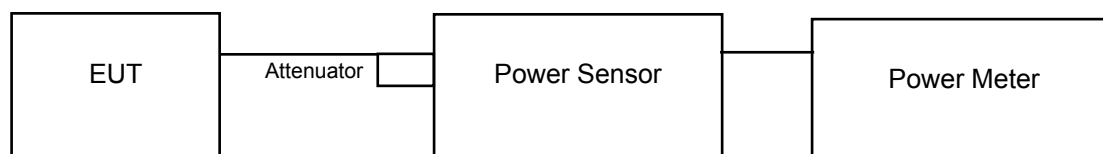
4.3.1 Limits of Transmit Power Measurement

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)

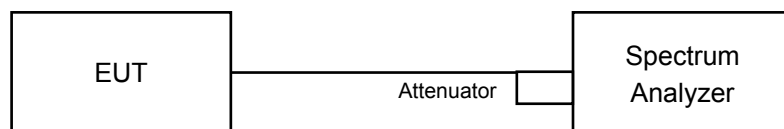
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

For Power Output Measurement
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



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

For 802.11a, 802.11n (HT20), 802.11n (HT40)

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

For 802.11ac (VHT80)

- a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- b. Set sweep trigger to "free run".
- c. Set RBW = 1 MHz.
- d. Set VBW $\geq$ 3 MHz
- e. Number of points in sweep $\geq$ 2 Span / RBW.
- f. Sweep time $\leq$ (number of points in sweep) * T
- g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- h. Detector = RMS.
- i. Trace mode = max hold.
- j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

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

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	11.858	10.74	24.00	Pass
40	5200	12.417	10.94	24.00	Pass
48	5240	12.503	10.97	24.00	Pass
149	5745	12.246	10.88	30.00	Pass
157	5785	12.474	10.96	30.00	Pass
165	5825	12.388	10.93	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	9.594	9.82	24.00	Pass
40	5200	9.863	9.94	24.00	Pass
48	5240	9.977	9.99	24.00	Pass
149	5745	9.594	9.82	30.00	Pass
157	5785	9.795	9.91	30.00	Pass
165	5825	9.484	9.77	30.00	Pass

802.11n (HT40)

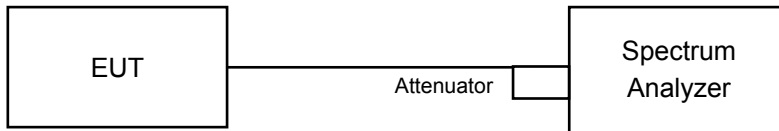
Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	9.705	9.87	24.00	Pass
46	5230	9.817	9.92	24.00	Pass
151	5755	9.817	9.92	30.00	Pass
159	5795	9.977	9.99	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	7.638	8.83	24.00	Pass
155	5775	7.691	8.86	30.00	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	17.16
40	5200	17.04
48	5240	16.92
149	5745	16.92
157	5785	16.92
165	5825	16.92

802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	18.12
40	5200	18.12
48	5240	18.12
149	5745	18.24
157	5785	18.00
165	5825	18.12

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
38	5190	36.72
46	5230	36.72
151	5755	36.72
159	5795	36.72

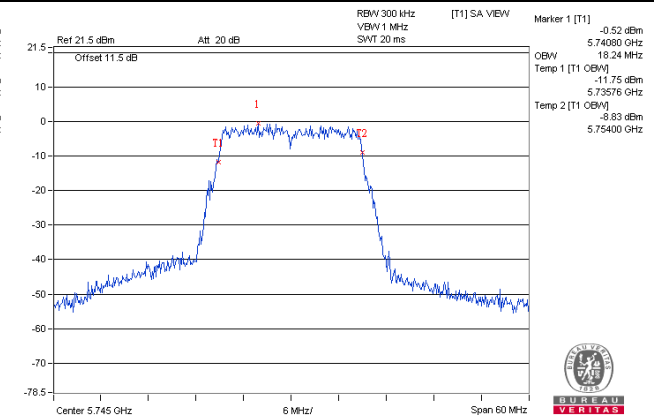
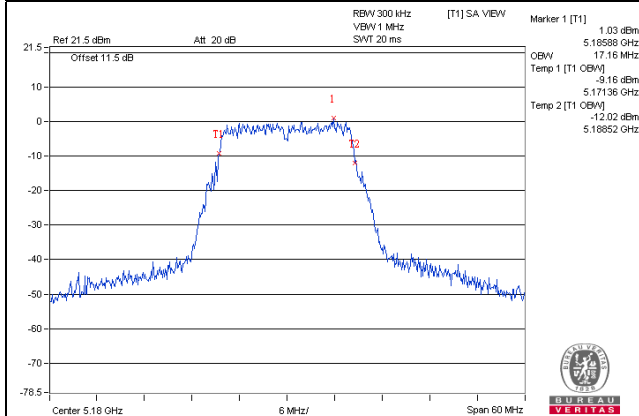
802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
42	5210	75.84
155	5775	75.84

Spectrum Plot of Worst Value

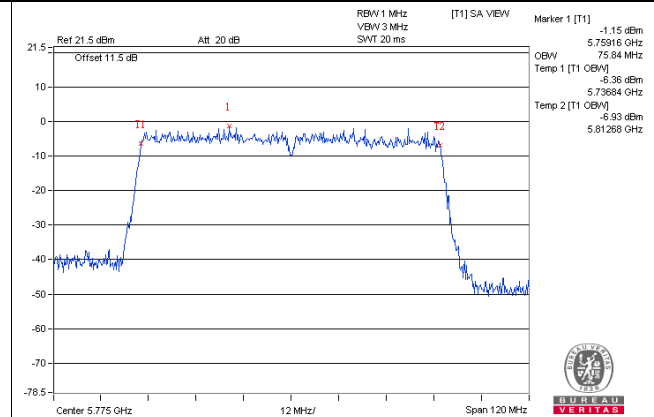
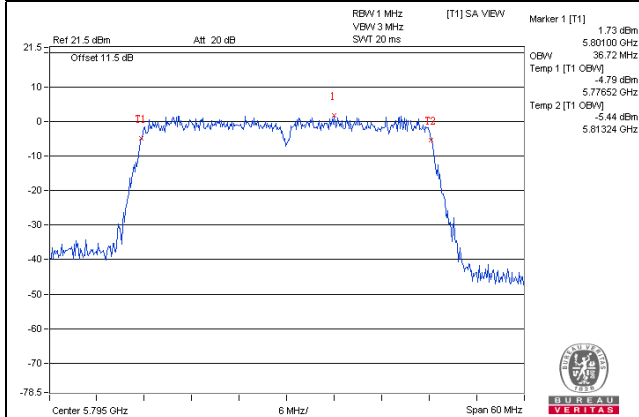
802.11a

802.11n (HT20)



802.11n (HT40)

802.11ac (VHT80)

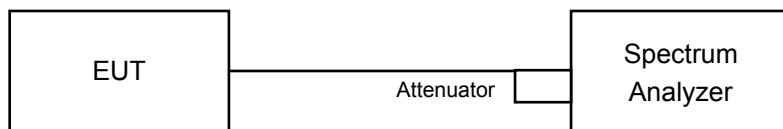


4.5 Peak Power Spectral Density Measurement

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 band:

Using method SA-2

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

For U-NII-3 band:

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 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 $BWCF = 10\log(500\text{ kHz}/300\text{ kHz})$
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- 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 Item 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	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	-3.61	0.09	-3.52	11.00	Pass
40	5200	-3.34	0.09	-3.25	11.00	Pass
48	5240	-3.33	0.09	-3.24	11.00	Pass

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

802.11n (HT20)

Chan.	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	-4.92	0.09	-4.83	11.00	Pass
40	5200	-4.73	0.09	-4.64	11.00	Pass
48	5240	-4.48	0.09	-4.39	11.00	Pass

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

802.11n (HT40)

Chan.	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
38	5190	-7.53	0.19	-7.34	11.00	Pass
46	5230	-7.35	0.19	-7.16	11.00	Pass

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

802.11ac (VHT80)

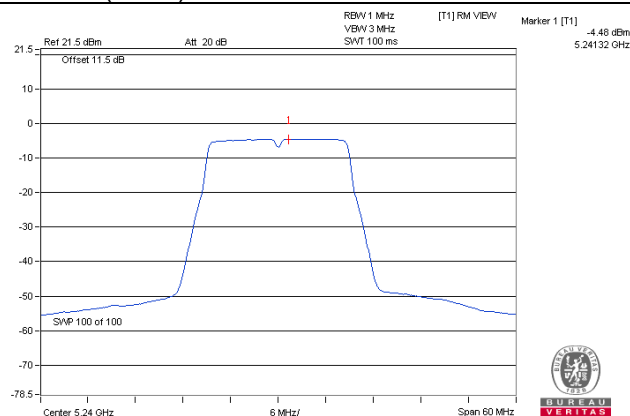
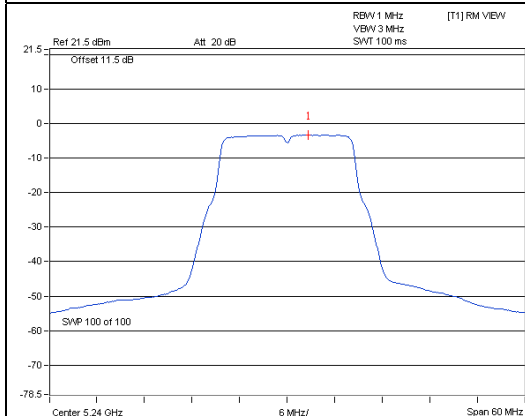
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
42	5210	-11.56	0.38	-11.19	11.00	Pass

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

Spectrum Plot of Worst Value

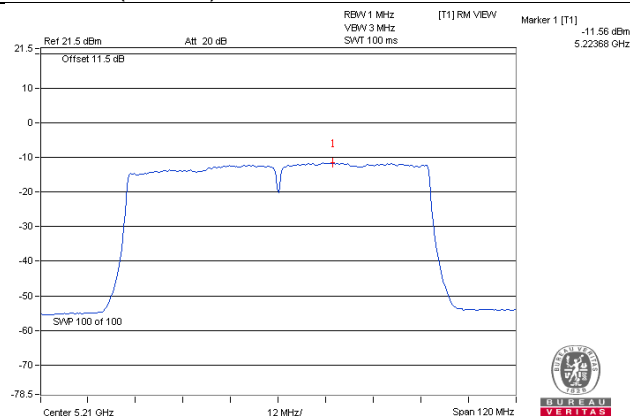
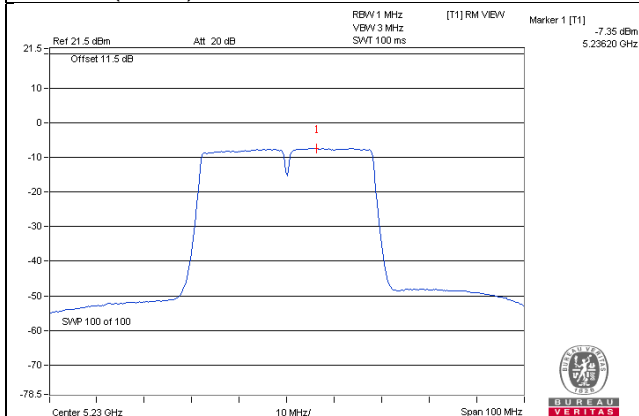
802.11a

802.11n (HT20)



802.11n (HT40)

802.11ac (VHT80)



For U-NII-3 Band

802.11a

Chan.	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	-10.63	-8.41	0.09	-8.32	30	Pass
157	5785	-10.99	-8.77	0.09	-8.68	30	Pass
165	5825	-11.47	-9.25	0.09	-9.16	30	Pass

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

802.11n (HT20)

Chan.	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	-12.56	-10.34	0.09	-10.25	30	Pass
157	5785	-12.94	-10.72	0.09	-10.63	30	Pass
165	5825	-13.41	-11.19	0.09	-11.10	30	Pass

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

802.11n (HT40)

Chan.	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)				
151	5755	-15.89	-13.67	0.19	-13.48	30	Pass
159	5795	-16.43	-14.21	0.19	-14.02	30	Pass

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

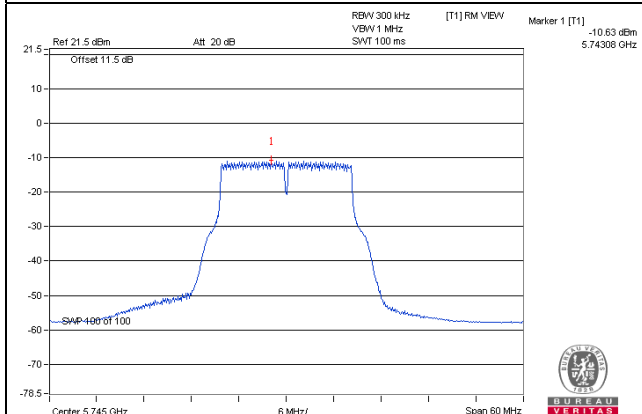
802.11ac (VHT80)

Chan.	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)				
155	5775	-20.16	-17.94	0.38	-17.56	30	Pass

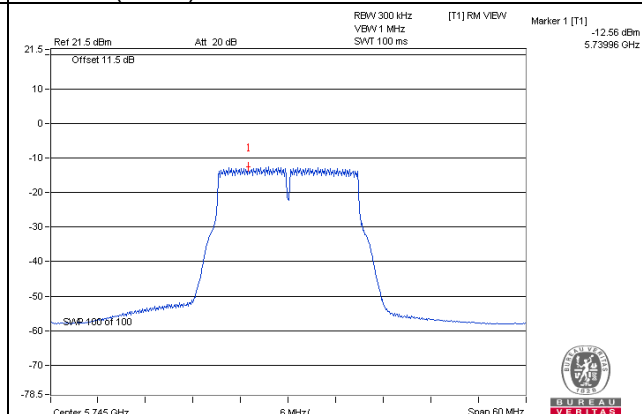
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

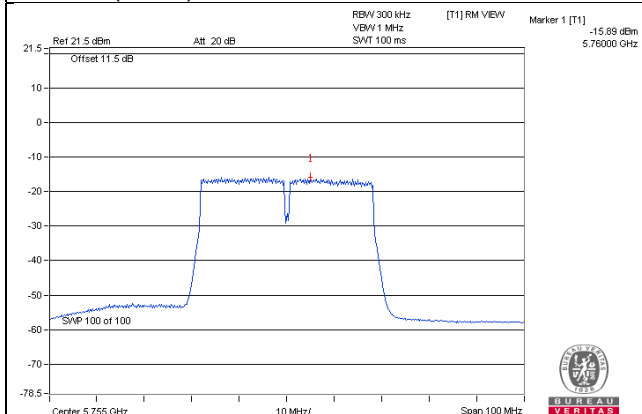
802.11a



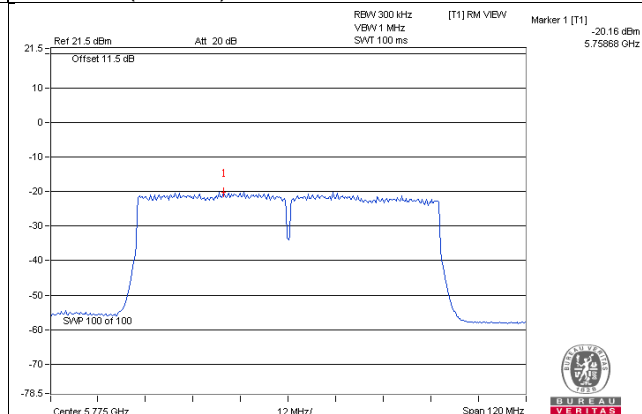
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

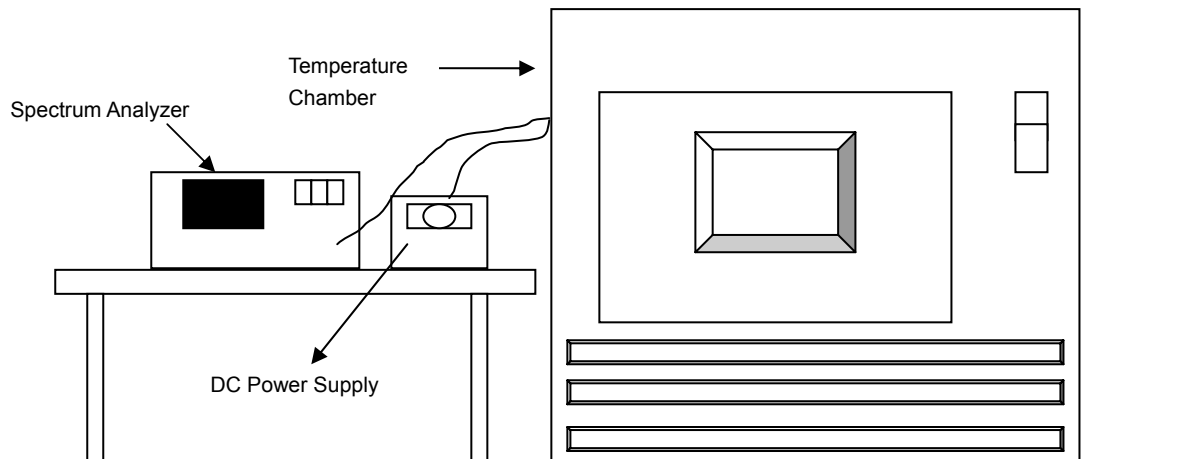


4.6 Frequency Stability

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 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.

4.6.4 Deviation from Test Standard

No deviation.

4.6.5 EUT Operating Condition

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

4.6.6 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)
50	24	5180.001	0.00002	5180.0037	0.00007	5180.0007	0.00001	5180.0033	0.00006
40	24	5180.0269	0.00052	5180.0267	0.00052	5180.0268	0.00052	5180.0272	0.00053
30	24	5179.9928	-0.00014	5179.99	-0.00019	5179.9901	-0.00019	5179.9948	-0.00010
20	24	5180.0142	0.00027	5180.0148	0.00029	5180.0133	0.00026	5180.0137	0.00026
10	24	5179.9989	-0.00002	5179.9958	-0.00008	5179.9975	-0.00005	5179.9983	-0.00003
0	24	5180.0211	0.00041	5180.0215	0.00042	5180.0166	0.00032	5180.0211	0.00041
-10	24	5179.9987	-0.00003	5180.0006	0.00001	5179.9991	-0.00002	5179.997	-0.00006
-20	24	5180.0033	0.00006	5180.0057	0.00011	5180.0023	0.00004	5180.0031	0.00006
-30	24	5180.0251	0.00048	5180.0224	0.00043	5180.0229	0.00044	5180.0223	0.00043

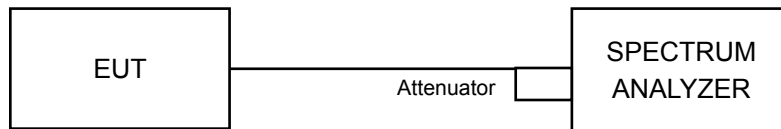
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)	Measured Frequency(MHz)	Frequency Drift (%)
20	27.6	5180.015	0.00029	5180.0142	0.00027	5180.0128	0.00025	5180.0141	0.00027
	24	5180.0142	0.00027	5180.0148	0.00029	5180.0133	0.00026	5180.0137	0.00026
	20.4	5180.0135	0.00026	5180.0144	0.00028	5180.0134	0.00026	5180.0129	0.00025

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	16.40	0.5	Pass
157	5785	16.42	0.5	Pass
165	5825	16.41	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.65	0.5	Pass
157	5785	17.67	0.5	Pass
165	5825	17.65	0.5	Pass

802.11n (HT40)

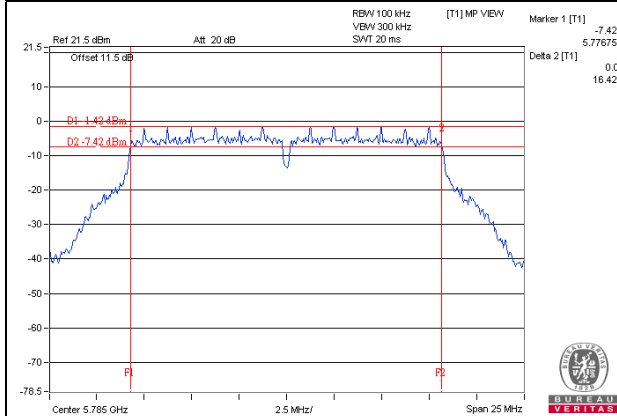
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	36.46	0.5	Pass
159	5795	36.46	0.5	Pass

802.11ac (VHT80)

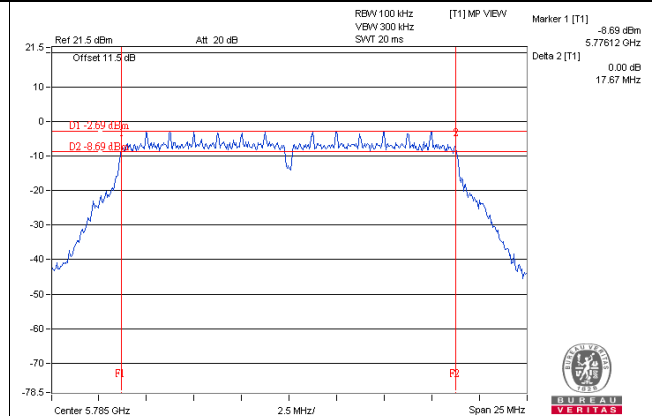
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	75.99	0.5	Pass

Spectrum Plot of Worst Value

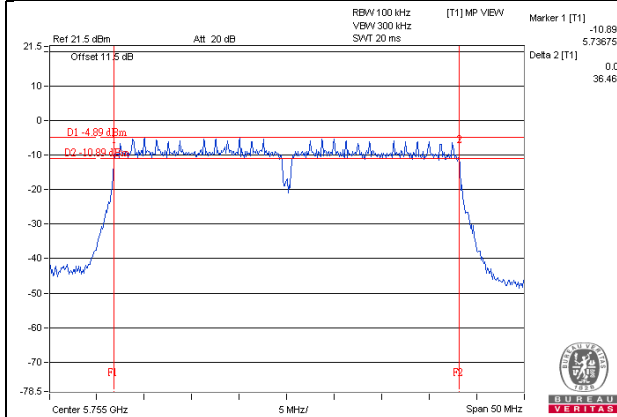
802.11a



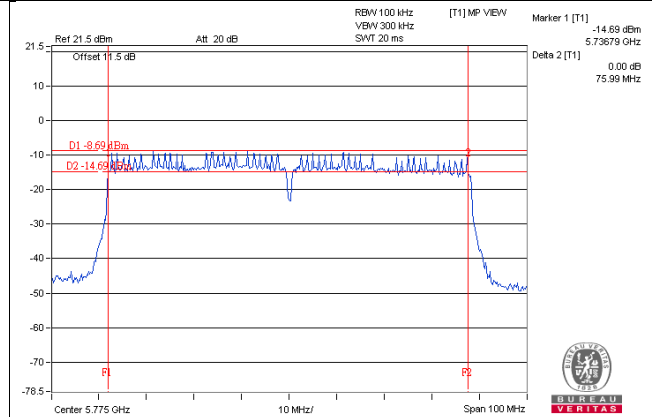
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

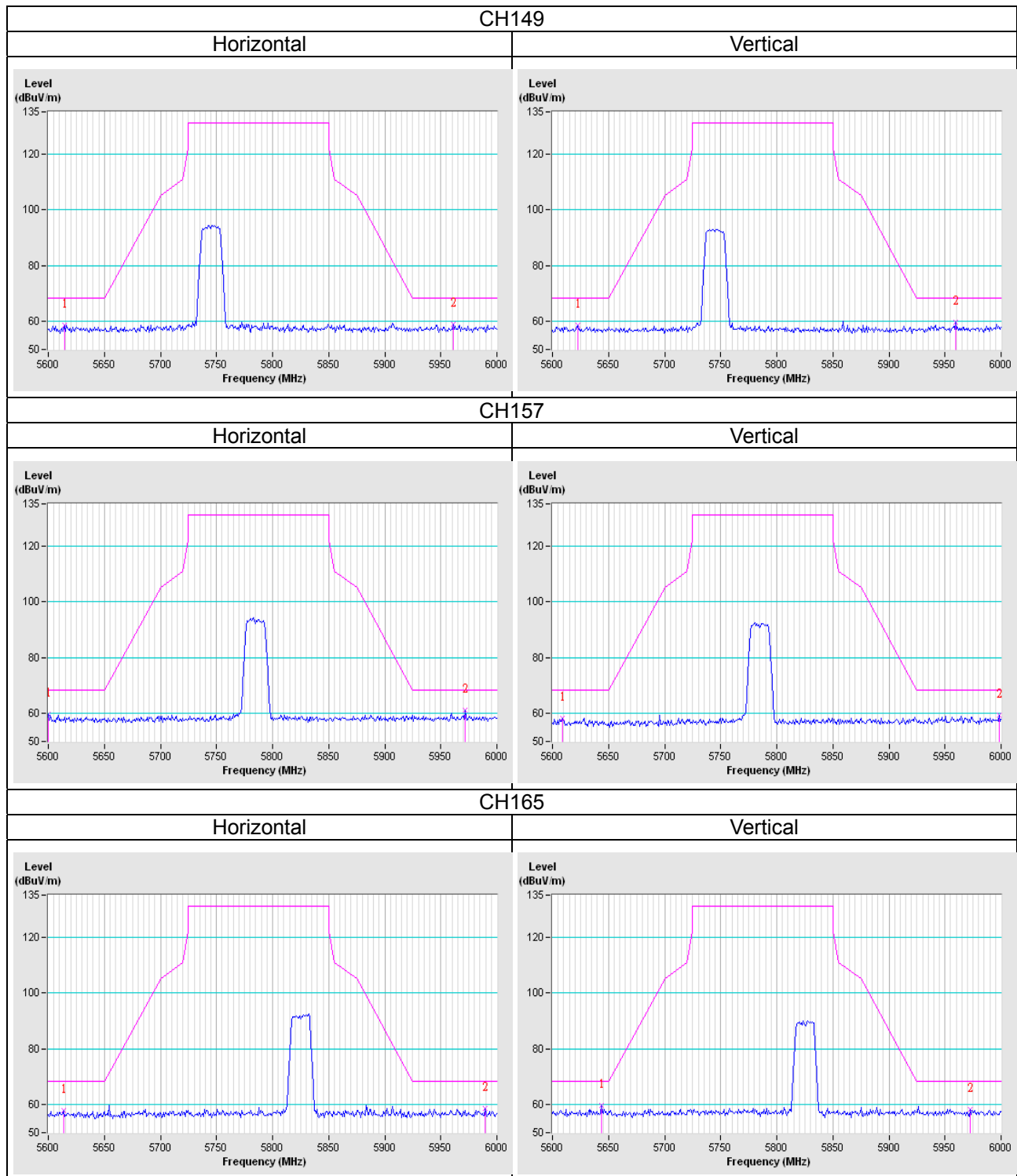


5 Pictures of Test Arrangements

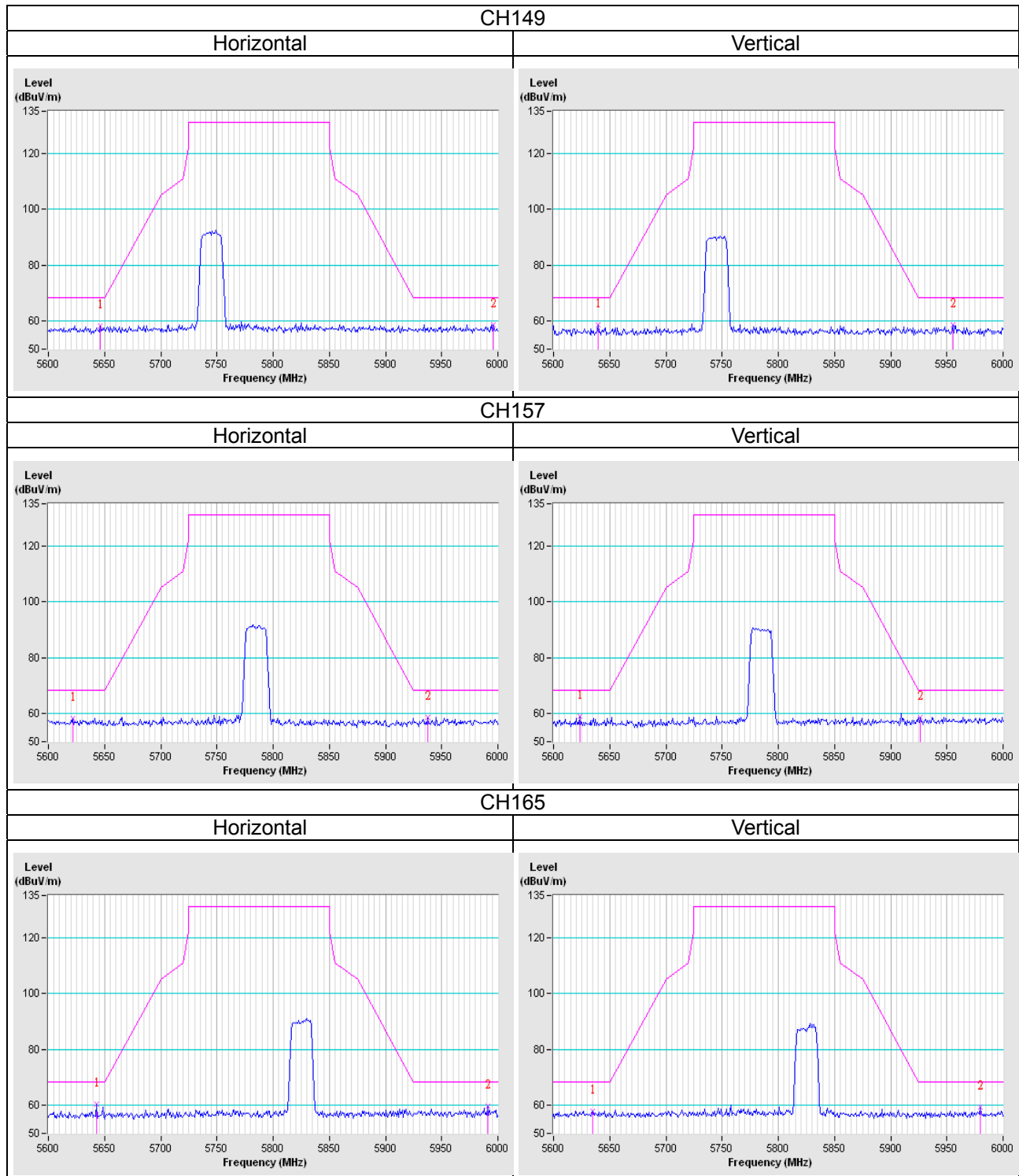
Please refer to the attached file (Test Setup Photo).

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

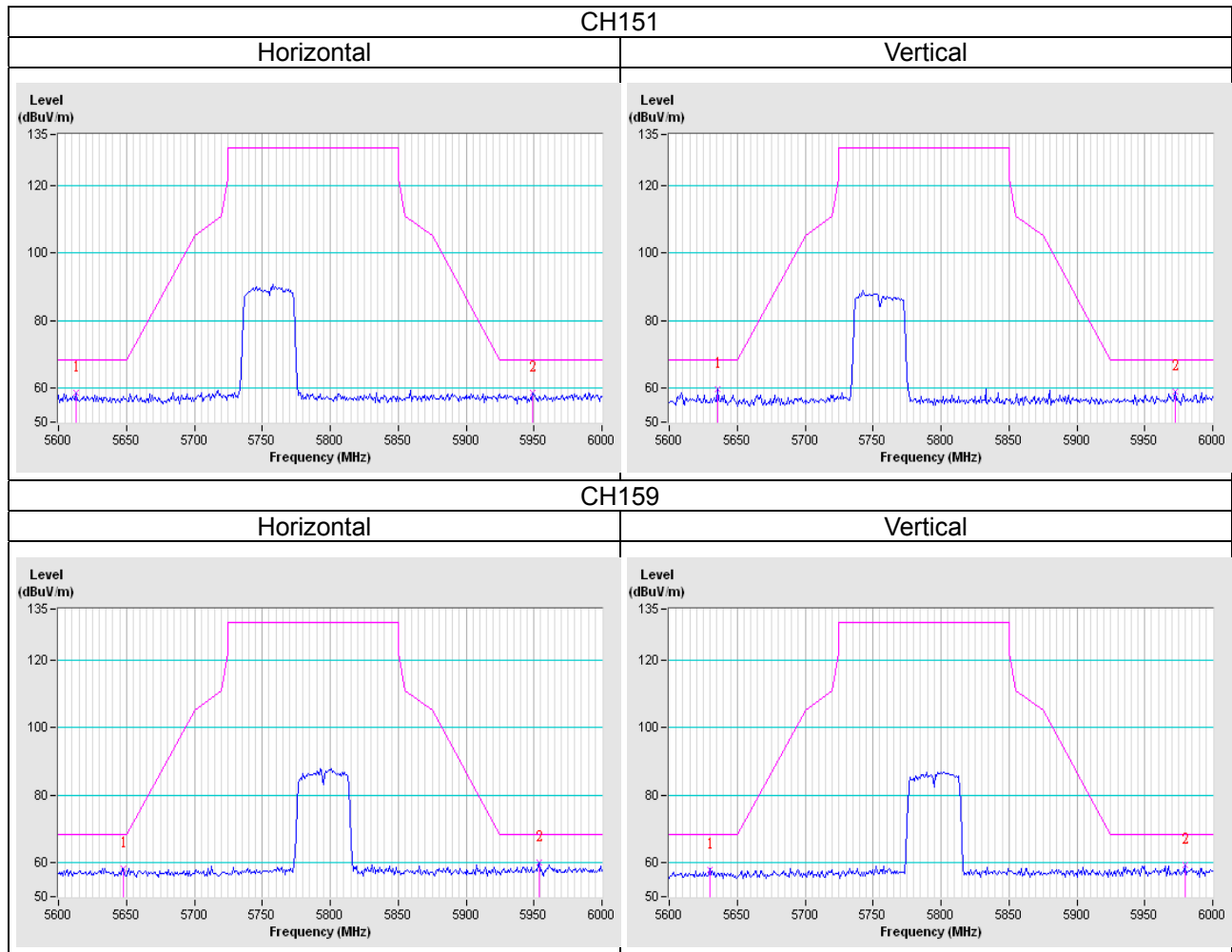
802.11a



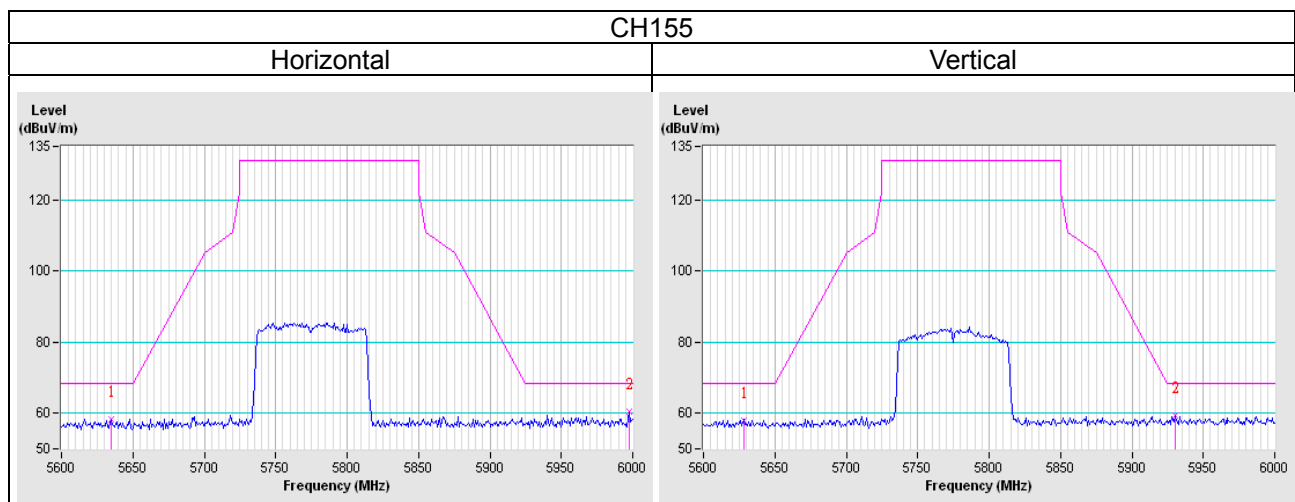
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



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 accredited and approved according to ISO/IEC 17025.

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

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Web Site: www.bureauveritas-adt.com

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

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