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FCC RADIO TEST REPORT

Applicant's company	**CyberTAN Technology, Inc.**
Applicant Address	No. 99, Park Avenue III, Science-based Industrial Park, Hsinchu, 308 Taiwan
FCC ID	**N89-WAP371**
Manufacturer's company	**CyberTAN Technology, Inc.**
Manufacturer Address	No. 99, Park Avenue III, Science-based Industrial Park, Hsinchu, 308 Taiwan

Product Name	Wireless-AC/N Dual Radio Point with Single Point Setup
Brand Name	CISCO
Model No.	WAP371
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Received Date	Sep. 09, 2015
Final Test Date	Nov. 04, 2015
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a/ac of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r01, KDB662911 D01 v02r01, KDB644545 D03 v01.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3O0832-06AB	Rev. 01	Initial issue of report	Mar. 24, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless-AC/N Dual Radio Point with Single Point Setup
Brand Name	:	CISCO
Model No.	:	WAP371
Applicant	:	CyberTAN Technology, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Sep. 09, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	3.03 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	3.90 dB
4.5	15.407(a)	Power Spectral Density	Complies	16.54 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.04 dB
4.7	15.407(b)	Band Edge Emissions	Complies	1.06 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter or PoE
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz / 5725 ~ 5850 MHz
Channel Number	21 for 20MHz bandwidth ; 9 for 40MHz bandwidth 4 for 80MHz bandwidth
Channel Band Width (99%)	IEEE 802.11a: 33.22 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 40.26 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 90.15 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 80.87 MHz
Maximum Conducted Output Power	IEEE 802.11a: 26.10 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 25.54 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.77 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.74 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☐ With 5600~5650MHz	☒ Without 5600~5650MHz
Beamforming Function	☐ With beamforming	☒ Without beamforming
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Band width

Antenna	Three (TX)		
Band width Mode	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80. Note 3: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac		

3.2. Accessories

Power	Brand	Model	Rating
Adapter	LEI	MU24-Y120200-A1	Input: 100-240V ~ 50/60Hz 0.7A Output: 12V, 2.0A
Others			
RJ-45 cable*1: Non-shielded, 1.5m			
Cradle*1			

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	Remark
1	GALTRONICS	2365-54480001R	PIFA Antenna	N/A	2.94	2.4GHz
2	GALTRONICS	2365-04610001R	PIFA Antenna	N/A	3.15	2.4GHz
3	GALTRONICS	2365-51670005R	PIFA Antenna	I-PEX	5.39	5GHz
4	GALTRONICS	2365-54480002R	PIFA Antenna	I-PEX	4.31	5GHz
5	GALTRONICS	2365-51670006R	PIFA Antenna	I-PEX	4.41	5GHz

Note: The EUT has five antennas.

For 2.4GHz function:

For IEEE 802.11b mode (1TX/2RX):

The EUT supports Ant. 1 and Ant. 2 with TX diversity function.

Ant. 1 generated the worst case than Ant. 2, so it is tested and recorded in the report.

Ant. 1 and Ant. 2 could receive simultaneously.

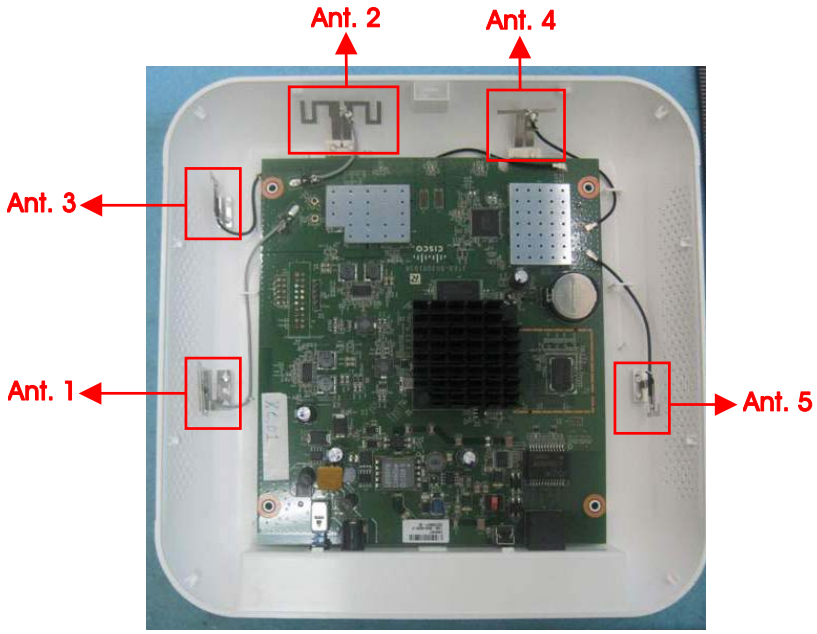
For IEEE 802.11g/n mode (2TX/2RX):

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac mode (3TX/3RX):

Ant. 3, Ant. 4 and Ant. 5 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 134, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 58, 106, 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz	-	-
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
	58	5290 MHz	-	-
5470~5725 MHz Band 3	100	5500 MHz	112	5560 MHz
	102	5510 MHz	116	5580 MHz
	104	5520 MHz	132	5660 MHz
	106	5530 MHz	134	5670 MHz
	108	5540 MHz	136	5680 MHz
	110	5550 MHz	140	5700 MHz
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Ant.
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Power Spectral Density	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Band Edge Emission	11a/BPSK	Band 4	6Mbps	149/157/165	3+4+5
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	3+4+5
	11ac VHT40	Band 4	MCS0/Nss1	151/159	3+4+5
	11ac VHT80	Band 4	MCS0/Nss1	155	3+4+5
Frequency Stability	20 MHz	Band 4	-	157	3
	40 MHz	Band 4	-	151	3
	80 MHz	Band 4	-	155	3

Note: 1. VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

2. The EUT supports AP mode, Bridge mode and Client mode, after evaluating, AP mode and Bridge mode has been evaluated to be the worst case.

The following test modes were performed for all tests:

For AC Power Line Conducted Emissions test:

Mode 1. AP mode

Mode 2. Bridge mode_2.4G

Mode 3. Bridge mode_5G

Mode 3 is the worst case, so it was selected to record in this test report.

For Radiated Emission Below 1GHz test:

Mode 1. EUT Y axis - AP mode

Mode 2. EUT Z axis - AP mode

Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3~Mode 4 will follow this same test mode.

Mode 3. EUT Y axis - Bridge mode_2.4G

Mode 4. EUT Y axis - Bridge mode_5G

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission Above 1GHz and Band Edge Emission test:

The EUT can be placed in Y axis and Z axis. The worst case was found at Y axis for original test report, so it's recorded in this report.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO02-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR3O0832

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding a new adapter (Model No.: MU24-Y120200-A1). 2. Adding the Bridge mode and Client without radar detection mode.	1. AC Power Line Conducted Emissions. 2. Radiated Emissions Below 1GHz.
3. Updating test rule of 5GHz band 1~4 to "New Rules" from "Old Rules".	For 5GHz band 1: After evaluating, it's not necessary to re-test all test items due to the same power as original filing. For 5GHz band 2~3: After evaluating, it's not necessary to re-test all test items. For 5GHz band 4: 1. 26dB Spectrum Bandwidth and 99% Occupied Bandwidth. 2. 6dB Spectrum Bandwidth. 3. Maximum Conducted Output Power. 4. Power Spectral Density. 5. Radiated Emission Above 1GHz. 6. Band Edge Emissions. 7. Frequency Stability.
4. Changing the DFS Firmware Version to "3.3.6.4" from "1.0.0.4".	No test case need redo.

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB (Below 1GHz)

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E4300	DoC

For Test Site No: 03CH01-CB (Above 1GHz)

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
AP Router	Planex	GW-AP54SGX	KA220030603014-1

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software Version	Telnet		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	78	87	87
802.11ac MCS0/Nss1 VHT20	72	86	85
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	70	88	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	67		

3.10. EUT Operation during Test

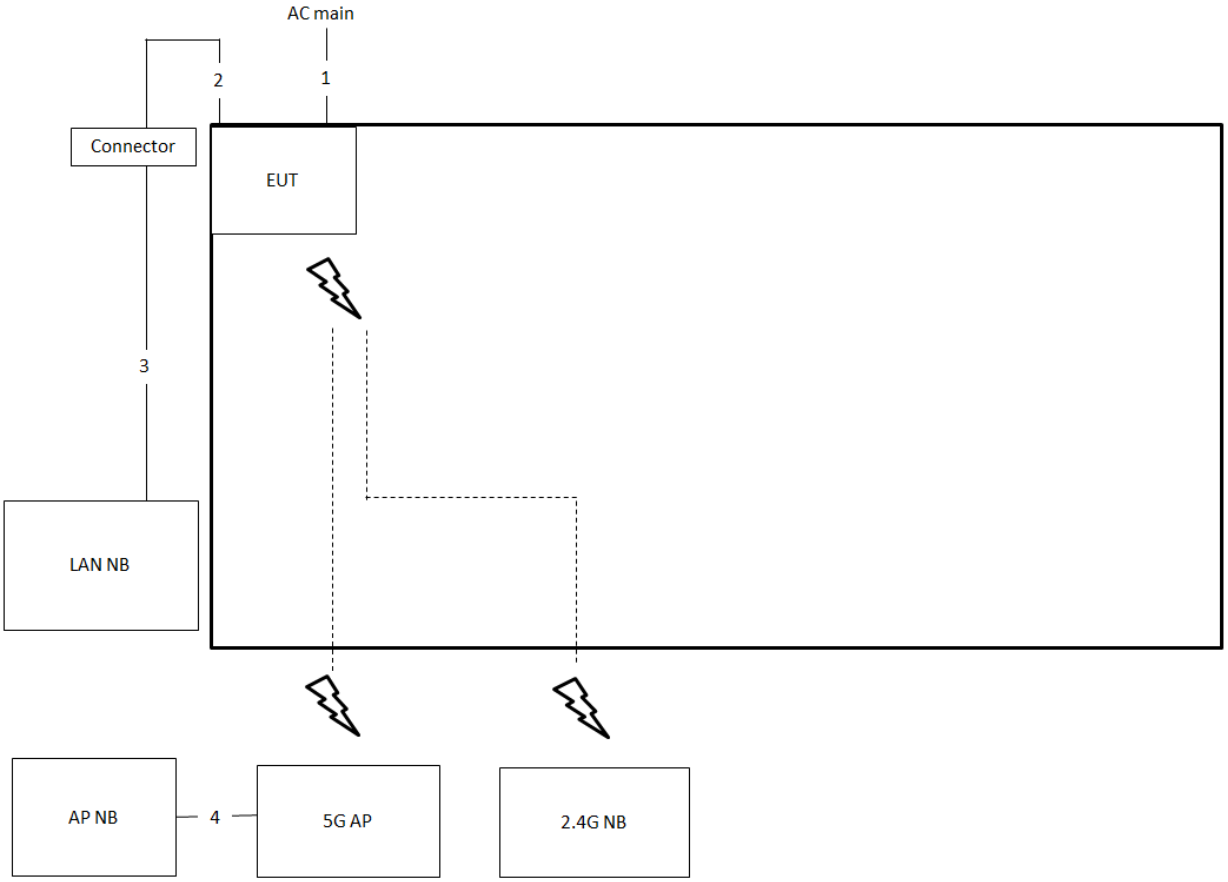
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.060	2.078	99.13	0.04	0.01
802.11ac MCS0/Nss1 VHT20	1.940	1.948	99.59	0.02	0.01
802.11ac MCS0/Nss1 VHT40	0.956	0.974	98.15	0.08	0.01
802.11ac MCS0/Nss1 VHT80	0.464	0.486	95.47	0.20	2.16

3.12. Test Configurations

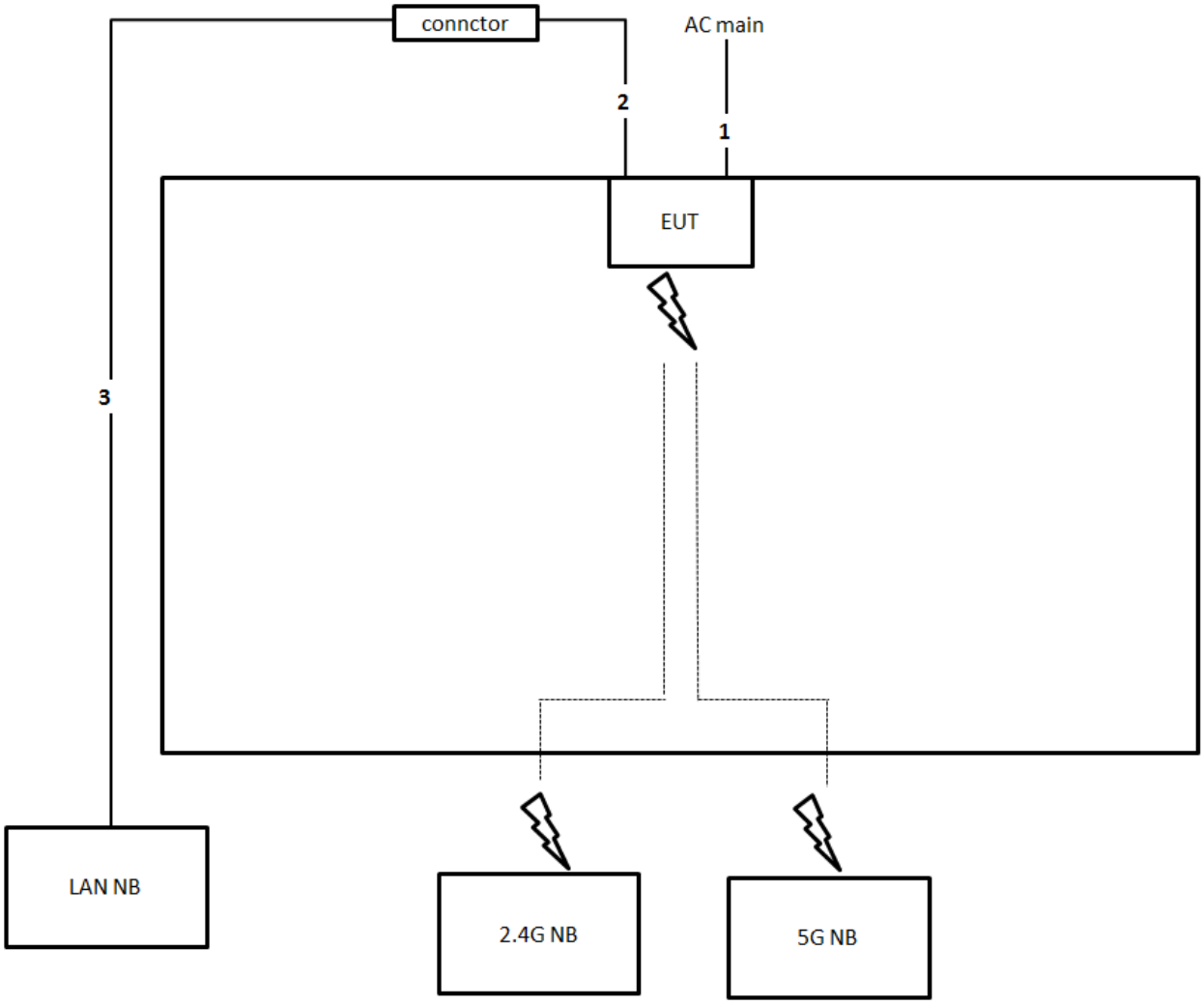
3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m

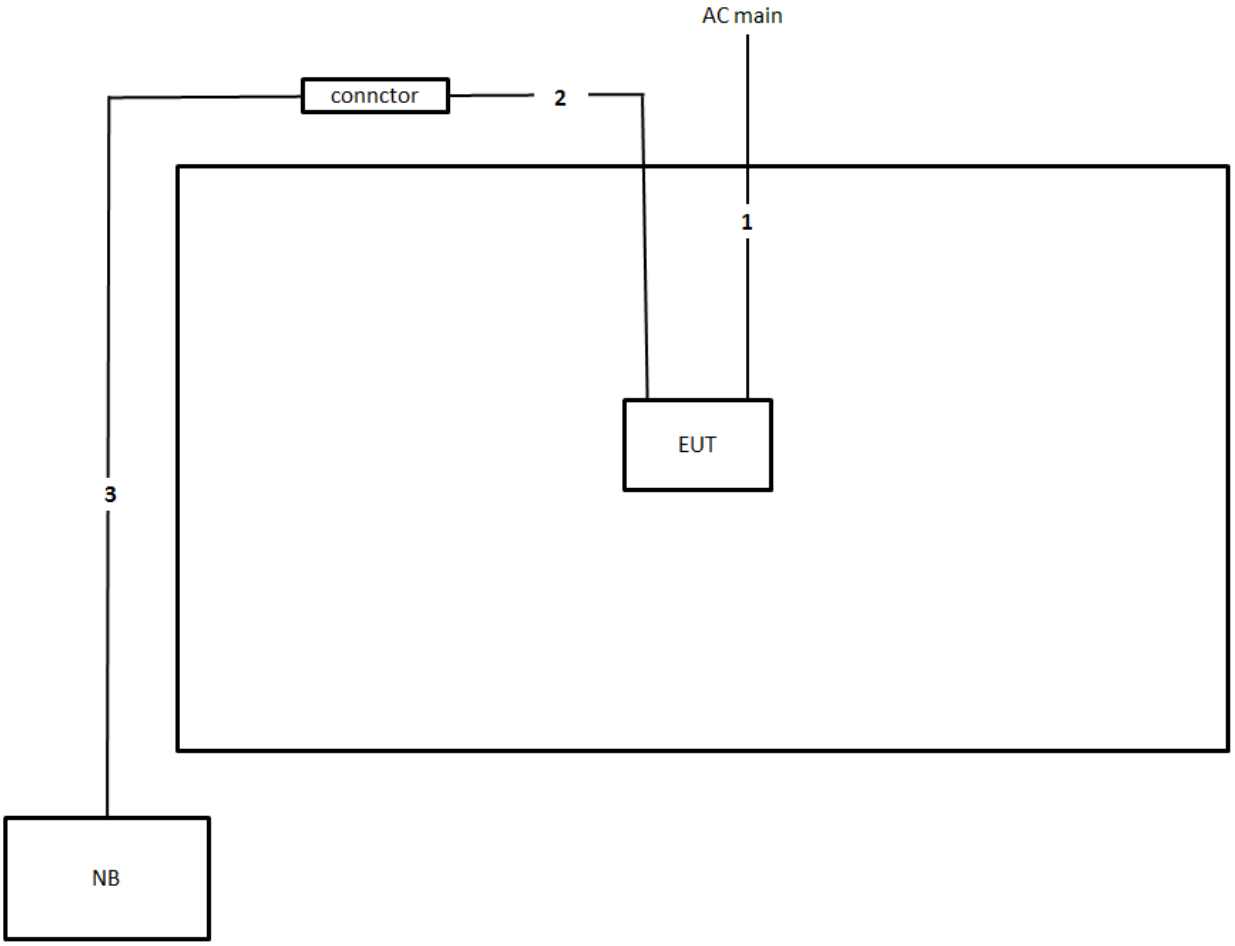
3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

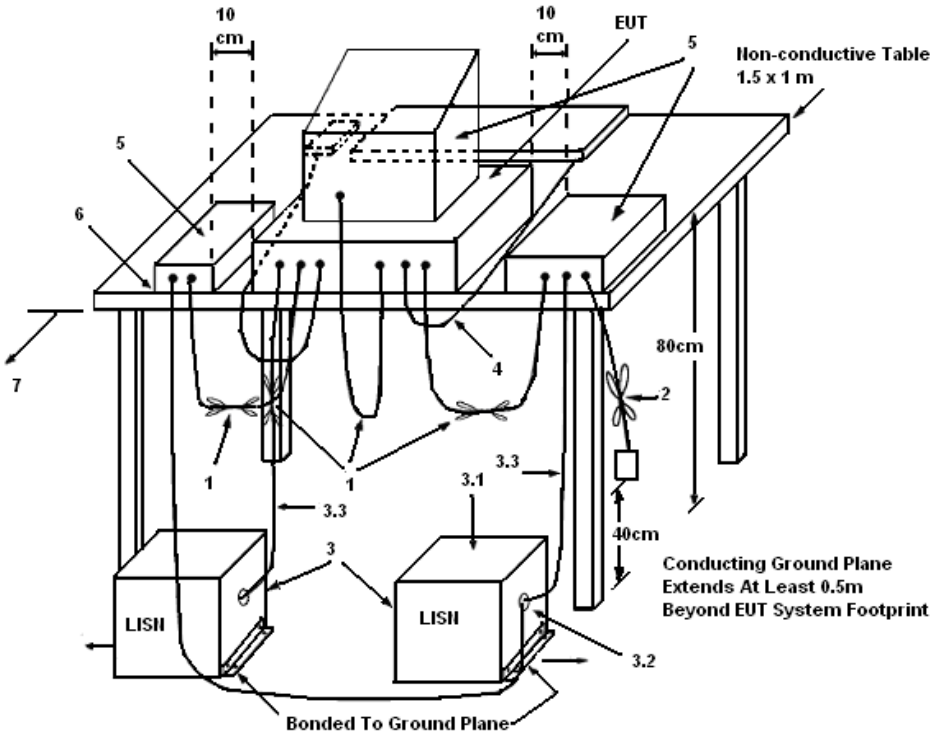
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

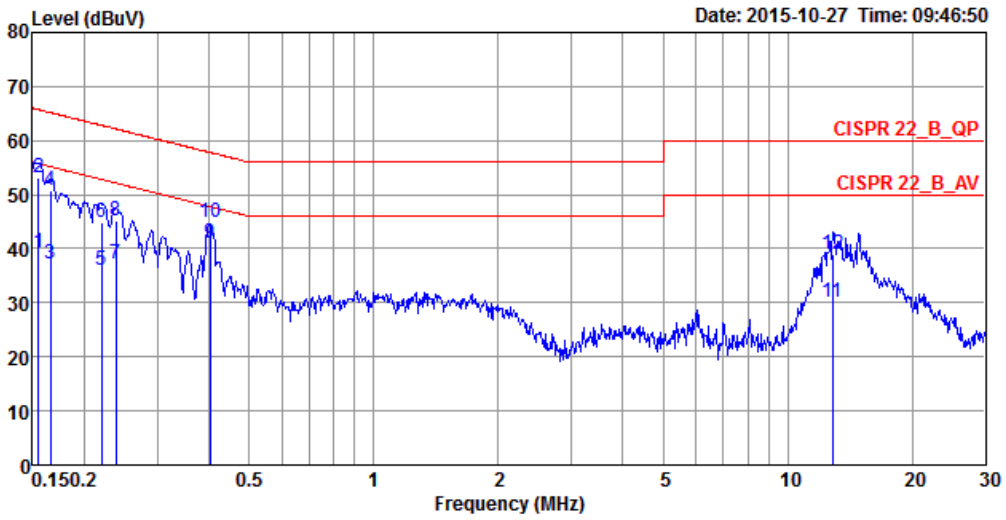
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

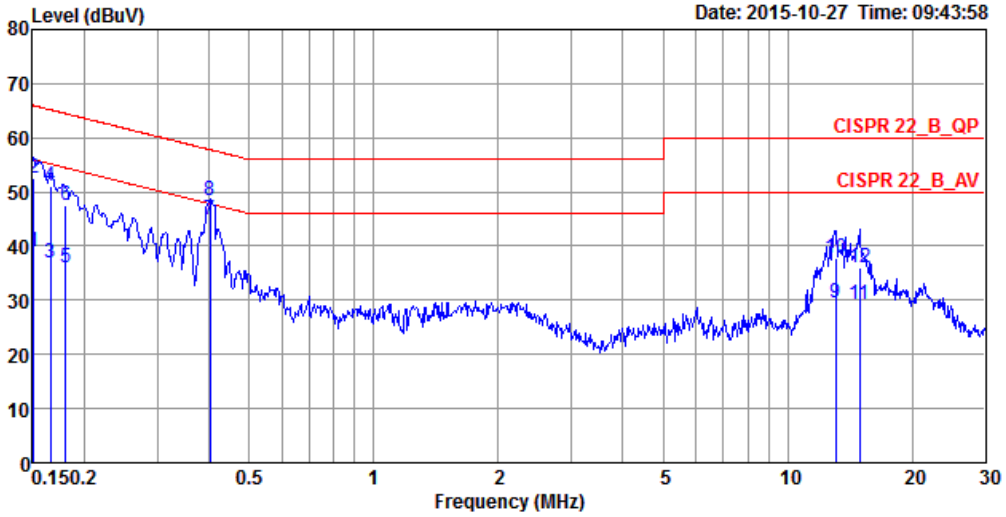
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23℃	Humidity	59%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1548	39.30	-16.44	55.74	29.15	9.98	Average	LINE
2	0.1548	53.15	-12.59	65.74	43.00	9.98	QP	LINE
3	0.1659	37.22	-17.94	55.16	27.07	9.98	Average	LINE
4	0.1659	50.83	-14.33	65.16	40.68	9.98	QP	LINE
5	0.2197	36.03	-16.80	52.83	25.87	9.97	Average	LINE
6	0.2197	45.00	-17.83	62.83	34.84	9.97	QP	LINE
7	0.2378	37.11	-15.06	52.17	26.95	9.97	Average	LINE
8	0.2378	45.14	-17.03	62.17	34.98	9.97	QP	LINE
9	0.4019	41.18	-6.63	47.81	31.00	9.98	Average	LINE
10	0.4019	45.00	-12.81	57.81	34.82	9.98	QP	LINE
11	12.8516	30.02	-19.98	50.00	19.36	10.25	Average	LINE
12	12.8516	38.95	-21.05	60.00	28.29	10.25	QP	LINE

Temperature	23°C	Humidity	59%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1508	39.02	-16.94	55.96	28.87	9.98	Average	NEUTRAL
2	0.1508	52.55	-13.41	65.96	42.40	9.98	QP	NEUTRAL
3	0.1659	37.05	-18.11	55.16	26.90	9.98	Average	NEUTRAL
4	0.1659	51.01	-14.15	65.16	40.86	9.98	QP	NEUTRAL
5	0.1806	35.90	-18.56	54.46	25.74	9.97	Average	NEUTRAL
6	0.1806	47.66	-16.80	64.46	37.50	9.97	QP	NEUTRAL
7	0.4019	44.78	-3.03	47.81	34.60	9.98	Average	NEUTRAL
8	0.4019	48.40	-9.41	57.81	38.22	9.98	QP	NEUTRAL
9	13.0575	29.56	-20.44	50.00	18.93	10.22	Average	NEUTRAL
10	13.0575	37.71	-22.29	60.00	27.08	10.22	QP	NEUTRAL
11	14.9068	29.31	-20.69	50.00	18.64	10.24	Average	NEUTRAL
12	14.9068	36.14	-23.86	60.00	25.47	10.24	QP	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

26dB Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	**Setting**
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

4.2.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. 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%.

4.2.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

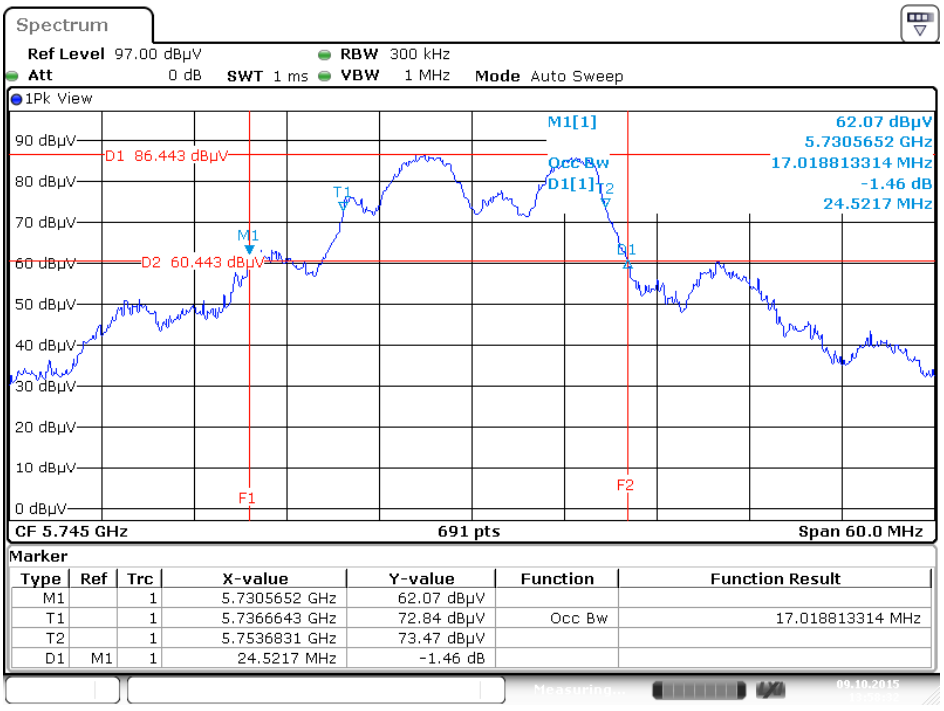
The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	25°C	Humidity	45%
Test Engineer	Eddie Weng		

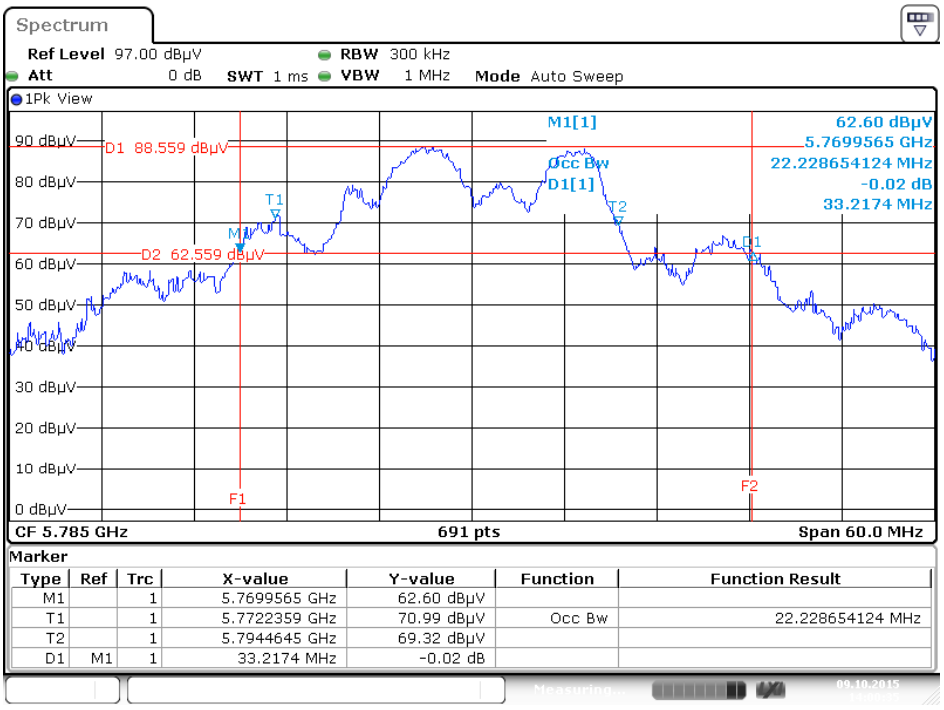
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	17.02	24.52
	5785 MHz	22.23	33.22
	5825 MHz	22.14	32.96
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.80	21.57
	5785 MHz	23.18	40.26
	5825 MHz	20.93	36.17
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.90	44.35
	5795 MHz	48.63	90.15
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.41	80.87

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 / 5745 MHz



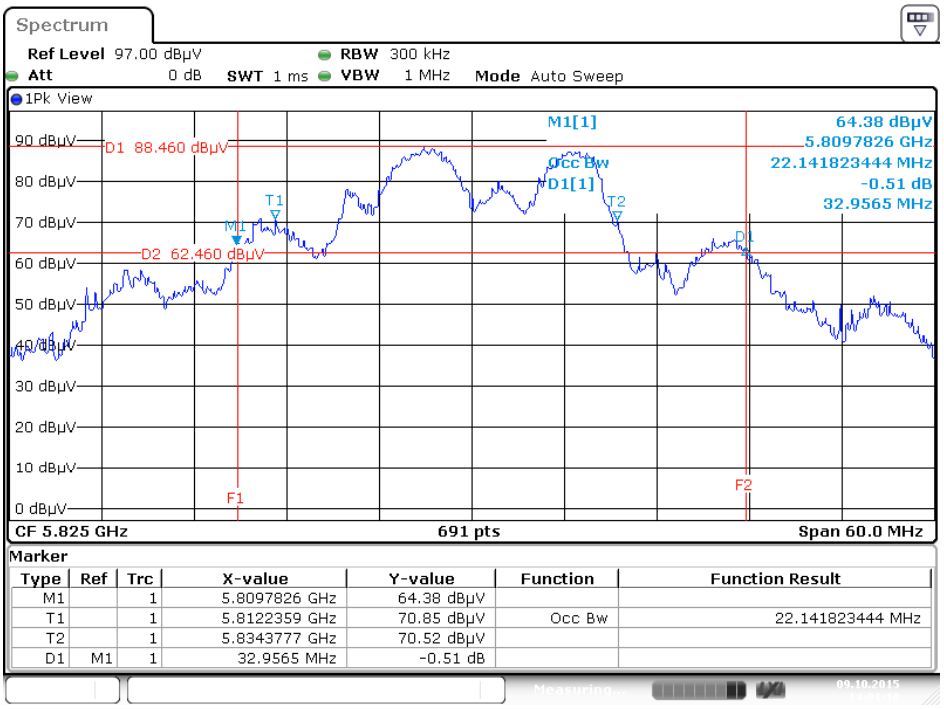
Date: 9.OCT.2015 13:58:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 / 5785 MHz



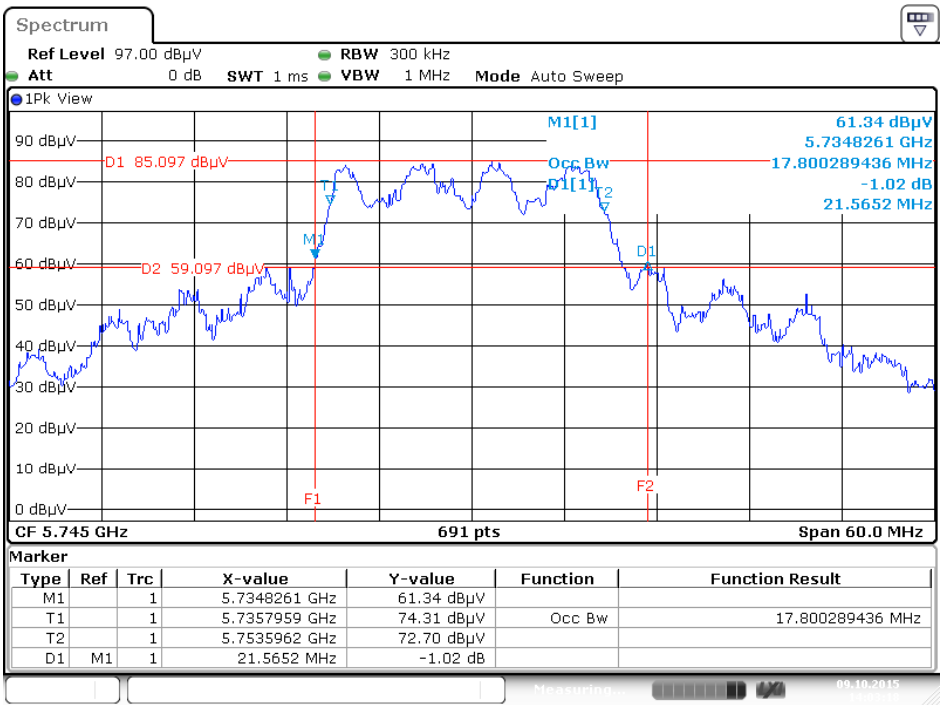
Date: 9.OCT.2015 14:00:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 / 5825 MHz



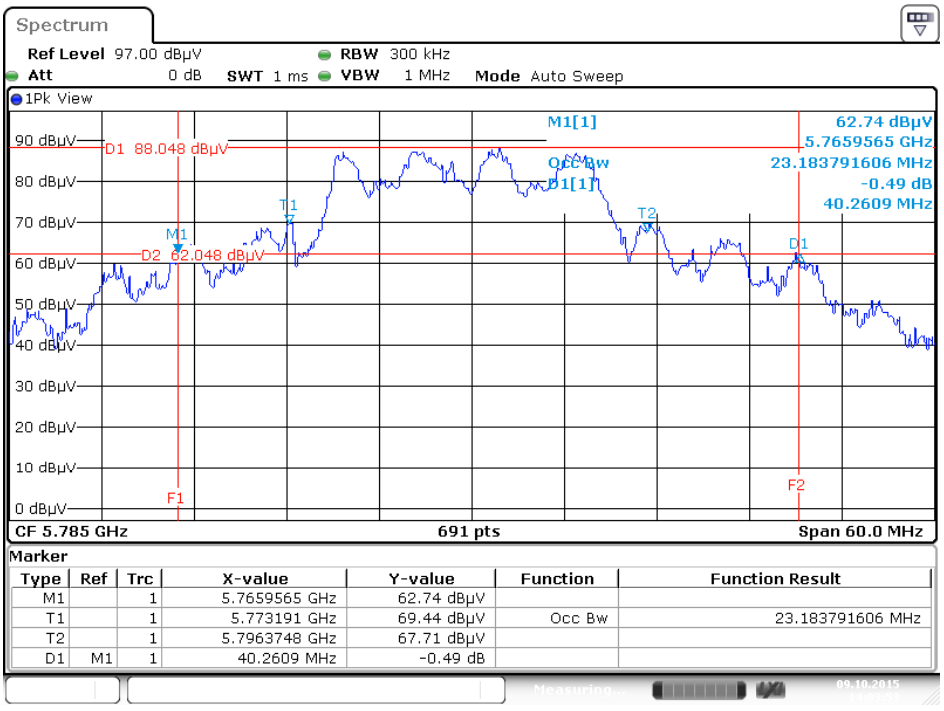
Date: 9.OCT.2015 14:01:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5745 MHz



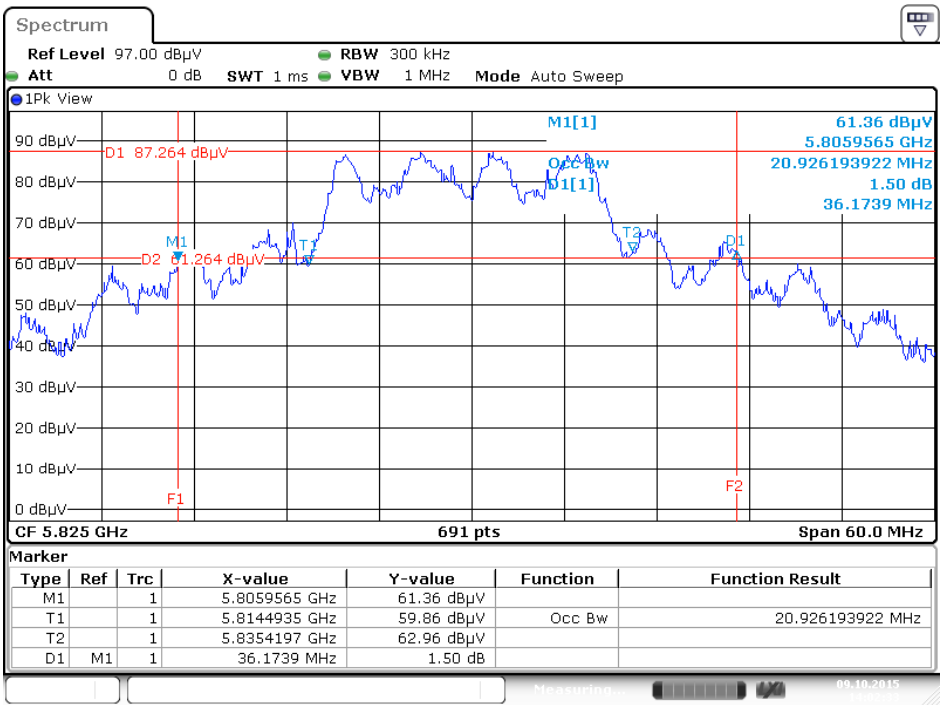
Date: 9.OCT.2015 14:03:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5785 MHz



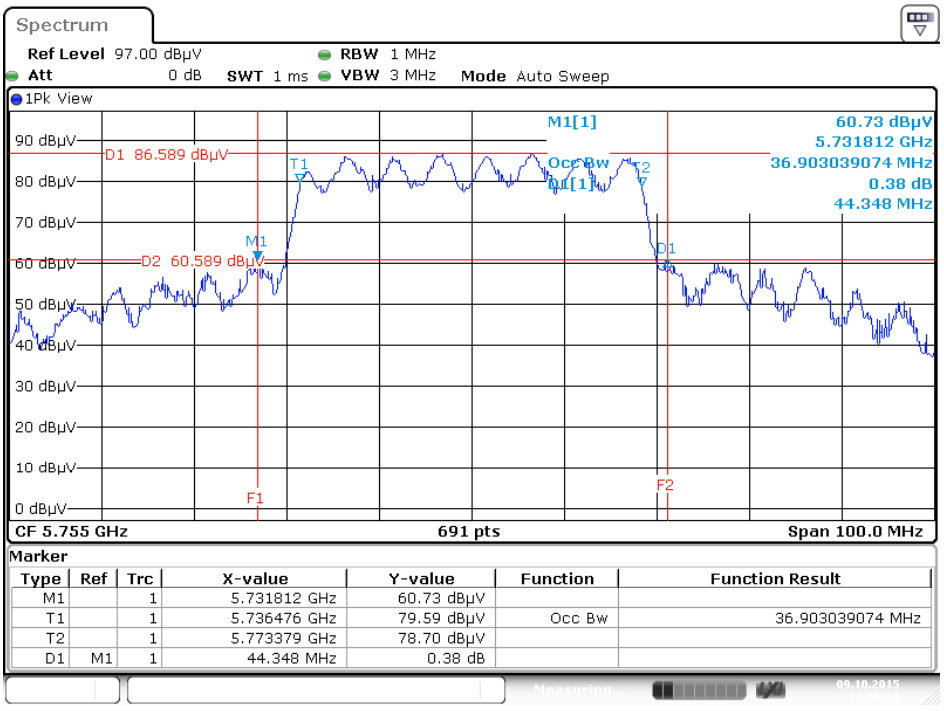
Date: 9.OCT.2015 14:03:53

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5825 MHz



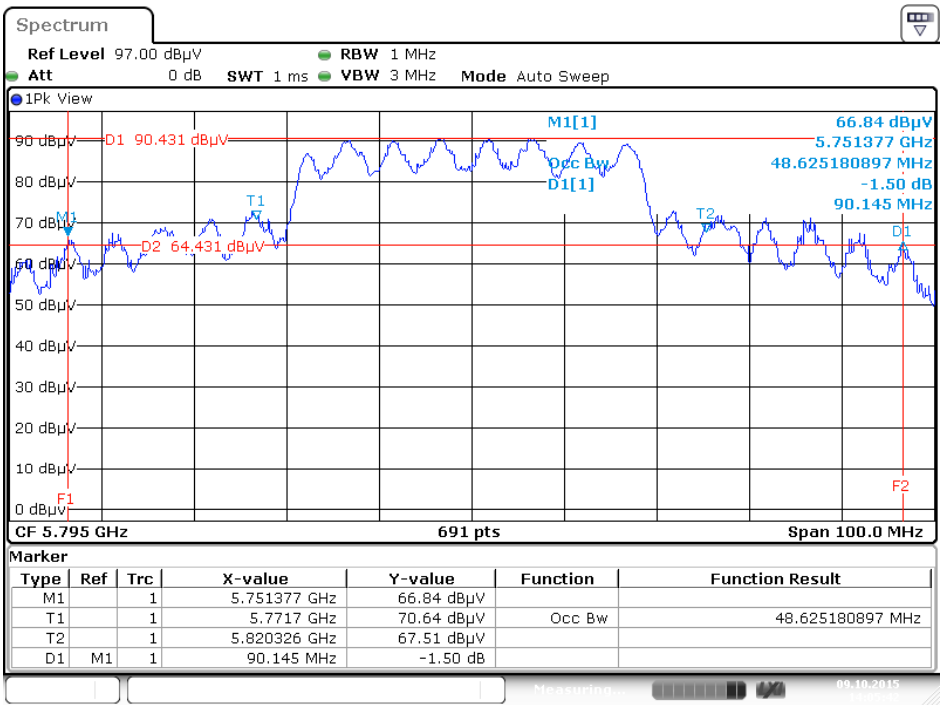
Date: 9.OCT.2015 14:02:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5755 MHz



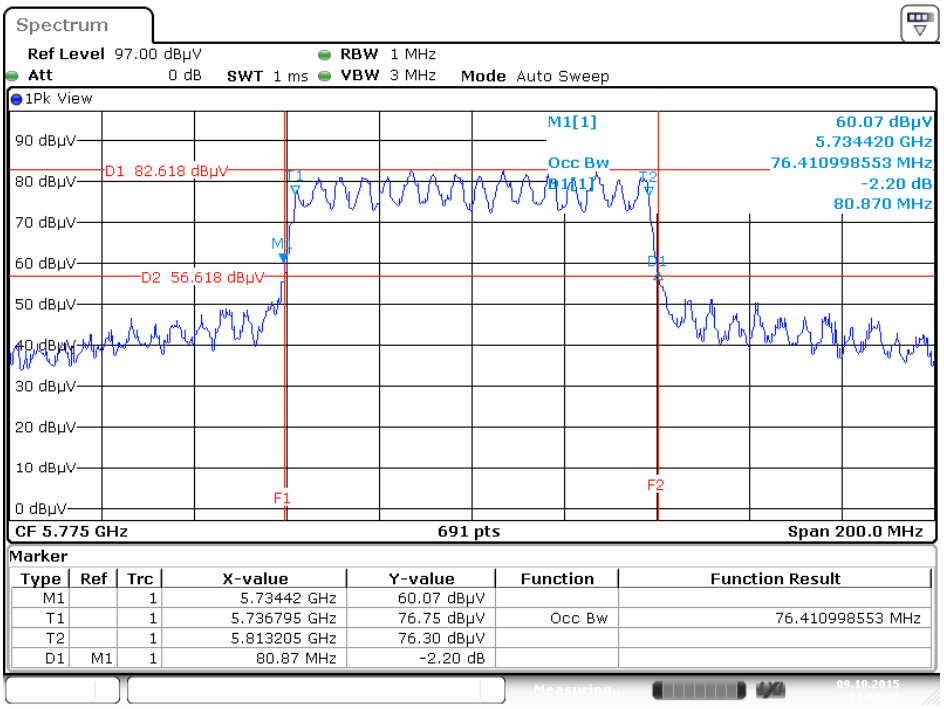
Date: 9.OCT.2015 14:06:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5795 MHz



Date: 9.OCT.2015 14:05:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5775 MHz



4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.3.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

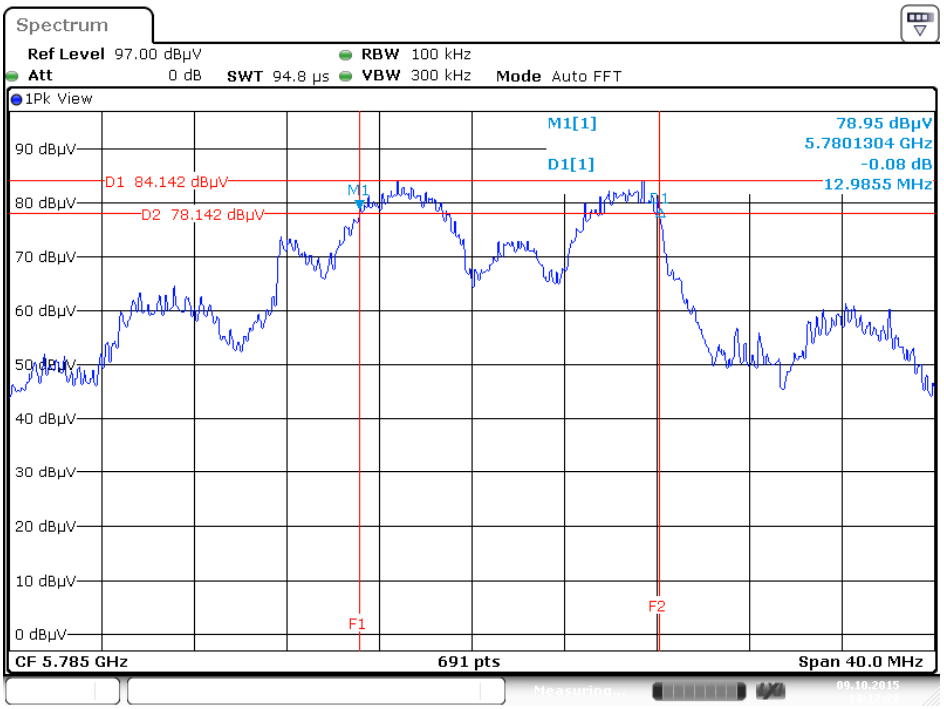
Temperature	25°C	Humidity	45%
Test Engineer	Eddie Weng		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	13.28	500	Complies
	5785 MHz	12.99	500	Complies
	5825 MHz	13.22	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.04	500	Complies
	5785 MHz	16.99	500	Complies
	5825 MHz	16.99	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.71	500	Complies
	5795 MHz	35.71	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	71.30	500	Complies

Note: All the test values were listed in the report.

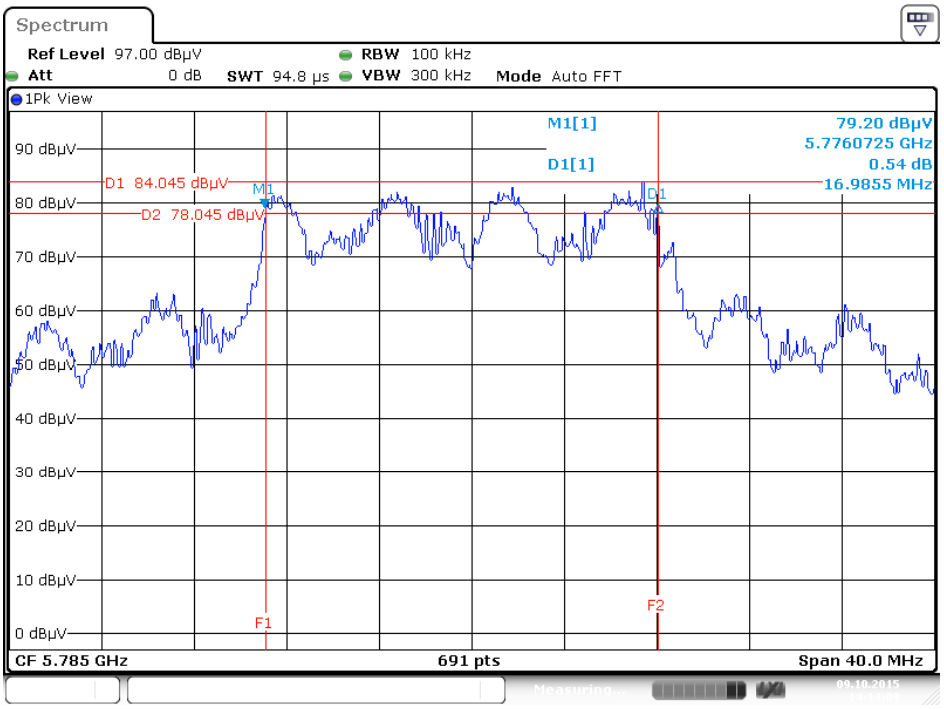
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 / 5785 MHz



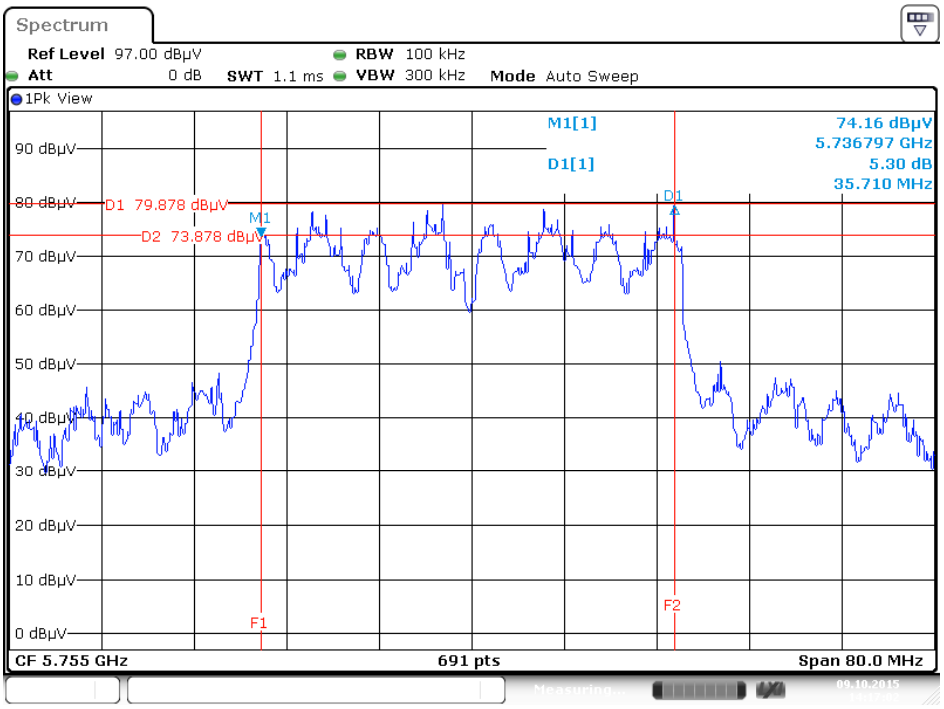
Date: 9.OCT.2015 14:12:19

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5785 MHz



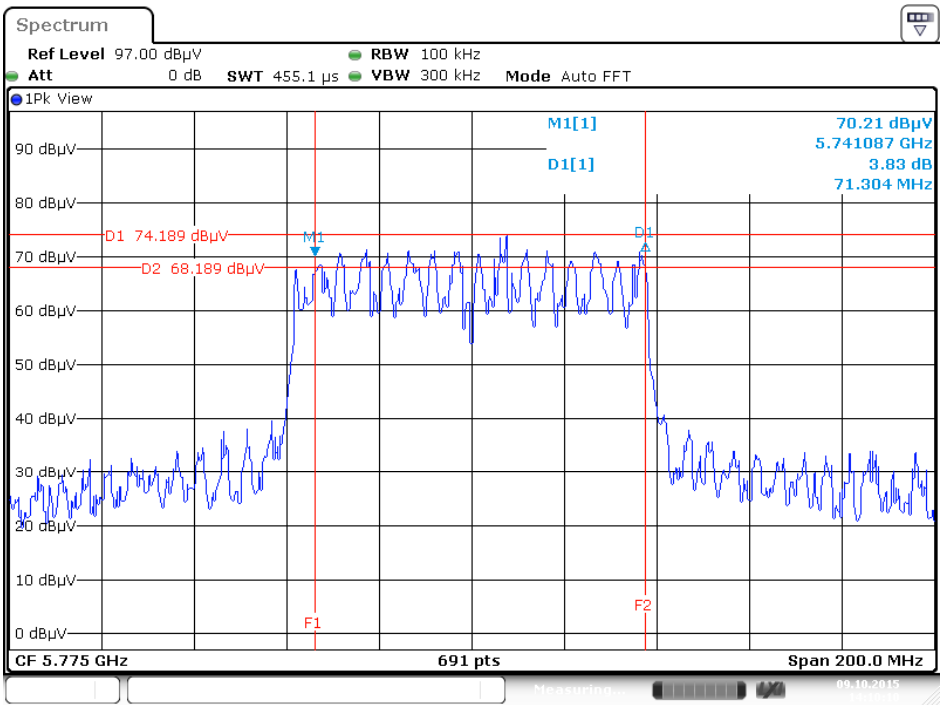
Date: 9.OCT.2015 14:14:09

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5755 MHz



Date: 9.OCT.2015 14:17:02

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5775 MHz



Date: 9.OCT.2015 14:10:10

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

Frequency Band		Limit
☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.4.2. Measuring Instruments and Setting

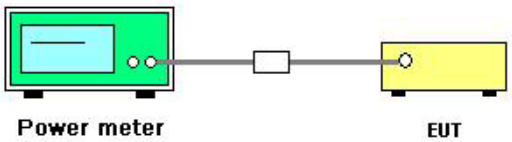
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems,add every result of the values by mathematic formula.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	25°C	Humidity	45%
Test Engineer	Eddie Weng	Test Date	Oct. 09, 2015

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Total		
802.11a	5745 MHz	19.41	19.74	19.38	24.28	30.00	Complies
	5785 MHz	20.86	21.75	21.31	26.09	30.00	Complies
	5825 MHz	20.96	21.64	21.37	26.10	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.36	17.93	17.90	22.51	30.00	Complies
	5785 MHz	20.16	21.05	21.04	25.54	30.00	Complies
	5825 MHz	20.22	20.58	20.47	25.20	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	16.92	17.29	17.18	21.90	30.00	Complies
	5795 MHz	20.73	21.13	21.11	25.77	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	15.64	16.19	16.05	20.74	30.00	Complies

4.5. Power Spectral Density Measurement

4.5.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.4.1.

Frequency Band		Limit
☒	5.725~5.85 GHz	30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

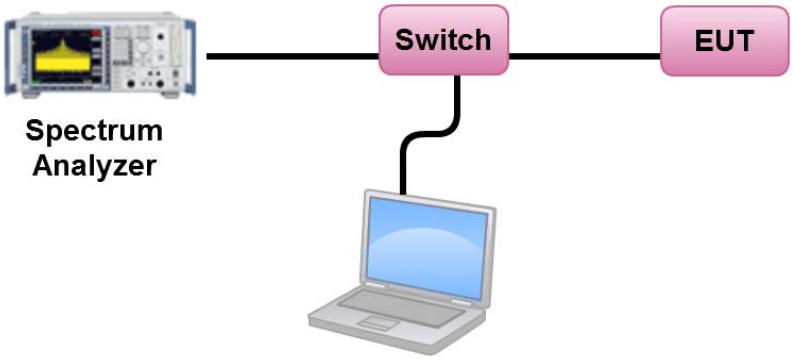
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	45%
Test Engineer	Eddie Weng	Test Date	Oct. 09, 2015

Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	11.16	-3.01	8.15	26.51	Complies
157	5785 MHz	12.95	-3.01	9.94	26.51	Complies
165	5825 MHz	12.98	-3.01	9.97	26.51	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.49dBi>6dBi, so limit=30–(9.49–6)=26.51dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.41	-3.01	6.40	26.51	Complies
157	5785 MHz	12.47	-3.01	9.46	26.51	Complies
165	5825 MHz	12.14	-3.01	9.13	26.51	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.49dBi>6dBi, so limit=30–(9.49–6)=26.51dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	5.79	-3.01	2.78	26.51	Complies
159	5795 MHz	9.69	-3.01	6.68	26.51	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.49dBi>6dBi, so limit=30–(9.49–6)=26.51dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5

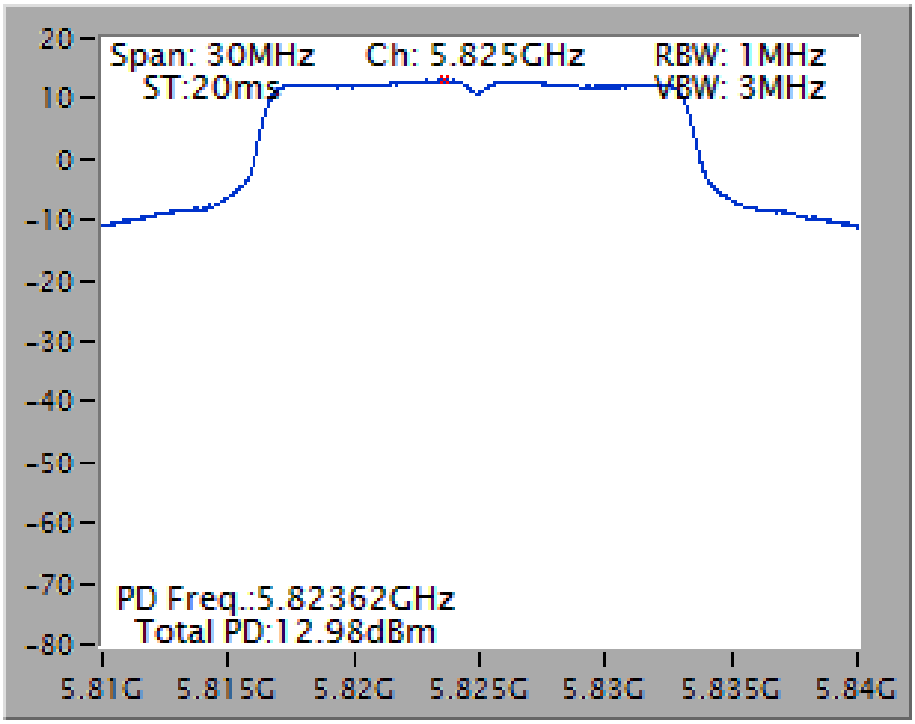
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	1.73	-3.01	-1.28	26.51	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.49dBi>6dBi, so limit=30–(9.49–6)=26.51dBm/500kHz.

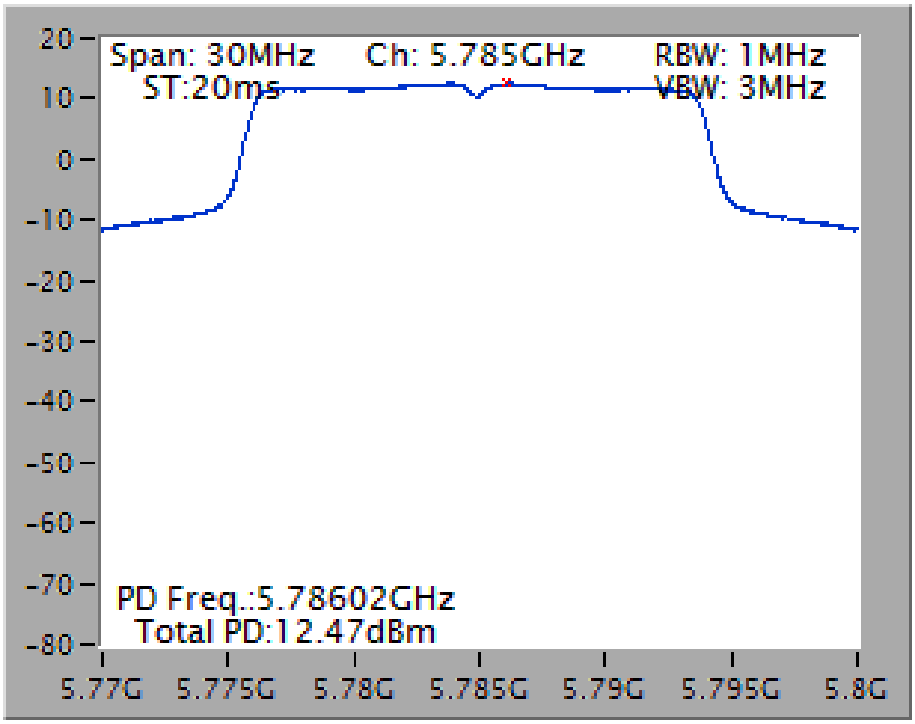
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

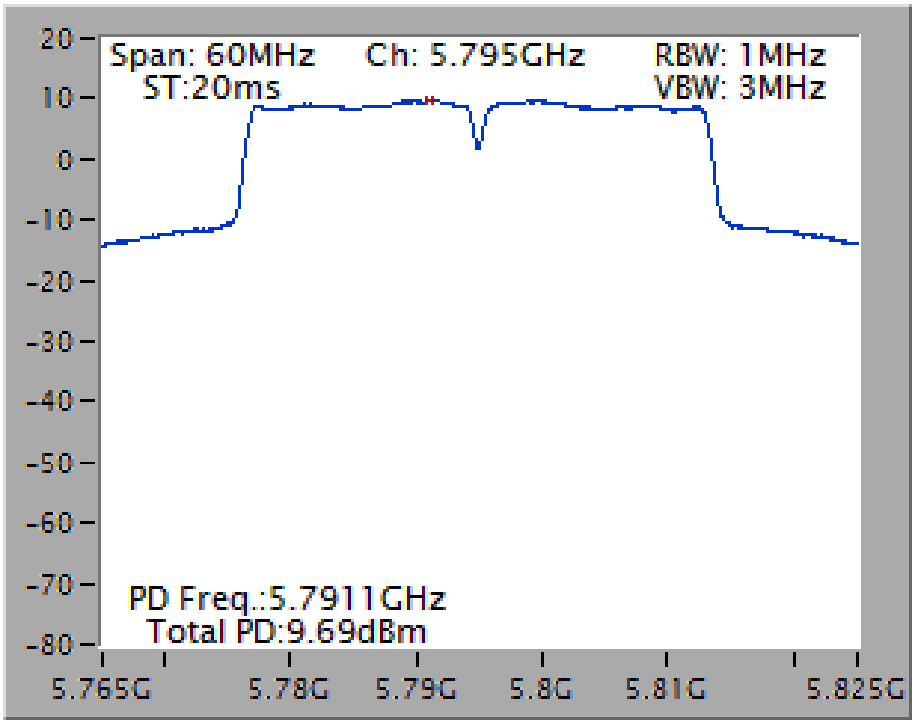
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 + Ant. 5 / 5825 MHz



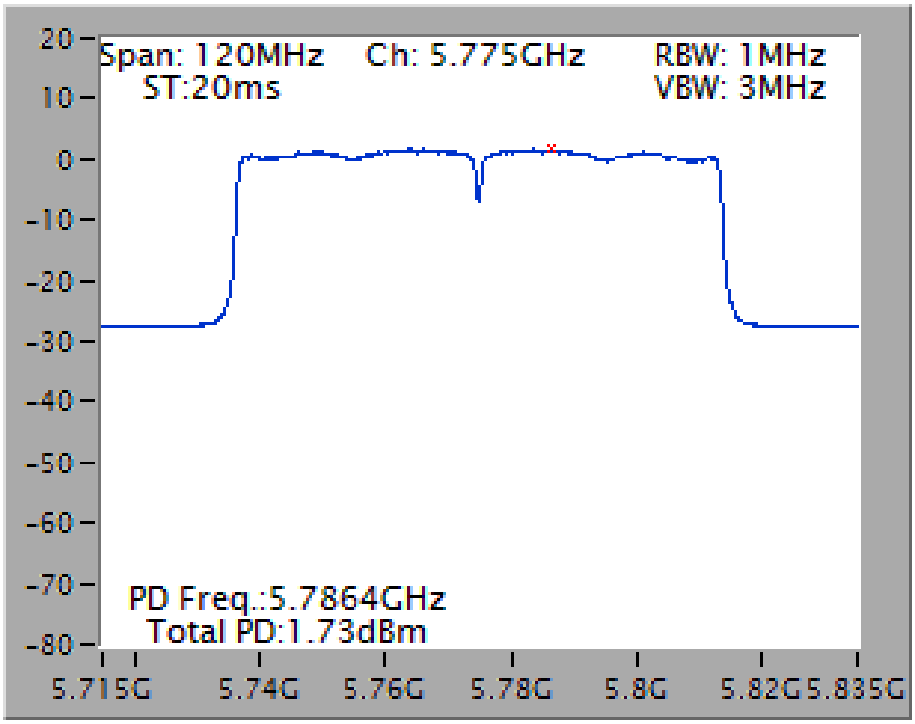
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5785 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

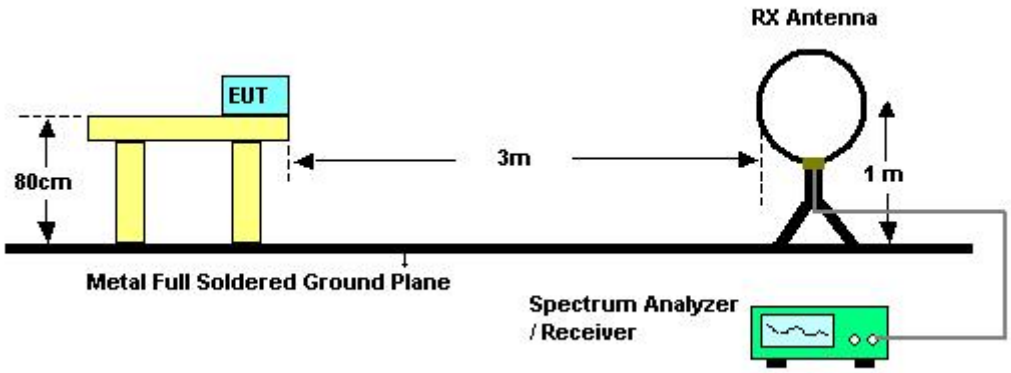
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

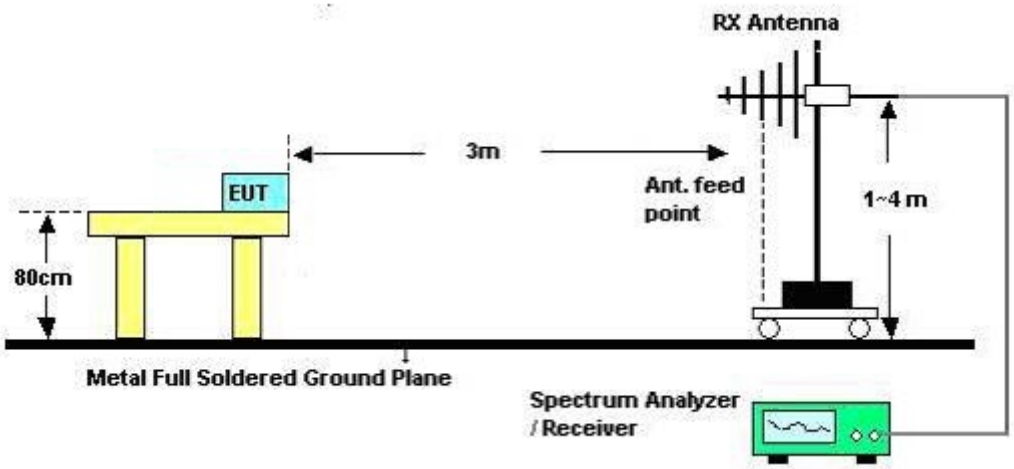
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.6.4. Test Setup Layout

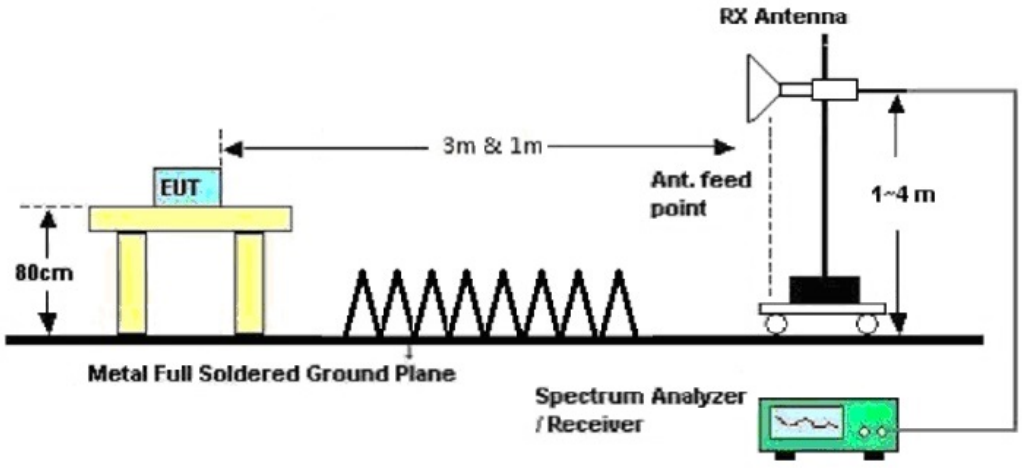
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	Normal Link
Test Date	Oct. 07, 2015	Test Mode	Mode 1

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

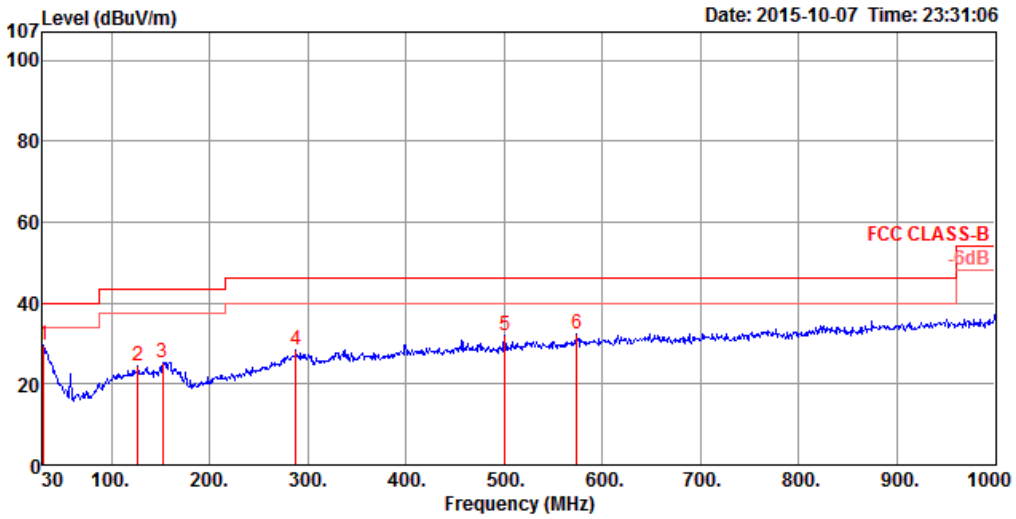
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.6.8. Results of Radiated Emissions (30MHz~1GHz)

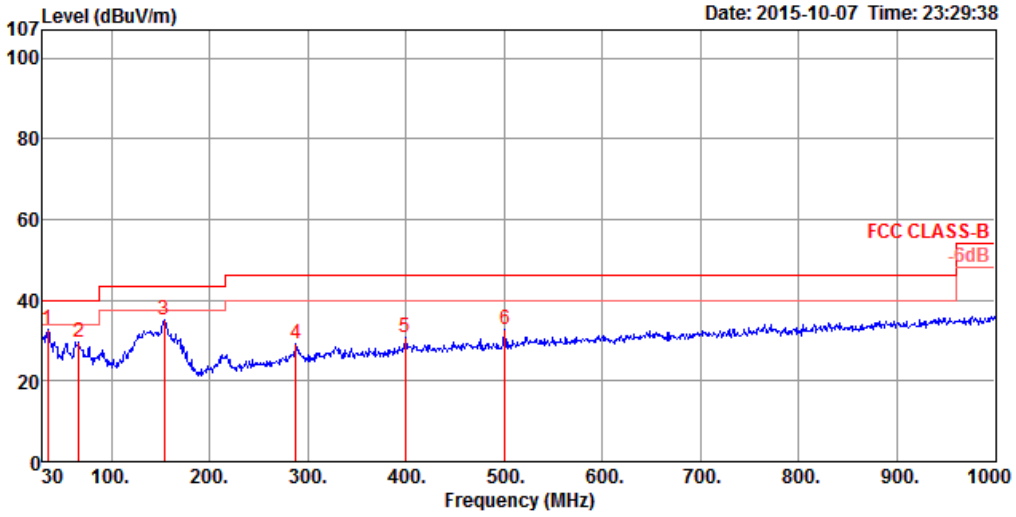
Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	30.97	29.54	40.00	-10.46	42.27	0.52	32.64	19.39	HORIZONTAL	150	59	Peak
2	127.00	24.56	43.50	-18.94	43.34	1.15	32.56	12.63	HORIZONTAL	300	243	Peak
3	152.22	25.41	43.50	-18.09	45.62	1.26	32.56	11.09	HORIZONTAL	125	198	Peak
4	288.02	28.51	46.00	-17.49	45.69	1.68	32.52	13.66	HORIZONTAL	125	220	Peak
5	500.45	32.05	46.00	-13.95	44.62	2.21	32.61	17.83	HORIZONTAL	200	306	Peak
6	574.17	32.28	46.00	-13.72	43.80	2.35	32.67	18.80	HORIZONTAL	150	126	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	34.85	32.74	40.00	-7.26	47.69	0.62	32.64	17.07	VERTICAL	150	69	Peak
2	66.86	29.49	40.00	-10.51	54.47	0.83	32.61	6.80	VERTICAL	200	173	Peak
3	154.16	34.99	43.50	-8.51	55.31	1.26	32.56	10.98	VERTICAL	100	310	Peak
4	288.02	29.04	46.00	-16.96	46.22	1.68	32.52	13.66	VERTICAL	100	128	Peak
5	399.57	30.84	46.00	-15.16	44.92	1.99	32.54	16.47	VERTICAL	300	215	Peak
6	500.45	32.69	46.00	-13.31	45.26	2.21	32.61	17.83	VERTICAL	300	303	Peak

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6.9. Results for Radiated Emissions (1GHz~40GHz)

Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11a CH 149 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11489.25	61.65	74.00	-12.35	45.95	11.03	35.23	39.90	HORIZONTAL	150	226	Peak
2	11489.87	48.49	54.00	-5.51	32.79	11.03	35.23	39.90	HORIZONTAL	150	226	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11489.72	46.77	54.00	-7.23	31.07	11.03	35.23	39.90	VERTICAL	153	224	Average
2	11489.89	59.89	74.00	-14.11	44.19	11.03	35.23	39.90	VERTICAL	153	224	Peak

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11a CH 157 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11570.32	64.99	74.00	-9.01	49.38	11.07	35.23	39.77	HORIZONTAL	142	224	Peak
2	11572.04	50.94	54.00	-3.06	35.33	11.07	35.23	39.77	HORIZONTAL	142	224	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11569.62	48.83	54.00	-5.17	33.22	11.07	35.23	39.77	VERTICAL	145	183	Average
2	11570.36	64.54	74.00	-9.46	48.93	11.07	35.23	39.77	VERTICAL	145	183	Peak

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11a CH 165 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11651.80	50.43	54.00	-3.57	34.98	11.10	35.22	39.57	HORIZONTAL	150	47	Average
2	11652.16	64.86	74.00	-9.14	49.41	11.10	35.22	39.57	HORIZONTAL	150	47	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11644.04	62.91	74.00	-11.09	47.40	11.10	35.22	39.63	VERTICAL	145	197	Peak
2	11653.84	48.59	54.00	-5.41	33.14	11.10	35.22	39.57	VERTICAL	145	197	Average

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11488.60	46.85	54.00	-7.15	31.15	11.03	35.23	39.90	HORIZONTAL	150	220	Average
2	11493.48	60.43	74.00	-13.57	44.72	11.04	35.23	39.90	HORIZONTAL	150	220	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11484.16	57.98	74.00	-16.02	42.28	11.03	35.23	39.90	VERTICAL	150	30	Peak
2	11493.28	45.73	54.00	-8.27	30.02	11.04	35.23	39.90	VERTICAL	150	30	Average

Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11568.56	64.85	74.00	-9.15	49.24	11.07	35.23	39.77	HORIZONTAL	150	222	Peak
2	11568.80	50.96	54.00	-3.04	35.35	11.07	35.23	39.77	HORIZONTAL	150	222	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11570.64	48.28	54.00	-5.72	32.67	11.07	35.23	39.77	VERTICAL	150	183	Average
2	11575.64	61.90	74.00	-12.10	46.29	11.07	35.23	39.77	VERTICAL	150	183	Peak

Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11648.64	64.15	74.00	-9.85	48.64	11.10	35.22	39.63	HORIZONTAL	150	220	Peak
2	11648.76	50.34	54.00	-3.66	34.83	11.10	35.22	39.63	HORIZONTAL	150	220	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11648.40	48.62	54.00	-5.38	33.11	11.10	35.22	39.63	VERTICAL	150	196	Average
2	11652.44	61.62	74.00	-12.38	46.17	11.10	35.22	39.57	VERTICAL	150	196	Peak

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11500.60	58.13	74.00	-15.87	42.42	11.04	35.23	39.90	HORIZONTAL	150	205	Peak
2	11511.64	44.52	54.00	-9.48	28.81	11.04	35.23	39.90	HORIZONTAL	150	205	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11508.84	57.66	74.00	-16.34	41.95	11.04	35.23	39.90	VERTICAL	150	130	Peak
2	11508.92	44.41	54.00	-9.59	28.70	11.04	35.23	39.90	VERTICAL	150	130	Average

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11588.80	48.87	54.00	-5.13	33.31	11.08	35.22	39.70	HORIZONTAL	150	219	Average
2	11588.84	62.22	74.00	-11.78	46.66	11.08	35.22	39.70	HORIZONTAL	150	219	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11588.28	46.19	54.00	-7.81	30.63	11.08	35.22	39.70	VERTICAL	150	167	Average
2	11593.20	60.35	74.00	-13.65	44.79	11.08	35.22	39.70	VERTICAL	150	167	Peak

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11549.87	44.99	54.00	-9.01	29.33	11.06	35.23	39.83	HORIZONTAL	158	65	Average
2	11550.16	57.93	74.00	-16.07	42.27	11.06	35.23	39.83	HORIZONTAL	158	65	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11550.27	44.81	54.00	-9.19	29.21	11.06	35.23	39.77	VERTICAL	150	13	Average
2	11550.36	58.56	74.00	-15.44	42.96	11.06	35.23	39.77	VERTICAL	150	13	Peak

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.7. Band Edge Emissions Measurement

4.7.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

4.7.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3.

4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5715.00	48.61	54.00	-5.39	41.76	7.79	33.00	32.06	HORIZONTAL	150	271	Average
2	5715.00	62.49	74.00	-11.51	55.64	7.79	33.00	32.06	HORIZONTAL	150	271	Peak
3	5725.00	77.14	78.20	-1.06	70.27	7.79	33.00	32.08	HORIZONTAL	150	271	Peak
4	5745.80	100.55			93.66	7.81	33.02	32.10	HORIZONTAL	150	271	Average
5	5745.80	110.60			103.71	7.81	33.02	32.10	HORIZONTAL	150	271	Peak

Item 4, 5 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5707.00	48.36	54.00	-5.64	41.52	7.78	33.00	32.06	HORIZONTAL	150	56	Average
2	5707.60	59.88	74.00	-14.12	53.04	7.78	33.00	32.06	HORIZONTAL	150	56	Peak
3	5720.20	56.46	78.20	-21.74	49.61	7.79	33.00	32.06	HORIZONTAL	150	56	Peak
4	5786.80	101.76			94.82	7.83	33.03	32.14	HORIZONTAL	150	56	Average
5	5787.40	112.29			105.35	7.83	33.03	32.14	HORIZONTAL	150	56	Peak
6	5857.20	61.75	78.20	-16.45	54.69	7.87	33.05	32.24	HORIZONTAL	150	56	Peak
7	5866.60	63.12	74.00	-10.88	56.06	7.88	33.06	32.24	HORIZONTAL	150	56	Peak
8	5867.20	50.74	54.00	-3.26	43.68	7.88	33.06	32.24	HORIZONTAL	150	56	Average

Item 4, 5 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5817.40	100.81			93.82	7.85	33.04	32.18	HORIZONTAL	150	57	Average
2	5817.40	111.43			104.44	7.85	33.04	32.18	HORIZONTAL	150	57	Peak
3	5851.00	76.17	78.20	-2.03	69.13	7.87	33.05	32.22	HORIZONTAL	150	57	Peak
4	5865.80	66.35	74.00	-7.65	59.30	7.87	33.06	32.24	HORIZONTAL	150	57	Peak
5	5907.40	49.36	54.00	-4.64	42.23	7.90	33.07	32.30	HORIZONTAL	150	57	Average

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5664.20	46.99	54.00	-7.01	40.21	7.76	32.98	32.00	HORIZONTAL	150	290	Average
2	5713.80	61.75	74.00	-12.25	54.90	7.79	33.00	32.06	HORIZONTAL	150	290	Peak
3	5724.60	77.07	78.20	-1.13	70.20	7.79	33.00	32.08	HORIZONTAL	150	290	Peak
4	5743.80	98.26			91.37	7.80	33.01	32.10	HORIZONTAL	150	290	Average
5	5743.80	108.91			102.02	7.80	33.01	32.10	HORIZONTAL	150	290	Peak

Item 4, 5 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5704.00	49.25	54.00	-4.75	42.43	7.78	33.00	32.04	HORIZONTAL	150	294	Average
2	5704.00	60.79	74.00	-13.21	53.97	7.78	33.00	32.04	HORIZONTAL	150	294	Peak
3	5723.80	59.02	78.20	-19.18	52.15	7.79	33.00	32.08	HORIZONTAL	150	294	Peak
4	5783.80	101.82			94.88	7.83	33.03	32.14	HORIZONTAL	150	294	Average
5	5784.40	112.52			105.58	7.83	33.03	32.14	HORIZONTAL	150	294	Peak
6	5859.40	62.55	78.20	-15.65	55.50	7.87	33.06	32.24	HORIZONTAL	150	294	Peak
7	5863.60	61.87	74.00	-12.13	54.82	7.87	33.06	32.24	HORIZONTAL	150	294	Peak
8	5864.20	50.91	54.00	-3.09	43.86	7.87	33.06	32.24	HORIZONTAL	150	294	Average

Item 4, 5 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5823.80	101.18			94.18	7.85	33.05	32.20	HORIZONTAL	150	298	Average
2	5823.80	111.78			104.78	7.85	33.05	32.20	HORIZONTAL	150	298	Peak
3	5854.20	77.05	78.20	-1.15	70.01	7.87	33.05	32.22	HORIZONTAL	150	298	Peak
4	5863.80	50.38	54.00	-3.62	43.33	7.87	33.06	32.24	HORIZONTAL	150	298	Average
5	5864.20	67.97	74.00	-6.03	60.92	7.87	33.06	32.24	HORIZONTAL	150	298	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5708.80	70.65	74.00	-3.35	63.81	7.78	33.00	32.06	HORIZONTAL	145	294	Peak
2	5714.20	52.85	54.00	-1.15	46.00	7.79	33.00	32.06	HORIZONTAL	145	294	Average
3	5724.40	76.27	78.20	-1.93	69.40	7.79	33.00	32.08	HORIZONTAL	145	294	Peak
4	5749.00	94.49			87.60	7.81	33.02	32.10	HORIZONTAL	145	294	Average
5	5759.20	105.21			98.30	7.81	33.02	32.12	HORIZONTAL	145	294	Peak
6	5857.20	57.39	78.20	-20.81	50.33	7.87	33.05	32.24	HORIZONTAL	145	294	Peak
7	5896.60	57.31	74.00	-16.69	50.21	7.89	33.07	32.28	HORIZONTAL	145	294	Peak
8	5898.40	45.22	54.00	-8.78	38.12	7.89	33.07	32.28	HORIZONTAL	145	294	Average

Item 4, 5 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5714.00	49.28	54.00	-4.72	42.43	7.79	33.00	32.06	HORIZONTAL	150	298	Average
2	5714.00	62.88	74.00	-11.12	56.03	7.79	33.00	32.06	HORIZONTAL	150	298	Peak
3	5725.00	66.81	78.20	-11.39	59.94	7.79	33.00	32.08	HORIZONTAL	150	298	Peak
4	5789.00	109.18			102.22	7.83	33.03	32.16	HORIZONTAL	150	298	Peak
5	5799.20	98.02			91.05	7.84	33.03	32.16	HORIZONTAL	150	298	Average
6	5854.40	73.46	78.20	-4.74	66.42	7.87	33.05	32.22	HORIZONTAL	150	298	Peak
7	5860.00	52.94	54.00	-1.06	45.89	7.87	33.06	32.24	HORIZONTAL	150	298	Average
8	5862.80	69.90	74.00	-4.10	62.85	7.87	33.06	32.24	HORIZONTAL	150	298	Peak

Item 4, 5 are the fundamental frequency at 5795 MHz.

Temperature	23℃	Humidity	58%
Test Engineer	Ian Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 09, 2015		

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5714.00	52.69	54.00	-1.31	45.84	7.79	33.00	32.06	HORIZONTAL	145	297	Average
2	5714.00	68.58	74.00	-5.42	61.73	7.79	33.00	32.06	HORIZONTAL	145	297	Peak
3	5724.00	70.22	78.20	-7.98	63.35	7.79	33.00	32.08	HORIZONTAL	145	297	Peak
4	5784.00	91.60			84.66	7.83	33.03	32.14	HORIZONTAL	145	297	Average
5	5804.00	100.66			93.70	7.84	33.04	32.16	HORIZONTAL	145	297	Peak
6	5859.00	64.91	78.20	-13.29	57.85	7.87	33.05	32.24	HORIZONTAL	145	297	Peak
7	5860.00	50.66	54.00	-3.34	43.61	7.87	33.06	32.24	HORIZONTAL	145	297	Average
8	5864.00	65.06	74.00	-8.94	58.01	7.87	33.06	32.24	HORIZONTAL	145	297	Peak

Item 4, 5 are the fundamental frequency at 5775 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.8. Frequency Stability Measurement

4.8.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.8.2. Measuring Instruments and Setting

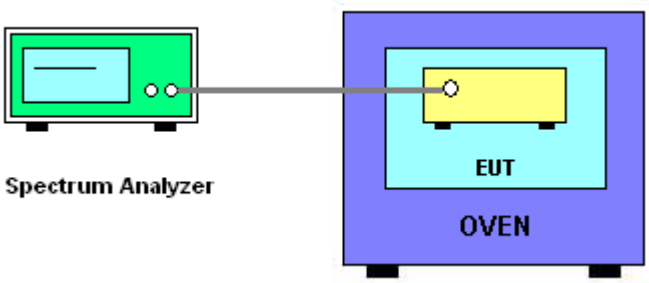
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10 kHz
Sweep Time	Auto

4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. 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.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is 0°C~40°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.8.7. Test Result of Frequency Stability

Temperature	25℃	Humidity	45%
Test Engineer	Eddie Weng	Test Date	Oct. 09, 2015

Mode: 20 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9117	5784.9104	5784.9088	5784.9069
110.00	5784.9105	5784.9092	5784.9076	5784.9057
93.50	5784.9091	5784.9078	5784.9062	5784.9043
Max. Deviation (MHz)	0.0909	0.0922	0.0938	0.0957
Max. Deviation (ppm)	15.71	15.94	16.21	16.54
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5784.9130	5784.9117	5784.9101	5784.9082
10	5784.9117	5784.9104	5784.9088	5784.9069
20	5784.9105	5784.9092	5784.9076	5784.9057
30	5784.9090	5784.9077	5784.9061	5784.9042
40	5784.9075	5784.9062	5784.9046	5784.9027
Max. Deviation (MHz)	0.0946	0.0960	0.0977	0.0998
Max. Deviation (ppm)	16.35	16.59	16.89	17.25
Result	Complies			

Mode: 40 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9065	5754.9052	5754.9036	5754.9017
110.00	5754.9053	5754.9040	5754.9024	5754.9005
93.50	5754.9039	5754.9026	5754.9010	5754.8991
Max. Deviation (MHz)	0.0961	0.0974	0.0990	0.1009
Max. Deviation (ppm)	16.70	16.92	17.20	17.53
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5754.9109	5754.9096	5754.9079	5754.9058
10	5754.9092	5754.9079	5754.9063	5754.9044
20	5754.9053	5754.9065	5754.9049	5754.9030
30	5754.9065	5754.9052	5754.9036	5754.9017
40	5754.9053	5754.9040	5754.9024	5754.9005
Max. Deviation (MHz)	0.0947	0.0960	0.0976	0.0995
Max. Deviation (ppm)	16.46	16.68	16.96	17.29
Result	Complies			

Mode: 80 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9026	5774.9013	5774.8997	5774.8978
110.00	5774.9014	5774.9001	5774.8985	5774.8966
93.50	5774.9000	5774.8987	5774.8971	5774.8952
Max. Deviation (MHz)	0.1000	0.1013	0.1029	0.1048
Max. Deviation (ppm)	17.32	17.54	17.82	18.15
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5774.9026	5774.9013	5774.8997	5774.8978
10	5774.9014	5774.9001	5774.8985	5774.8966
20	5774.8999	5774.8986	5774.8970	5774.8951
30	5774.8984	5774.8971	5774.8955	5774.8936
40	5774.8963	5774.8949	5774.8932	5774.8911
Max. Deviation (MHz)	0.1037	0.1051	0.1068	0.1089
Max. Deviation (ppm)	17.96	18.20	18.49	18.86
Result	Complies			

4.9. Antenna Requirements

4.9.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.9.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 13, 2015	Conduction (CO02-CB)
COND Cable	Woken	Cable	01	0.15MHz ~ 30MHz	Dec. 01, 2014	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F	9561-F073	9kHz ~ 30MHz	Sep. 30, 2015	Conduction (CO02-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

"*" Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%