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FCC RADIO TEST REPORT

Applicant's company	**ASUSTeK COMPUTER INC.**
Applicant Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
FCC ID	**MSQ-RTGZ00**
Manufacturer's company (1)	**ASKEY TECHNOLOGY (JIANG SU) LTD**
Manufacturer Address	NO1388, Jiao Tong Road, Wujiang Economic Technological Development Area Jiangsu Province 215200 China
Manufacturer's company (2)	**Compal Networking (KunShan) Co., LTD.**
Manufacturer Address	No. 520, Nabbang Rd., Economic & Technical Development Zone Kunshan, Jiangsu Province China

Product Name	Wireless-AC5300 Tri-band Gigabit Router
Brand Name	ASUS
Model No.	RT-AC5300, RT-AC5300R, RT-AC5300W, RT-AC5300P, RT-AC95U, RT-AC96U
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Apr. 28, 2015
Final Test Date	Nov. 03, 2015
Submission Type	Class II Change

Statement

Test result included is only for the IEEE 802.11b/g, 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 C63.10-2013**, **47 CFR FCC Part 15 Subpart C**, **KDB558074 D01 v03r03**, **KDB 662911 D01 v02r01**, **KDB644545 D01 v01r02.**
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
FR532637-04AA	Rev. 01	Initial issue of report	Nov. 06, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless-AC5300 Tri-band Gigabit Router
Brand Name	:	ASUS
Model No.	:	RT-AC5300, RT-AC5300R, RT-AC5300W, RT-AC5300P, RT-AC95U, RT-AC96U
Applicant	:	ASUSTeK COMPUTER INC.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 28, 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

For adding a heat sink (2mm) and resistance (0201) – EUT 1 test record

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.5	15.247(d)	Radiated Emissions	Complies	2.38 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.29 dB
4.7	15.203	Antenna Requirements	Complies	-

For adding two SKU B and SKU C – EUT 2 test record

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	16.08 dB
4.5	15.247(d)	Radiated Emissions	Complies	4.17 dB
4.7	15.203	Antenna Requirements	Complies	-

For adding adapter 4 ~ 6 – EUT 2 test record

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	10.01 dB
4.5	15.247(d)	Radiated Emissions	Complies	6.71 dB
4.7	15.203	Antenna Requirements	Complies	-

For 3TX/3RX Function – EUT 1 test record

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.16 dB
4.3	15.247(e)	Power Spectral Density	Complies	1.28 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	6.46 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.08 dB
4.7	15.203	Antenna Requirements	Complies	-

For removing 5GHz Band Pass Filter – EUT 1 test record

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.5	15.247(d)	Radiated Emissions	Complies	4.50 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX/3RX, 4TX/4RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11b: DSSS IEEE 802.11a/g: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM, 1024QAM)
Data Rate (Mbps)	IEEE 802.11b: DSSS (1/ 2/ 5.5/11) IEEE 802.11a/g: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	For 2.4GHz Band: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth

Channel Band Width (99%)	**EUT: Version 1** **4TX** For non-beamforming function: For 2.4GHz Band: IEEE 802.11b: 10.51 MHz IEEE 802.11g: 16.32 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.45 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.61 MHz For 5GHz Band: IEEE 802.11a: 23.79 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 25.70 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 49.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.41 MHz For beamforming function: For 2.4GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.04 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 17.71 MHz For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.14 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 18.49 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.77 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 77.27 MHz

	EUT: Version 2 **3TX** For 2.4GHz Band: For non-beamforming function: IEEE 802.11ac MCS0/Nss1 (VHT20): 16.85 MHz For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz **4TX** For non-beamforming function: For 2.4GHz Band: IEEE 802.11b: 10.41 MHz IEEE 802.11g: 15.97 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 16.93 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.75 MHz For 5GHz Band: IEEE 802.11a: 26.74 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 26.22 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 50.50 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz For beamforming function: For 2.4GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 17.71 MHz For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.14 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz IEEE 802.11ac MCS0/Nss2 (VHT20): 19.27 MHz IEEE 802.11ac MCS0/Nss2 (VHT40): 37.91 MHz IEEE 802.11ac MCS0/Nss2 (VHT80): 76.41 MHz

Maximum Conducted Output Power	**EUT: Version 1** **4TX** For non-beamforming function: For 2.4GHz Band: IEEE 802.11b: 29.78 dBm IEEE 802.11g: 29.85 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.87 dBm For 5GHz Band: IEEE 802.11a: 29.86 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.87 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.78 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 27.23 dBm For beamforming function: For 2.4GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 27.56 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.06 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 29.87 dBm For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 26.42 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.41 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 26.45 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 29.44 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 29.40 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 29.39 dBm

	EUT: Version 2 **3TX** For 2.4GHz Band: For non-beamforming function: IEEE 802.11ac MCS0/Nss1 (VHT20): 29.84 dBm For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT80): 27.95 dBm **4TX** For non-beamforming function: For 2.4GHz Band: IEEE 802.11b: 29.98 dBm IEEE 802.11g: 29.72 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.84 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.91 dBm For 5GHz Band: IEEE 802.11a: 29.90 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.88 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.80 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 28.02 dBm For beamforming function: For 2.4GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 27.50 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.11 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 29.93 dBm For 5GHz Band: IEEE 802.11ac MCS0/Nss1 (VHT20): 26.38 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.46 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 26.45 dBm IEEE 802.11ac MCS0/Nss2 (VHT20): 29.44 dBm IEEE 802.11ac MCS0/Nss2 (VHT40): 29.40 dBm IEEE 802.11ac MCS0/Nss2 (VHT80): 28.39 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☒ With beamforming	☐ Without beamforming

Note: The product has beamforming function for 802.11n and 802.11ac.

Antenna and Band width

Antenna		Three (TX)			Four (TX)		
Band width Mode		20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz
2.4G	IEEE 802.11b	V	X	X	V	X	X
	IEEE 802.11g	V	X	X	V	X	X
	IEEE 802.11n	V	V	X	V	V	X
	IEEE 802.11ac	V	V	X	V	V	X
5G	IEEE 802.11a	V	X	X	V	X	X
	IEEE 802.11n	V	V	X	V	V	X
	IEEE 802.11ac	V	V	V	V	V	V

IEEE 802.11n/ac Spec.

Protocol		Number of Transmit Chains (NTX)	Data Rate / MCS
2.4G	802.11n (HT20)	3, 4	MCS0-23, MCS0-31
	802.11n (HT40)	3, 4	MCS0-23, MCS0-31
	802.11ac (VHT20)	3, 4	MCS0-11/Nss1-3, MCS0-11/Nss1-4
	802.11ac (VHT40)	3, 4	MCS0-11/Nss1-3, MCS0-11/Nss1-4
5G	802.11n (HT20)	3, 4	MCS0-23, MCS0-31
	802.11n (HT40)	3, 4	MCS0-23, MCS0-31
	802.11ac (VHT20)	3, 4	MCS0-11/Nss1-3, MCS0-11/Nss1-4
	802.11ac (VHT40)	3, 4	MCS0-11/Nss1-3, MCS0-11/Nss1-4
	802.11ac (VHT80)	3, 4	MCS0-11/Nss1-3, MCS0-11/Nss1-4

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 for 2.4GHz, and supports VHT20, VHT40, VHT80 for 5GHz.

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 No.	Rating
Adapter 1	ASUS	ADP-65DW B	Input: 100-240Vac, 50-60Hz, 1.5A Output: 19Vdc, 3.42A
Adapter 2	ASUS	AD887320	Input: 100-240Vac, 50-60Hz, 1.5A Output: 19Vdc, 3.42A
Adapter 3	ASUS	PA-1650-93	Input: 100-240Vac, 50-60Hz, 1.7A Output: 19Vdc, 3.42A
Adapter 4	ASUS	ADP-65DW B	Input: 100-240Vac, 50-60Hz, 1.5A Output: 19Vdc, 3.42A
Adapter 5	ASUS	PA-1650-63	Input: 100-240Vac, 50-60Hz, 1.7A Output: 19Vdc, 3.42A
Adapter 6	ASUS	AD887320	Input: 100-240Vac, 50-60Hz, 1.5A Output: 19Vdc, 3.42A
Other			
RJ-45 cable*1: Shielded, 1.5m			

3.3. Table for Filed Antenna

Set	Brand	Part No.	Antenna Type	Connector
1	PSA	RFDPA131000SBLB805	Dipole Antenna	Reversed-SMA
2	PSA	RFDPA151000SBLB802	Dipole Antenna	Reversed-SMA
3	M.gear	C660-510368-A	Dipole Antenna	Reversed-SMA
4	M.gear	C660-510369-A	Dipole Antenna	Reversed-SMA
5	M.gear	C660-510370-A	Dipole Antenna	Reversed-SMA

Set	Gain (dBi)		Cable Loss		True Gain (dBi)	
	2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	2.32	3.47	-	-	2.32	3.47
2	1.98	3.37	-	-	1.98	3.37
3	1.50	3.30	0.39	0.61	1.11	2.69
4	2.00	3.20	0.35	0.55	1.65	2.65
5	2.20	3.20	0.33	0.51	1.87	2.69

Note: 1. The EUT has five set of antenna, and each set contains eight antennas.

2. Both antennas above are the same type. Besides, only set 1 antenna was selected to perform the test and written in this report due to the highest gain.

For IEEE 802.11a/b/g/n/ac mode:

For 2.4GHz and 5GHz (3TX/3RX) function:

Chain 1, Chain 2 and Chain 3 can be used as transmitting/receiving antenna.

Chain 1, Chain 2 and Chain 3 could transmit/receive simultaneously.

For 2.4GHz and 5GHz (4TX/4RX) function:

Chain 1, Chain 2, Chain 3 and Chain 4 can be used as transmitting/receiving antenna.

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

3. The EUT has two versions theirs measure information as below:


Version 1:
5GHz Band 1: Chain 2
Version 2:
5GHz Band4: Chain 3
Version 1:
5GHz Band 1: Chain 3
Version 2:
5GHz Band4: Chain 2
Version 1:
5GHz Band 1: Chain 1
Version 2:
5GHz Band4: Chain 4
Version 1:
5GHz Band 1: Chain 4
Version 2:
5GHz Band4: Chain 1
Version 1:
2.4GHz Band and 5GHz Band 4: Chain 4
Version 2:
2.4GHz Band: Chain 1
5GHz Band 1: Chain 4
Version 1:
2.4GHz Band and 5GHz Band 4: Chain 1
Version 2:
2.4GHz Band: Chain 4
5GHz Band 1: Chain 1
Version 1:
2.4GHz Band and 5GHz Band 4: Chain 3
Version 2:
2.4GHz Band: Chain 2
5GHz Band 1: Chain 3
Version 1:
2.4GHz Band and 5GHz Band 4: Chain 2
Version 2:
2.4GHz Band: Chain 3
5GHz Band 1: Chain 2

3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

For 20MHz bandwidth systems, use Channel 1~Channel 11.

For 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz	-	-

For 5GHz Band:

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
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 Mode

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.

For 2.4GHz Band:

Verify below items for adding a heat sink (2mm) – EUT 1

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Above 1GHz	11b/CCK	1 Mbps	1	1+2+3+4

Verify below items for adding a resistance (0201) – EUT 1

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Above 1GHz	11b/CCK	1 Mbps	1/11	1+2+3+4
Band Edge Emissions	11b/CCK	1 Mbps	1/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/9	1+2+3+4

Verify below items for adding two SKU B and SKU C – EUT 2

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-

For 5GHz Band:

Verify below items for adding a heat sink (2mm) – EUT 1

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11a/BPSK	6 Mbps	149	1+2+3+4

Verify below items for adding a resistance (0201) – EUT 1

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11a/BPSK	6 Mbps	149	1+2+3+4
Band Edge Emissions	11ac VHT80	MCS0/Nss1	155	1+2+3+4

Verify below items for adding two SKU B and SKU C – EUT 2

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Below 1GHz	CTX	-	-	-

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.

The following test modes were performed for all tests:

For AC Power Line Conducted Emissions test:

Verify for adding two SKU B and SKU C – EUT 2

2.4GHz WLAN function and Adapter 1 generated the worst case for original report; consequently, measurement for AC Power Line Conducted Emissions will follow this test mode.

Mode 1. EUT 2 (Version 2) + Adapter 1 + SKU B with 2.4GHz WLAN function

Mode 2. EUT 2 (Version 2) + Adapter 1 + SKU C with 2.4GHz WLAN function

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

For Radiated Emissions Below 1GHz test:

Verify for adding a heat sink (2mm) and resistance (0201) – EUT 1

5GHz Band 4 WLAN function and Adapter 3 generated the worst case for original report; consequently, measurement for Radiated Emissions will follow this test mode.

Mode 1. EUT 1 (Version 2) + Adapter 3 + SKU A with 5GHz Band 4 WLAN function

Verify for adding two SKU B and SKU C – EUT 2

5GHz Band 4 WLAN function and Adapter 3 generated the worst case for original report; consequently, measurement for Radiated Emissions will follow this test mode.

Mode 1. EUT 2 (Version 2) + Adapter 3 + SKU B with 5GHz Band 4 WLAN function

Mode 2. EUT 2 (Version 2) + Adapter 3 + SKU C with 5GHz Band 4 WLAN function

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emissions Above 1GHz test:

Verify for adding a heat sink (2mm) – EUT 1

EUT 1 (Version 2) - 11b (2412MHz)

EUT 1 (Version 2) - 11a (5745MHz)

Verify for adding a resistance (0201) – EUT 1

EUT 1 (Version 2) - 11b (2412MHz、2462MHz)

EUT 1 (Version 2) - 11a (5745MHz)

For Band Edge Emissions test:

Verify for adding a resistance (0201) – EUT 1

EUT 1 (Version 2) - 11b (2412MHz、2462MHz)

EUT 1 (Version 2) - 11ac VHT20 (2412MHz、2462MHz) - Non beamforming mode

EUT 1 (Version 2) - 11ac VHT40 (2422MHz、2452MHz) - Non beamforming mode

Emission not in Restricted Band:

EUT 1 (Version 2) - 11ac VHT80 (5775MHz) - Non beamforming mode

Verify below items for adding adapter 4 ~ 6 – EUT 2

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Radiated Emissions Below 1GHz	CTX	-	-	-

Note: The EUT is used for laying only.

The following test modes were performed for all tests:

For AC Power Line Conducted Emissions test:

SKU A generated the worst test results in Conducted Emissions of Original Report; thus, adding adapter 4 ~ 6 will follow this same configuration.

Mode 1. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 2.4GHz WLAN function

Mode 2. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 5GHz Band 1 WLAN function

Mode 3. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 5GHz Band 4 WLAN function

Mode 3 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4~5 will follow this same test mode.

Mode 4. EUT 2 (Version 2 - Rev 1.31)+ Adapter 5 + SKU A with 5GHz Band 4 WLAN function

Mode 5. EUT 2 (Version 2 - Rev 1.31)+ Adapter 6 + SKU A with 5GHz Band 4 WLAN function

Mode 4 is the worst case, so it was selected to record in this test report.

For Radiated Emissions <Below 1GHz> test:

SKU A generated the worst test results in Radiated Emissions Below 1GHz of Original Report; thus, additional report (Rev. 1.31) will follow this same configuration.

Mode 1. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 2.4GHz WLAN function

Mode 2. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 5GHz Band 1 WLAN function

Mode 3. EUT 2 (Version 2 - Rev 1.31)+ Adapter 4 + SKU A with 5GHz Band 4 WLAN function

Mode 1 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4~5 will follow this same test mode.

Mode 4. EUT 2 (Version 2 - Rev 1.31)+ Adapter 5 + SKU A with 2.4GHz WLAN function

Mode 5. EUT 2 (Version 2 - Rev 1.31)+ Adapter 6 + SKU A with 2.4GHz WLAN function

Mode 5 is the worst case, so it was selected to record in this test report

Verify below items for 3TX/3RX Function – EUT 1

For 2.4GHz and 5GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
Maximum Conducted Output Power	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
Power Spectral Density	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
6dB Spectrum Bandwidth	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
Radiated Emissions Above 1GHz	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
Band Edge Emissions	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3

Note: 1. The EUT is used for laying only.

2. The test configuration, test mode and test software were written in this test report are designated by the applicant.

The following test modes were performed for all tests:

For Radiated Emission test (Above 1GHz):

Mode 1. EUT 1 (Version 2) - CTX (Non beamforming mode)

Verify below items for removing 5GHz Band Pass Filter – EUT 1

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Above 1GHz	11a/BPSK	6 Mbps	165	1+2+3+4
Band Edge Emissions	11a/BPSK	6 Mbps	165	1+2+3+4

Note: Only verify the 11a channel 165 due to it is maximum output power on the Grant.

The following test modes were performed for all tests:

For Radiated Emission test (Above 1GHz):

Mode 1. EUT 1 (Version 2) - CTX (Non beamforming mode)

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.**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-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 Multiple List

1. The model numbers in the following table are all refer to the identical product.

Model No.	Description
RT-AC5300	The models are identical except for the model numbers as marketing strategy.
RT-AC5300R	
RT-AC5300W	
RT-AC5300P	
RT-AC95U	
RT-AC96U	

2. The EUT has two types, which are identical to each other in all aspects except for the following table:

EUT	LAN Port	EUT Version	Transformer	Resistance (Size)	Thickness of Heat sink (mm)	Pad (mm)	Fan
EUT 1	8	Version 1, 2 (Rev 1.30)	SKU A	0402/0201	4.2mm/2mm	1mm/5mm	V
EUT 2	4	Version 1,2 (Rev 1.30)	SKU A	0402/0201	4.2mm/2mm	1mm/5mm	V / X
		Version 2 (Rev 1.30, Rev 1.31)	SKU A ~ SKU C	0402/0201	4.2mm/2mm	1mm/5mm	V / X

Note 1: All the specification of test configurations and test modes were based on customer's request.

Note 2: V : With X :Without

The transformer information as below:

Transformer	Brand	LAN	LAN	WAN
SKU A	Mingtek	HN8011VG	HN8011VG	HN18101CG
SKU B	Mingtek	HN8014VG	HN8015VG	HN18101CG
SKU C	FCE	NS777207	NS777208	NS771802

3.8. Table for Class II Change

This product is an extension of original report under Sporton project number: FR532637AA
Below is the table for the change of the product with respect to the original one.

Modification	Performance Checking
1. Adding four set same type of Dipole antenna (set 2~ set 5) with lower gains than the original. (Please refer to the table of filed antenna for detail) 2. Adding a pad (5mm).	After evaluating, it is not necessary to verify.
3. Adding a heat sink (2mm).	1. Radiated Emissions Below 1GHz test 2. Radiated Emissions Above 1GHz test 11b (2412MHz) 11a (5745MHz)
4. Adding a resistance (0201).	1. Radiated Emissions Below 1GHz test 2. Radiated Emissions Above 1GHz test 11b (2412MHz、2462MHz) 11a (5745MHz) 3. Band Edge Emissions test 11b (2412MHz、2462MHz) 11ac VHT20 (2412MHz、2462MHz) 11ac VHT40 (2422MHz、2452MHz) 4. Emission not in Restricted Band 11ac VHT80 (5775MHz)
5. Adding two SKU B and SKU C for the EUT with 4 ports (EUT 2).	1. AC Power Line Conducted Emissions test 2. Radiated Emissions Below 1GHz test
6. Only EUT 2 updating EUT version to "Rev 1.31" from "Rev 1.30" The version of EUT difference between item, Please refer to below and photographs of EUT (1) Adding the EUT without the fan. (2) Adding Capacitance. (3) Changing all the push buttons to DIP.	After evaluating, it is not necessary to verify.

7. Adding three adapters: (1) Adapter 4 (Model No.: ADP-65DW B) (2) Adapter 5 (Model No.: PA-1650-63) (3) Adapter 6 (Model No.: AD887320) (Please refer to below table for adapter detail)	1. AC Power Line Conducted Emissions 2. Radiated Emissions Below 1GHz test
8. For version 2 adding 3TX/3RX	1. Maximum Conducted Output Power 2. Power Spectral Density 3. 6dB Spectrum Bandwidth 4. Radiated Emissions Above 1GHz 5. Band Edge Emissions Note: only verify non-beamforming mode 11ac VHT 20 Channel 1, 6, 11 and 11ac VHT80 Channel 155, for EUT 1 test; The 3TX powers of the rest of the test modes were based on the 3TX powers out of 4TX.
9. Removing 5GHz Band Pass Filter	1. Radiated Emissions Above 1GHz 2. Band Edge Emissions Note: only verify 11a (5825MHz).

a. The difference between adapter 1(model: ADP-65DW B) and adapter 4 (model: ADP-65DW B) as below:

Adapter 1			
Design No	**MFG TITLE**	**MFG PART**	**DESCRIPTION**
Q1	AUK	SMK0760F	FET 600V 7A 1.2ohm TO-220F-3P
Q1	ST	STP6NK60ZFP	FET 600V 6A 1.2ohm TO-220FP-3P
Q1	TOSHIBA	TK10A60DR(STA4,X)	FET 600V 10A 750mohm TO-220SIS-3P
D101	ST	STPS20S100CT	DIO SBD 20A 100V TO-220AB-3P C.C.
D101	ST	STPS20SM100ST	DIO SBD 20A 100V TO-220AB-3P
D101	ST	STPS30SM100ST	DIO SBD 30A 100V TO-220AB-3P
IC31	ON	DAP022ASN65T1G	IC ASIC PWM CURRENT MODE TSOP-6P SMD
IC131	TI	TL432BIDBZR	IC VOL REF ADJ 2.495V 100mA 0.5%
IC131	NXP	TL431BMFDT	IC VOL REF ADJ 2.495V 100mA 0.5%
IC131	DIODES	AS431ANTR-G1	IC VOL REF ADJ 2.5V 100mA 0.5% SOT-23-3P
IC32	EVERLIGHT	EL816M(Y)(D)-VG	PHOTO TR 50mA 80V DIP-4P 150%-300%
IC32	SHARP	PC123Y92FZ0F	PHOTO TR 50mA 70V DIP-4P 160%-300%
IC32	Renesas	PS2561DL1-1Y-V-A(G)	EOL PHOTO TR 40mA 80V DIP-4P 150%-300%
CX1	EUROPTRONIC	MPX2224K30B15LXD20	CAP X2 MP PC 305VAC 0.22uF K S15
CX1	OKAYA	LE224-MX-30-C3.2	CAP X2 MP PC 300VAC 0.22uF K S15
CX1	HUA	MKP-224K0275AB115S-G	CAP X2 MP PC 275VAC 0.22uF K S15

FL1	DELTA	HFV-MP13202	LINE FILTER T14 14mH MIN
FL101	DELTA	LFV-MP13303	LINE FILTER T10 17uH MIN
T1	DELTA	MV-MP13167	TRANSFORMER MAIN RM10 1mH +/-5%
C1	NICHICON	UPT2G680MHD3	CAP AL 400V 68uF M 16*25 P7.5
C1	NCC	EKMG401ELL680ML25S	CAP AL 400V 68uF M 16*25 P7.5
C1	L-Tec	TYJ2GM680K25O	CAP AL 400V 68uF M 16*25 P7.5
CY1	MURATA	DE1B3KX221KNHAN99F	CAP Y1/X1 CD 250VAC 220pF K B TP VI10
CY1	TDK	CD70-B2GA221KYVK	CAP Y1/X1 CD 250VAC 220pF K B TP VI10
CY1	WALSIN	YP0AH221K061DASDAB	CAP Y1/X1 CD 250VAC 220pF K B TP VI10
Adapter 4			
Design No	**MFG TITLE**	**MFG PART**	**DESCRIPTION**
Q1	TOSHIBA	TK10A60DR(STA4,X)	FET 600V 10A 750mohm TO-220SIS-3P
Q1	FUJI	FMV11N60ES	FET 600V 11A 750mohm TO-220F-3P
D101	ST	STPS20S100CT	DIO SBD 20A 100V TO-220AB-3P C.C.
D101	ST	STPS20H100CT	DIO SBD 20A 100V TO-220AB-3P C.C.
D101	ST	STPS30H100CT	DIO SBD 30A 100V TO-220AB-3P C.C.
IC31	NeoEnergy	DAP022AT	IC ASIC PWM CURRENT MODE SOT-26-6P SMD
IC131	LITE-ON	LA431OCRPA	IC REGU ADJ 2.495V 100mA 0.4% SOT-23R-3P
IC131	TI	TL432BIDBZR	IC VOL REF ADJ 2.495V 100mA 0.5%
IC131	NXP	TL431BMFDT	IC VOL REF ADJ 2.495V 100mA 0.5%
IC32	EVERLIGHT	EL816M(Y)(D)-VG	PHOTO TR 50mA 80V DIP-4P 150%-300%
IC32	SHARP	PC123Y92FZ0F	PHOTO TR 50mA 70V DIP-4P 160%-300%
IC32	TOSHIBA	TLP785F(D4-GRH,F	PHOTO TR 60mA 80V DIP-4P 150%-300%
CX1	HUA	MKP-334K0275AB115S-G	CAP X2 MP PC 275VAC 0.33uF K S15
CX1	HUA	MKP-334K0275AB115S-P	CAP X2 MP PC 275VAC 0.33uF K S15
CX1	EUROPTRONIC	MPX2334K30B15LXD31	CAP X2 MP PC 305VAC 0.33uF K S15
FL1	DELTA	HFV-MP15027	LINE FILTER T16 12.7mH MIN
FL101	DELTA	LFV-MP13171	LINE FILTER T6 1.55uH MIN
T1	DELTA	MV-MP15037	TRANSFORMER MAIN RM10 1000uH +/-5%
C1	NCC	EKMG401ELL680ML25S	CAP AL 400V 68uF M 16*25 P7.5
CY1	MURATA	DE1B3KX221KNHAN99F	CAP Y1/X1 CD 250VAC 220pF K B TP VI10
CY1	WALSIN	YP0AH221K061DASDAB	CAP Y1/X1 CD 250VAC 220pF K B TP VI10

b. The difference between adapter 3 (model: PA-1650-93) and adapter 5 (model: PA-1650-63) as below:

Adapter 3	Adapter 5
Model: PA-1650-93	Model: PA-1650-63

c. The difference between adapter 2 (model: AD887320) and new adapter 6 (model: AD887320) as below:

Adapter 2	Adapter 6

Type: 010KLF BAH	Type: 010K-3LF

3.9. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

For Test Site No: 03CH01-CB and TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.10. 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.

For 4TX/4RX Function:

EUT: Version 1 / Non-beamforming function

For 2.4GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	98	98	98	-	-	-
802.11g	80	97	88	-	-	-
802.11ac MCS0/Nss1 VHT20	82	97	82	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	59	72	65

For 5GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11a	99	99	99	-	-	-
802.11ac MCS0/Nss1 VHT20	99	99	99	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	92	99	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	90

EUT: Version 1 / Beamforming function

For 2.4GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11ac MCS0/Nss1 VHT20	76	88	77	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	58	70	63
802.11ac MCS0/Nss2 VHT20	-	97	-	-	-	-

For 5GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11ac MCS0/Nss1 VHT20	84	86	86	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	84	86	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	86
802.11ac MCS0/Nss2 VHT20	97	97	97	-	-	-
802.11ac MCS0/Nss2 VHT40	-	-	-	94	97	-
802.11ac MCS0/Nss2 VHT80	-	-	-	-	-	97

EUT: Version 2 / Non-beamforming function

For 2.4GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	97	97	98	-	-	-
802.11g	86	97	91	-	-	-
802.11ac MCS0/Nss1 VHT20	82	98	82	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	61	77	67

For 5GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11a	103	102	101	-	-	-
802.11ac MCS0/Nss1 VHT20	103	102	100	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	99	100	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	94

EUT: Version 2 / Beamforming function

For 2.4GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11ac MCS0/Nss1 VHT20	75	88	78	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	62	70	64
802.11ac MCS0/Nss2 VHT20	-	96	-	-	-	-

For 5GHz Band

Test Software Version	MTOOL 2.0.2.7					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11ac MCS0/Nss1 VHT20	87	86	84	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	87	86	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	87
802.11ac MCS0/Nss2 VHT20	99	98	98	-	-	-
802.11ac MCS0/Nss2 VHT40	-	-	-	99	98	-
802.11ac MCS0/Nss2 VHT80	-	-	-	-	-	95

For 3X/3X Function:

EUT: Version 2 / Non-beamforming function

For 2.4GHz Band and 5GHz Band

Test Software Version	MTOOL 2.0.2.7			
Mode	Test Frequency (MHz)			
	NCB: 20MHz			NCB: 80MHz
	2412 MHz	2437 MHz	2462 MHz	5775 MHz
802.11ac MCS0/Nss1 VHT20	85	104	85	-
802.11ac MCS0/Nss1 VHT80	-	-	-	97

3.11. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.12. Maximum Conducted Output Power for original report

EUT: Version 1 / Non-beamforming function

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11b	2412 MHz	23.99	23.78	23.91	23.31	29.78
	2437 MHz	23.95	23.62	23.85	23.25	29.70
	2462 MHz	23.85	23.63	23.77	23.29	29.66
802.11g	2412 MHz	20.32	20.04	20.28	19.68	26.11
	2437 MHz	24.04	23.89	24.02	23.31	29.85
	2462 MHz	22.01	21.87	21.94	21.63	27.89
802.11ac MCS0/Nss1 VHT20	2412 MHz	20.35	20.13	20.27	19.67	26.13
	2437 MHz	24.03	23.86	24.05	23.27	29.83
	2462 MHz	20.51	20.21	20.26	19.94	26.26
802.11ac MCS0/Nss1 VHT40	2422 MHz	14.62	14.46	14.52	14.14	20.46
	2437 MHz	17.92	17.89	18.02	17.57	23.87
	2452 MHz	16.26	16.11	16.29	15.74	22.13

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11a	5745 MHz	24.05	23.83	23.79	23.66	29.86
	5785 MHz	24.21	23.78	23.63	23.55	29.82
	5825 MHz	24.25	24.19	23.84	22.79	29.83
802.11ac MCS0/Nss1 VHT20	5745 MHz	24.15	23.42	24.11	23.58	29.85
	5785 MHz	24.07	24.01	23.47	23.54	29.80
	5825 MHz	24.37	24.35	23.75	22.72	29.87
802.11ac MCS0/Nss1 VHT40	5755 MHz	22.13	21.67	22.15	22.36	28.11
	5795 MHz	24.03	23.48	23.77	23.74	29.78
802.11ac MCS0/Nss1 VHT80	5775 MHz	21.44	21.01	21.07	21.29	27.23

EUT: Version 1 / Beamforming function

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11ac MCS0/Nss1 VHT20	2412 MHz	19.12	18.81	19.03	18.75	24.95
	2437 MHz	21.69	21.52	21.53	21.42	27.56
	2462 MHz	19.27	19.11	19.16	18.71	25.09
802.11ac MCS0/Nss1 VHT40	2422 MHz	14.11	13.98	14.25	14.23	20.16
	2437 MHz	17.03	16.97	17.03	17.14	23.06
	2452 MHz	15.52	15.28	15.24	15.29	21.35
802.11ac MCS0/Nss2 VHT20	2437 MHz	23.91	23.83	23.86	23.79	29.87

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.46	20.18	20.44	20.43	26.40
	5785 MHz	20.13	20.48	20.01	20.65	26.35
	5825 MHz	20.32	21.14	20.16	19.86	26.42
802.11ac MCS0/Nss1 VHT40	5755 MHz	20.48	20.19	20.26	20.38	26.35
	5795 MHz	20.33	20.79	20.15	20.27	26.41
802.11ac MCS0/Nss1 VHT80	5775 MHz	20.29	20.57	20.41	20.45	26.45
802.11ac MCS0/Nss2 VHT20	5745 MHz	23.46	23.41	23.42	23.37	29.44
	5785 MHz	23.14	23.74	23.06	23.41	29.37
	5825 MHz	23.32	23.97	23.11	22.86	29.36
802.11ac MCS0/Nss2 VHT40	5755 MHz	22.74	22.69	22.72	22.89	28.78
	5795 MHz	23.11	23.65	23.26	23.48	29.40
802.11ac MCS0/Nss2 VHT80	5775 MHz	23.08	23.59	23.31	23.47	29.39

EUT: Version 2 / Non-beamforming function

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11b	2412 MHz	23.83	23.85	23.96	23.77	29.87
	2437 MHz	23.88	23.59	23.93	23.85	29.84
	2462 MHz	24.01	23.72	24.07	24.01	29.98
802.11g	2412 MHz	21.13	20.95	21.22	21.07	27.11
	2437 MHz	23.74	23.57	23.72	23.77	29.72
	2462 MHz	22.19	21.97	22.26	22.53	28.26
802.11ac MCS0/Nss1 VHT20	2412 MHz	20.15	19.79	20.05	20.04	26.03
	2437 MHz	24.09	23.63	23.77	23.79	29.84
	2462 MHz	20.18	19.84	19.96	20.06	26.03
802.11ac MCS0/Nss1 VHT40	2422 MHz	14.74	14.76	15.12	14.96	20.92
	2437 MHz	18.82	18.65	19.09	18.97	24.91
	2452 MHz	16.17	16.03	16.43	16.56	22.32

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11a	5745 MHz	23.87	23.83	22.99	24.20	29.77
	5785 MHz	23.93	23.78	23.66	23.98	29.86
	5825 MHz	24.30	24.23	23.88	22.98	29.90
802.11ac MCS0/Nss1 VHT20	5745 MHz	23.89	24.03	23.29	24.17	29.88
	5785 MHz	23.99	23.71	23.60	23.79	29.80
	5825 MHz	24.17	24.07	23.78	23.14	29.83
802.11ac MCS0/Nss1 VHT40	5755 MHz	22.95	22.90	22.65	23.51	29.03
	5795 MHz	23.87	23.65	23.92	23.66	29.80
802.11ac MCS0/Nss1 VHT80	5775 MHz	22.21	21.78	21.84	22.15	28.02

EUT: Version 2 / Beamforming function

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11ac MCS0/Nss1 VHT20	2412 MHz	18.26	18.31	18.32	18.04	24.25
	2437 MHz	21.66	21.43	21.54	21.26	27.50
	2462 MHz	19.13	18.98	19.14	19.01	25.09
802.11ac MCS0/Nss1 VHT40	2422 MHz	15.03	14.96	15.06	15.11	21.06
	2437 MHz	17.01	17.03	17.27	17.06	23.11
	2452 MHz	15.88	15.63	15.62	15.56	21.69
802.11ac MCS0/Nss2 VHT20	2437 MHz	24.02	23.88	24.13	23.59	29.93

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				
		Chain 1	Chain 2	Chain 3	Chain 4	Total
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.04	20.38	20.06	20.81	26.35
	5785 MHz	20.63	20.16	20.42	20.19	26.37
	5825 MHz	20.77	20.73	20.40	19.42	26.38
802.11ac MCS0/Nss1 VHT40	5755 MHz	20.33	19.89	20.51	20.88	26.44
	5795 MHz	20.78	20.16	20.73	20.04	26.46
802.11ac MCS0/Nss1 VHT80	5775 MHz	20.38	20.17	20.77	20.36	26.45
802.11ac MCS0/Nss2 VHT20	5745 MHz	23.32	23.39	23.22	23.62	29.41
	5785 MHz	23.61	23.19	23.41	23.18	29.37
	5825 MHz	23.72	23.85	23.48	22.48	29.44
802.11ac MCS0/Nss2 VHT40	5755 MHz	23.18	23.09	23.48	23.75	29.40
	5795 MHz	23.47	23.14	23.67	23.05	29.36
802.11ac MCS0/Nss2 VHT80	5775 MHz	22.39	21.96	22.63	22.48	28.39

3.13. Duty Cycle

For 4TX/4RX Function:

EUT: Version 1 / Non-beamforming function

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11b	1.000	1.000	100.00	0.00	0.01
	802.11g	2.040	2.100	97.14	0.13	0.49
	802.11n MCS0/Nss1 VHT20	1.910	1.940	98.45	0.07	0.01
	802.11n MCS0/Nss1 VHT40	0.924	0.985	93.81	0.28	1.08
5G	802.11a	0.420	0.488	86.07	0.65	2.38
	802.11ac MCS0/Nss1 VHT20	2.040	2.080	98.08	0.08	0.01
	802.11ac MCS0/Nss1 VHT40	1.910	1.940	98.45	0.07	0.01
	802.11ac MCS0/Nss1 VHT80	0.922	0.992	92.94	0.32	1.08

EUT: Version 1 / Beamforming function

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11ac MCS0/Nss1 VHT20	3.820	4.180	91.39	0.39	0.26
	802.11ac MCS0/Nss1 VHT40	4.560	5.300	86.04	0.65	0.22
	802.11ac MCS0/Nss2 VHT20	4.800	5.080	94.49	0.25	0.21
5G	802.11ac MCS0/Nss1 VHT20	3.820	4.240	90.09	0.45	0.26
	802.11ac MCS0/Nss1 VHT40	4.560	5.300	86.04	0.65	0.22
	802.11ac MCS0/Nss1 VHT80	5.600	7.000	80.00	0.97	0.18
	802.11ac MCS0/Nss2 VHT20	4.780	5.080	94.09	0.26	0.21
	802.11ac MCS0/Nss2 VHT40	5.060	5.480	92.34	0.35	0.20
	802.11ac MCS0/Nss2 VHT80	5.300	6.220	85.21	0.70	0.19

EUT: Version 2 / Non-beamforming function

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11b	1.000	1.000	100.00	0.00	0.01
	802.11g	2.056	2.100	97.90	0.09	0.49
	802.11n MCS0/Nss1 VHT20	1.917	1.946	98.51	0.07	0.01
	802.11n MCS0/Nss1 VHT40	0.922	0.977	94.36	0.25	1.08
5G	802.11a	2.059	2.083	98.84	0.05	0.01
	802.11ac MCS0/Nss1 VHT20	1.923	1.939	99.17	0.04	0.01
	802.11ac MCS0/Nss1 VHT40	0.914	1.045	87.46	0.58	1.09
	802.11ac MCS0/Nss1 VHT80	0.425	0.489	86.91	0.61	2.35

EUT: Version 2 / Beamforming function

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11ac MCS0/Nss1 VHT20	3.818	4.094	93.26	0.30	0.26
	802.11ac MCS0/Nss1 VHT40	4.550	4.910	92.67	0.33	0.22
	802.11ac MCS0/Nss2 VHT20	3.840	4.160	92.31	0.35	0.26
5G	802.11ac MCS0/Nss1 VHT20	3.846	4.191	91.78	0.37	0.26
	802.11ac MCS0/Nss1 VHT40	4.585	5.012	91.48	0.39	0.22
	802.11ac MCS0/Nss1 VHT80	5.090	5.446	93.47	0.29	0.20
	802.11ac MCS0/Nss2 VHT20	3.840	4.160	92.31	0.35	0.26
	802.11ac MCS0/Nss2 VHT40	4.590	4.980	92.17	0.35	0.22
	802.11ac MCS0/Nss2 VHT80	5.070	5.340	94.94	0.23	0.20

For 3TX/3RX Function:

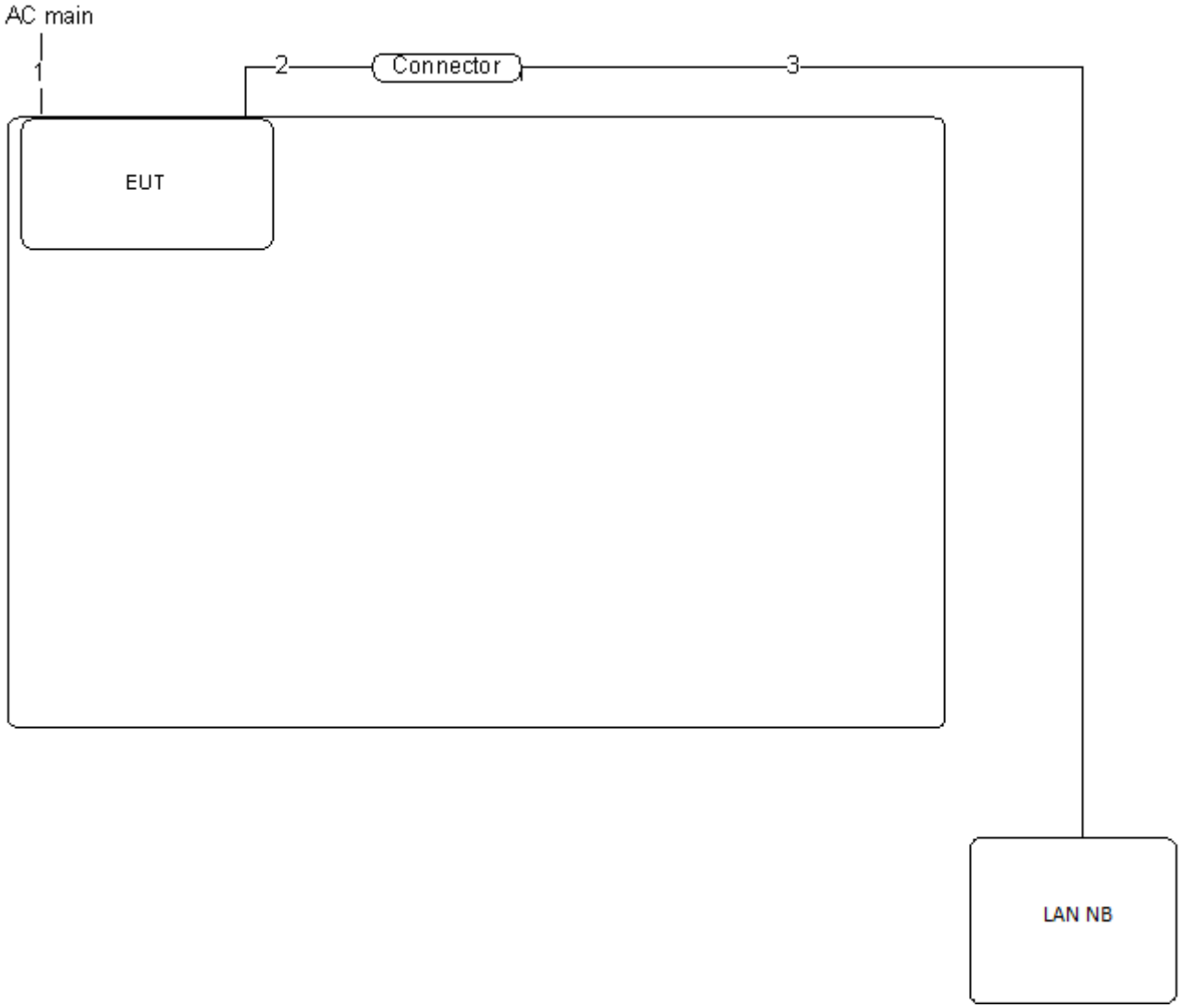
EUT: Version 2 / Non-beamforming function

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11n MCS0/Nss1 VHT20	1.928	1.949	98.90%	0.05	0.01
5G	802.11ac MCS0/Nss1 VHT80	0.462	0.488	94.67%	0.24	2.16

3.14. Test Configurations

3.14.1. AC Power Line Conduction Emissions Test Configuration

Verify for adding two SKU B and SKU C and adapter 4 ~ 6 – EUT 2

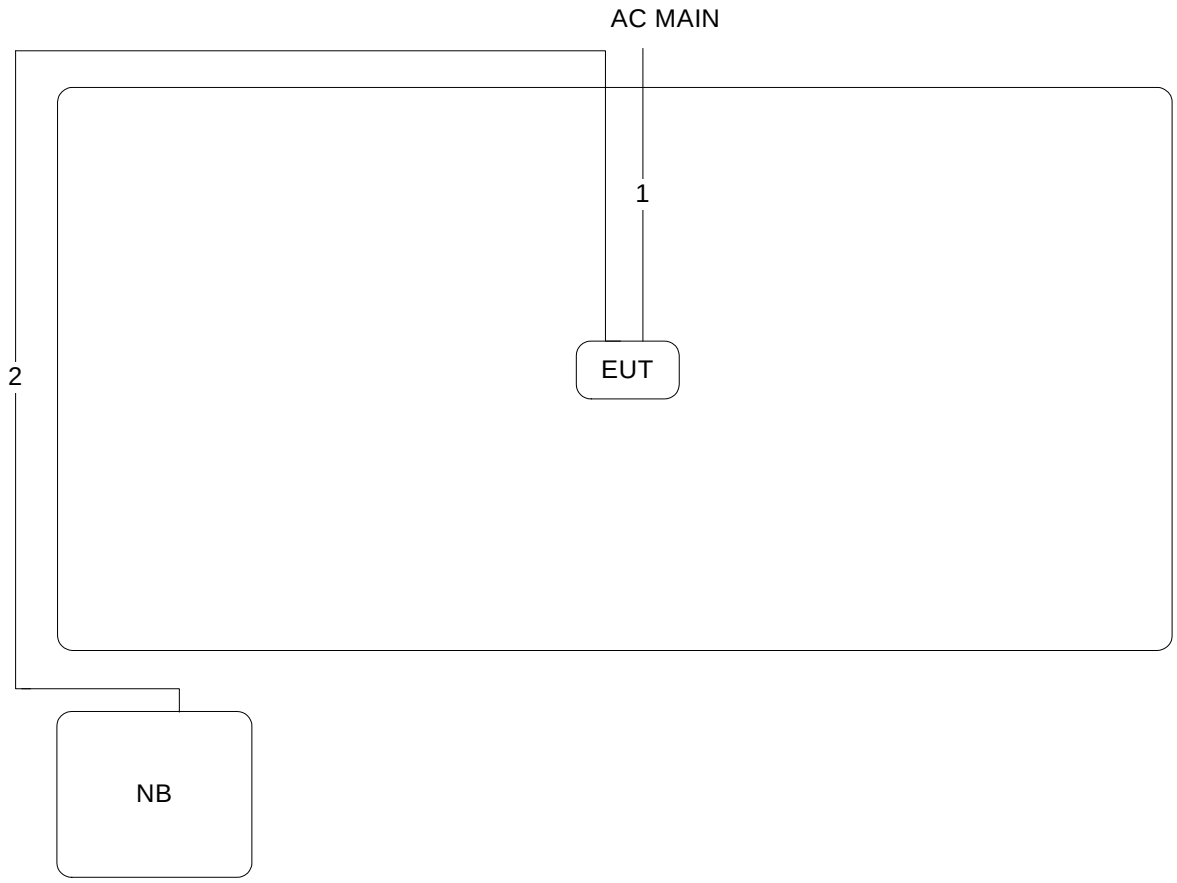


Item	Connection	Shielded	Length
1	Power cable	No	2.3m
2	RJ-45 cable	Yes	1.5m
3	RJ-45 cable	Yes	10m

3.14.2. Radiation Emissions Test Configuration

Verify for adding a heat sink (2mm) and resistance (0201) – EUT 1 and two SKU B and SKU C – EUT 2

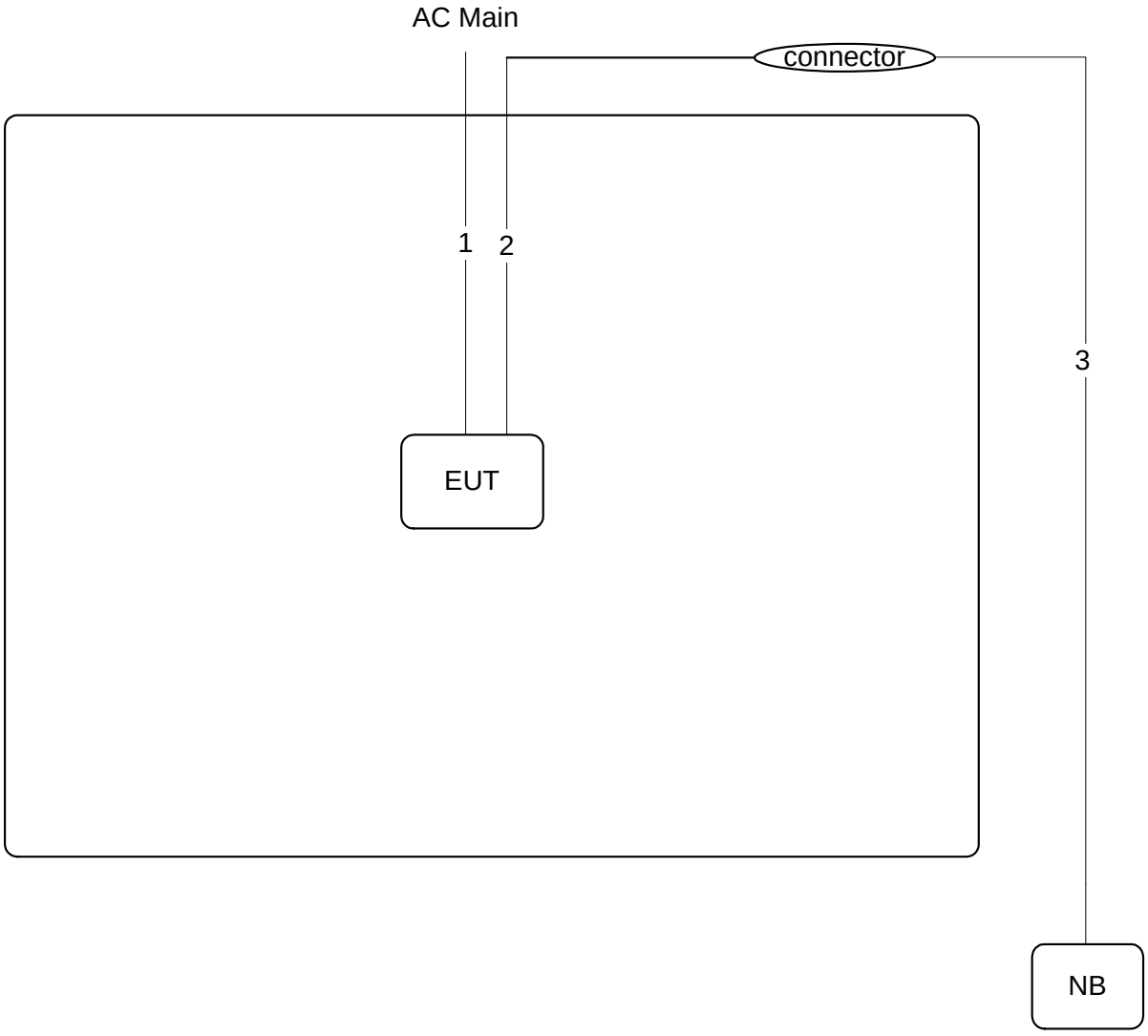
Test Configuration: 30MHz ~1GHz and above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.3m
2	RJ-45 cable	No	10m

Verify below items for adding adapter 4 ~ 6 – EUT 2

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.3m
2	RJ-45 cable	Yes	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 which is designed to be connected 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

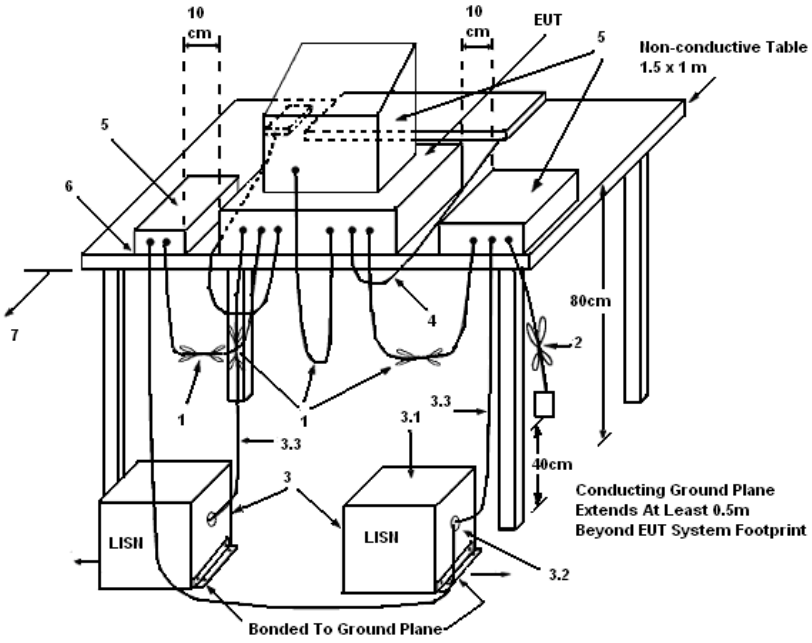
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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.

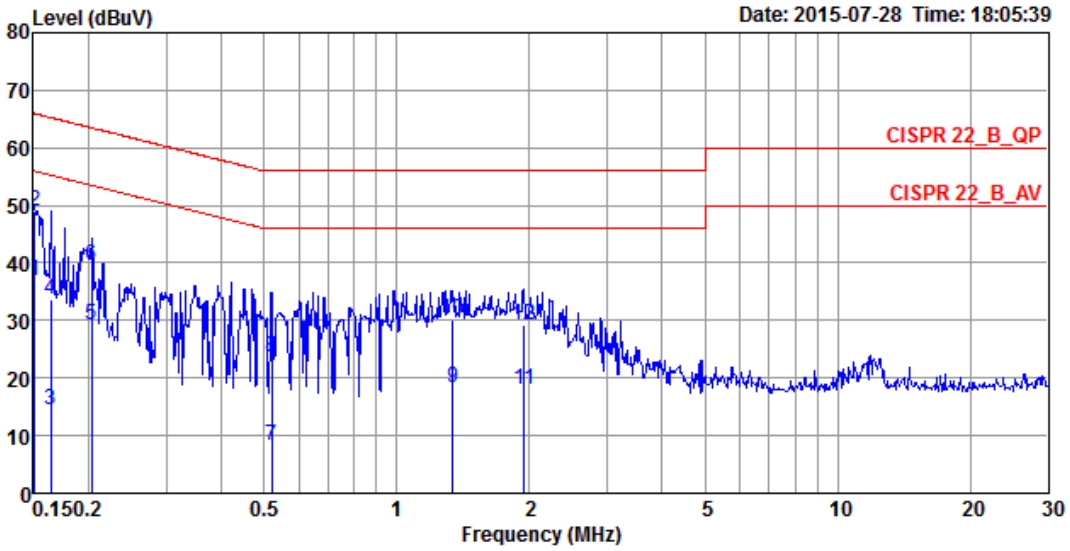
4.1.6. EUT Operation during Test

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

4.1.7. Results of AC Power Line Conducted Emissions Measurement

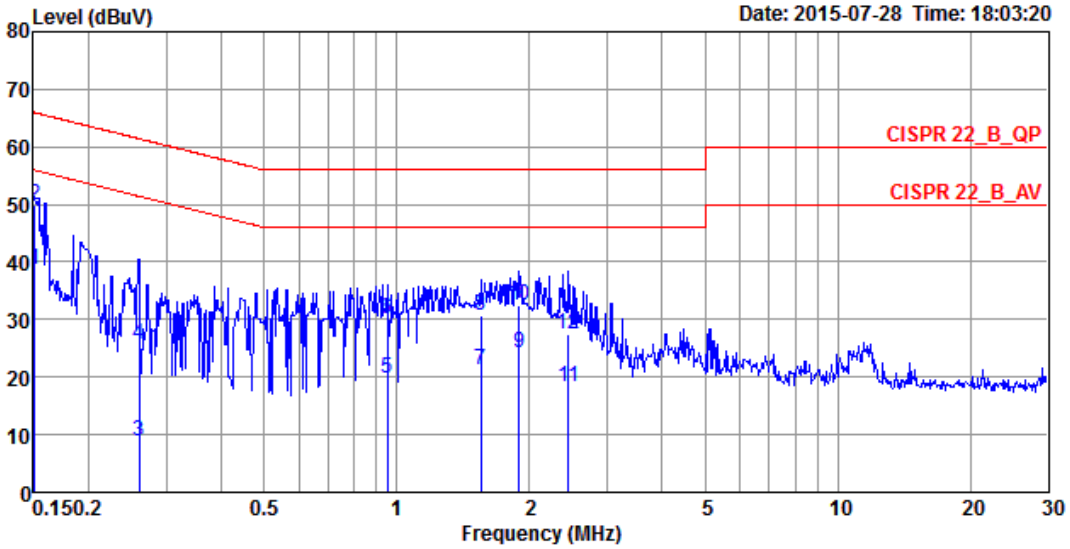
For adding two SKU B and SKU C – EUT 2 test record

Temperature	24°C	Humidity	56%
Test Engineer	Parody Lin	Phase	Line
Configuration	CTX	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	36.90	-19.06	55.96	26.95	9.93	0.02	LINE	Average
2	0.1508	48.93	-17.03	65.96	38.98	9.93	0.02	LINE	QP
3	0.1641	14.55	-40.70	55.25	4.60	9.93	0.02	LINE	Average
4	0.1641	33.75	-31.50	65.25	23.80	9.93	0.02	LINE	QP
5	0.2029	29.15	-24.34	53.49	19.20	9.93	0.02	LINE	Average
6	0.2029	39.57	-23.92	63.49	29.62	9.93	0.02	LINE	QP
7	0.5210	8.23	-37.77	46.00	-1.75	9.94	0.04	LINE	Average
8	0.5210	23.54	-32.46	56.00	13.56	9.94	0.04	LINE	QP
9	1.3379	18.18	-27.82	46.00	8.16	9.97	0.05	LINE	Average
10	1.3379	29.97	-26.03	56.00	19.95	9.97	0.05	LINE	QP
11	1.9489	18.04	-27.96	46.00	7.99	9.99	0.06	LINE	Average
12	1.9489	29.35	-26.65	56.00	19.30	9.99	0.06	LINE	QP

Temperature	24°C	Humidity	56%
Test Engineer	Parody Lin	Phase	Neutral
Configuration	CTX	Test Mode	Mode 1



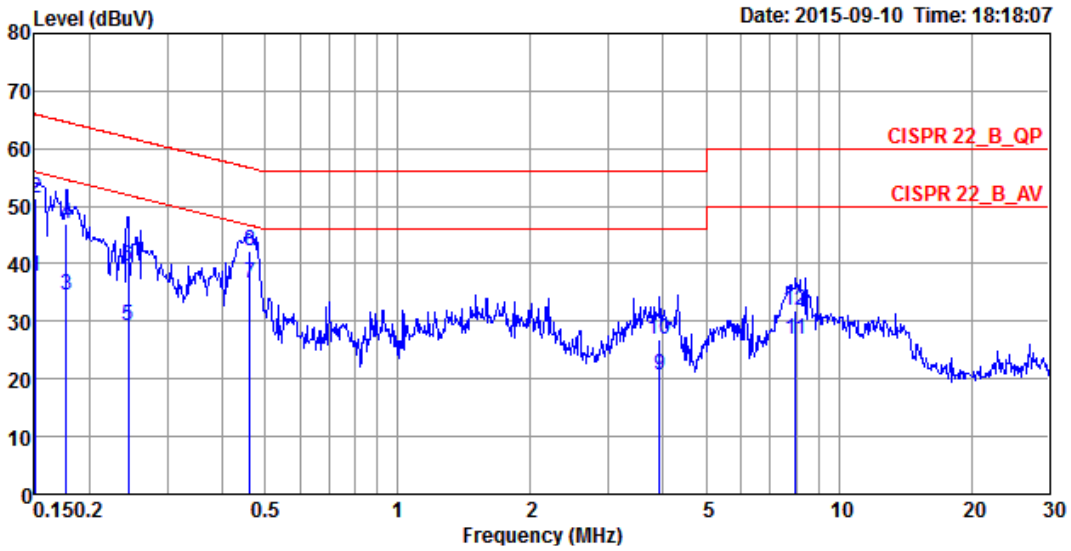
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	38.57	-17.39	55.96	28.77	9.78	0.02	NEUTRAL	Average
2	0.1508	49.88	-16.08	65.96	40.08	9.78	0.02	NEUTRAL	QP
3	0.2603	8.81	-42.61	51.42	-1.01	9.79	0.03	NEUTRAL	Average
4	0.2603	25.54	-35.88	61.42	15.72	9.79	0.03	NEUTRAL	QP
5	0.9531	19.71	-26.29	46.00	9.85	9.81	0.05	NEUTRAL	Average
6	0.9531	30.02	-25.98	56.00	20.16	9.81	0.05	NEUTRAL	QP
7	1.5518	21.38	-24.62	46.00	11.49	9.83	0.06	NEUTRAL	Average
8	1.5518	30.81	-25.19	56.00	20.92	9.83	0.06	NEUTRAL	QP
9	1.8979	24.34	-21.66	46.00	14.44	9.84	0.06	NEUTRAL	Average
10	1.8979	32.34	-23.66	56.00	22.44	9.84	0.06	NEUTRAL	QP
11	2.4476	18.43	-27.57	46.00	8.53	9.85	0.05	NEUTRAL	Average
12	2.4476	27.32	-28.68	56.00	17.42	9.85	0.05	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

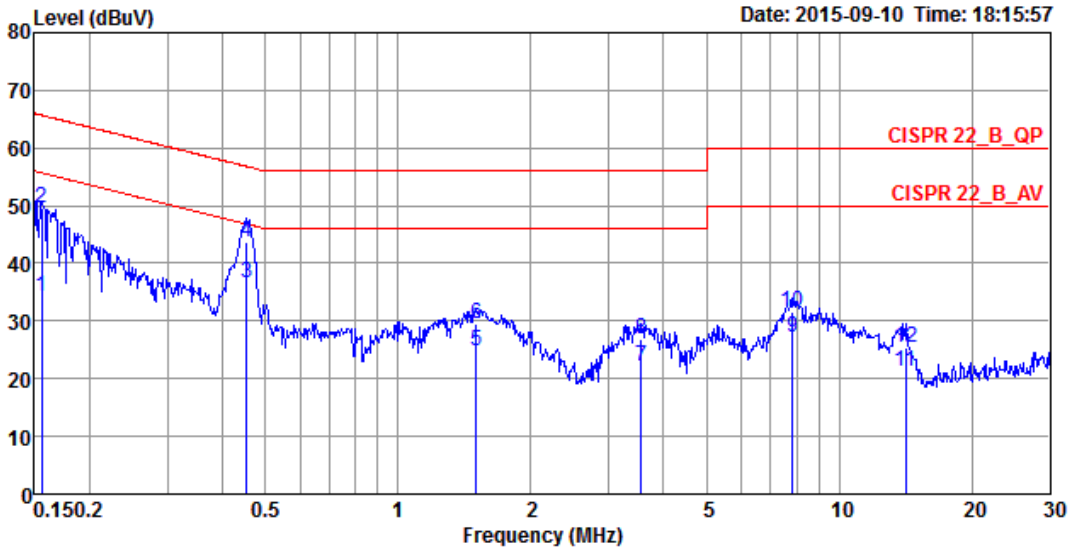
For adding adapter 4 ~ 6 – EUT 2 test record

Temperature	24°C	**Humidity**	56%
Test Engineer	Hank Yang	**Phase**	Line
Configuration	CTX	**Test Mode**	Mode 4



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	37.75	-18.21	55.96	27.80	9.93	0.02	LINE	Average
2	0.1508	51.36	-14.60	65.96	41.41	9.93	0.02	LINE	QP
3	0.1768	34.51	-20.13	54.64	24.56	9.93	0.02	LINE	Average
4	0.1768	46.93	-17.71	64.64	36.98	9.93	0.02	LINE	QP
5	0.2442	29.37	-22.58	51.95	19.41	9.93	0.03	LINE	Average
6	0.2442	39.63	-22.32	61.95	29.67	9.93	0.03	LINE	QP
7	0.4612	36.66	-10.01	46.67	26.69	9.93	0.04	LINE	Average
8	0.4612	42.32	-14.35	56.67	32.35	9.93	0.04	LINE	QP
9	3.9222	20.70	-25.30	46.00	10.61	10.02	0.07	LINE	Average
10	3.9222	26.96	-29.04	56.00	16.87	10.02	0.07	LINE	QP
11	7.9774	26.96	-23.04	50.00	16.65	10.14	0.17	LINE	Average
12	7.9774	31.74	-28.26	60.00	21.43	10.14	0.17	LINE	QP

Temperature	24°C	Humidity	56%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	CTX	Test Mode	Mode 4



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	34.11	-21.58	55.69	24.31	9.78	0.02	NEUTRAL	Average
2	0.1557	49.65	-16.04	65.69	39.85	9.78	0.02	NEUTRAL	QP
3	0.4539	36.58	-10.22	46.80	26.75	9.79	0.04	NEUTRAL	Average
4	0.4539	43.70	-13.10	56.80	33.87	9.79	0.04	NEUTRAL	QP
5	1.5033	24.67	-21.33	46.00	14.78	9.83	0.06	NEUTRAL	Average
6	1.5033	29.37	-26.63	56.00	19.48	9.83	0.06	NEUTRAL	QP
7	3.5654	22.05	-23.95	46.00	12.13	9.86	0.06	NEUTRAL	Average
8	3.5654	26.90	-29.10	56.00	16.98	9.86	0.06	NEUTRAL	QP
9	7.8516	27.14	-22.86	50.00	17.00	9.97	0.17	NEUTRAL	Average
10	7.8516	31.65	-28.35	60.00	21.51	9.97	0.17	NEUTRAL	QP
11	14.1376	21.18	-28.82	50.00	10.84	10.09	0.25	NEUTRAL	Average
12	14.1376	25.37	-34.63	60.00	15.03	10.09	0.25	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. The limited has to be reduced by the amount in dB that the gains of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter output power.

4.2.2. Measuring Instruments and Setting

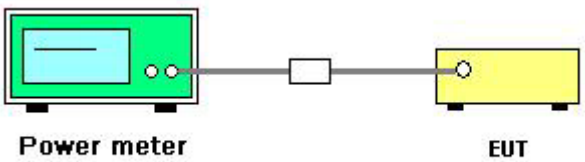
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

4.2.3. Test Procedures

1. Test procedures refer KDB558074 D01 v03r03 section 9.2.3.2 Measurement using a power meter (PM).
2. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

4.2.4. Test Setup Layout



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 Maximum Conducted Output Power

For 3TX/3RX Function – EUT 1 test record

Temperature	25°C	Humidity	59%
Test Engineer	Peter Wu	Test Date	Oct. 28, 2015
Test EUT / Function	EUT: Version 2 / Non-beamforming function		

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT20	2412 MHz	20.55	20.38	20.36	25.20	30.00	Complies
	2437 MHz	25.21	24.97	25.03	29.84	30.00	Complies
	2462 MHz	20.23	20.02	19.82	24.80	30.00	Complies

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT80	5775 MHz	23.37	23.14	23.01	27.95	30.00	Complies

4.3. Power Spectral Density Measurement

4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

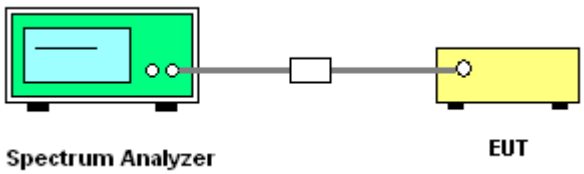
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	3 kHz ≤ RBW ≤ 100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

4.3.3. Test Procedures

1. Test was performed in accordance with KDB558074 D01 v03r03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 8 dBm.

4.3.4. Test Setup Layout



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 Power Spectral Density

For 3TX/3RX Function – EUT 1 test record

Temperature	25°C	Humidity	59%
Test Engineer	Peter Wu	Test EUT / Function	EUT: Version 2 / Non-beamforming function

For 2.4GHz Band

Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT20	2412 MHz	-3.68	-4.09	-5.56	0.40	6.91	Complies
	2437 MHz	0.54	0.57	1.42	5.63	6.91	Complies
	2462 MHz	-4.54	-4.67	-4.64	0.15	6.91	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =7.09dBi, so limit=8-(7.09-6)=6.91 dBm/3kHz

For 5GHz Band

Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT80	5775 MHz	-7.70	-7.00	-7.58	-2.64	5.76	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =8.24dBi, so limit=8-(8.24-6)=5.76 dBm/3kHz

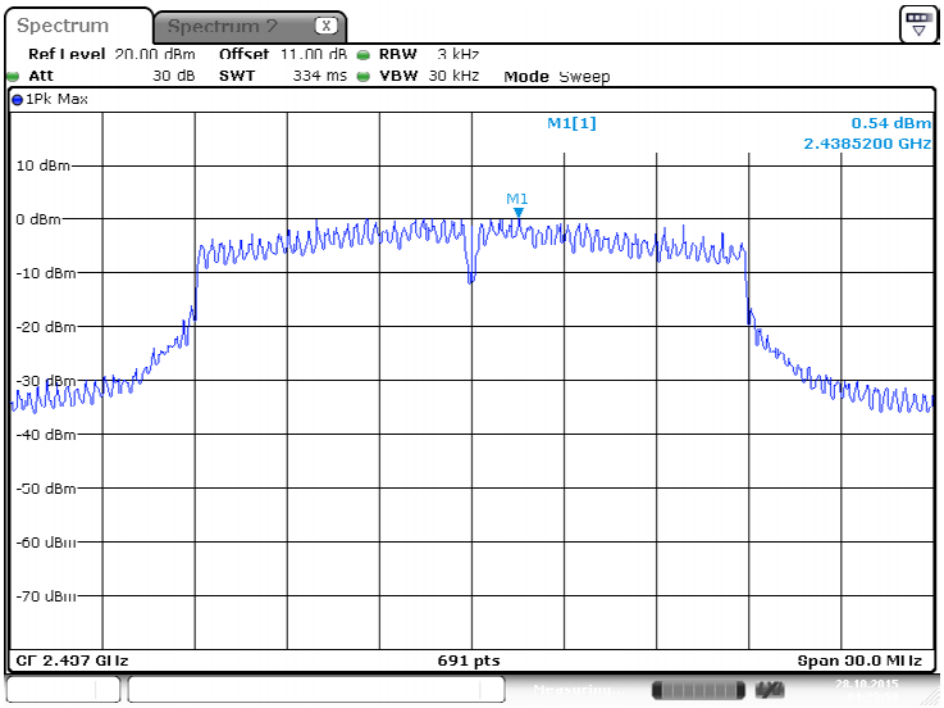
Note: All the test values were listed in the report.

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

EUT: Version 2 / Non-beamforming function

For 2.4GHz Band

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 1



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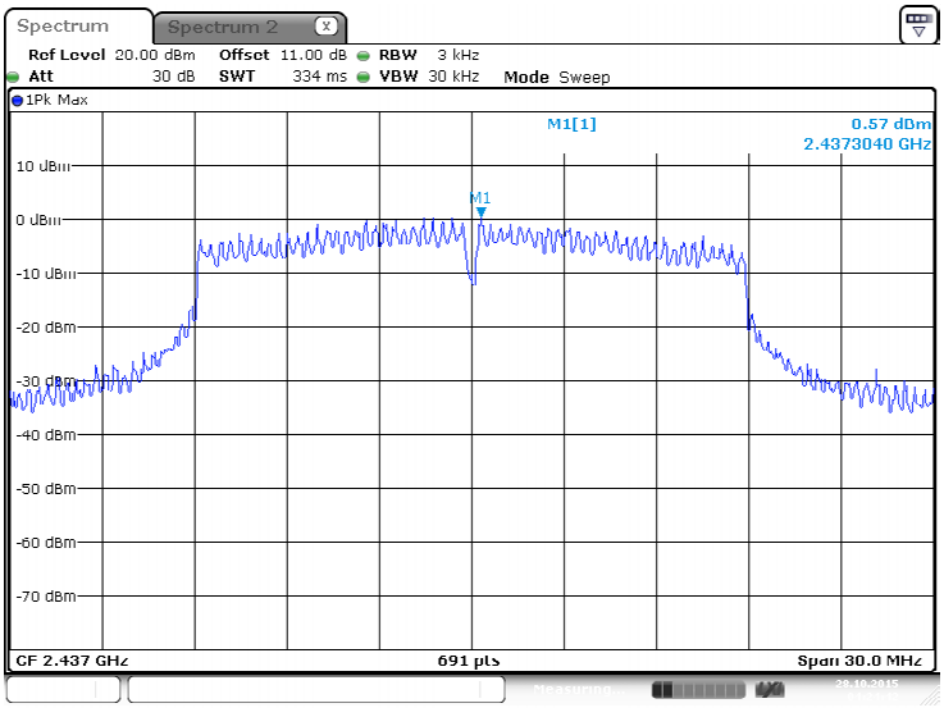
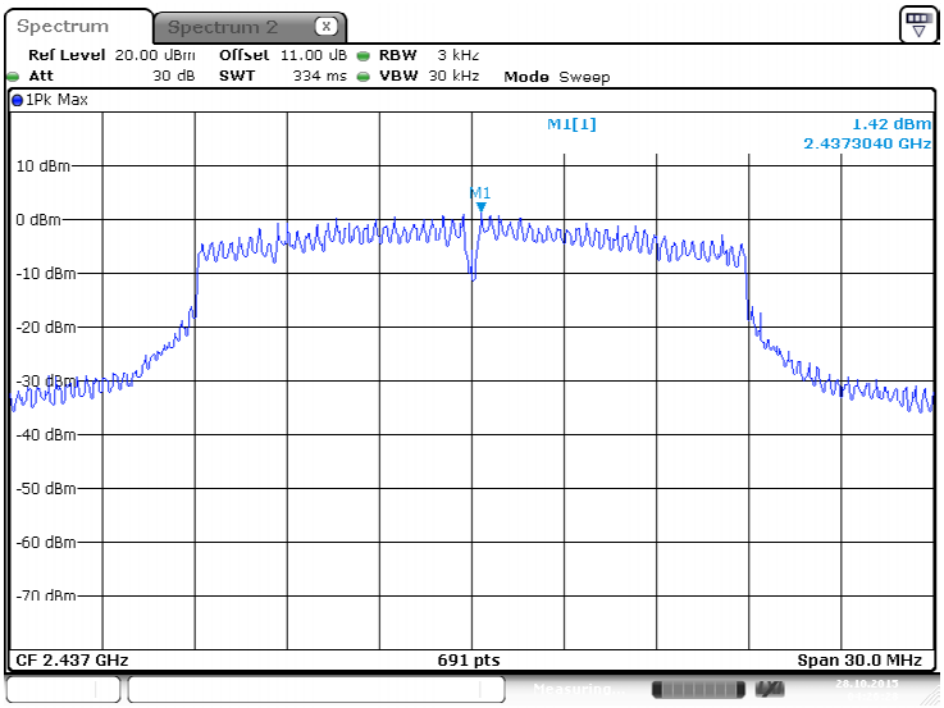
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 2



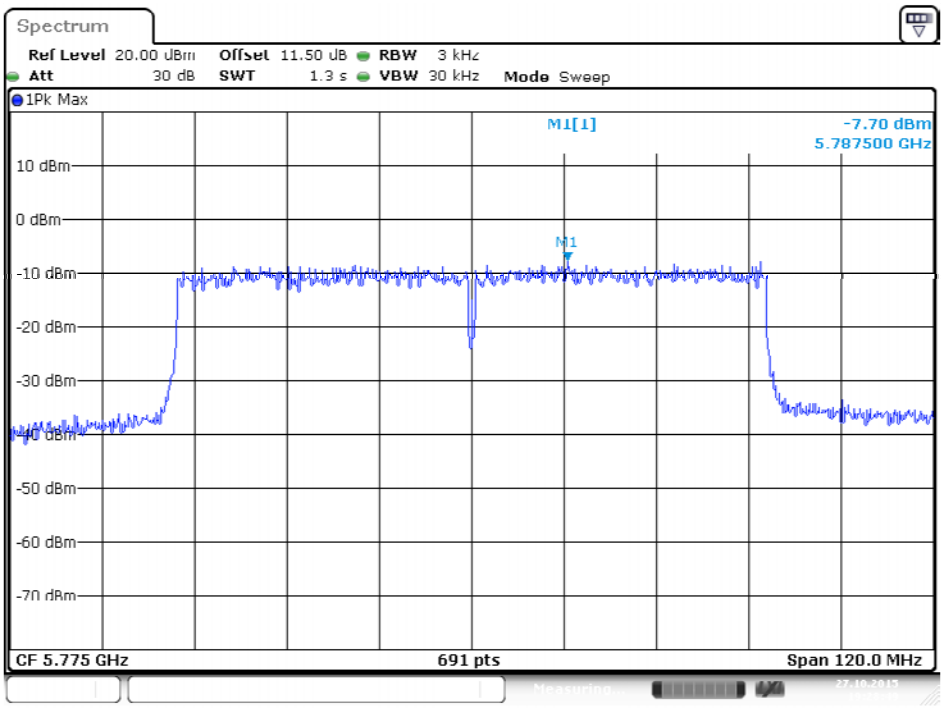
Date: 28.OCT.2015 04:24:42

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 3



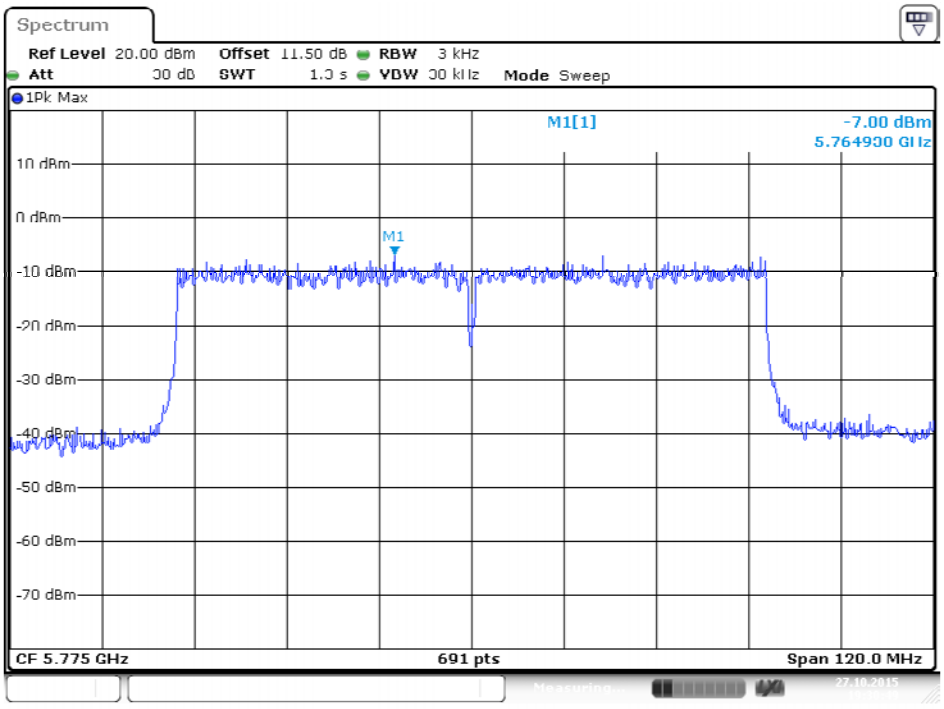
For 5GHz Band

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



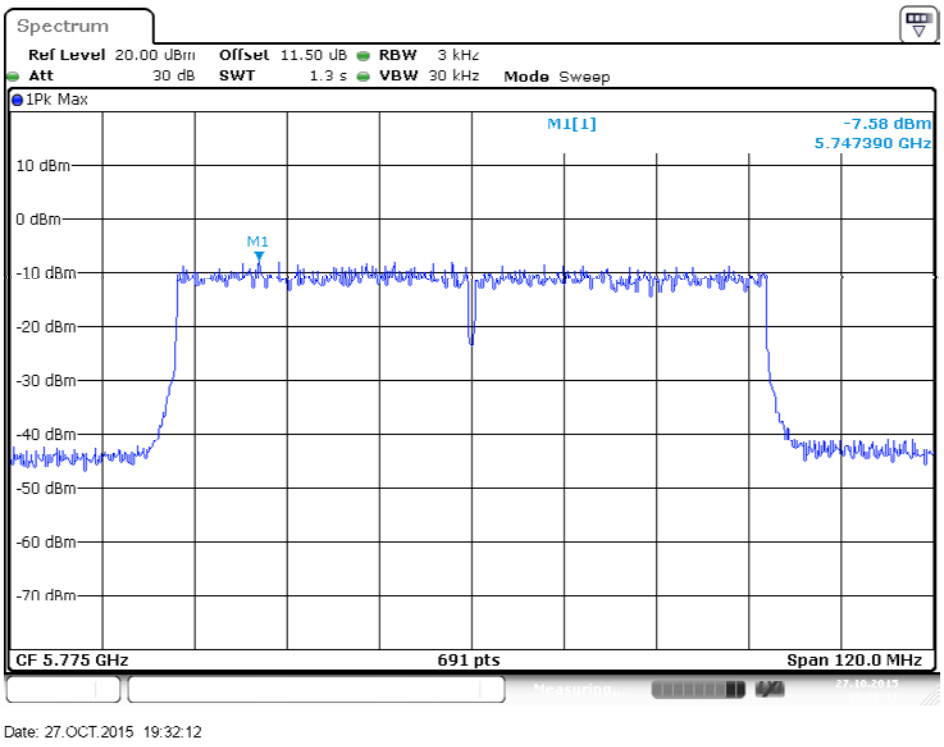
Date: 27.OCT.2015 19:28:50

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2



Date: 27.OCT.2015 19:30:50

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 3



4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

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

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 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
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

4.4.3. 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 KDB558074 D01 v03r03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 8.0 DTS bandwidth=> 8.1 Option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 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.

4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

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 6dB Spectrum Bandwidth

For 3TX/3RX Function – EUT 1 test record

Temperature	22°C	**Humidity**	64%
Test Engineer	Magic Lai	**Test EUT / Function**	EUT: Version 2 / Non-beamforming function

For 2.4GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	2412 MHz	10.67	16.76	500	Complies
	2437 MHz	11.48	16.85	500	Complies
	2462 MHz	10.67	16.67	500	Complies

For 5GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.36	75.54	500	Complies

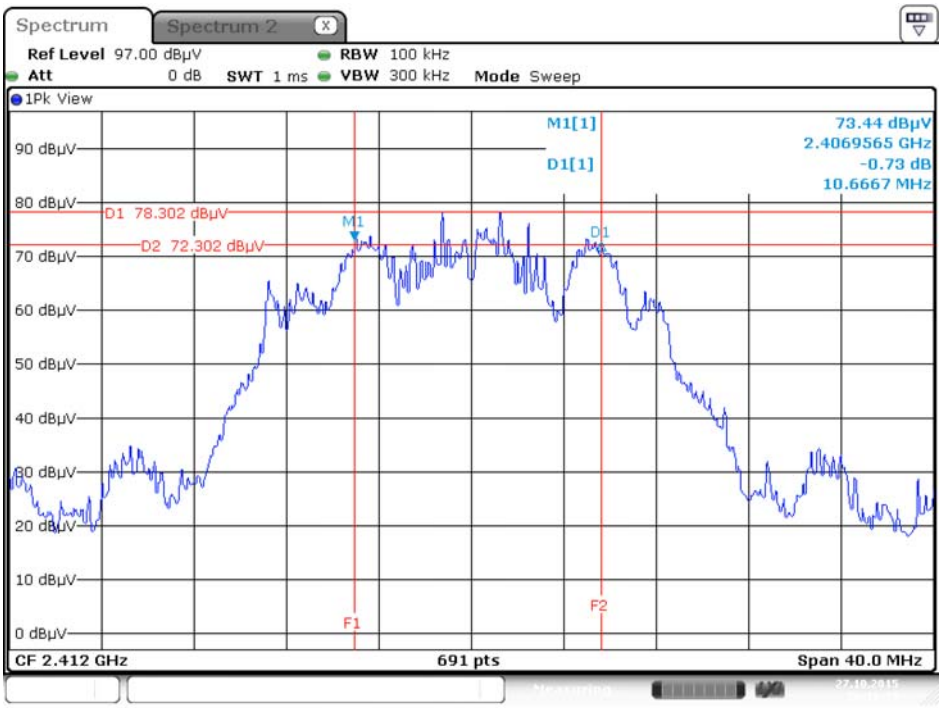
Note: All the test values were listed in the report.

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

EUT: Version 2 / Non-beamforming function

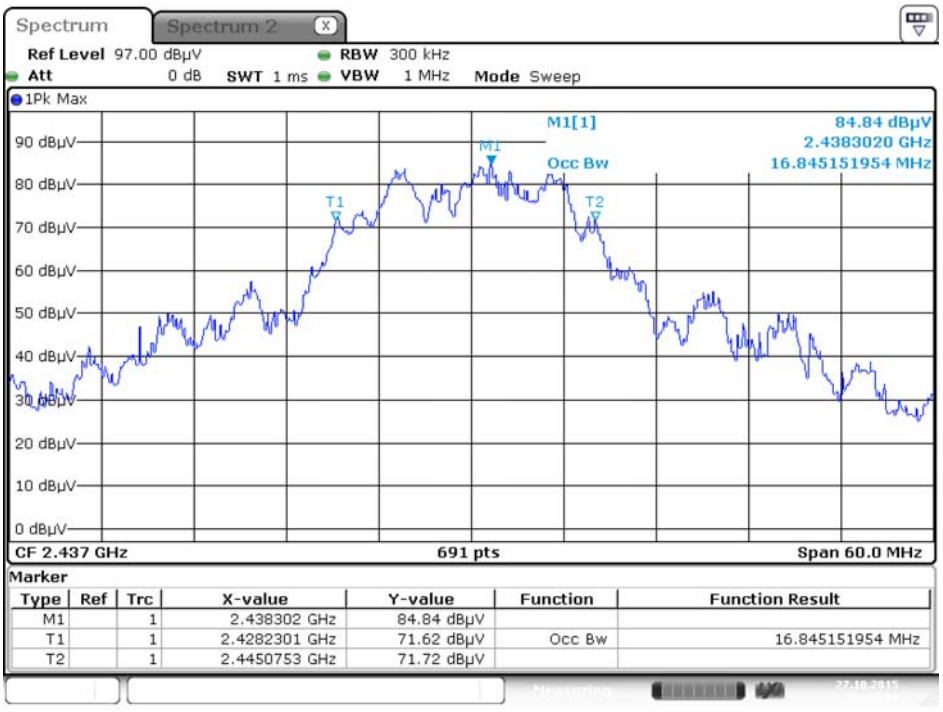
For 2.4GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2412 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.OCT.2015 20:16:39

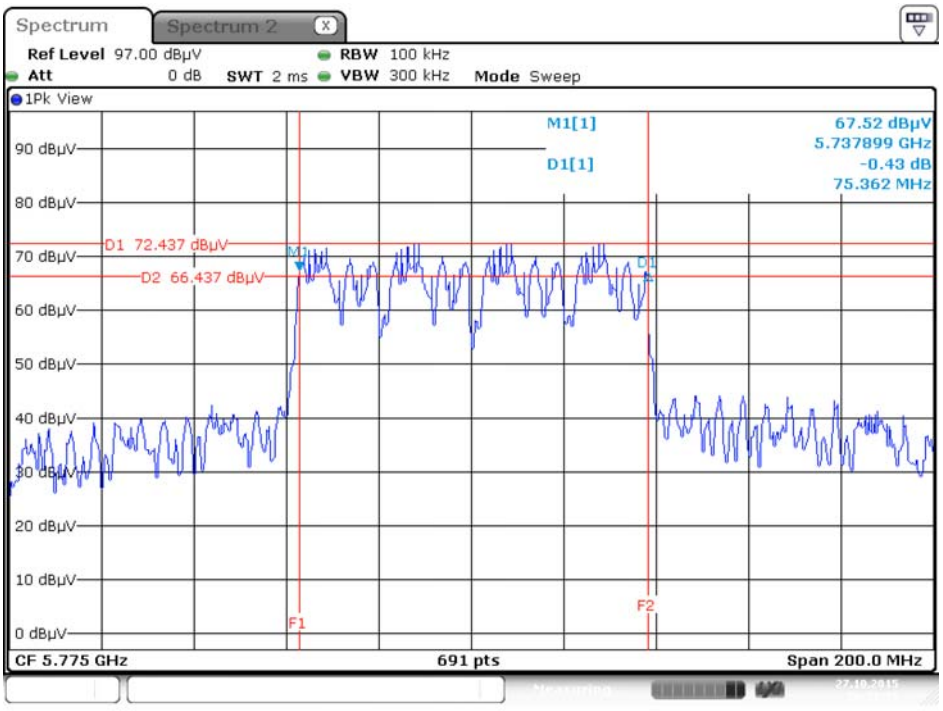
99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.OCT.2015 20:34:01

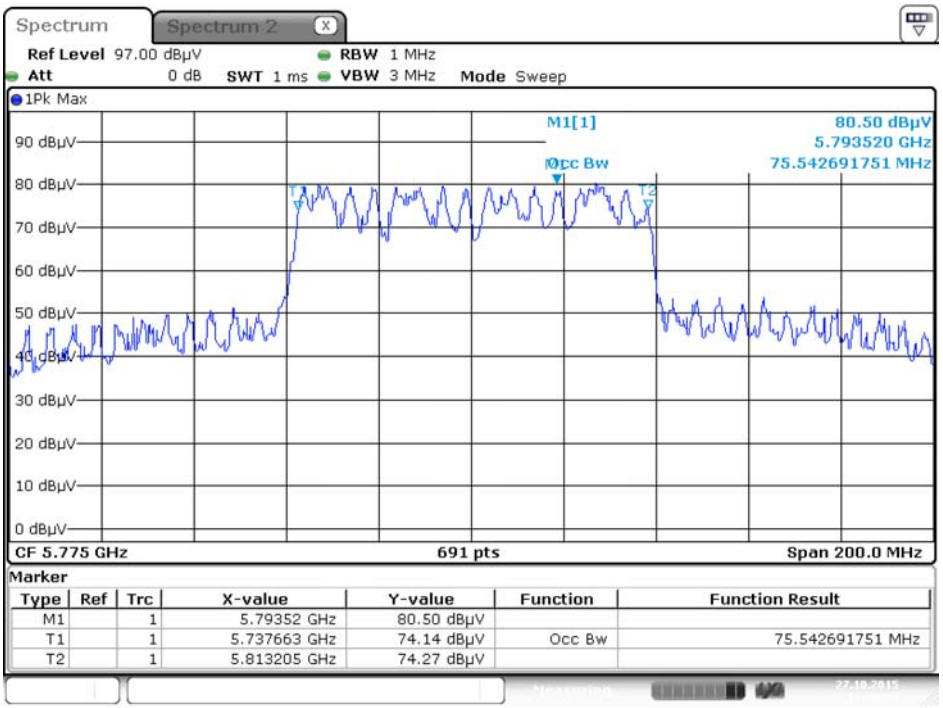
For 5GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.OCT.2015 20:21:31

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.OCT.2015 19:45:26

4.5. Radiated Emissions Measurement

4.5.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. 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

4.5.2. 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	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

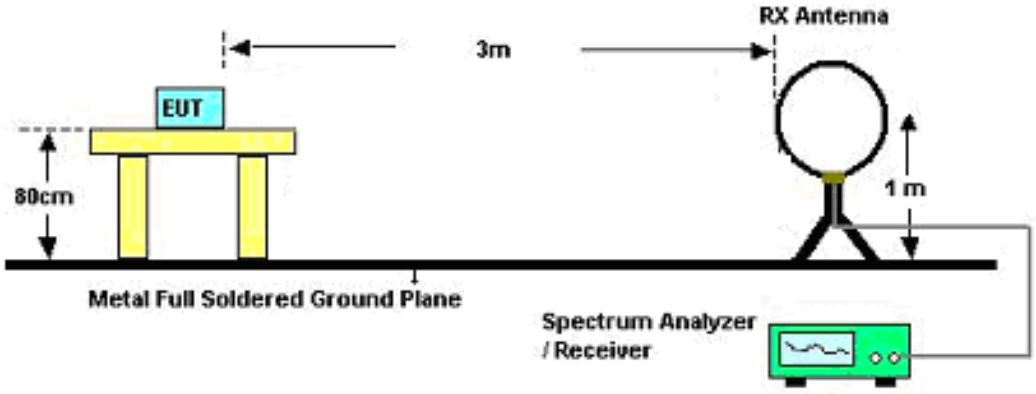
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

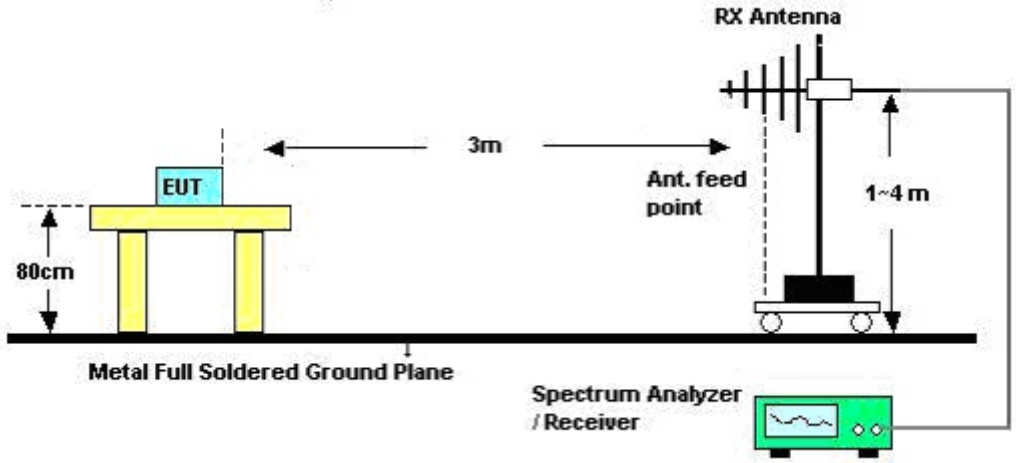
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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.

4.5.4. Test Setup Layout

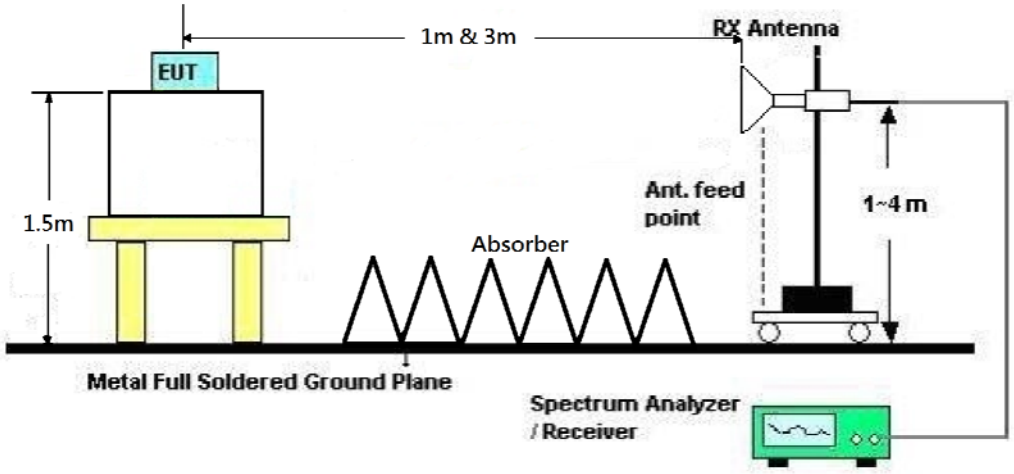
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

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

For adding a heat sink (2mm) and resistance (0201) – EUT 1 test record

Temperature	22°C	**Humidity**	60%
Test Engineer	Akina Chiu	**Configurations**	CTX
Test Date	Jul. 22, 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 20 dB 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.

For adding two SKU B and SKU C – EUT 2 test record

Temperature	22°C	**Humidity**	60%
Test Engineer	Akina Chiu	**Configurations**	CTX
Test Date	Sep. 03, 2015	**Test Mode**	Mode 2

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 20 dB 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.

For adding adapter 4 ~ 6 – EUT 2 test record

Temperature	24°C	**Humidity**	55%
Test Engineer	Gary Chu	**Configurations**	CTX
Test Date	Aug. 26, 2015	**Test Mode**	Mode 5

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 20 dB below the permissible value has no need to be reported.

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

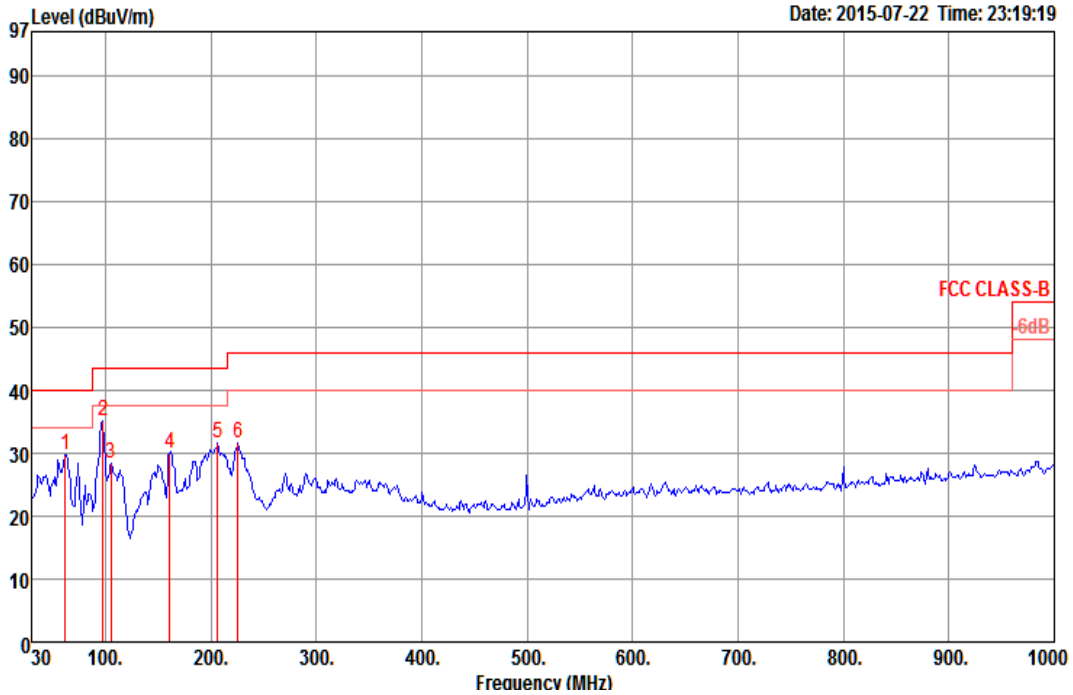
Limit line = specific limits (dBuV) + distance extrapolation factor.

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

For adding a heat sink (2mm) and resistance (0201) – EUT 1 test record

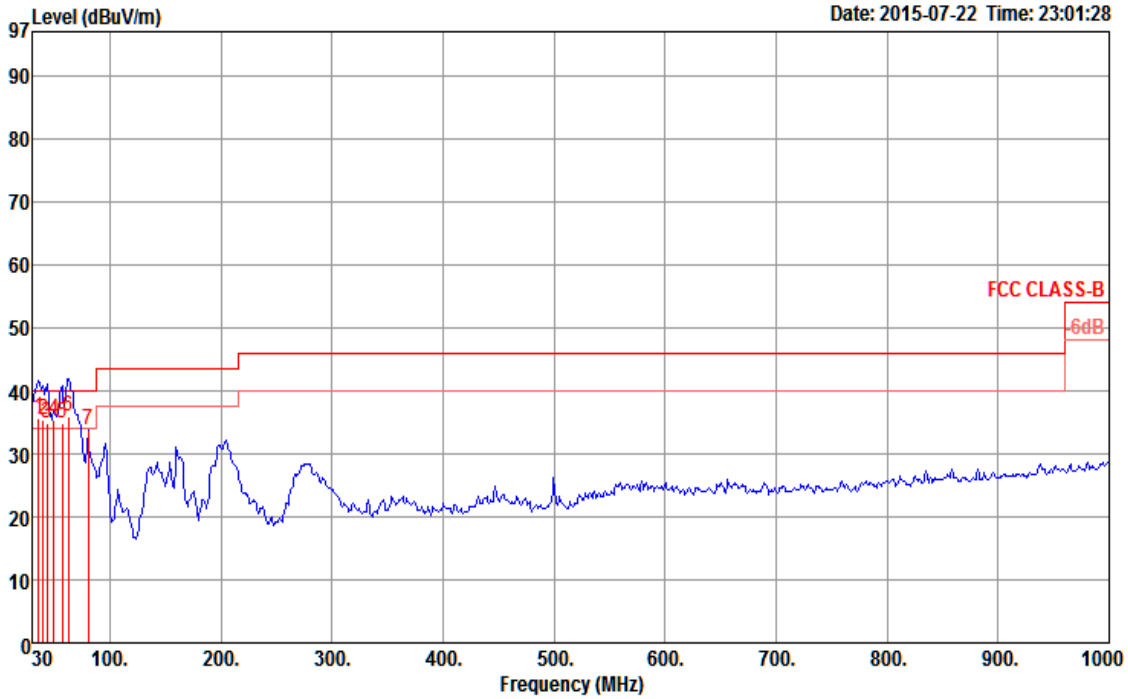
Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	CTX
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	62.01	29.78	40.00	-10.22	51.51	0.72	6.96	29.41	360	150	Peak	HORIZONTAL
2	97.90	35.12	43.50	-8.38	52.68	0.84	10.88	29.28	360	150	Peak	HORIZONTAL
3	105.66	28.36	43.50	-15.14	44.63	0.89	12.08	29.24	360	150	Peak	HORIZONTAL
4	160.95	29.86	43.50	-13.64	47.13	1.07	10.66	29.00	360	150	Peak	HORIZONTAL
5	206.54	31.72	43.50	-11.78	48.77	1.19	10.56	28.80	360	150	Peak	HORIZONTAL
6	225.94	31.58	46.00	-14.42	47.97	1.25	11.06	28.70	360	150	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	35.82	35.54	40.00	-4.46	48.25	0.61	16.18	29.50	85	100	QP	VERTICAL
2	39.70	35.40	40.00	-4.60	50.60	0.59	13.70	29.49	102	100	QP	VERTICAL
3	43.58	34.95	40.00	-5.05	52.37	0.60	11.46	29.48	52	100	QP	VERTICAL
4	49.40	35.43	40.00	-4.57	55.11	0.63	9.15	29.46	360	200	QP	VERTICAL
5	57.16	34.85	40.00	-5.15	56.05	0.69	7.54	29.43	96	100	QP	VERTICAL
6	62.98	35.91	40.00	-4.09	57.66	0.72	6.94	29.41	182	100	QP	VERTICAL
7	80.44	33.68	40.00	-6.32	54.86	0.76	7.40	29.34	360	200	Peak	VERTICAL

Note:

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

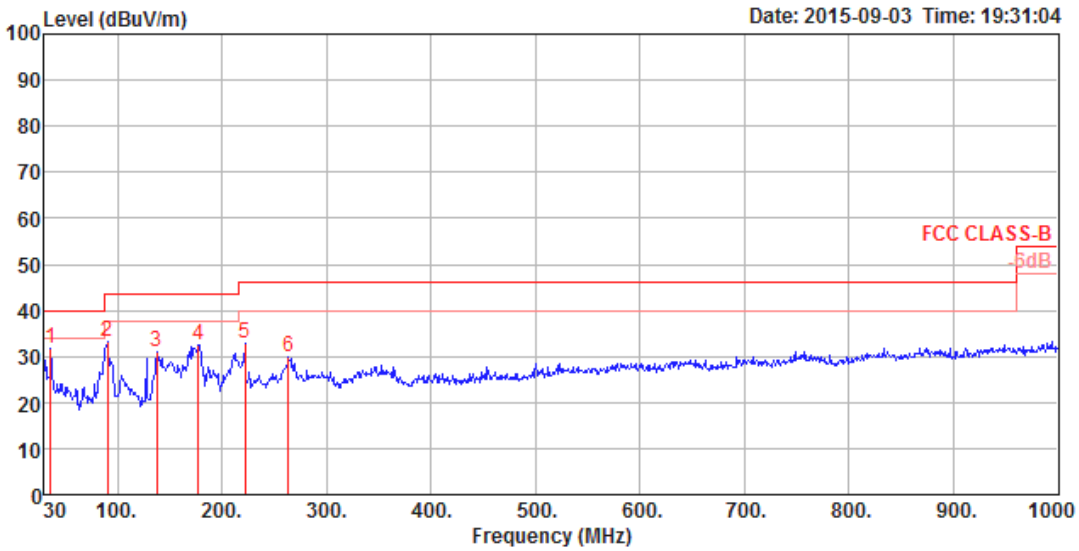
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

For adding two SKU B and SKU C – EUT 2 test record

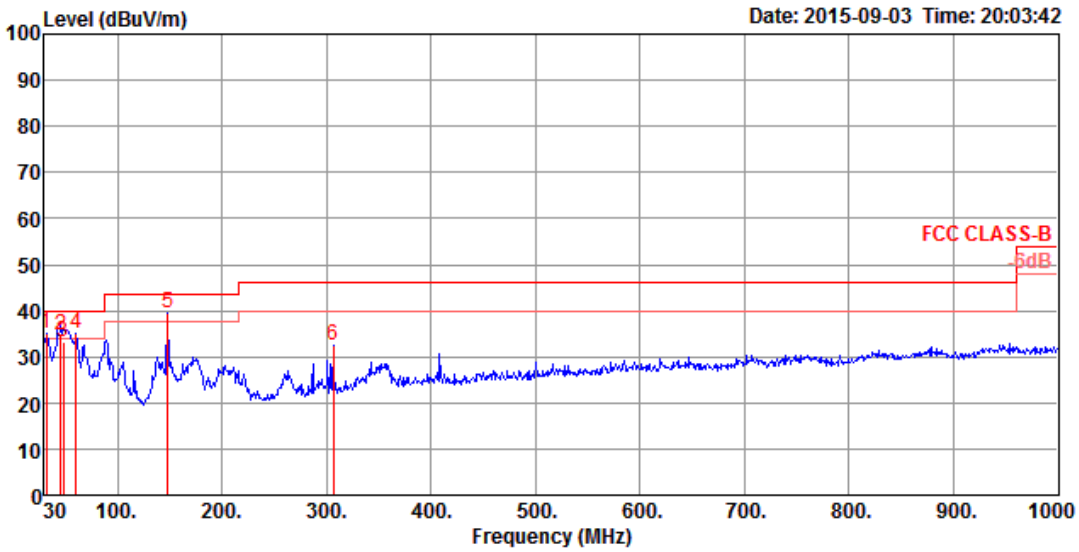
Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	CTX
Test Mode	Mode 2		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	35.82	31.68	40.00	-8.32	46.88	0.65	16.55	32.40	125	0	Peak	HORIZONTAL
2	90.14	33.17	43.50	-10.33	55.38	0.92	9.26	32.39	150	91	Peak	HORIZONTAL
3	137.67	30.98	43.50	-12.52	50.06	1.07	12.21	32.36	175	100	Peak	HORIZONTAL
4	177.44	32.55	43.50	-10.95	53.87	1.17	9.85	32.34	200	251	Peak	HORIZONTAL
5	222.06	32.66	46.00	-13.34	52.82	1.32	10.84	32.32	150	91	Peak	HORIZONTAL
6	263.77	29.98	46.00	-16.02	47.08	1.41	13.79	32.30	100	62	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	35.20	40.00	-4.80	48.09	0.64	18.87	32.40	100	1	Peak	VERTICAL
2	45.52	34.83	40.00	-5.17	55.49	0.68	11.07	32.41	100	9	QP	VERTICAL
3	48.43	33.03	40.00	-6.97	55.04	0.71	9.69	32.41	100	1	QP	VERTICAL
4	60.07	35.16	40.00	-4.84	59.89	0.77	6.90	32.40	100	24	Peak	VERTICAL
5	148.34	39.33	43.50	-4.17	59.25	1.10	11.34	32.36	125	71	Peak	VERTICAL
6	306.45	32.48	46.00	-13.52	49.16	1.51	14.09	32.28	175	42	Peak	VERTICAL

Note:

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

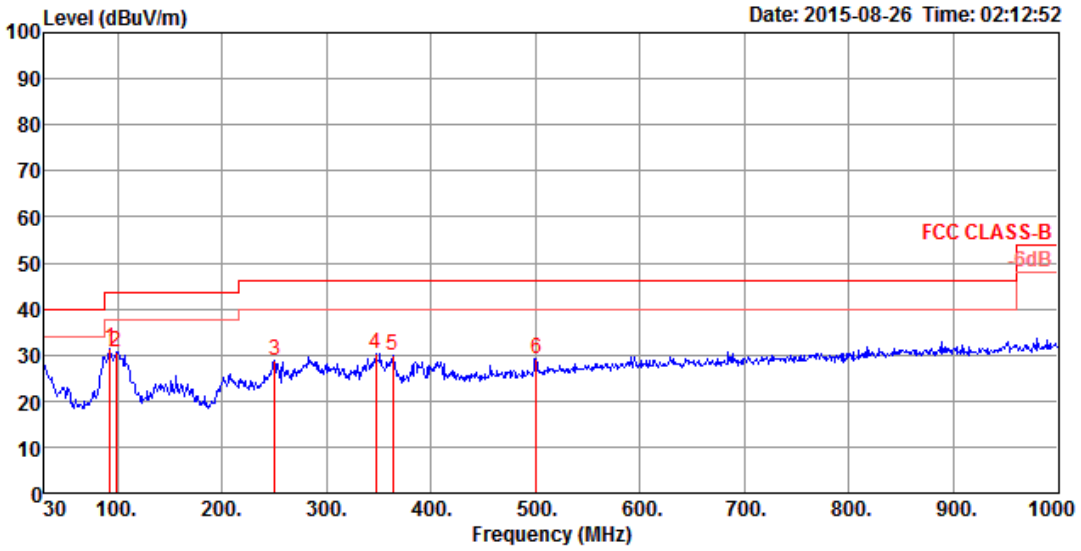
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

For adding adapter 4 ~ 6 – EUT 2 test record

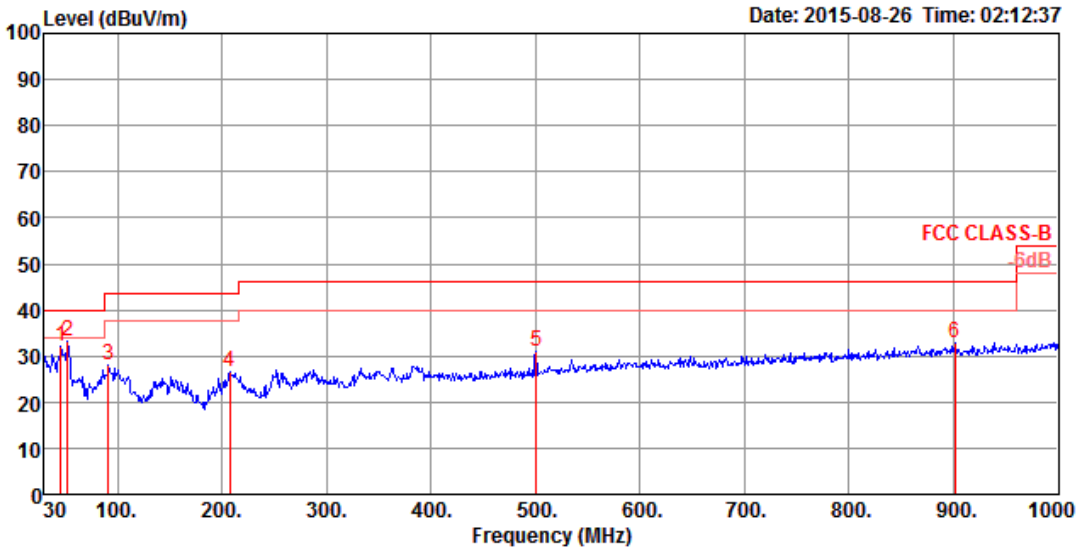
Temperature	24°C	Humidity	55%
Test Engineer	Gary Chu	Configurations	CTX
Test Mode	Mode 5		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	93.05	31.20	43.50	-12.30	52.84	0.92	9.83	32.39	200	93	Peak	HORIZONTAL
2	98.87	30.66	43.50	-12.84	51.21	0.93	10.91	32.39	200	258	Peak	HORIZONTAL
3	250.19	28.91	46.00	-17.09	46.93	1.38	12.90	32.30	100	128	Peak	HORIZONTAL
4	347.19	30.39	46.00	-15.61	45.89	1.61	15.20	32.31	100	23	Peak	HORIZONTAL
5	363.68	29.91	46.00	-16.09	44.92	1.65	15.65	32.31	100	298	Peak	HORIZONTAL
6	500.45	29.17	46.00	-16.83	41.79	1.90	17.83	32.35	150	244	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	45.52	31.97	40.00	-8.03	52.63	0.68	11.07	32.41	100	249	Peak	VERTICAL
2	52.31	33.29	40.00	-6.71	56.49	0.73	8.48	32.41	100	0	Peak	VERTICAL
3	91.11	28.15	43.50	-15.35	50.17	0.92	9.45	32.39	100	280	Peak	VERTICAL
4	207.51	26.75	43.50	-16.75	47.09	1.28	10.71	32.33	100	194	Peak	VERTICAL
5	500.45	30.82	46.00	-15.18	43.44	1.90	17.83	32.35	100	226	Peak	VERTICAL
6	901.06	32.73	46.00	-13.27	40.34	2.43	21.70	31.74	150	296	Peak	VERTICAL

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.

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

For adding a heat sink (2mm) – EUT 1 test record

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Jul. 22, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.96	43.40	54.00	-10.60	41.13	4.10	32.69	34.52	172	123	Average	HORIZONTAL
2	4824.02	49.50	74.00	-24.50	47.23	4.10	32.69	34.52	172	123	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4824.00	47.28	54.00	-6.72	45.01	4.10	32.69	34.52	282	130	Average	VERTICAL
2	4824.10	52.18	74.00	-21.82	49.91	4.10	32.69	34.52	282	130	Peak	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Jul. 22, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11485.10	42.41	54.00	-11.59	31.80	6.53	38.70	34.62	282	110	Average	HORIZONTAL
2	11492.06	55.34	74.00	-18.66	44.73	6.53	38.70	34.62	282	110	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11488.10	46.50	54.00	-7.50	35.89	6.53	38.70	34.62	20	117	Average	VERTICAL
2	11488.80	60.87	74.00	-13.13	50.26	6.53	38.70	34.62	20	117	Peak	VERTICAL

For adding a resistance (0201) – EUT 1 test record

Temperature	22°C	**Humidity**	60%
Test Engineer	Akina Chiu	**Configurations**	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Jul. 22, 2015	**Test EUT / Function**	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4823.99	51.58	54.00	-2.42	48.04	5.38	32.55	34.39	100	217	HORIZONTAL	Average
2	4824.06	55.42	74.00	-18.58	51.88	5.38	32.55	34.39	100	217	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4824.04	55.17	74.00	-18.83	51.63	5.38	32.55	34.39	100	228	VERTICAL	Peak
2	4824.05	51.62	54.00	-2.38	48.08	5.38	32.55	34.39	100	228	VERTICAL	Average

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11b CH 11/ Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Jul. 22, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4923.97	51.56	74.00	-22.44	47.75	5.42	32.76	34.37	104	217	HORIZONTAL	Peak
2	4924.03	46.93	54.00	-7.07	43.12	5.42	32.76	34.37	104	217	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4923.99	47.46	54.00	-6.54	43.65	5.42	32.76	34.37	100	227	VERTICAL	Average
2	4924.03	52.12	74.00	-21.88	48.31	5.42	32.76	34.37	100	227	VERTICAL	Peak

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Jul. 22, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11491.03	44.10	54.00	-9.90	30.50	8.73	39.20	34.33	200	207	HORIZONTAL	Average
2	11491.73	56.36	74.00	-17.64	42.76	8.73	39.20	34.33	200	207	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.25	56.80	74.00	-17.20	43.20	8.73	39.20	34.33	200	221	VERTICAL	Peak
2	11489.70	44.53	54.00	-9.47	30.93	8.73	39.20	34.33	200	221	VERTICAL	Average

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.

For 3TX/3RX Function – EUT 1 test record

Temperature	22°C	**Humidity**	60%
Test Engineer	Akina Chiu	**Configurations**	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 28, 2015	**Test EUT / Function**	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4824.00	42.00	54.00	-12.00	37.73	6.11	32.55	34.39	103	4	HORIZONTAL	Average
2	4824.00	55.92	74.00	-18.08	51.65	6.11	32.55	34.39	103	4	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4824.54	50.82	74.00	-23.18	46.55	6.11	32.55	34.39	150	252	VERTICAL	Peak
2	4824.89	36.50	54.00	-17.50	32.23	6.11	32.55	34.39	150	252	VERTICAL	Average

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 28, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4874.00	47.54	54.00	-6.46	43.12	6.14	32.66	34.38	100	8	HORIZONTAL	Average
2	4874.00	61.73	74.00	-12.27	57.31	6.14	32.66	34.38	100	8	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4874.00	44.89	54.00	-9.11	40.47	6.14	32.66	34.38	100	231	VERTICAL	Average
2	4874.00	61.45	74.00	-12.55	57.03	6.14	32.66	34.38	100	231	VERTICAL	Peak

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 28, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4924.00	44.25	54.00	-9.75	39.70	6.16	32.76	34.37	100	14	HORIZONTAL	Average
2	4924.00	58.53	74.00	-15.47	53.98	6.16	32.76	34.37	100	14	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4924.00	39.83	54.00	-14.17	35.28	6.16	32.76	34.37	102	270	VERTICAL	Average
2	4924.00	53.42	74.00	-20.58	48.87	6.16	32.76	34.37	102	270	VERTICAL	Peak

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 28, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11551.67	57.68	74.00	-16.32	43.24	9.64	39.17	34.37	150	140	HORIZONTAL	Peak
2	11551.86	44.69	54.00	-9.31	30.25	9.64	39.17	34.37	150	140	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11550.95	44.75	54.00	-9.25	30.31	9.64	39.17	34.37	150	250	VERTICAL	Average
2	11551.41	58.15	74.00	-15.85	43.71	9.64	39.17	34.37	150	250	VERTICAL	Peak

For removing 5GHz Band Pass Filter – EUT 1 test record

Temperature	22℃	**Humidity**	60%
Test Engineer	Akina Chiu	**Configurations**	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Oct. 28, 2015	**Test EUT / Function**	EUT: Version 2 / Non-beamforming function

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.12	60.67	74.00	-13.33	46.26	9.67	39.15	34.41	202	116	HORIZONTAL	Peak
2	11649.48	48.26	54.00	-5.74	33.85	9.67	39.15	34.41	202	116	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11652.00	61.10	74.00	-12.90	46.70	9.68	39.13	34.41	175	277	VERTICAL	Peak
2	11653.16	49.50	54.00	-4.50	35.10	9.68	39.13	34.41	175	277	VERTICAL	Average

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.

4.6. Emissions Measurement

4.6.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. 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 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 (30dBc in any 100 kHz bandwidth emission)	100 kHz / 300 kHz for Peak

4.6.3. Test Procedures

For Radiated band edges Measurement:

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around band edges.

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB558074 D01 v03r03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

This test setup layout is the same as that shown in section 4.5.4.

For Radiated Out of Band Emission Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For adding a resistance (0201) – EUT 1 test record

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11b CH 1, 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	May 08, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2389.72	63.99	74.00	-10.01	32.34	3.73	27.92	0.00	100	248	VERTICAL	Peak
2	2390.00	53.35	54.00	-0.65	21.70	3.73	27.92	0.00	100	248	VERTICAL	Average
3	2411.04	125.30			93.65	3.75	27.90	0.00	100	248	VERTICAL	Peak
4	2411.36	121.54			89.90	3.75	27.89	0.00	100	248	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2462.80	120.48			88.85	3.79	27.84	0.00	102	248	VERTICAL	Average
2	2462.96	124.53			92.90	3.79	27.84	0.00	102	248	VERTICAL	Peak
3	2483.50	53.71	54.00	-0.29	22.07	3.82	27.82	0.00	102	248	VERTICAL	Average
4	2483.96	64.22	74.00	-9.78	32.58	3.82	27.82	0.00	102	248	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 2462 MHz.

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac VHT20 CH 1, 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	May 08, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2387.16	71.12	74.00	-2.88	39.47	3.73	27.92	0.00	100	248	VERTICAL	Peak
2	2387.32	52.68	54.00	-1.32	21.03	3.73	27.92	0.00	100	248	VERTICAL	Average
3	2411.36	120.59			88.95	3.75	27.89	0.00	100	248	VERTICAL	Peak
4	2412.32	110.47			78.83	3.75	27.89	0.00	100	248	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2461.04	120.58			88.95	3.79	27.84	0.00	100	246	VERTICAL	Peak
2	2462.48	109.54			77.91	3.79	27.84	0.00	100	246	VERTICAL	Average
3	2483.50	51.18	54.00	-2.82	19.54	3.82	27.82	0.00	100	246	VERTICAL	Average
4	2484.60	69.17	74.00	-4.83	37.53	3.82	27.82	0.00	100	246	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 2462 MHz.

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac VHT40 CH 3, 9/ Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	May 08, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2387.06	53.18	54.00	-0.82	21.53	3.73	27.92	0.00	100	247	VERTICAL	Average
2	2387.06	65.57	74.00	-8.43	33.92	3.73	27.92	0.00	100	247	VERTICAL	Peak
3	2412.06	102.56			70.92	3.75	27.89	0.00	100	247	VERTICAL	Average
4	2412.06	112.26			80.62	3.75	27.89	0.00	100	247	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 2422 MHz.

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2467.39	102.88			71.24	3.80	27.84	0.00	100	246	VERTICAL	Average
2	2467.39	112.45			80.81	3.80	27.84	0.00	100	246	VERTICAL	Peak
3	2486.94	64.29	74.00	-9.71	32.65	3.82	27.82	0.00	100	246	VERTICAL	Peak
4	2487.26	52.66	54.00	-1.34	21.02	3.82	27.82	0.00	100	246	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 2452 MHz.

Note:

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

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

For 3TX/3RX Function – EUT 1 test record

Temperature	22°C	Humidity	60%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Oct. 22, 2015	Test EUT / Function	EUT: Version 2 / Non-beamforming function

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2387.80	73.03	74.00	-0.97	41.13	3.98	27.92	0.00	191	3	VERTICAL	Peak
2	2388.00	53.92	54.00	-0.08	22.02	3.98	27.92	0.00	191	3	VERTICAL	Average
3	2412.80	111.09			79.19	4.01	27.89	0.00	191	3	VERTICAL	Average
4	2412.80	121.68			89.78	4.01	27.89	0.00	191	3	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2383.20	66.84	74.00	-7.16	34.93	3.98	27.93	0.00	230	2	VERTICAL	Peak
2	2388.00	49.73	54.00	-4.27	17.83	3.98	27.92	0.00	230	2	VERTICAL	Average
3	2437.80	115.01			83.10	4.04	27.87	0.00	230	2	VERTICAL	Average
4	2437.80	125.89			93.98	4.04	27.87	0.00	230	2	VERTICAL	Peak
5	2486.70	67.52	74.00	-6.48	35.61	4.09	27.82	0.00	230	2	VERTICAL	Peak
6	2487.10	49.16	54.00	-4.84	17.25	4.09	27.82	0.00	230	2	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2460.00	109.97			78.06	4.06	27.85	0.00	228	341	VERTICAL	Average
2	2460.00	121.15			89.24	4.06	27.85	0.00	228	341	VERTICAL	Peak
3	2483.70	72.70	74.00	-1.30	40.82	4.06	27.82	0.00	228	341	VERTICAL	Peak
4	2484.50	53.96	54.00	-0.04	22.05	4.09	27.82	0.00	228	341	VERTICAL	Average

Item 1, 2 are the fundamental frequency at 2462 MHz.

Note:

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

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

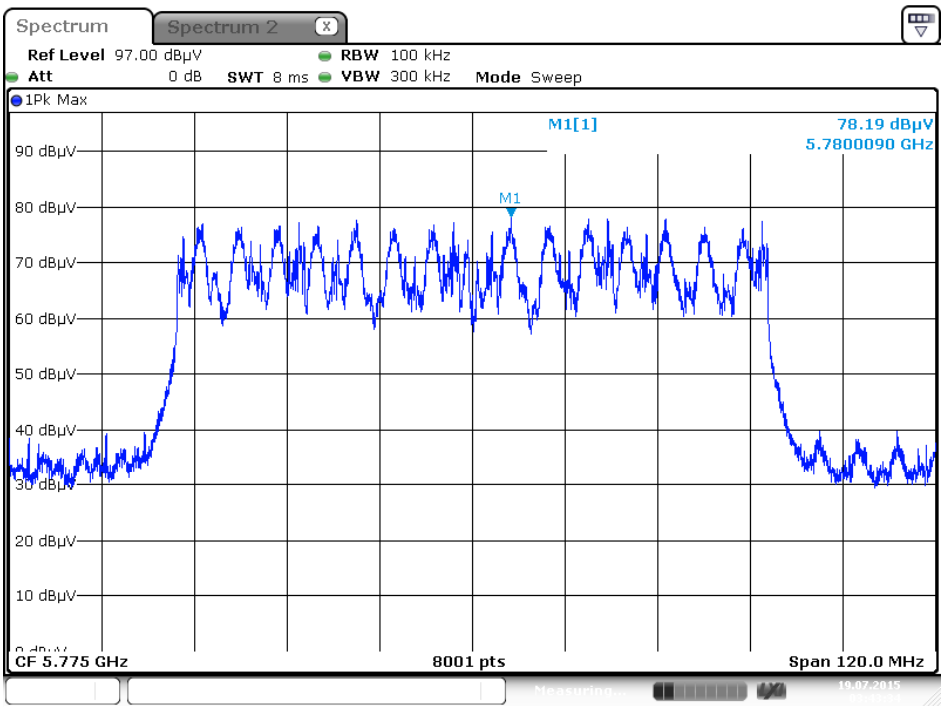
For Emission not in Restricted Band

For adding a resistance (0201) – EUT 1 test record

EUT: Version 2 / Non-beamforming function

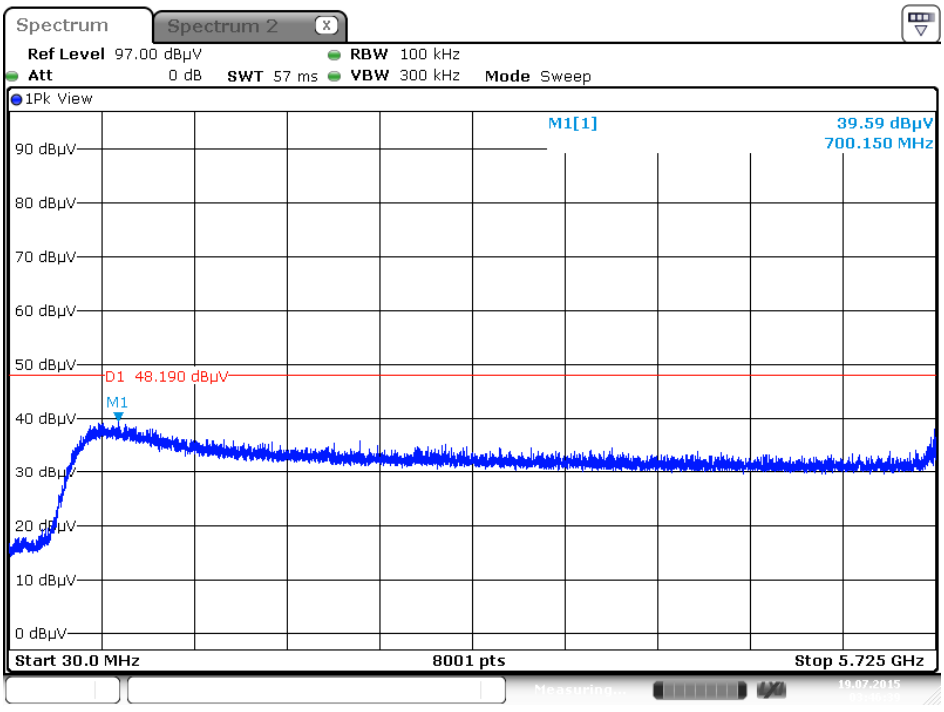
For 5GHz Band:

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Reference Level



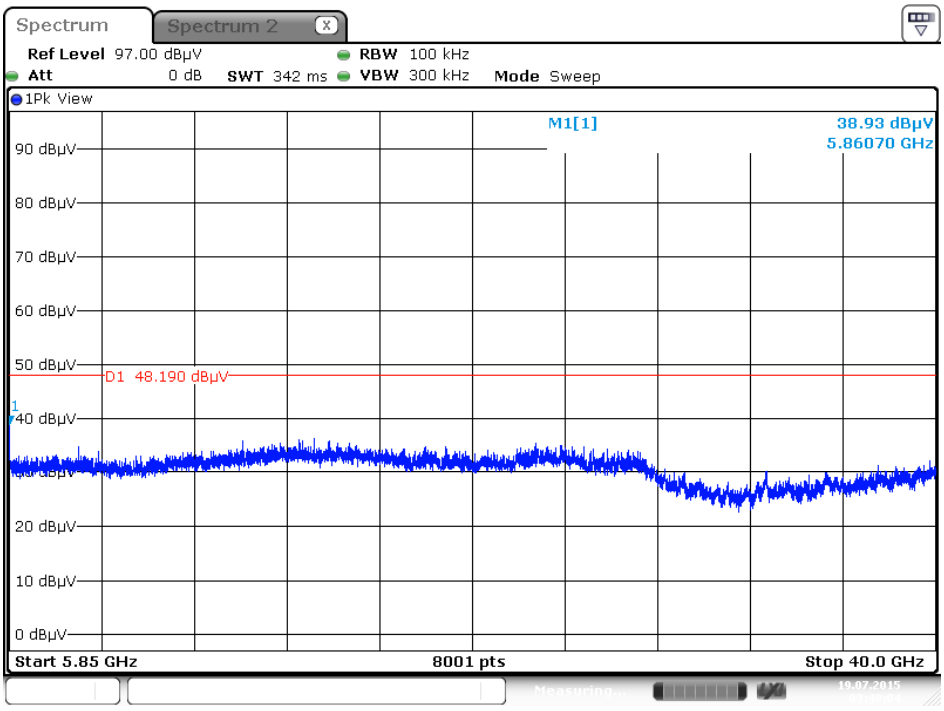
Date: 19.JUL.2015 03:43:35

Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 19.JUL.2015 03:46:39

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 5850MHz~40000MHz (down 30dBc)



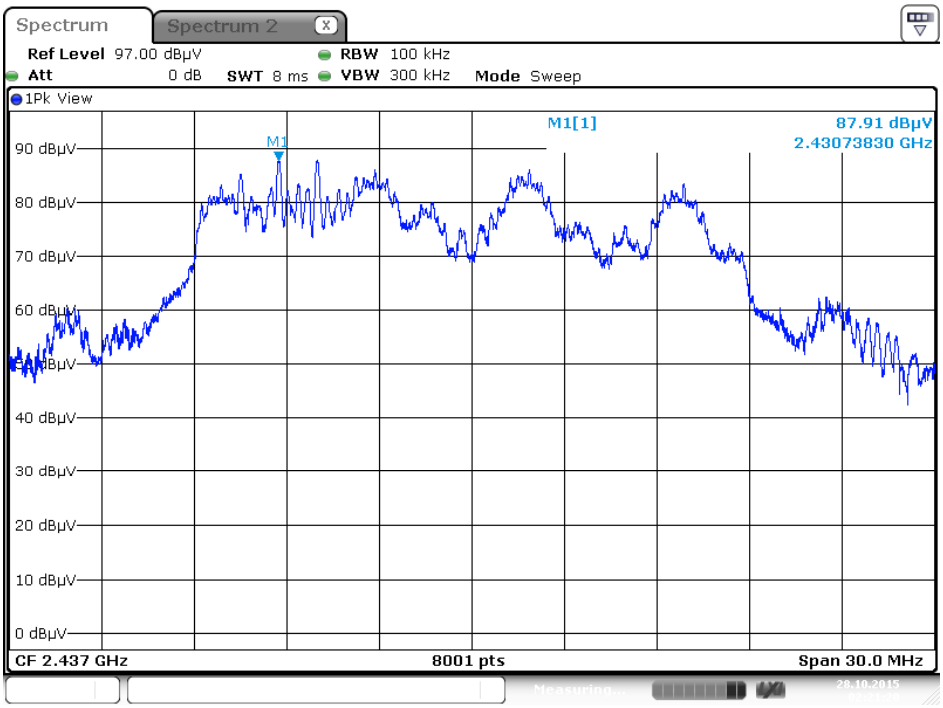
Date: 19.JUL.2015 03:48:04

For 3TX/3RX Function – EUT 1 test record

EUT: Version 2 / Non-beamforming function

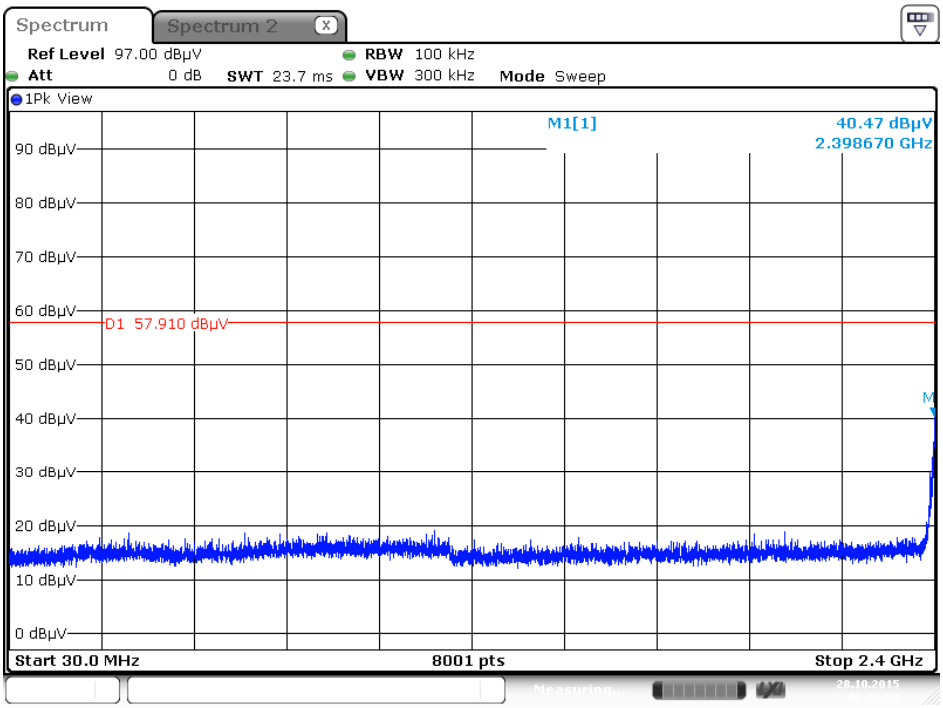
For 2.4GHz Band:

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Reference Level



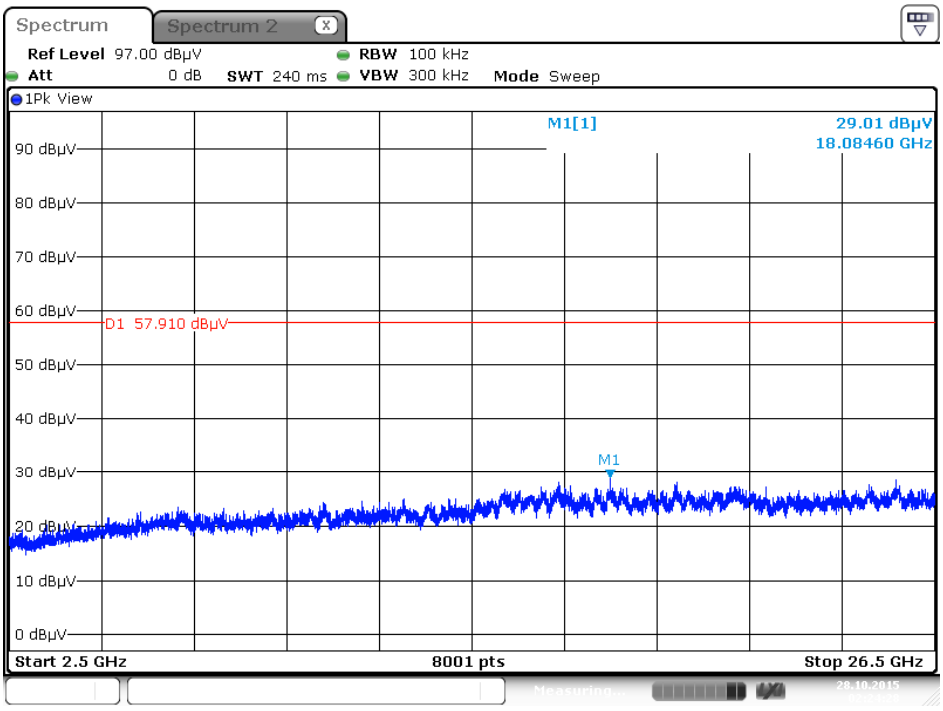
Date: 28.OCT.2015 02:21:20

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



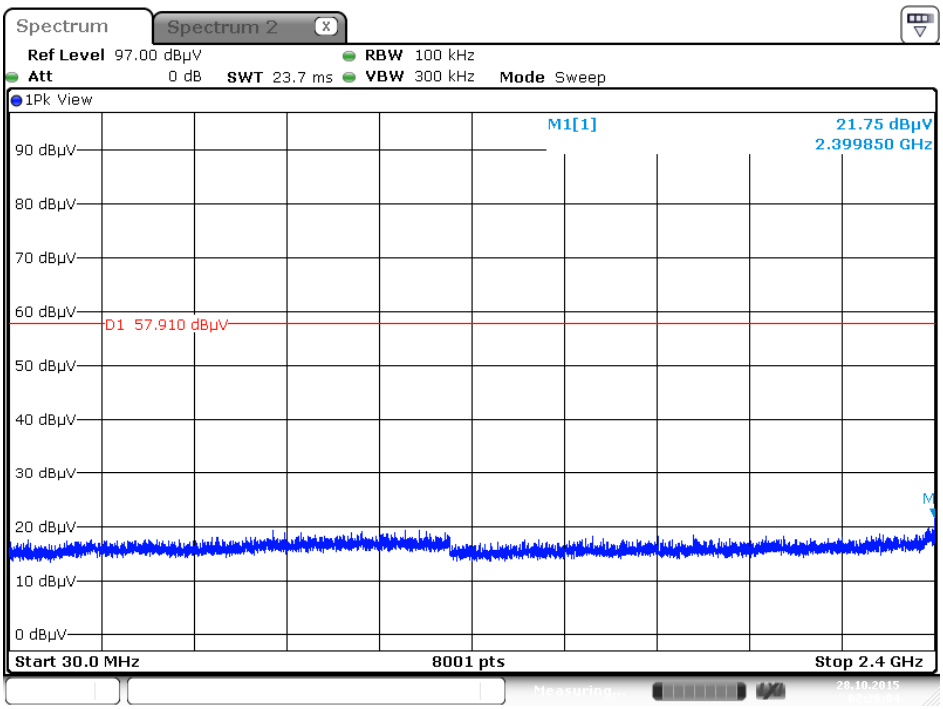
Date: 28.OCT.2015 02:22:54

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



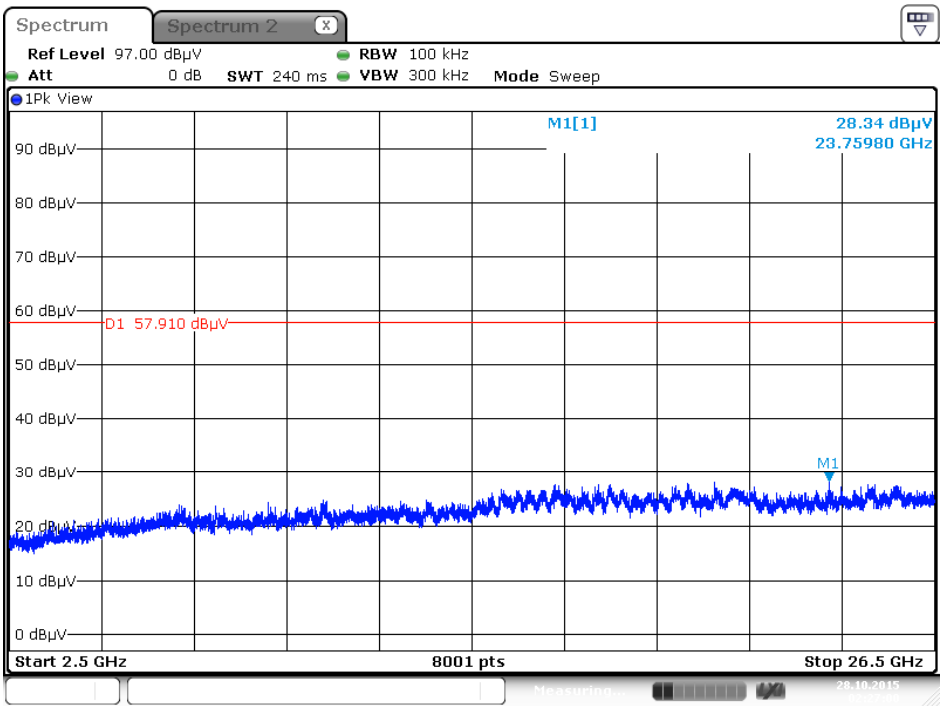
Date: 28.OCT.2015 02:24:28

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 30MHz~2400MHz (down 30dBc)



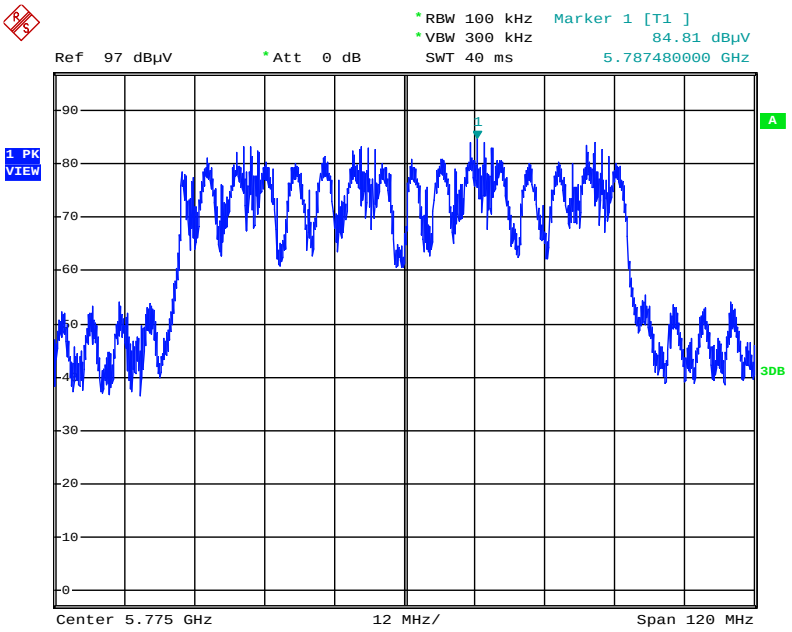
Date: 28.OCT.2015 02:26:04

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



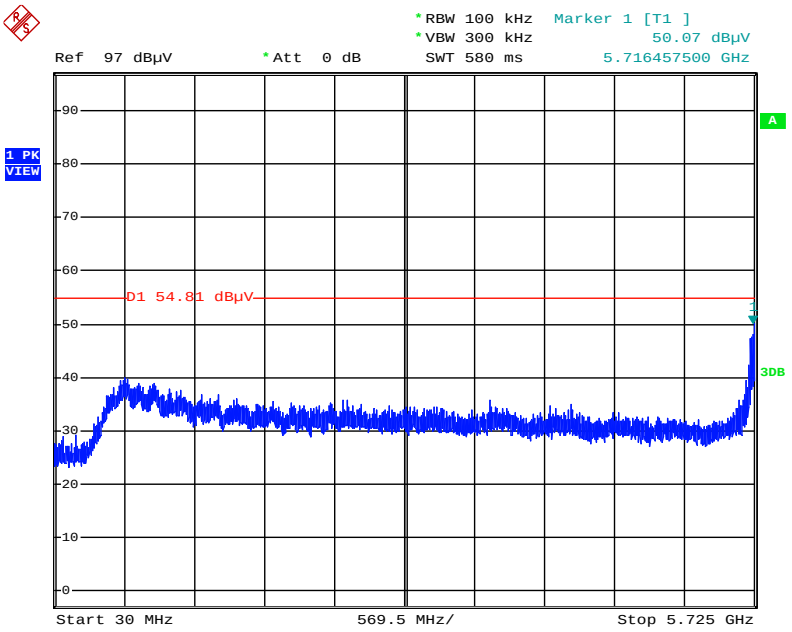
For 5GHz Band:

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Reference Level



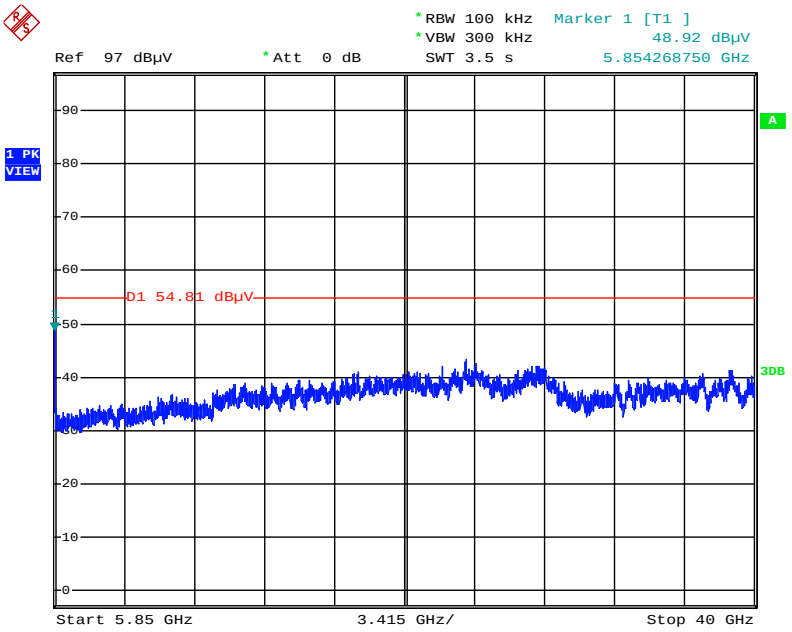
Date: 22.OCT.2015 23:01:43

Plot on Configuration IEEE 802.11ac MCS0/Nss2 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 22.OCT.2015 23:02:28

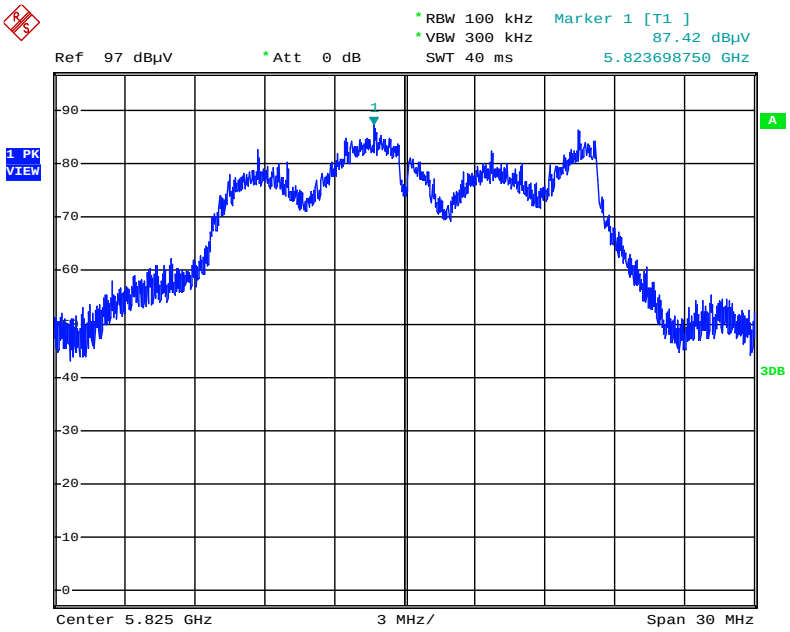
Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 5850MHz~40000MHz (down 30dBc)



Date: 22.OCT.2015 23:04:19

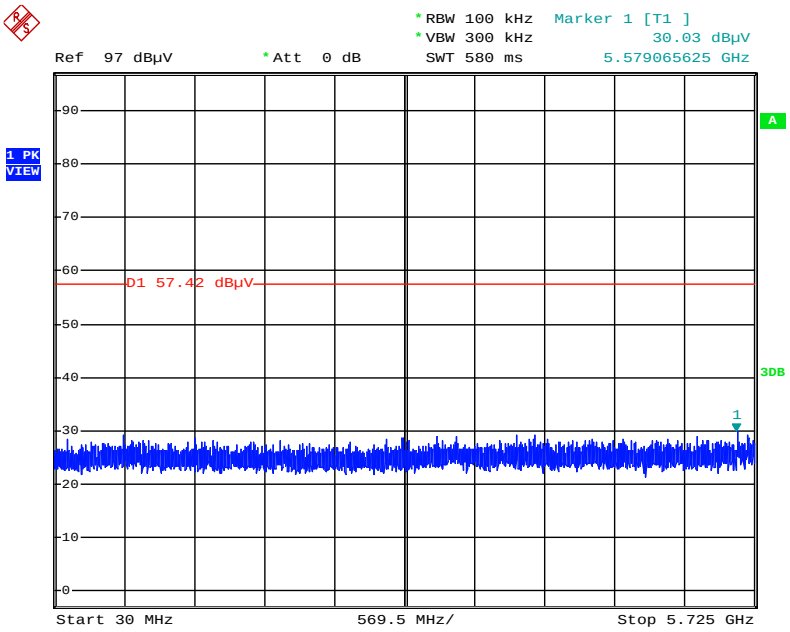
For removing 5GHz Band Pass Filter – EUT 1 test record

Plot on Configuration IEEE 802.11a / Reference Level



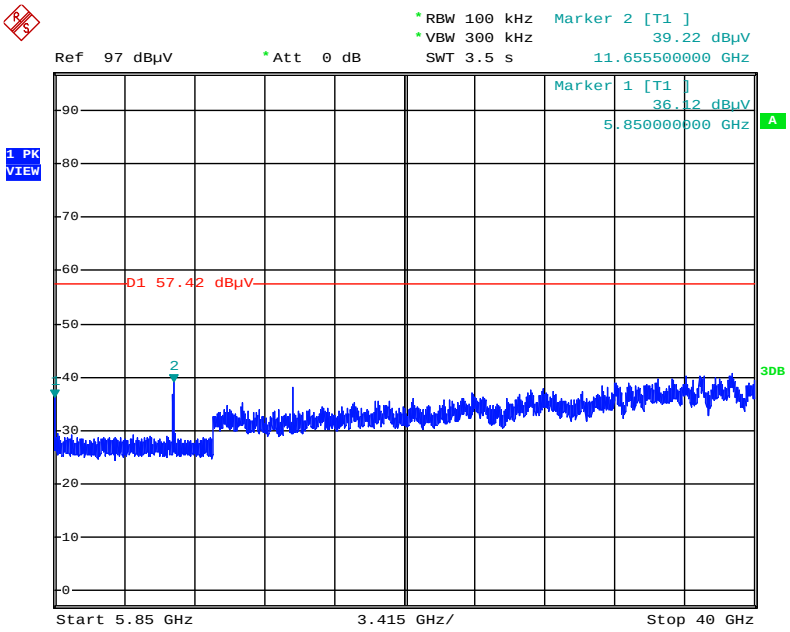
Date: 3.NOV.2015 21:46:25

Plot on Configuration IEEE 802.11a / CH 165 / 30MHz~5725MHz (down 30dBc)



Date: 3.NOV.2015 21:47:08

Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~40000MHz (down 30dBc)



Date: 3.NOV.2015 21:48:12

4.7. Antenna Requirements

4.7.1. 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.

4.7.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

For adding a heat sink (2mm) and resistance (0201) – EUT 1 and two SKU B and SKU C – EUT 2 test record

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (10CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	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)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Jan. 21, 2015	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	N/A	1 m ~ 4 m	N.C.R.	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)
Thermometer	HTC-1	HTC-1	TP-1	-50℃~70℃	Mar. 11, 2015	Radiation (03CH01-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.

For adding adapter 4 ~ 6 – EUT 2 test record

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	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)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	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)

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.

For 3TX/3RX Function and 5GHz Band Pass Filter – EUT 1 test record

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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	Oct. 27, 2015	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)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Sep. 21, 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)
Power Sensor	Agilent	U2021XA	MY54320014	50MHz~18GHz	Mar. 23, 2015	Conducted (TH01-CB)

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

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%