



MEASUREMENT REPORT

EN 302 502 V1.2.1 WLAN 802.11a/n/ac

Applicant: Compex Systems Pte Ltd
Address: 135, Joo Seng Road, #08-01 Singapore 368363
Product: WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER
Model No.: WLE600V5-27ESD
Brand Name: COMPEX
Standards: ETSI EN 302 502 V1.2.1 (2008-07)
Result: Complies
Test Date: Aug. 03 ~ 24, 2014

Reviewed By : Robin Wu
(Robin Wu)
Approved By : Marlin Chen
(Marlin Chen)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1408RSU00105	Rev. 01	Initial report	08-25-2014

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1. General Information

1.1. Applicant

Compex Systems Pte Ltd
135, Joo Seng Road, #08-01 Singapore 368363

1.2. Manufacturer

Compex Systems Pte Ltd
135, Joo Seng Road, #08-01 Singapore 368363

1.3. Testing Facility

Test Site

MRT Technology (Suzhou) Co., Ltd

Test Site Location

D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.
- MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (11384A-1).
- MRT facility is an IC registered (11384A-1) test laboratory with the site description on file at Industry Canada.



1.4. Feature of Product

Product Name	WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER
Model No.	WLE600V5-27ESD
Brand Name	COMPEX
Frequency Range	802.11a /n-HT20/ac-VHT20:5745 ~ 5825MHz
Channel Number	802.11a/n-HT20/ac-VHT20: 5
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 130Mbps 802.11ac: up to 156Mbps

1.5. Frequency / Channel Operation

Channel List for 802.11a/n-HT20/ac-VHT20

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

1.6. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Manufacturer	Tx Paths	Max Directional Gain (dBi)
Panel Antenna 1#	5.1 ~ 5.8	Lanbowan Communications Ltd.	2	25
Panel Antenna 2#	5.1 ~ 5.8	Lanbowan Communications Ltd.	2	23
Panel Antenna 3#	5.1 ~ 5.8	Kenbotong Communication LTD	2	19
Panel Antenna 4#	5.1 ~ 5.8	Compex Systems Pte Ltd	2	17
Panel Antenna 5#	5.1 ~ 5.8	Compex Systems Pte Ltd	2	16
Panel Antenna 6#	5.1 ~ 5.8	Compex Systems Pte Ltd	2	15
Panel Antenna 7#	5.1 ~ 5.8	Kenbotong Communication LTD	2	10
Panel Antenna 8#	5.1 ~ 5.8	Smart Ant Inc	2	7
Panel Antenna 9#	5.1 ~ 5.8	Compex Systems Pte Ltd	2	5
Panel Antenna 10#	5.1 ~ 5.8	Compex Systems Pte Ltd	2	5
Dipole Antenna 1#	5.1 ~ 5.8	Kunshan Wavelink Electronic Co., Ltd.	2	2

Note1: We selected the panel antenna 1# and dipole antenna 1# for all radiated emission testing.

1.7. Standards Applicable for Testing

The EUT complies with the requirements of ETSI EN 302502 V1.2.1.

2. Test Configuration of Equipment under Test

2.1. Description of Test Mode

Pre-Test RF Output Power at various data rates.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	RF Output Power (dBm)
11a	20	157	5785	6	10.50
				24	10.27
				54	10.27
11n	20	157	5785	6.5	10.41
				26	10.26
				65	10.26
11ac	20	157	5785	6.5	10.37
				39	10.22
				78	10.22

Note: All modes of operation and data rates were investigated, so all RF test requirements shall be executed at low data rates.

Test Mode	Duty Cycle
11a	100%
11n-HT20	100%
11ac-VHT20	100%

2.2. Description of Test Software

The test utility software used during testing was “ART2-GUI Version: 2.3”.

Final Power Parameter Value of the test software.

Test Mode	Test Frequency	Power Parameter Value		
		Ant 0	Ant 1	Ant 0 + 1
802.11a	5745	10.5	10.0	Not Support
	5785	10.5	8.0	
	5825	10.5	6.5	
802.11n-HT20	5745	10.5	10.0	7.0
	5785	10.5	8.5	5.0
	5825	10.5	6.5	5.0
802.11ac-VHT20	5745	10.5	10.0	6.5
	5785	10.5	8.5	5.5
	5825	10.5	6.5	5.5

3. Test Summary

Clause EN 302 502	Test Parameter	Result (Pass/Fail)	Remark
4.1	Frequency Error	Pass	--
4.2,4.4	Transmitter RF Output Power, EIRP, TPC and EIRP Spectral Density	Pass	--
4.3.1	Transmitter Unwanted Emissions Outside the 5725 MHz to 5875 MHz Band	Pass	--
4.3.2	Transmitter Unwanted Emissions Within the 5725 MHz to 5875 MHz Band	Pass	--
4.5	Receiver Spurious Emissions	Pass	--
4.6	Dynamic Frequency Selection (DFS)	Pass	Refer to DFS report

4. Carrier Frequencies

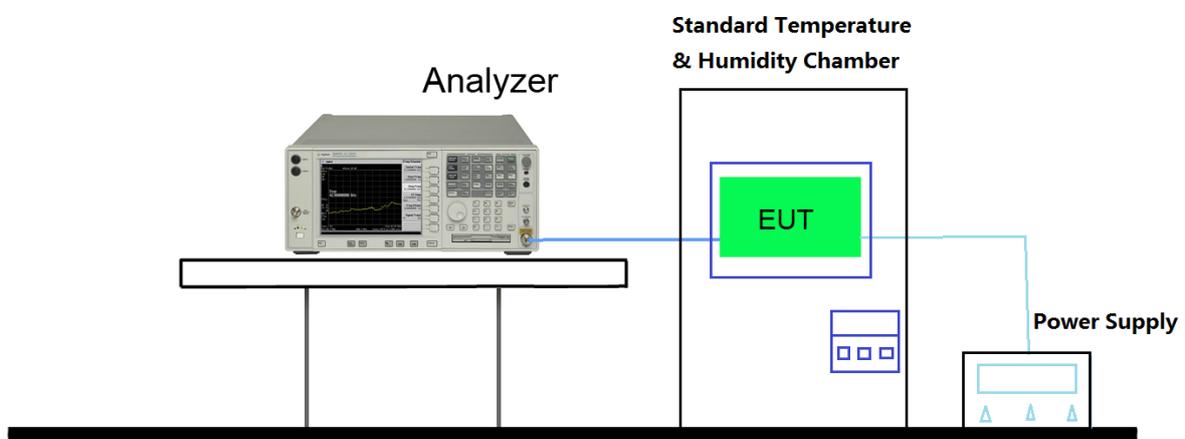
4.1. Limit

The manufacturer shall declare the centre frequencies on which the equipment can operate. The equipment shall only operate in channels centred on any of those frequencies identified in clause 4.1.1 of standard.

The actual carrier centre frequency shall be maintained within the range $f_c \pm 20$ ppm of the nominal channel centre frequency.

4.2. Test Setup

For Conducted Measurement



4.3. Test Procedure

Refer to ETSI EN 302 502 V1.2.1 (2008-07) Clause 5.3.2.

4.4. Test Result

Test Engineer	Milo Li	Temperature	25°C
Test Time	08-20-2014	Relative Humidity	58%

Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)	Result
5745	5745.013684	2.38	≤ 20	Pass
5825	5824.962283	-6.48	≤ 20	Pass

5. Transmitter RF Output Power, EIRP, TPC and EIRP Spectral Density

5.1. Limit

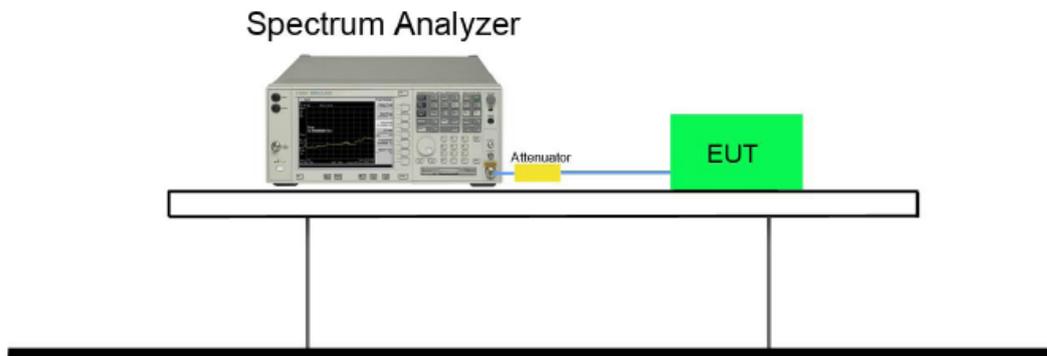
The mean EIRP, RF power and EIRP spectral density when configured to operate at the highest stated power level (Pcond_1) shall not exceed the limit in following table.

Mean RF output power, EIRP and power density limits at the highest power level			
Channel Width ChS	Mean RF power into antenna(dBm)	Mean EIRP (dBm)	Mean EIRP spectral density(dBm/MHz)
10 MHz	27	33	23
20 MHz	30	36	23

The FWA device shall have the capability to reduce the operating mean EIRP level to level not exceeding 24 dBm for ChS = 20 MHz and 21 dBm for ChS = 10 MHz.

Note: The mean EIRP and the mean EIRP spectral density limits apply to a device and not to each radio of a device.

5.2. Test Setup



5.3. Test Procedure

Refer to ETSI EN 302 502 V1.2.1 (2008-07) Clause 5.3.3.

5.4. Test Result

Test Engineer	Milo Li	Temperature	25°C
Test Time	08-20-2014	Relative Humidity	54%

RF Output Power Ant 0 / Ant 1

Mode	N _{Tx}	Ch. No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Average Power Limit (dBm)	Gain (dBi)	Ant 0 Max EIRP Power (dBm)	Ant 1 Max EIRP Power (dBm)	Limit (dBm)	Result
11a	1	149	5745	10.50	10.42	≤30	25	35.50	35.42	≤36	Pass
11a	1	157	5785	10.27	9.87	≤30	25	35.27	34.87	≤36	Pass
11a	1	165	5825	10.27	10.43	≤30	25	35.27	35.43	≤36	Pass
n-HT20	1	149	5745	10.41	10.56	≤30	25	35.41	35.56	≤36	Pass
n-HT20	1	157	5785	10.26	10.43	≤30	25	35.26	35.43	≤36	Pass
n-HT20	1	165	5825	10.26	10.00	≤30	25	35.26	35.00	≤36	Pass
ac-VHT20	1	149	5745	10.37	10.14	≤30	25	35.37	35.14	≤36	Pass
ac-VHT20	1	157	5785	10.22	10.63	≤30	25	35.22	35.63	≤36	Pass
ac-VHT20	1	165	5825	10.22	10.04	≤30	25	35.22	35.04	≤36	Pass

Note: Max EIRP Power(dBm) = Average Power(dBm) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

RF Output Power Ant 0 + 1

Mode	N _{Tx}	Ch. No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Gain (dBi)	Max EIRP Power (dBm)	Limit (dBm)	Result
n-HT20	2	149	5745	5.20	9.30	10.73	≤30	25	35.73	≤36	Pass
n-HT20	2	157	5785	4.74	9.39	10.67	≤30	25	35.67	≤36	Pass
n-HT20	2	165	5825	4.41	9.59	10.74	≤30	25	35.74	≤36	Pass
ac-VHT20	2	149	5745	5.80	8.00	10.05	≤30	25	35.05	≤36	Pass
ac-VHT20	2	157	5785	5.14	9.16	10.61	≤30	25	35.61	≤36	Pass
ac-VHT20	2	165	5825	4.90	9.52	10.81	≤30	25	35.81	≤36	Pass

Note: Max EIRP Power(dBm) = Average Power(dBm) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

Transmit Power Control (TPC) Ant 0 / Ant 1

Mode	N _{Tx}	Channel	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Gain (dBi)	EIRP of TPC (dBm)	EIRP of TPC (dBm)	Limit (dBm)	Result
11a	1	149	5745	-1.42	-1.51	25	23.58	23.49	≤24	Pass
11a	1	157	5785	-1.47	-2.03	25	23.53	22.97	≤24	Pass
11a	1	165	5825	-1.41	-1.52	25	23.59	23.48	≤24	Pass
n-HT20	1	149	5745	-1.42	-1.52	25	23.58	23.48	≤24	Pass
n-HT20	1	157	5785	-1.48	-1.50	25	23.52	23.50	≤24	Pass
n-HT20	1	165	5825	-1.70	-1.94	25	23.30	23.06	≤24	Pass
ac-VHT20	1	149	5745	-1.45	-1.64	25	23.55	23.36	≤24	Pass
ac-VHT20	1	157	5785	-1.52	-1.41	25	23.48	23.59	≤24	Pass
ac-VHT20	1	165	5825	-1.61	-1.77	25	23.39	23.23	≤24	Pass

Note: EIRP of TPC (dBm) = Average Power(dBm) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

Transmit Power Control (TPC) Ant 0 + 1

Mode	N _{Tx}	Channel	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Gain (dBi)	EIRP of TPC (dBm)	Limit (dBm)	Result
n-HT20	2	149	5745	-6.91	-2.47	-1.14	25	23.86	≤24	Pass
n-HT20	2	157	5785	-7.02	-2.63	-1.28	25	23.72	≤24	Pass
n-HT20	2	165	5825	-7.24	-2.49	-1.24	25	23.76	≤24	Pass
ac-VHT20	2	149	5745	-6.28	-3.80	-1.86	25	23.14	≤24	Pass
ac-VHT20	2	157	5785	-6.90	-2.53	-1.18	25	23.82	≤24	Pass
ac-VHT20	2	165	5825	-7.12	-2.37	-1.12	25	23.88	≤24	Pass

Note: EIRP of TPC (dBm) = Average Power(dBm) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

Power Density Ant 0 / Ant 1

Mode	N _{Tx}	Chan nel	Freq. (MHz)	Ant 0 Spectral Power Density (dBm/M Hz)	Ant 1 Spectral Power Density (dBm/M Hz)	Gain (dBi)	Ant 0 EIRP Spectral Power Density (dBm/MHz)	Ant 1 EIRP Spectral Power Density (dBm/MHz)	Limit (dBm)	Result
11a	1	149	5745	-2.10	-2.10	25	22.90	22.90	≤23	Pass
11a	1	157	5785	-2.48	-2.90	25	22.52	22.10	≤23	Pass
11a	1	165	5825	-2.58	-2.84	25	22.42	22.16	≤23	Pass
n-HT20	1	149	5745	-2.56	-2.74	25	22.44	22.26	≤23	Pass
n-HT20	1	157	5785	-2.18	-2.53	25	22.82	22.47	≤23	Pass
n-HT20	1	165	5825	-2.50	-3.48	25	22.50	21.52	≤23	Pass
ac-VHT20	1	149	5745	-2.25	-2.76	25	22.75	22.24	≤23	Pass
ac-VHT20	1	157	5785	-2.31	-2.53	25	22.69	22.47	≤23	Pass
ac-VHT20	1	165	5825	-2.53	-2.37	25	22.47	22.63	≤23	Pass

Note: EIRP Spectral Power Density (dBm/MHz) = Spectral Power Density (dBm/MHz) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

Power Density Ant 0 + 1

Mode	N _{Tx}	Chan nel	Freq. (MHz)	Ant 0 Spectral Power Density (dBm/M Hz)	Ant 1 Spectral Power Density (dBm/M Hz)	Total Spectral Power Density (dBm/MHz)	Gain (dBi)	EIRP Spectral Power Density (dBm/MHz)	Limit (dBm)	Result
n-HT20	2	149	5745	-6.340	-5.52	-6.34	25	22.10	≤23	Pass
n-HT20	2	157	5785	-6.740	-5.61	-6.74	25	21.87	≤23	Pass
n-HT20	2	165	5825	-6.850	-5.0	-6.85	25	22.13	≤23	Pass
ac-VHT20	2	149	5745	-5.940	-5.86	-5.94	25	22.11	≤23	Pass
ac-VHT20	2	157	5785	-6.210	-5.42	-6.21	25	22.21	≤23	Pass
ac-VHT20	2	165	5825	-6.520	-5.62	-6.52	25	21.96	≤23	Pass

Note: EIRP Spectral Power Density (dBm/MHz) = Spectral Power Density (dBm/MHz) + Antenna Gain(dBi) + 10*log(1/Duty Cycle).

6. Transmitter Unwanted Emissions Outside the 5725 MHz to 5875 MHz Band

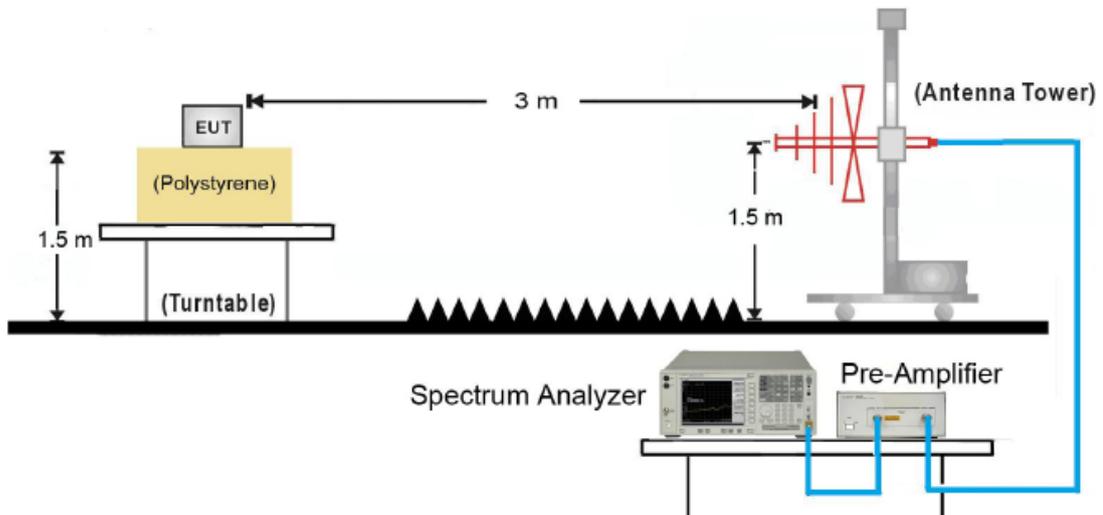
6.1. Limit

Frequency Range (MHz)	Limit (dBm)	Bandwidth (kHz) (see note)
30 to 1000	-36	100
1000 to 5725	-30	1000
5875 to 26500	-30	1000

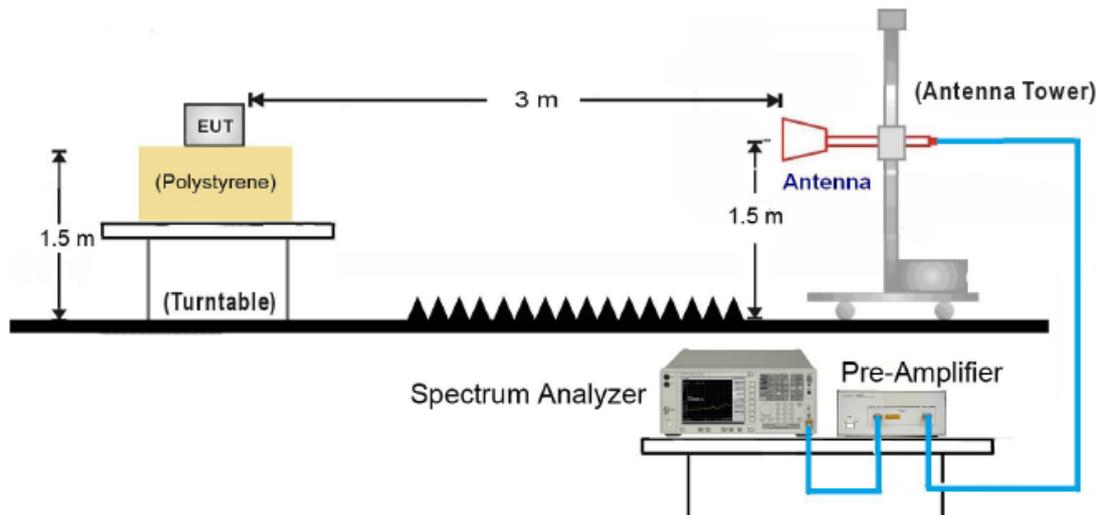
Note: At frequencies just below 5725 MHz or just above 5875 MHz, account shall be taken of the spacing between the emission centre frequency and the measurement centre frequency to evaluate the appropriate reference bandwidth given in annex 2 of CEPT/ERC Recommendation 74-01 [10].

6.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.3. Test Procedure

Refer to ETSI EN 302 502 V1.2.1 (2008-07) Clause 5.3.4.1.

6.4. Test Result

Test by Panel Antenna – 25dBi

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	674.6	-65.37	-36	-29.37	Peak	Horizontal
	512.4	-68.93	-36	-32.93	Peak	Vertical
	855.3	-68.58	-36	-32.58	Peak	Horizontal
	611.4	-67.42	-36	-31.42	Peak	Vertical
	11490.0	-42.27	-30	-12.27	Peak	Horizontal
	11490.0	-44.12	-30	-14.12	Peak	Vertical
	17235.0	-35.45	-30	-5.45	Peak	Horizontal
	17235.0	-37.72	-30	-7.72	Peak	Vertical
165	605.6	-69.90	-36	-33.90	Peak	Horizontal
	319.3	-71.87	-36	-35.87	Peak	Vertical
	661.3	-69.26	-36	-33.26	Peak	Horizontal
	560.6	-66.74	-36	-30.74	Peak	Vertical
	11650.0	-37.03	-30	-7.03	Peak	Horizontal
	11650.0	-38.53	-30	-8.53	Peak	Vertical
	17475.0	-35.73	-30	-5.73	Peak	Horizontal
	17475.0	-36.18	-30	-6.18	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	740.3	-68.09	-36	-32.09	Peak	Horizontal
	451.6	-64.31	-36	-28.31	Peak	Vertical
	921.3	-64.99	-36	-28.99	Peak	Horizontal
	624.8	-73.51	-36	-37.51	Peak	Vertical
	11490.0	-44.33	-30	-14.33	Peak	Horizontal
	11490.0	-41.81	-30	-11.81	Peak	Vertical
	17235.0	-39.66	-30	-9.66	Peak	Horizontal
	17235.0	-37.57	-30	-7.57	Peak	Vertical
165	379.2	-60.79	-36	-24.79	Peak	Horizontal
	524.5	-63.76	-36	-27.76	Peak	Vertical
	619.8	-57.09	-36	-21.09	Peak	Horizontal
	626.7	-66.37	-36	-30.37	Peak	Vertical
	11650.0	-33.56	-30	-3.56	Peak	Horizontal
	11650.0	-37.17	-30	-7.17	Peak	Vertical
	17475.0	-34.92	-30	-4.92	Peak	Horizontal
	17475.0	-36.17	-30	-6.17	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	630.6	-60.96	-36	-24.96	Peak	Horizontal
	612.8	-62.97	-36	-26.97	Peak	Vertical
	739.1	-58.59	-36	-22.59	Peak	Horizontal
	739.7	-67.79	-36	-31.79	Peak	Vertical
	11490.0	-41.56	-30	-11.56	Peak	Horizontal
	11490.0	-42.27	-30	-12.27	Peak	Vertical
	17235.0	-35.56	-30	-5.56	Peak	Horizontal
	17235.0	-39.21	-30	-9.21	Peak	Vertical
165	612.6	-63.50	-36	-27.50	Peak	Horizontal
	568.5	-68.11	-36	-32.11	Peak	Vertical
	705.9	-70.44	-36	-34.44	Peak	Horizontal
	625.2	-63.93	-36	-27.93	Peak	Vertical
	11650.0	-35.52	-30	-5.52	Peak	Horizontal
	11650.0	-36.61	-30	-6.61	Peak	Vertical
	17475.0	-36.43	-30	-6.43	Peak	Horizontal
	17475.0	-34.80	-30	-4.80	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	438.3	-71.80	-36	-35.80	Peak	Horizontal
	558.3	-65.27	-36	-29.27	Peak	Vertical
	691.4	-58.80	-36	-22.80	Peak	Horizontal
	794.6	-69.13	-36	-33.13	Peak	Vertical
	11490.0	-40.65	-30	-10.65	Peak	Horizontal
	11490.0	-43.15	-30	-13.15	Peak	Vertical
	17235.0	-36.91	-30	-6.91	Peak	Horizontal
	17235.0	-37.66	-30	-7.66	Peak	Vertical
165	572.9	-64.90	-36	-28.90	Peak	Horizontal
	501.2	-67.68	-36	-31.68	Peak	Vertical
	797.4	-69.69	-36	-33.69	Peak	Horizontal
	716.7	-62.65	-36	-26.65	Peak	Vertical
	11650.0	-36.80	-30	-6.80	Peak	Horizontal
	11650.0	-37.30	-30	-7.30	Peak	Vertical
	17475.0	-35.97	-30	-5.97	Peak	Horizontal
	17475.0	-35.82	-30	-5.82	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	382.8	-66.36	-36	-30.36	Peak	Horizontal
	629.0	-63.16	-36	-27.16	Peak	Vertical
	723.5	-67.42	-36	-31.42	Peak	Horizontal
	825.0	-68.63	-36	-32.63	Peak	Vertical
	11490.0	-42.56	-30	-12.56	Peak	Horizontal
	11490.0	-44.62	-30	-14.62	Peak	Vertical
	17235.0	-34.81	-30	-4.81	Peak	Horizontal
	17235.0	-38.30	-30	-8.30	Peak	Vertical
165	503.6	-65.61	-36	-29.61	Peak	Horizontal
	625.5	-63.21	-36	-27.21	Peak	Vertical
	600.3	-67.02	-36	-31.02	Peak	Horizontal
	822.0	-70.39	-36	-34.39	Peak	Vertical
	11650.0	-36.01	-30	-6.01	Peak	Horizontal
	11650.0	-38.55	-30	-8.55	Peak	Vertical
	17475.0	-35.69	-30	-5.69	Peak	Horizontal
	17475.0	-37.41	-30	-7.41	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	123.4	-62.82	-36	-26.82	Peak	Horizontal
	-74.6	-62.89	-36	-26.89	Peak	Vertical
	307.7	-63.14	-36	-27.14	Peak	Horizontal
	373.9	-61.83	-36	-25.83	Peak	Vertical
	11490.0	-42.48	-30	-12.48	Peak	Horizontal
	11490.0	-43.93	-30	-13.93	Peak	Vertical
	17235.0	-36.03	-30	-6.03	Peak	Horizontal
	17235.0	-38.31	-30	-8.31	Peak	Vertical
165	179.8	-66.26	-36	-30.26	Peak	Horizontal
	149.9	-62.50	-36	-26.50	Peak	Vertical
	207.8	-52.68	-36	-16.68	Peak	Horizontal
	245.3	-52.50	-36	-16.50	Peak	Vertical
	11650.0	-40.57	-30	-10.57	Peak	Horizontal
	11650.0	-37.84	-30	-7.84	Peak	Vertical
	17475.0	-35.60	-30	-5.60	Peak	Horizontal
	17475.0	-35.92	-30	-5.92	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	292.6	-61.31	-36	-25.31	Peak	Horizontal
	183.3	-63.95	-36	-27.95	Peak	Vertical
	392.3	-66.82	-36	-30.82	Peak	Horizontal
	309.6	-65.32	-36	-29.32	Peak	Vertical
	11490.0	-45.72	-30	-15.72	Peak	Horizontal
	11490.0	-44.74	-30	-14.74	Peak	Vertical
	17235.0	-37.90	-30	-7.90	Peak	Horizontal
	17235.0	-37.51	-30	-7.51	Peak	Vertical
165	105.6	-63.78	-36	-27.78	Peak	Horizontal
	140.5	-61.62	-36	-25.62	Peak	Vertical
	344.2	-63.53	-36	-27.53	Peak	Horizontal
	289.9	-65.79	-36	-29.79	Peak	Vertical
	11650.0	-41.01	-30	-11.01	Peak	Horizontal
	11650.0	-39.46	-30	-9.46	Peak	Vertical
	17475.0	-35.31	-30	-5.31	Peak	Horizontal
	17475.0	-37.11	-30	-7.11	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	231.4	-66.62	-36	-30.62	Peak	Horizontal
	169.3	-64.05	-36	-28.05	Peak	Vertical
	408.4	-61.82	-36	-25.82	Peak	Horizontal
	439.9	-65.62	-36	-29.62	Peak	Vertical
	11490.0	-41.24	-30	-11.24	Peak	Horizontal
	11490.0	-43.93	-30	-13.93	Peak	Vertical
	17235.0	-37.52	-30	-7.52	Peak	Horizontal
	17235.0	-38.11	-30	-8.11	Peak	Vertical
165	193.1	-65.87	-36	-29.87	Peak	Horizontal
	232.7	-64.71	-36	-28.71	Peak	Vertical
	325.3	-68.50	-36	-32.50	Peak	Horizontal
	208.0	-61.97	-36	-25.97	Peak	Vertical
	11650.0	-38.00	-30	-8.00	Peak	Horizontal
	11650.0	-40.51	-30	-10.51	Peak	Vertical
	17475.0	-35.17	-30	-5.17	Peak	Horizontal
	17475.0	-39.14	-30	-9.14	Peak	Vertical

Test by Dipole Antenna – 2dBi

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	224.5	-64.23	-36	-28.23	Peak	Horizontal
	233.1	-64.63	-36	-28.63	Peak	Vertical
	327.7	-60.00	-36	-24.00	Peak	Horizontal
	381.7	-60.87	-36	-24.87	Peak	Vertical
	11490.0	-46.10	-30	-16.10	Peak	Horizontal
	11490.0	-43.15	-30	-13.15	Peak	Vertical
	17235.0	-35.78	-30	-5.78	Peak	Horizontal
	17235.0	-36.78	-30	-6.78	Peak	Vertical
165	174.6	-63.74	-36	-27.74	Peak	Horizontal
	213.1	-55.39	-36	-19.39	Peak	Vertical
	397.0	-53.18	-36	-17.18	Peak	Horizontal
	397.6	-57.20	-36	-21.20	Peak	Vertical
	11650.0	-40.44	-30	-10.44	Peak	Horizontal
	11650.0	-37.57	-30	-7.57	Peak	Vertical
	17475.0	-35.78	-30	-5.78	Peak	Horizontal
	17475.0	-35.26	-30	-5.26	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	287.1	-53.34	-36	-17.34	Peak	Horizontal
	151.9	-56.30	-36	-20.30	Peak	Vertical
	397.8	-61.12	-36	-25.12	Peak	Horizontal
	432.8	-55.41	-36	-19.41	Peak	Vertical
	11490.0	-42.95	-30	-12.95	Peak	Horizontal
	11490.0	-44.83	-30	-14.83	Peak	Vertical
	17235.0	-34.52	-30	-4.52	Peak	Horizontal
	17235.0	-38.61	-30	-8.61	Peak	Vertical
165	217.1	-64.10	-36	-28.10	Peak	Horizontal
	183.6	-59.47	-36	-23.47	Peak	Vertical
	310.0	-52.11	-36	-16.11	Peak	Horizontal
	314.3	-58.19	-36	-22.19	Peak	Vertical
	11650.0	-40.08	-30	-10.08	Peak	Horizontal
	11650.0	-37.63	-30	-7.63	Peak	Vertical
	17475.0	-35.97	-30	-5.97	Peak	Horizontal
	17475.0	-38.04	-30	-8.04	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	95.4	-63.39	-36	-27.39	Peak	Horizontal
	91.9	-61.59	-36	-25.59	Peak	Vertical
	309.1	-62.17	-36	-26.17	Peak	Horizontal
	313.7	-62.21	-36	-26.21	Peak	Vertical
	11490.0	-43.53	-30	-13.53	Peak	Horizontal
	11490.0	-42.90	-30	-12.90	Peak	Vertical
	17235.0	-36.79	-30	-6.79	Peak	Horizontal
	17235.0	-38.88	-30	-8.88	Peak	Vertical
165	131.0	-67.11	-36	-31.11	Peak	Horizontal
	266.9	-63.36	-36	-27.36	Peak	Vertical
	244.3	-51.75	-36	-15.75	Peak	Horizontal
	343.9	-52.35	-36	-16.35	Peak	Vertical
	11650.0	-40.46	-30	-10.46	Peak	Horizontal
	11650.0	-37.76	-30	-7.76	Peak	Vertical
	17475.0	-34.28	-30	-4.28	Peak	Horizontal
	17475.0	-36.58	-30	-6.58	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	292.7	-62.07	-36	-26.07	Peak	Horizontal
	167.0	-64.63	-36	-28.63	Peak	Vertical
	433.5	-65.72	-36	-29.72	Peak	Horizontal
	287.7	-65.15	-36	-29.15	Peak	Vertical
	11490.0	-46.32	-30	-16.32	Peak	Horizontal
	11490.0	-44.83	-30	-14.83	Peak	Vertical
	17235.0	-38.43	-30	-8.43	Peak	Horizontal
	17235.0	-37.01	-30	-7.01	Peak	Vertical
165	75.8	-62.59	-36	-26.59	Peak	Horizontal
	202.1	-61.19	-36	-25.19	Peak	Vertical
	254.3	-63.48	-36	-27.48	Peak	Horizontal
	339.9	-66.85	-36	-30.85	Peak	Vertical
	11650.0	-41.00	-30	-11.00	Peak	Horizontal
	11650.0	-39.46	-30	-9.46	Peak	Vertical
	17475.0	-35.10	-30	-5.10	Peak	Horizontal
	17475.0	-37.69	-30	-7.69	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	173.0	-67.05	-36	-31.05	Peak	Horizontal
	227.3	-64.17	-36	-28.17	Peak	Vertical
	272.4	-62.11	-36	-26.11	Peak	Horizontal
	387.5	-65.56	-36	-29.56	Peak	Vertical
	11490.0	-41.92	-30	-11.92	Peak	Horizontal
	11490.0	-42.90	-30	-12.90	Peak	Vertical
	17235.0	-37.69	-30	-7.69	Peak	Horizontal
	17235.0	-39.55	-30	-9.55	Peak	Vertical
165	192.5	-65.51	-36	-29.51	Peak	Horizontal
	298.2	-65.05	-36	-29.05	Peak	Vertical
	347.1	-67.37	-36	-31.37	Peak	Horizontal
	463.4	-61.89	-36	-25.89	Peak	Vertical
	11650.0	-38.52	-30	-8.52	Peak	Horizontal
	11650.0	-40.14	-30	-10.14	Peak	Vertical
	17475.0	-34.98	-30	-4.98	Peak	Horizontal
	17475.0	-38.15	-30	-8.15	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	493.9	-61.00	-36	-25.00	Peak	Horizontal
	666.4	-63.84	-36	-27.84	Peak	Vertical
	646.5	-57.60	-36	-21.60	Peak	Horizontal
	724.5	-68.71	-36	-32.71	Peak	Vertical
	11490.0	-40.65	-30	-10.65	Peak	Horizontal
	11490.0	-42.55	-30	-12.55	Peak	Vertical
	17235.0	-36.37	-30	-6.37	Peak	Horizontal
	17235.0	-39.66	-30	-9.66	Peak	Vertical
165	565.1	-63.14	-36	-27.14	Peak	Horizontal
	606.5	-68.67	-36	-32.67	Peak	Vertical
	645.8	-69.86	-36	-33.86	Peak	Horizontal
	735.6	-63.24	-36	-27.24	Peak	Vertical
	11650.0	-32.92	-30	-2.92	Peak	Horizontal
	11650.0	-36.05	-30	-6.05	Peak	Vertical
	17475.0	-36.40	-30	-6.40	Peak	Horizontal
	17475.0	-35.87	-30	-5.87	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	544.9	-72.24	-36	-36.24	Peak	Horizontal
	384.4	-65.95	-36	-29.95	Peak	Vertical
	630.3	-58.46	-36	-22.46	Peak	Horizontal
	655.7	-69.90	-36	-33.90	Peak	Vertical
	11490.0	-41.48	-30	-11.48	Peak	Horizontal
	11490.0	-44.23	-30	-14.23	Peak	Vertical
	17235.0	-37.54	-30	-7.54	Peak	Horizontal
	17235.0	-38.67	-30	-8.67	Peak	Vertical
165	629.0	-65.21	-36	-29.21	Peak	Horizontal
	451.9	-67.70	-36	-31.70	Peak	Vertical
	801.2	-68.93	-36	-32.93	Peak	Horizontal
	594.0	-62.27	-36	-26.27	Peak	Vertical
	11650.0	-36.38	-30	-6.38	Peak	Horizontal
	11650.0	-37.42	-30	-7.42	Peak	Vertical
	17475.0	-34.52	-30	-4.52	Peak	Horizontal
	17475.0	-35.10	-30	-5.10	Peak	Vertical

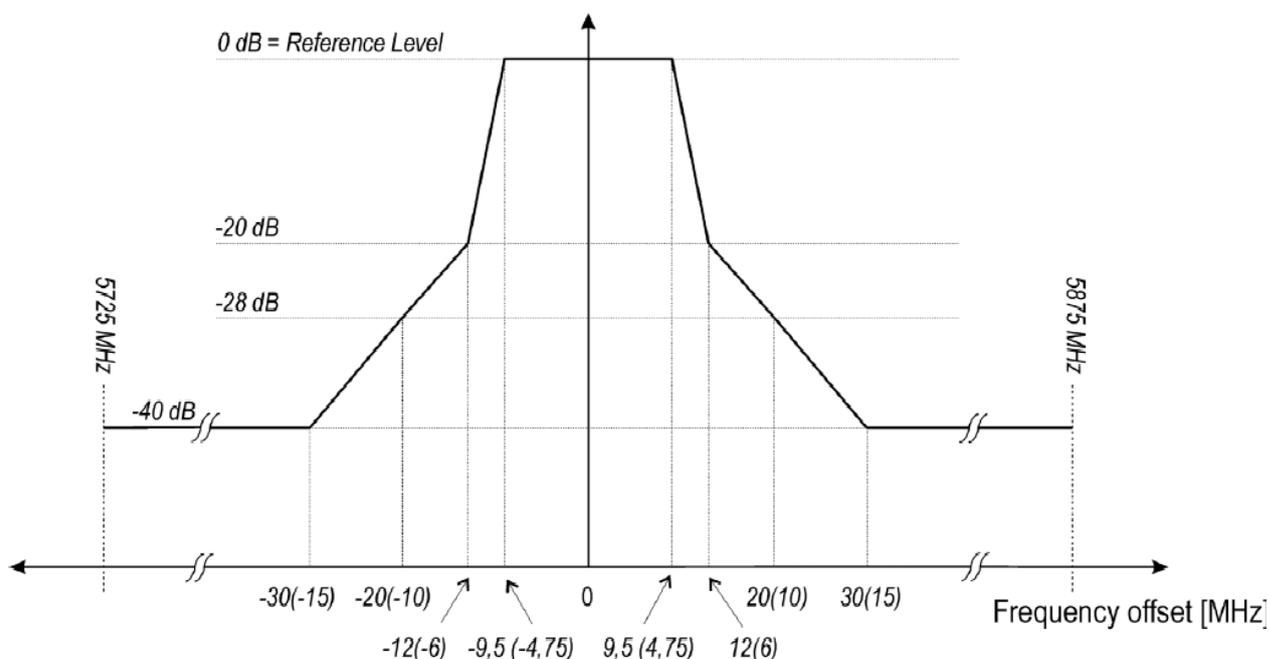
Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	463.5	-65.79	-36	-29.79	Peak	Horizontal
	311.7	-62.03	-36	-26.03	Peak	Vertical
	724.0	-65.86	-36	-29.86	Peak	Horizontal
	766.9	-69.77	-36	-33.77	Peak	Vertical
	11490.0	-41.06	-30	-11.06	Peak	Horizontal
	11490.0	-44.41	-30	-14.41	Peak	Vertical
	17235.0	-35.47	-30	-5.47	Peak	Horizontal
	17235.0	-38.89	-30	-8.89	Peak	Vertical
165	606.8	-65.00	-36	-29.00	Peak	Horizontal
	699.8	-62.26	-36	-26.26	Peak	Vertical
	892.0	-67.82	-36	-31.82	Peak	Horizontal
	779.5	-69.12	-36	-33.12	Peak	Vertical
	11650.0	-35.77	-30	-5.77	Peak	Horizontal
	11650.0	-38.38	-30	-8.38	Peak	Vertical
	17475.0	-34.10	-30	-4.10	Peak	Horizontal
	17475.0	-36.61	-30	-6.61	Peak	Vertical

7. Transmitter Unwanted Emissions Within the 5725 MHz to 5875 MHz Band

7.1. Limit

The average level of the transmitted spectrum based on the declared ChS shall not exceed the limits given in figure 1 when operating under highest output power conditions.

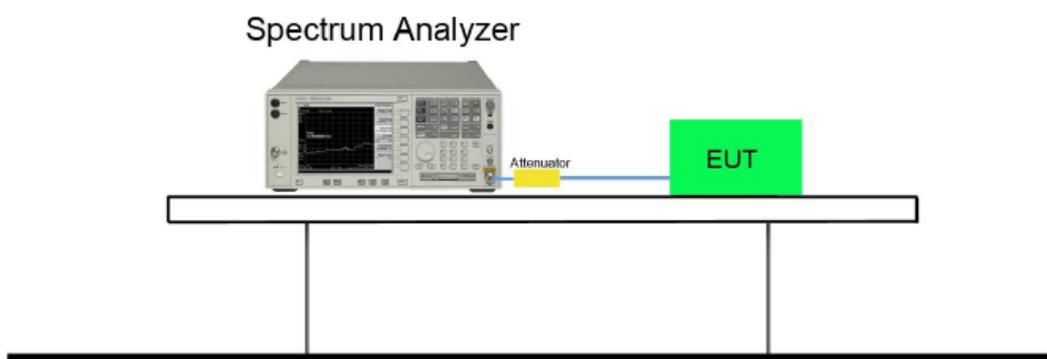


NOTE 1: 0 dB Reference Level is the spectral density relative to the maximum spectral power density of the transmitted signal.

NOTE 2: On the Frequency Offset axis, the figures apply to ChS = 20 MHz whereas the figures in parentheses apply to ChS = 10 MHz.

NOTE 3: Emissions that fall outside the lower and upper band frequency limits of 5 725 MHz and 5 875 MHz respectively shall instead meet the unwanted emission limits of clause 4.3.1.

7.2. Test Setup



7.3. Test Procedure

Refer to ETSI EN 302 502 V1.2.1 (2008-07) Clause 5.3.4.2.

7.4. Test Result

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-24-2014	Relative Humidity	54%

Test Mode	Channel No.	Frequency (MHz)	Result
Ant 0			
802.11a	149	5745	Pass
802.11a	165	5825	Pass
802.11n-HT20	149	5745	Pass
802.11n-HT20	165	5825	Pass
802.11ac-VHT20	149	5745	Pass
802.11ac-VHT20	165	5825	Pass
Ant 1			
802.11a	149	5745	Pass
802.11a	165	5825	Pass
802.11n-HT20	149	5745	Pass
802.11n-HT20	165	5825	Pass
802.11ac-VHT20	149	5745	Pass
802.11ac-VHT20	165	5825	Pass
Ant 0 + 1			
802.11n-HT20	149	5745	Pass
802.11n-HT20	165	5825	Pass
802.11ac-VHT20	149	5745	Pass
802.11ac-VHT20	165	5825	Pass

Transmitter Unwanted Emissions Within the 5GHz RLAN Bands

802.11a - Ant 0

Channel 149 (5745MHz)



Channel 165 (5825MHz)

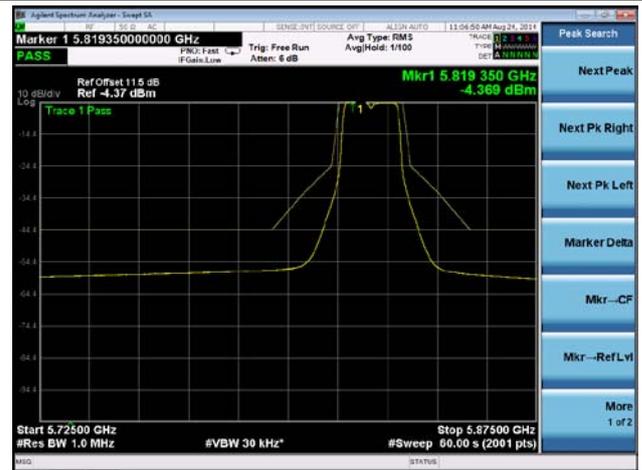


802.11a - Ant 1

Channel 149 (5745MHz)



Channel 165 (5825MHz)

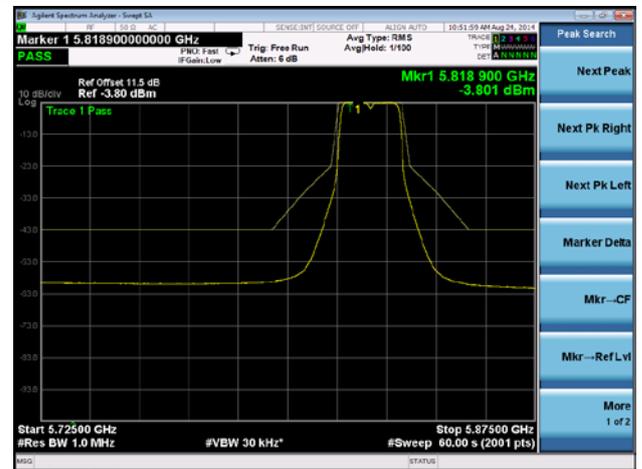


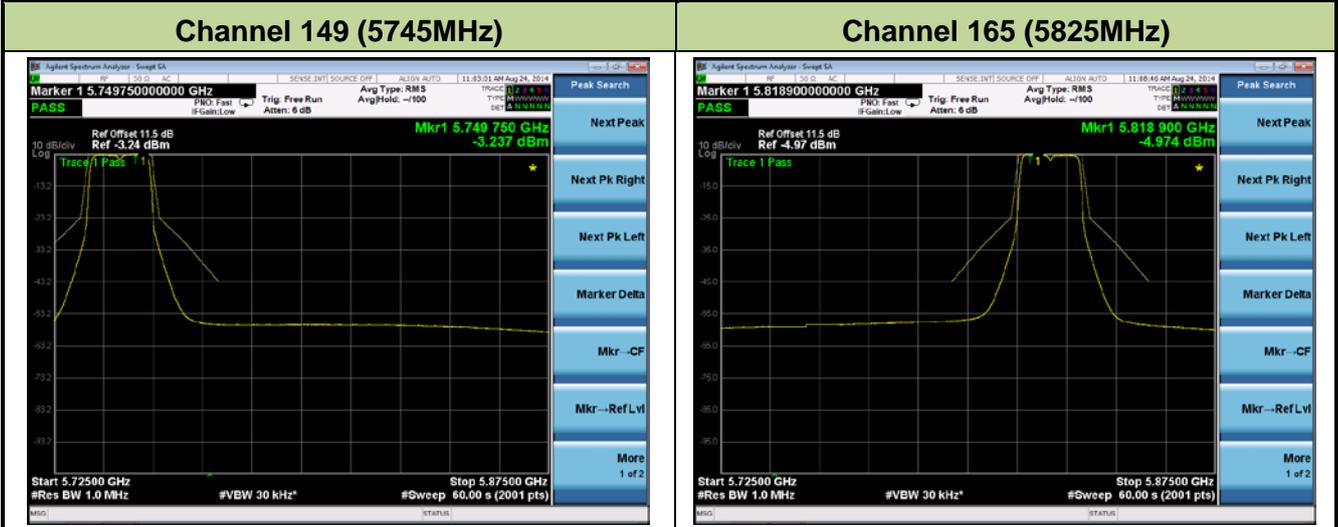
802.11n-HT20 - Ant 0

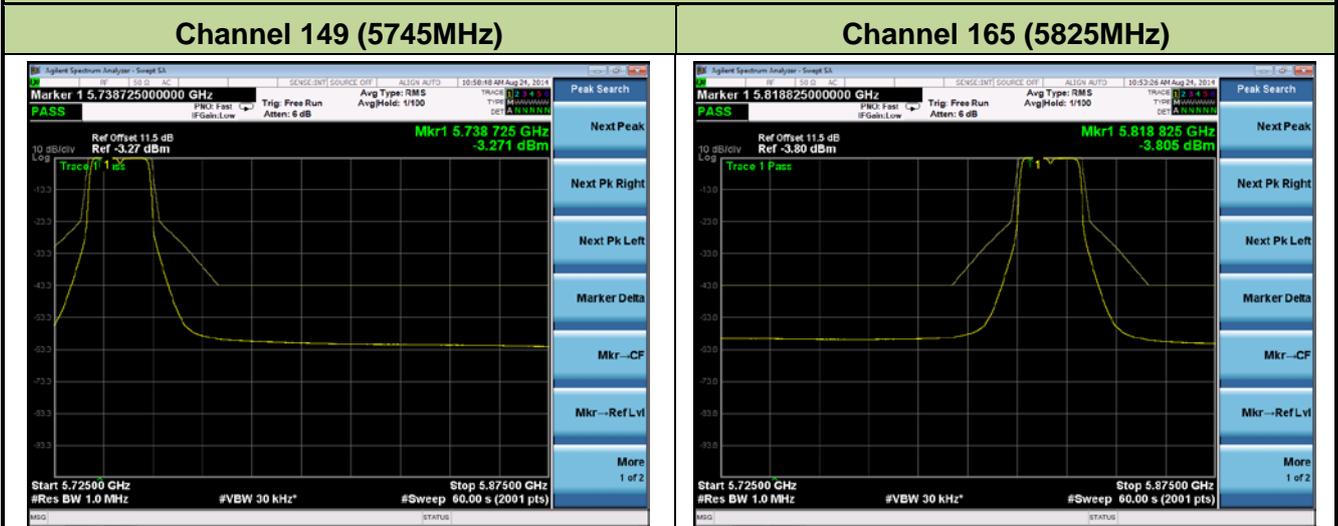
Channel 149 (5745MHz)



Channel 165 (5825MHz)

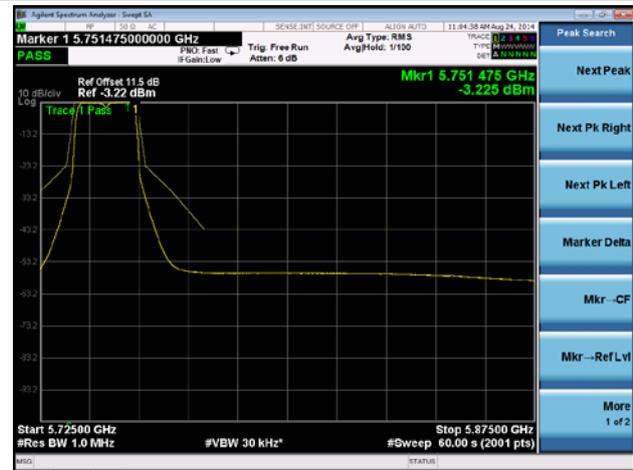


802.11n-HT20 - Ant 1

802.11n-HT20 - Ant 0 + 1

802.11ac-VHT20 - Ant 0


802.11ac-VHT20 - Ant 1

Channel 149 (5745MHz)



Channel 165 (5825MHz)

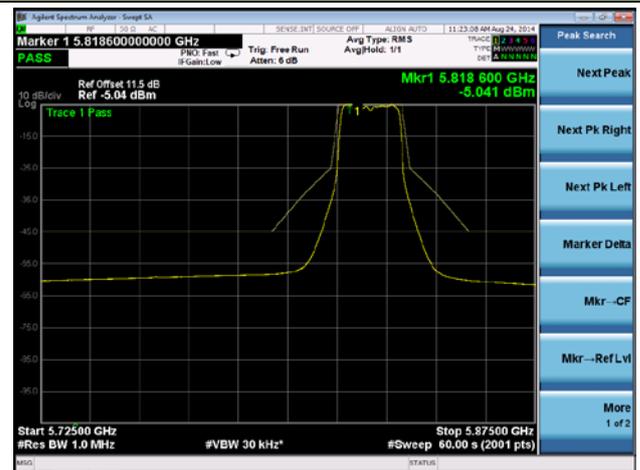


802.11ac-VHT20 - Ant 0 + 1

Channel 149 (5745MHz)



Channel 165 (5825MHz)



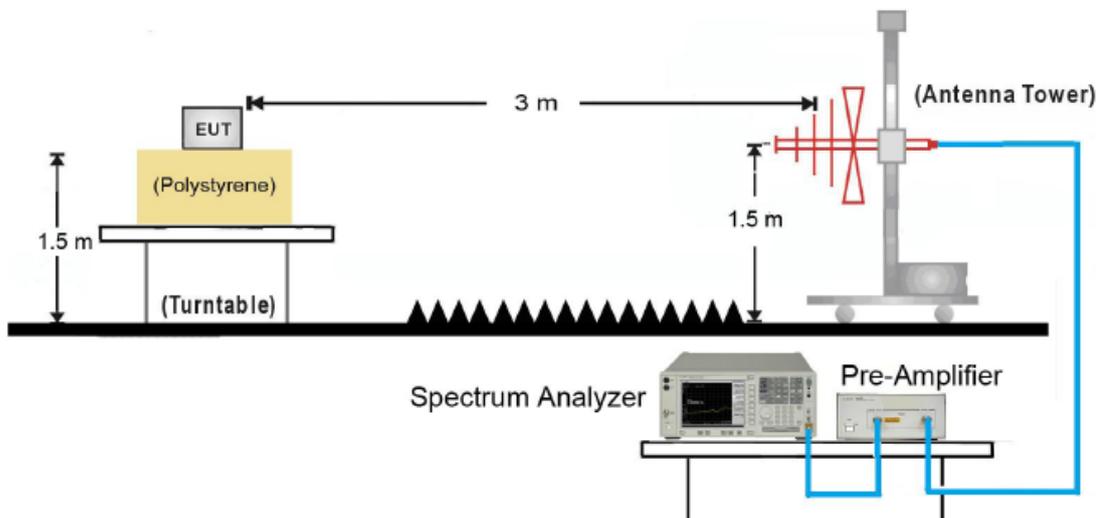
8. Receiver Spurious Emissions

8.1. Limit

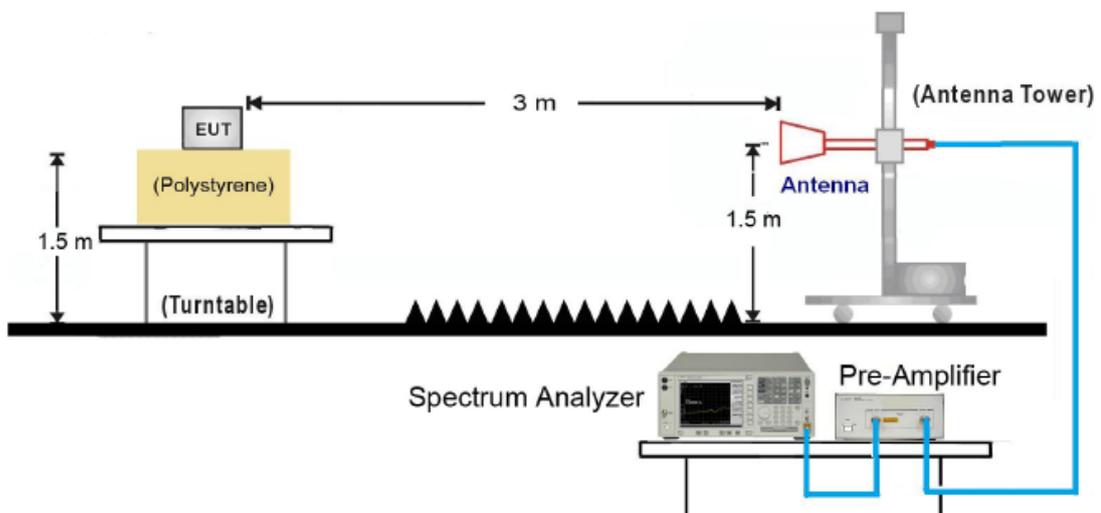
Frequency Range	Maximum Power, ERP	Measurement Bandwidth
30 MHz to 1GHz	-57 dBm	100 kHz
1 GHz to 26.5 GHz	-47 dBm	1 MHz

8.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



8.3. Test Procedure

Refer to ETSI EN 302 502 V1.2.1 (2008-07) Clause 5.3.5.

8.4. Test Result

Test by Panel Antenna – 25dBi

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	94.6	-74.04	-57	-17.04	Peak	Horizontal
	108.4	-66.86	-57	-9.86	Peak	Vertical
	379.1	-70.28	-57	-13.28	Peak	Horizontal
	191.6	-63.20	-57	-6.20	Peak	Vertical
	2174.6	-55.37	-47	-8.37	Peak	Horizontal
	1401.0	-53.89	-47	-6.89	Peak	Vertical
	2833.5	-54.41	-47	-7.41	Peak	Horizontal
	2057.9	-54.48	-47	-7.48	Peak	Vertical
165	455.0	-69.12	-57	-12.12	Peak	Horizontal
	323.6	-59.93	-57	-2.93	Peak	Vertical
	712.8	-72.03	-57	-15.03	Peak	Horizontal
	591.7	-66.48	-57	-9.48	Peak	Vertical
	2188.1	-55.49	-47	-8.49	Peak	Horizontal
	2283.1	-52.77	-47	-5.77	Peak	Vertical
	3826.8	-53.51	-47	-6.51	Peak	Horizontal
	2659.2	-53.07	-47	-6.07	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	344.3	-68.44	-57	-11.44	Peak	Horizontal
	225.5	-62.78	-57	-5.78	Peak	Vertical
	688.0	-71.56	-57	-14.56	Peak	Horizontal
	613.3	-66.93	-57	-9.93	Peak	Vertical
	2115.5	-54.77	-47	-7.77	Peak	Horizontal
	1992.9	-55.01	-47	-8.01	Peak	Vertical
	3041.1	-54.99	-47	-7.99	Peak	Horizontal
	3013.5	-49.39	-47	-2.39	Peak	Vertical
165	491.8	-69.31	-57	-12.31	Peak	Horizontal
	215.8	-62.35	-57	-5.35	Peak	Vertical
	684.9	-66.83	-57	-9.83	Peak	Horizontal
	480.6	-62.11	-57	-5.11	Peak	Vertical
	2153.8	-53.60	-47	-6.60	Peak	Horizontal
	1595.6	-56.04	-47	-9.04	Peak	Vertical
	2896.1	-55.09	-47	-8.09	Peak	Horizontal
	2033.8	-53.35	-47	-6.35	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	476.7	-69.06	-57	-12.06	Peak	Horizontal
	234.5	-67.47	-57	-10.47	Peak	Vertical
	691.6	-72.15	-57	-15.15	Peak	Horizontal
	465.0	-65.63	-57	-8.63	Peak	Vertical
	2175.9	-55.11	-47	-8.11	Peak	Horizontal
	1970.8	-51.83	-47	-4.83	Peak	Vertical
	3048.5	-51.30	-47	-4.30	Peak	Horizontal
	3045.2	-52.72	-47	-5.72	Peak	Vertical
165	455.1	-67.09	-57	-10.09	Peak	Horizontal
	311.5	-67.31	-57	-10.31	Peak	Vertical
	583.8	-69.69	-57	-12.69	Peak	Horizontal
	518.0	-66.97	-57	-9.97	Peak	Vertical
	2121.1	-56.85	-47	-9.85	Peak	Horizontal
	1478.2	-52.00	-47	-5.00	Peak	Vertical
	2934.2	-51.58	-47	-4.58	Peak	Horizontal
	2213.4	-51.81	-47	-4.81	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	149.8	-71.81	-57	-14.81	Peak	Horizontal
	312.9	-64.32	-57	-7.32	Peak	Vertical
	311.5	-69.96	-57	-12.96	Peak	Horizontal
	586.0	-62.81	-57	-5.81	Peak	Vertical
	2126.2	-56.36	-47	-9.36	Peak	Horizontal
	1500.9	-52.52	-47	-5.52	Peak	Vertical
	2969.6	-54.81	-47	-7.81	Peak	Horizontal
	3070.8	-53.84	-47	-6.84	Peak	Vertical
165	358.6	-69.41	-57	-12.41	Peak	Horizontal
	241.2	-65.41	-57	-8.41	Peak	Vertical
	710.8	-69.03	-57	-12.03	Peak	Horizontal
	583.4	-64.31	-57	-7.31	Peak	Vertical
	1222.9	-51.08	-47	-4.08	Peak	Horizontal
	1481.4	-54.56	-47	-7.56	Peak	Vertical
	2127.4	-54.69	-47	-7.69	Peak	Horizontal
	1966.9	-53.87	-47	-6.87	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	132.7	-70.60	-57	-13.60	Peak	Horizontal
	374.1	-62.59	-57	-5.59	Peak	Vertical
	403.0	-69.80	-57	-12.80	Peak	Horizontal
	429.2	-63.27	-57	-6.27	Peak	Vertical
	2017.6	-51.11	-47	-4.11	Peak	Horizontal
	1473.4	-55.32	-47	-8.32	Peak	Vertical
	2986.4	-52.87	-47	-5.87	Peak	Horizontal
	3039.0	-52.49	-47	-5.49	Peak	Vertical
165	368.5	-67.12	-57	-10.12	Peak	Horizontal
	330.6	-63.26	-57	-6.26	Peak	Vertical
	642.8	-69.03	-57	-12.03	Peak	Horizontal
	442.0	-65.70	-57	-8.70	Peak	Vertical
	1188.9	-55.00	-47	-8.00	Peak	Horizontal
	1505.5	-52.29	-47	-5.29	Peak	Vertical
	2081.1	-56.01	-47	-9.01	Peak	Horizontal
	2104.6	-53.79	-47	-6.79	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	145.5	-73.98	-57	-16.98	Peak	Horizontal
	269.1	-62.29	-57	-5.29	Peak	Vertical
	414.7	-71.54	-57	-14.54	Peak	Horizontal
	499.1	-65.76	-57	-8.76	Peak	Vertical
	2062.3	-54.99	-47	-7.99	Peak	Horizontal
	1531.9	-53.91	-47	-6.91	Peak	Vertical
	3054.7	-52.51	-47	-5.51	Peak	Horizontal
	3159.8	-54.90	-47	-7.90	Peak	Vertical
165	306.3	-67.48	-57	-10.48	Peak	Horizontal
	362.6	-66.39	-57	-9.39	Peak	Vertical
	723.4	-65.26	-57	-8.26	Peak	Horizontal
	463.4	-64.56	-57	-7.56	Peak	Vertical
	1190.9	-52.86	-47	-5.86	Peak	Horizontal
	1557.9	-54.74	-47	-7.74	Peak	Vertical
	2073.8	-53.22	-47	-6.22	Peak	Horizontal
	1935.8	-54.37	-47	-7.37	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	157.7	-69.98	-57	-12.98	Peak	Horizontal
	195.4	-66.75	-57	-9.75	Peak	Vertical
	360.2	-68.74	-57	-11.74	Peak	Horizontal
	591.8	-63.81	-57	-6.81	Peak	Vertical
	2013.0	-57.57	-47	-10.57	Peak	Horizontal
	1422.4	-55.30	-47	-8.30	Peak	Vertical
	3081.7	-54.76	-47	-7.76	Peak	Horizontal
	3043.8	-52.47	-47	-5.47	Peak	Vertical
165	472.0	-71.58	-57	-14.58	Peak	Horizontal
	376.2	-65.24	-57	-8.24	Peak	Vertical
	695.8	-73.85	-57	-16.85	Peak	Horizontal
	492.6	-66.25	-57	-9.25	Peak	Vertical
	1088.5	-55.91	-47	-8.91	Peak	Horizontal
	1473.2	-51.19	-47	-4.19	Peak	Vertical
	2077.6	-54.61	-47	-7.61	Peak	Horizontal
	1991.3	-55.96	-47	-8.96	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	125.9	-76.34	-57	-19.34	Peak	Horizontal
	269.7	-63.42	-57	-6.42	Peak	Vertical
	457.8	-67.66	-57	-10.66	Peak	Horizontal
	440.0	-64.73	-57	-7.73	Peak	Vertical
	1956.8	-57.44	-47	-10.44	Peak	Horizontal
	1591.9	-54.56	-47	-7.56	Peak	Vertical
	3009.8	-51.14	-47	-4.14	Peak	Horizontal
	3188.2	-55.09	-47	-8.09	Peak	Vertical
165	428.2	-68.43	-57	-11.43	Peak	Horizontal
	319.6	-64.45	-57	-7.45	Peak	Vertical
	586.0	-66.78	-57	-9.78	Peak	Horizontal
	541.7	-68.52	-57	-11.52	Peak	Vertical
	1178.5	-54.59	-47	-7.59	Peak	Horizontal
	1416.7	-54.38	-47	-7.38	Peak	Vertical
	2112.6	-56.22	-47	-9.22	Peak	Horizontal
	2093.6	-56.01	-47	-9.01	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	191.1	-72.12	-57	-15.12	Peak	Horizontal
	261.1	-67.16	-57	-10.16	Peak	Vertical
	372.1	-66.89	-57	-9.89	Peak	Horizontal
	576.6	-64.25	-57	-7.25	Peak	Vertical
	2123.8	-54.15	-47	-7.15	Peak	Horizontal
	1427.2	-56.58	-47	-9.58	Peak	Vertical
	2961.3	-54.48	-47	-7.48	Peak	Horizontal
	3007.5	-54.80	-47	-7.80	Peak	Vertical
165	361.3	-68.94	-57	-11.94	Peak	Horizontal
	326.5	-65.44	-57	-8.44	Peak	Vertical
	748.2	-69.30	-57	-12.30	Peak	Horizontal
	509.1	-64.73	-57	-7.73	Peak	Vertical
	1115.0	-53.35	-47	-6.35	Peak	Horizontal
	1407.2	-52.15	-47	-5.15	Peak	Vertical
	2141.7	-51.79	-47	-4.79	Peak	Horizontal
	2133.4	-51.57	-47	-4.57	Peak	Vertical

Test by Dipole Antenna – 2dBi

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	210.6	-71.06	-57	-14.06	Peak	Horizontal
	125.6	-68.40	-57	-11.40	Peak	Vertical
	401.0	-67.05	-57	-10.05	Peak	Horizontal
	268.3	-62.36	-57	-5.36	Peak	Vertical
	2058.6	-54.48	-47	-7.48	Peak	Horizontal
	1410.1	-55.70	-47	-8.70	Peak	Vertical
	2874.1	-53.19	-47	-6.19	Peak	Horizontal
	2120.3	-52.81	-47	-5.81	Peak	Vertical
165	355.0	-73.39	-57	-16.39	Peak	Horizontal
	194.7	-67.88	-57	-10.88	Peak	Vertical
	607.0	-72.64	-57	-15.64	Peak	Horizontal
	454.6	-69.03	-57	-12.03	Peak	Vertical
	2135.5	-54.65	-47	-7.65	Peak	Horizontal
	2239.1	-53.66	-47	-6.66	Peak	Vertical
	3855.9	-52.85	-47	-5.85	Peak	Horizontal
	3594.9	-51.64	-47	-4.64	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11a – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	328.5	-72.38	-57	-15.38	Peak	Horizontal
	371.0	-64.54	-57	-7.54	Peak	Vertical
	657.7	-71.13	-57	-14.13	Peak	Horizontal
	549.0	-63.75	-57	-6.75	Peak	Vertical
	2173.4	-53.59	-47	-6.59	Peak	Horizontal
	2118.1	-56.64	-47	-9.64	Peak	Vertical
	2933.6	-55.99	-47	-8.99	Peak	Horizontal
	3141.9	-52.62	-47	-5.62	Peak	Vertical
165	318.1	-69.60	-57	-12.60	Peak	Horizontal
	237.6	-66.46	-57	-9.46	Peak	Vertical
	648.0	-69.41	-57	-12.41	Peak	Horizontal
	581.7	-66.38	-57	-9.38	Peak	Vertical
	2034.5	-52.97	-47	-5.97	Peak	Horizontal
	1475.9	-59.22	-47	-12.22	Peak	Vertical
	2967.2	-55.22	-47	-8.22	Peak	Horizontal
		2171.8	-57.08	-47	-10.08	Peak

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	167.6	-71.60	-57	-14.60	Peak	Horizontal
	196.0	-66.62	-57	-9.62	Peak	Vertical
	369.6	-68.81	-57	-11.81	Peak	Horizontal
	600.4	-65.19	-57	-8.19	Peak	Vertical
	2003.7	-57.14	-47	-10.14	Peak	Horizontal
	1416.4	-56.12	-47	-9.12	Peak	Vertical
	3088.5	-53.94	-47	-6.94	Peak	Horizontal
	3048.2	-52.97	-47	-5.97	Peak	Vertical
165	470.9	-72.18	-57	-15.18	Peak	Horizontal
	379.9	-65.61	-57	-8.61	Peak	Vertical
	681.4	-73.03	-57	-16.03	Peak	Horizontal
	505.9	-66.34	-57	-9.34	Peak	Vertical
	1085.9	-56.24	-47	-9.24	Peak	Horizontal
	1457.6	-52.80	-47	-5.80	Peak	Vertical
	2070.5	-53.97	-47	-6.97	Peak	Horizontal
	2004.6	-56.54	-47	-9.54	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	135.5	-75.40	-57	-18.40	Peak	Horizontal
	278.1	-64.25	-57	-7.25	Peak	Vertical
	460.5	-66.81	-57	-9.81	Peak	Horizontal
	453.2	-63.58	-57	-6.58	Peak	Vertical
	1955.6	-56.48	-47	-9.48	Peak	Horizontal
	1601.4	-53.41	-47	-6.41	Peak	Vertical
	3005.7	-52.43	-47	-5.43	Peak	Horizontal
	3190.2	-54.22	-47	-7.22	Peak	Vertical
165	427.5	-68.64	-57	-11.64	Peak	Horizontal
	327.8	-63.28	-57	-6.28	Peak	Vertical
	582.6	-66.74	-57	-9.74	Peak	Horizontal
	535.0	-68.56	-57	-11.56	Peak	Vertical
	1179.1	-54.16	-47	-7.16	Peak	Horizontal
	1414.1	-54.14	-47	-7.14	Peak	Vertical
	2123.8	-55.31	-47	-8.31	Peak	Horizontal
	2097.6	-56.70	-47	-9.70	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11n-HT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	174.3	-71.73	-57	-14.73	Peak	Horizontal
	245.9	-66.67	-57	-9.67	Peak	Vertical
	392.2	-66.93	-57	-9.93	Peak	Horizontal
	592.2	-64.46	-57	-7.46	Peak	Vertical
	2133.6	-54.05	-47	-7.05	Peak	Horizontal
	1435.9	-56.57	-47	-9.57	Peak	Vertical
	2983.8	-54.51	-47	-7.51	Peak	Horizontal
	2976.6	-54.83	-47	-7.83	Peak	Vertical
165	334.9	-68.58	-57	-11.58	Peak	Horizontal
	332.7	-64.97	-57	-7.97	Peak	Vertical
	724.8	-69.08	-57	-12.08	Peak	Horizontal
	524.3	-64.54	-57	-7.54	Peak	Vertical
	1127.8	-52.98	-47	-5.98	Peak	Horizontal
	1398.0	-51.19	-47	-4.19	Peak	Vertical
	2120.8	-52.85	-47	-5.85	Peak	Horizontal
	2105.1	-52.03	-47	-5.03	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	114.6	-71.84	-57	-14.84	Peak	Horizontal
	332.9	-63.83	-57	-6.83	Peak	Vertical
	324.8	-70.01	-57	-13.01	Peak	Horizontal
	585.7	-63.99	-57	-6.99	Peak	Vertical
	2092.6	-56.21	-47	-9.21	Peak	Horizontal
	1478.9	-52.49	-47	-5.49	Peak	Vertical
	2944.8	-54.92	-47	-7.92	Peak	Horizontal
	3092.3	-53.29	-47	-6.29	Peak	Vertical
165	357.8	-68.61	-57	-11.61	Peak	Horizontal
	251.4	-65.78	-57	-8.78	Peak	Vertical
	707.6	-69.41	-57	-12.41	Peak	Horizontal
	573.2	-63.79	-57	-6.79	Peak	Vertical
	1204.7	-51.72	-47	-4.72	Peak	Horizontal
	1515.6	-53.50	-47	-6.50	Peak	Vertical
	2126.0	-54.51	-47	-7.51	Peak	Horizontal
	1986.8	-53.44	-47	-6.44	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	110.2	-69.55	-57	-12.55	Peak	Horizontal
	375.8	-63.03	-57	-6.03	Peak	Vertical
	384.5	-69.62	-57	-12.62	Peak	Horizontal
	442.6	-63.33	-57	-6.33	Peak	Vertical
	2007.8	-51.09	-47	-4.09	Peak	Horizontal
	1484.2	-55.30	-47	-8.30	Peak	Vertical
	2986.1	-52.86	-47	-5.86	Peak	Horizontal
	3027.8	-52.38	-47	-5.38	Peak	Vertical
165	362.7	-67.20	-57	-10.20	Peak	Horizontal
	351.0	-63.53	-57	-6.53	Peak	Vertical
	648.3	-68.09	-57	-11.09	Peak	Horizontal
	453.6	-67.09	-57	-10.09	Peak	Vertical
	1194.3	-55.38	-47	-8.38	Peak	Horizontal
	1503.4	-52.09	-47	-5.09	Peak	Vertical
	2082.5	-56.84	-47	-9.84	Peak	Horizontal
	2111.7	-53.84	-47	-6.84	Peak	Vertical

Test Engineer	Milo Li	Temperature	26°C
Test Time	08-23-2014	Relative Humidity	54%
Test Mode	802.11ac-VHT20 – Ant 0+1	Test Site	AC1

Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	157.7	-73.44	-57	-16.44	Peak	Horizontal
	269.4	-63.01	-57	-6.01	Peak	Vertical
	402.7	-71.88	-57	-14.88	Peak	Horizontal
	493.8	-67.07	-57	-10.07	Peak	Vertical
	2046.8	-55.07	-47	-8.07	Peak	Horizontal
	1565.5	-53.93	-47	-6.93	Peak	Vertical
	3050.5	-52.54	-47	-5.54	Peak	Horizontal
	3140.9	-53.59	-47	-6.59	Peak	Vertical
165	331.8	-68.42	-57	-11.42	Peak	Horizontal
	357.3	-66.86	-57	-9.86	Peak	Vertical
	721.9	-65.45	-57	-8.45	Peak	Horizontal
	472.5	-64.26	-57	-7.26	Peak	Vertical
	1193.9	-54.44	-47	-7.44	Peak	Horizontal
	1562.3	-55.52	-47	-8.52	Peak	Vertical
	2077.5	-51.90	-47	-4.90	Peak	Horizontal
	1949.4	-54.13	-47	-7.13	Peak	Vertical

9. Dynamic Frequency Selection (DFS)

Please refer to report number 1408RSU00106-CE-EN302502 DFS.

10. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

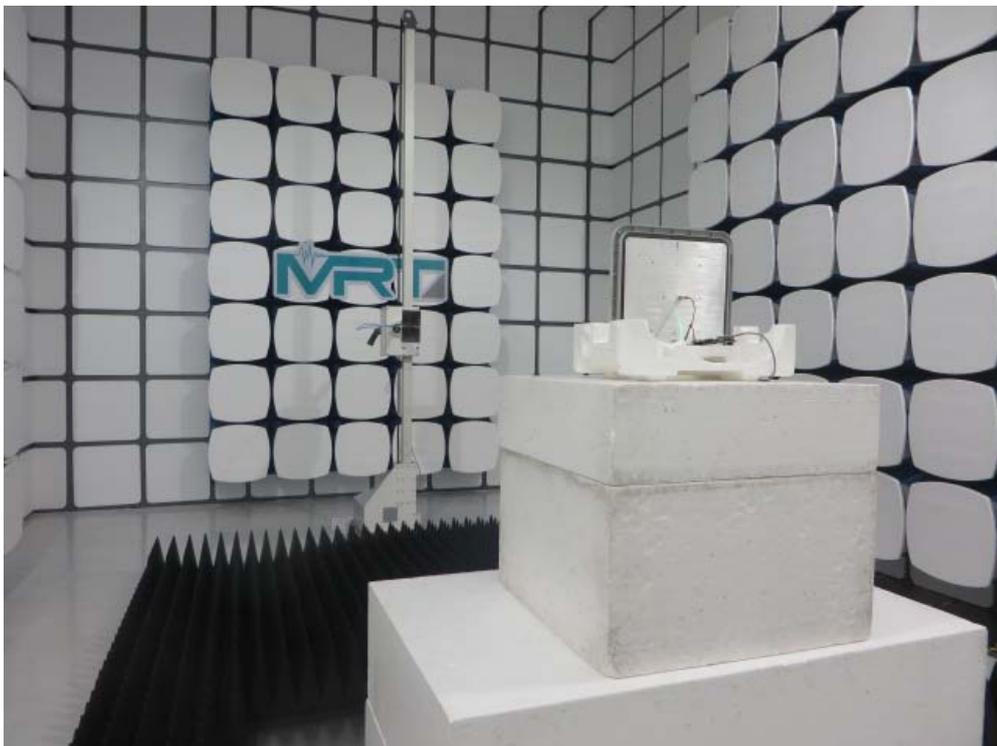
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
RF output power, conducted	± 1.5 dB
Power Spectral Density, conducted	± 3 dB
Temperature	± 1 °C
Humidity	± 5 %
DC and low frequency voltages	± 3 %
Time	± 5 %
Duty Cycle	± 5 %

11. Test Photograph

Description: Radiated Spurious Emissions Test Setup for Below 1GHz
(Panel Antenna 25dBi)



Description: Radiated Spurious Emissions Test Setup for Above 1GHz
(Panel Antenna 25dBi)



Description: Radiated Spurious Emissions Test Setup for Above 18GHz
(Panel Antenna 25dBi)



Description: Radiated Spurious Emissions Test Setup for Below 1GHz
(Dipole Antenna 2dBi)



Description: Radiated Spurious Emissions Test Setup for Above 1GHz
(Dipole Antenna 2dBi)



Description: Radiated Spurious Emissions Test Setup for Above 18GHz
(Dipole Antenna 2dBi)



12. List of Measuring Instrument

Carrier Frequencies

Instrument	Manufacturer	Type No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	1 year	2014/11/08
DC Power Supply	GWINSTEK	GPS-3030D	1 year	2014/11/14
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	1 year	2014/11/20
Temperature/Humidity Meter	Anymetre	TH101B	1 year	2014/11/15

RF Output Power, Transmit Power Control (TPC) and Power Density

Instrument	Manufacturer	Type No.	Cali. Interval	Cali. Due Date
Power Meter	Agilent	U2021XA	1 year	2014/12/14
DC Power Supply	GWINSTEK	GPS-3030D	1 year	2014/11/14
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	1 year	2014/11/20
Temperature/Humidity Meter	Anymetre	TH101B	1 year	2014/11/15

Transmitter Unwanted Emissions Within the 5GHz RLAN Bands

Instrument	Manufacturer	Type No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	1 year	2014/11/08
Temperature/Humidity Meter	Anymetre	TH101B	1 year	2014/11/15

Transmitter Spurious Emissions and Receiver Spurious Emissions

Instrument	Manufacturer	Type No.	Cali. Interval	Cal. Due Date
Spectrum Analyzer	Agilent	E4447A	1 year	2014/11/08
Preamplifier	MRT	AP25M01	1 year	2015/10/06
Preamplifier	MRT	AP01G18	1 year	2015/10/06
Bilog Period Antenna	Schwarzbeck	VULB 9162	1 year	2014/11/24
Broadband Horn Antenna	Schwarzbeck	BBHA9170	1 year	2014/12/11
Horn Antenna	Schwarzbeck	BBHA9120D	1 year	2014/11/24
Temperature/Humidity Meter	Anymetre	TH101B	1 year	2014/11/15

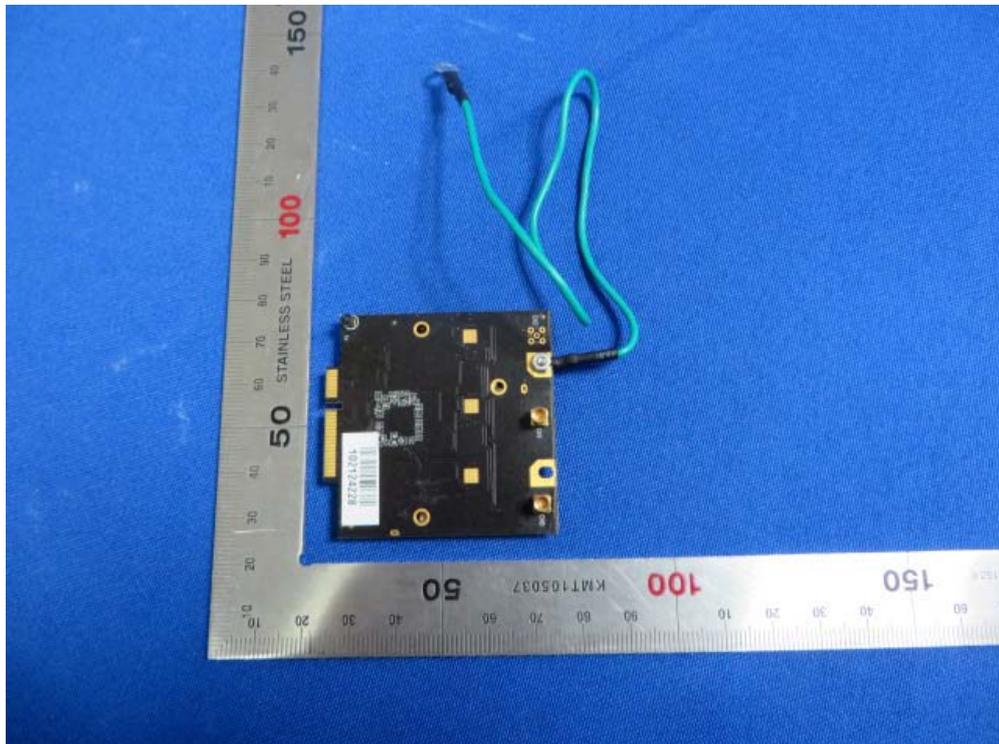
Appendix

EUT Photograph

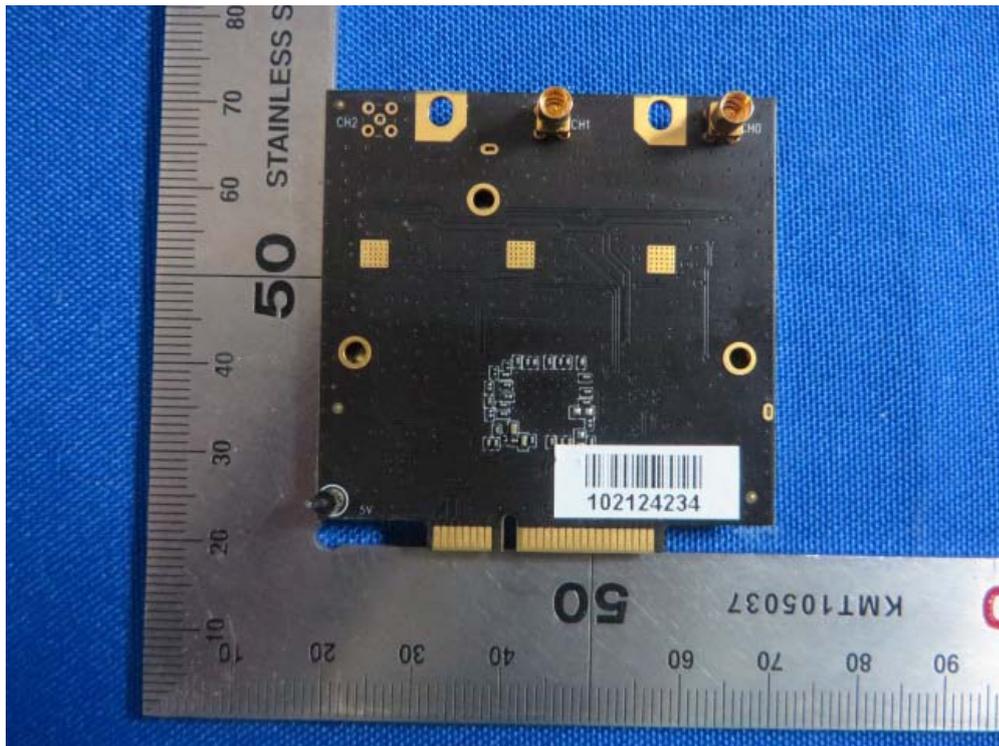
(1) EUT Photo



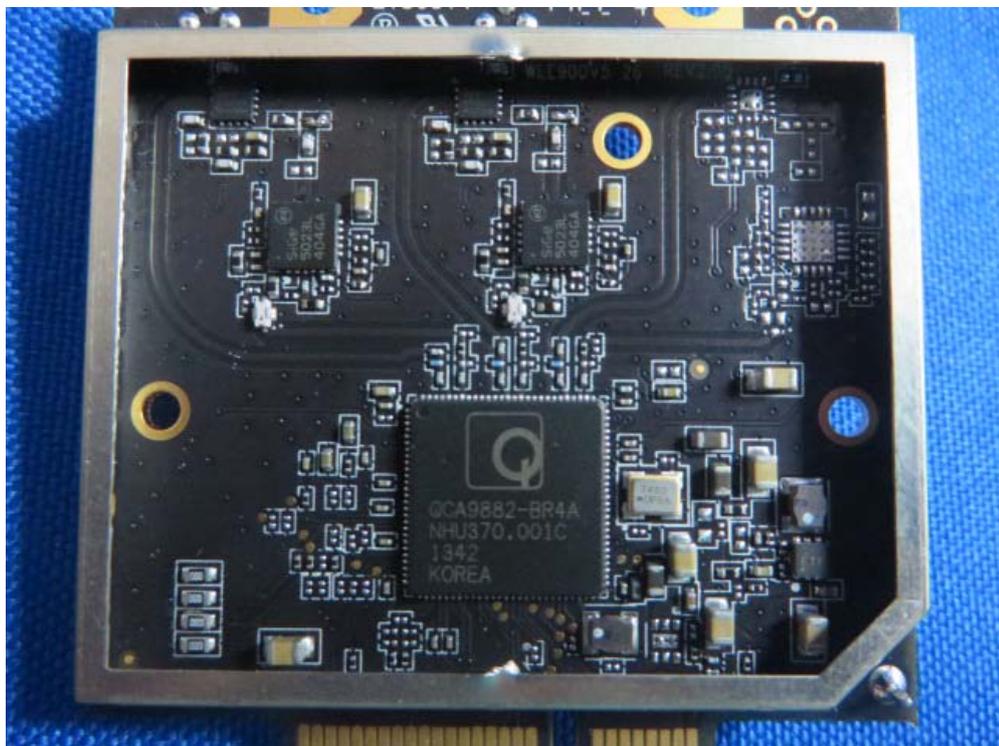
(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



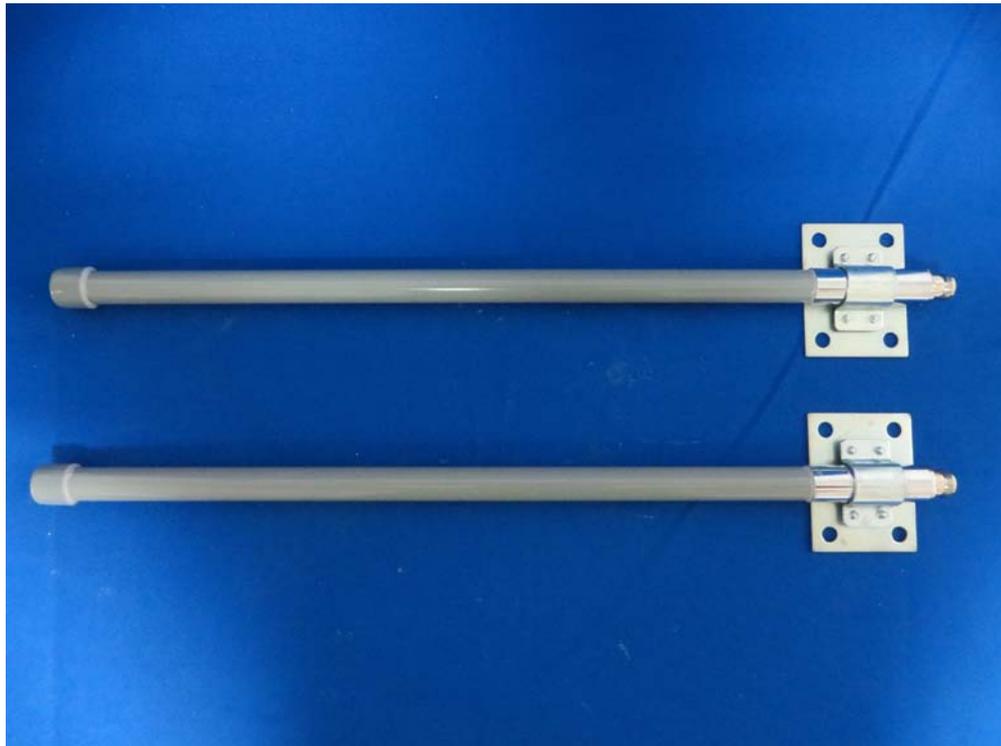
(5) EUT Photo (Dipole Antenna 2dBi)



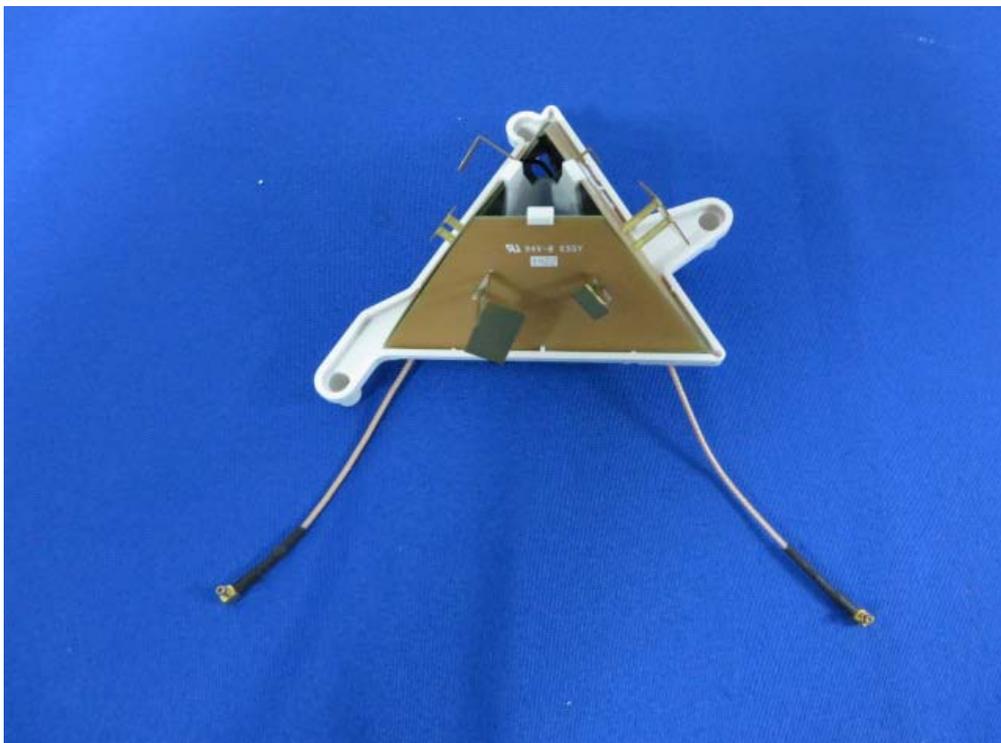
(6) EUT Photo (Panel Antenna 7dBi)



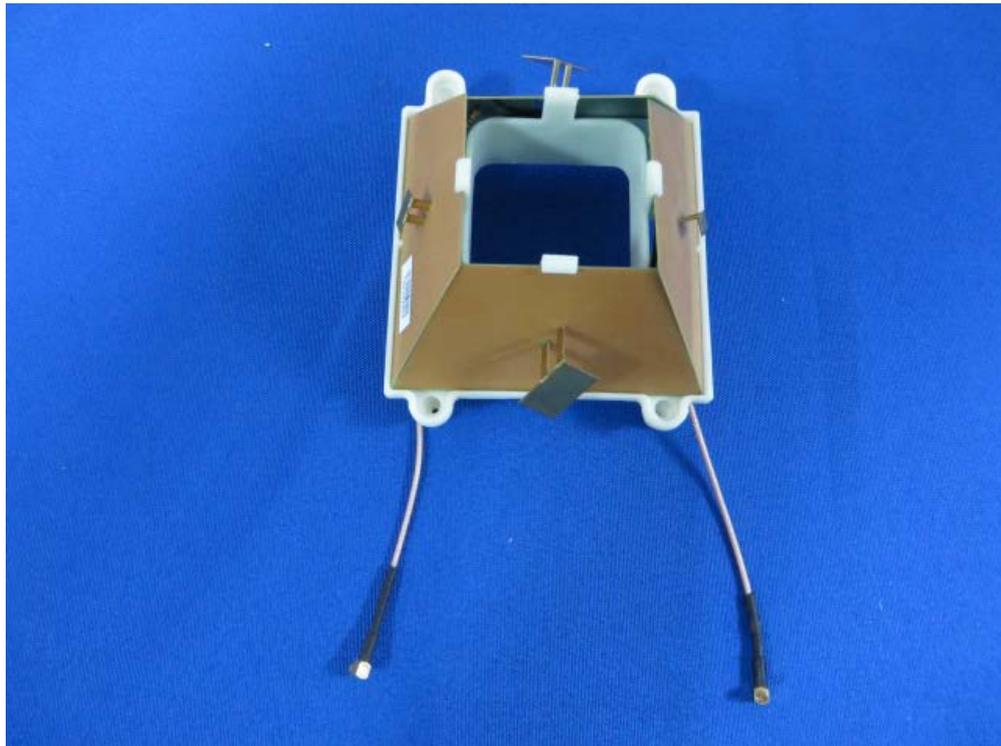
(7) EUT Photo (Panel Antenna 10dBi)



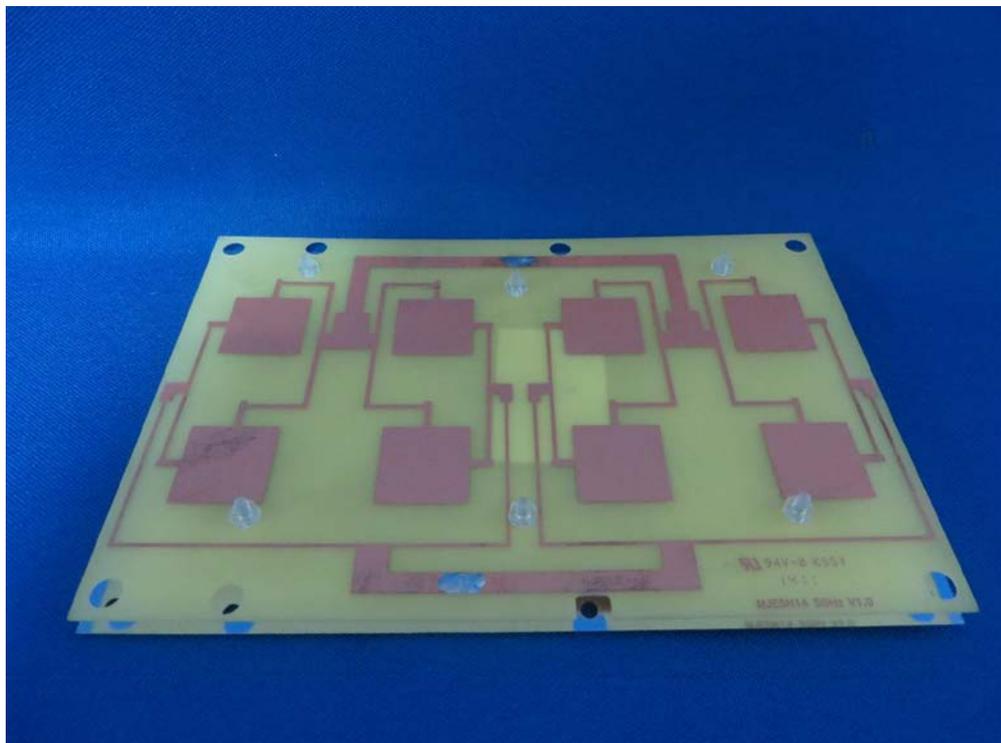
(8) EUT Photo (Panel Antenna 5dBi)



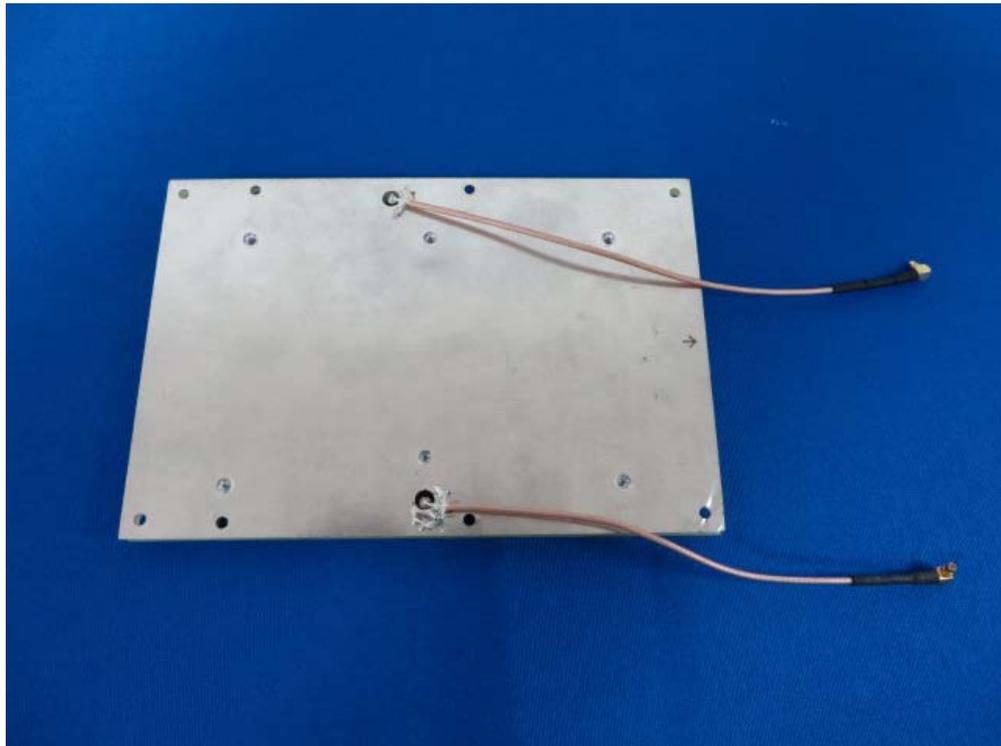
(9) EUT Photo (Panel Antenna 5dBi)



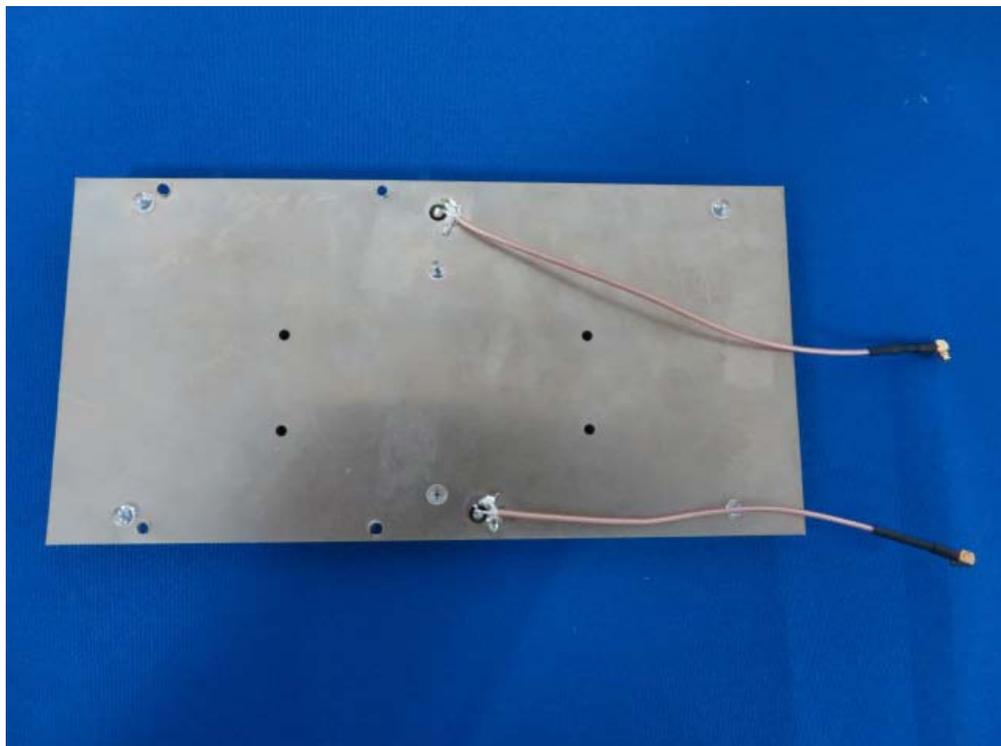
(10) EUT Photo (Panel Antenna 15dBi)



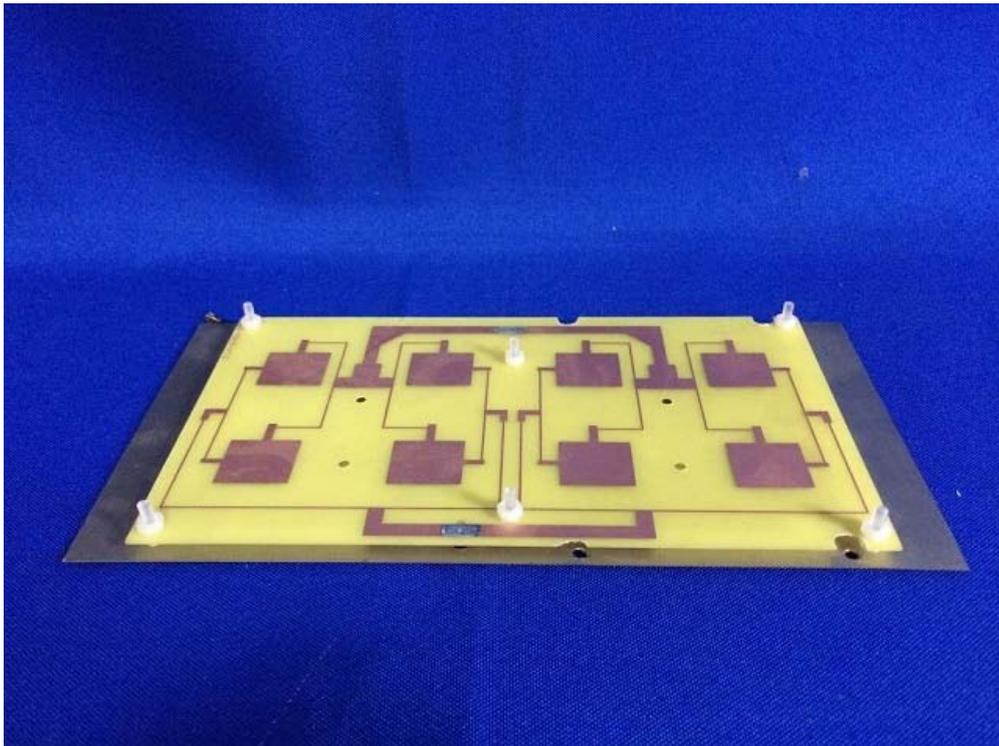
(11) EUT Photo (Panel Antenna 15dBi)



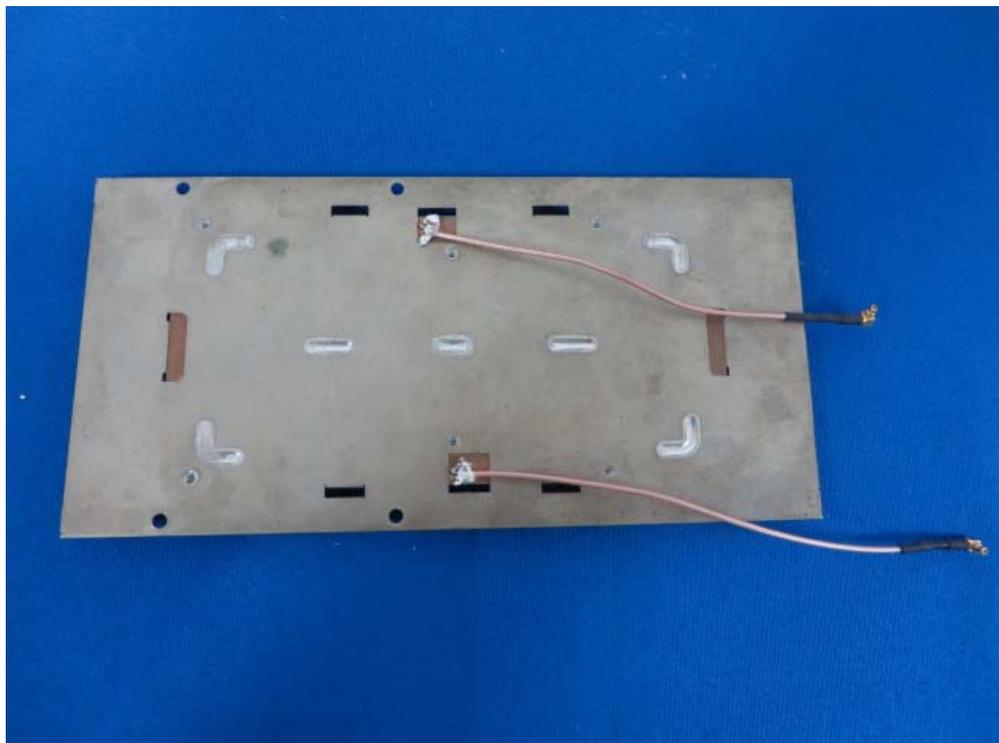
(12) EUT Photo (Panel Antenna 16dBi)



(13) EUT Photo (Panel Antenna 16dBi)



(14) EUT Photo (Panel Antenna 17dBi)



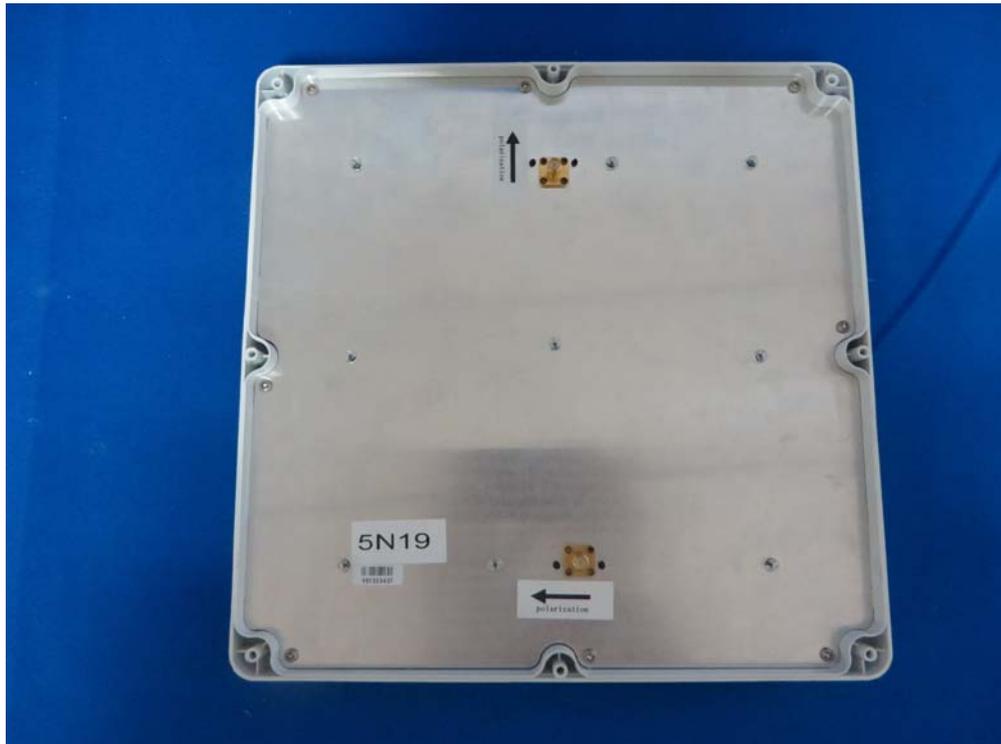
(15) EUT Photo (Panel Antenna 17dBi)



(16) EUT Photo (Panel Antenna 19dBi)



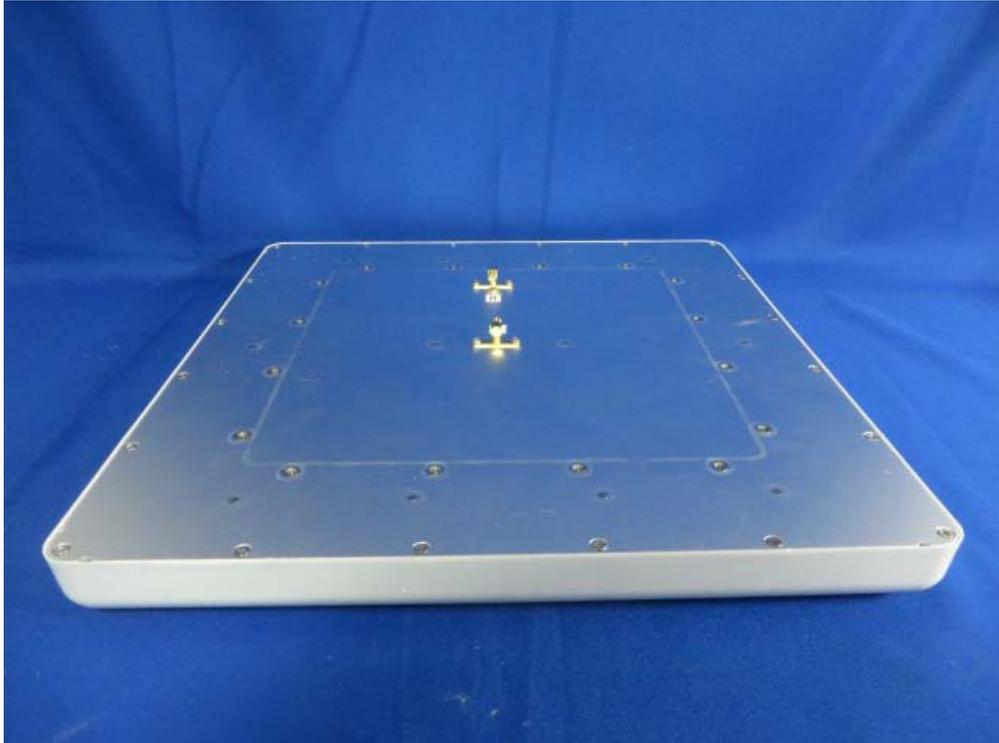
(17) EUT Photo (Panel Antenna 19dBi)



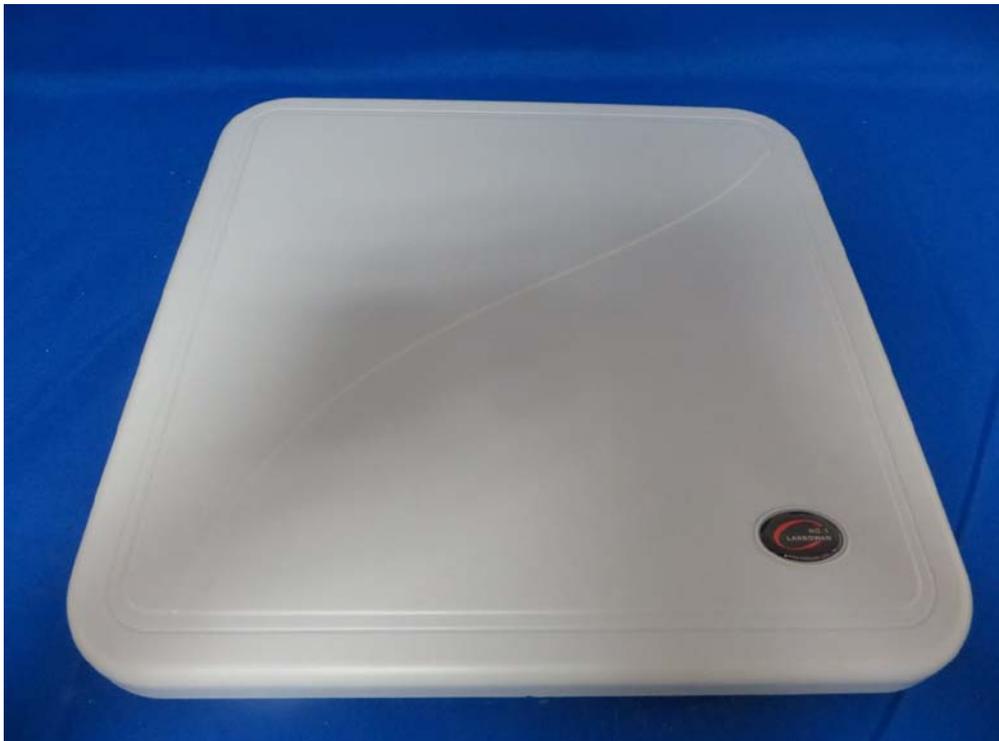
(18) EUT Photo (Panel Antenna 23dBi)



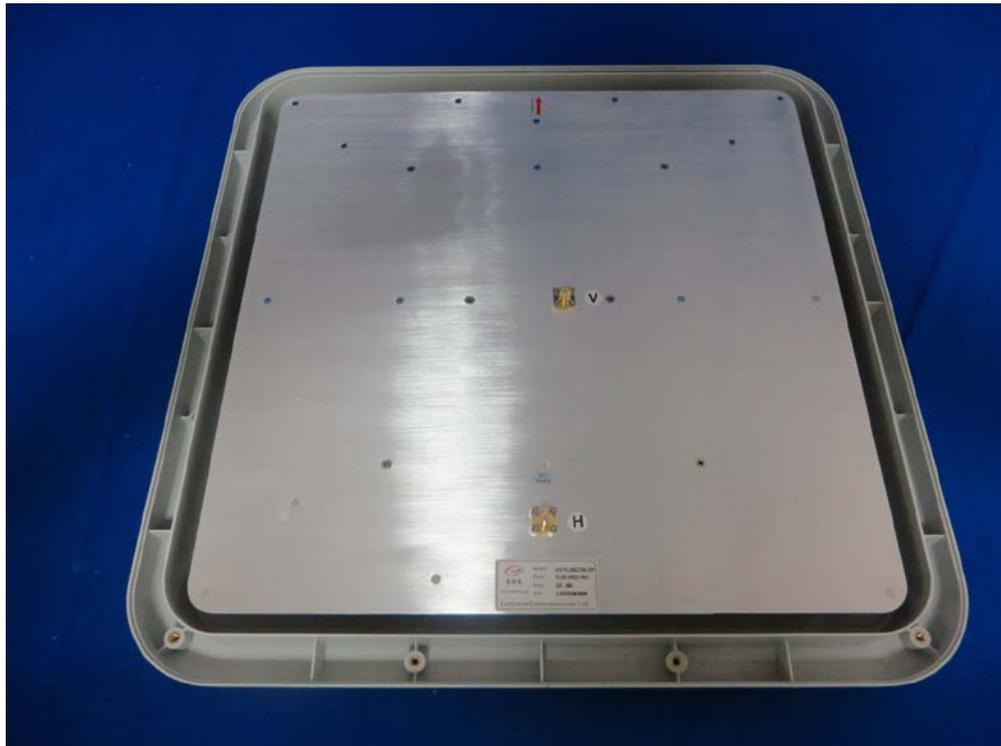
(19) EUT Photo (Panel Antenna 23dBi)



(20) EUT Photo (Panel Antenna 25dBi)



(21) EUT Photo (Panel Antenna 25dBi)



The End