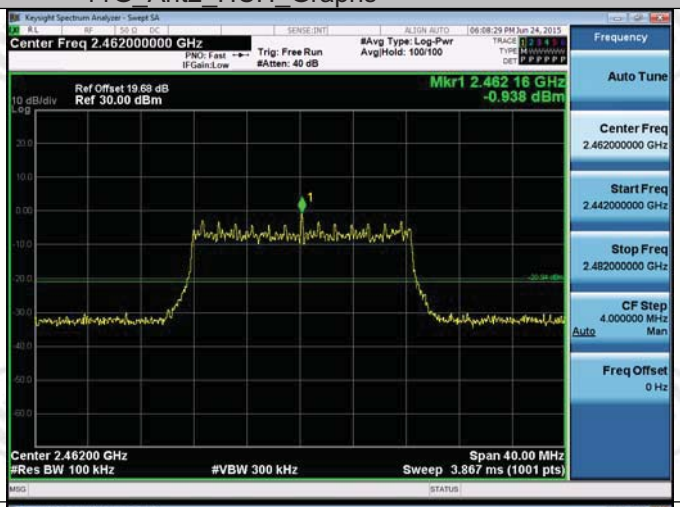
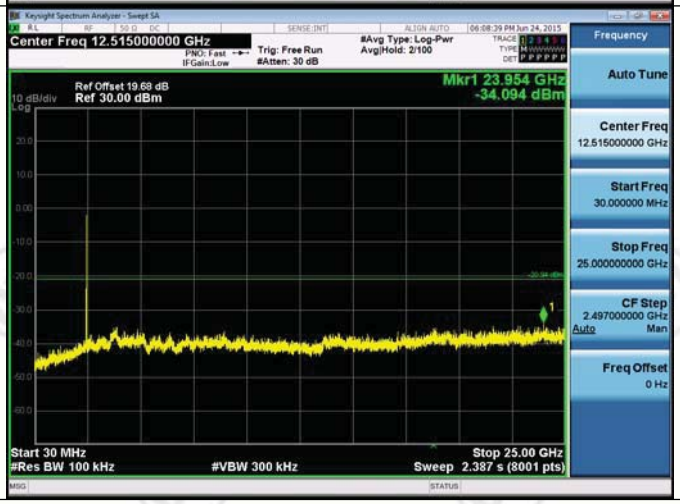
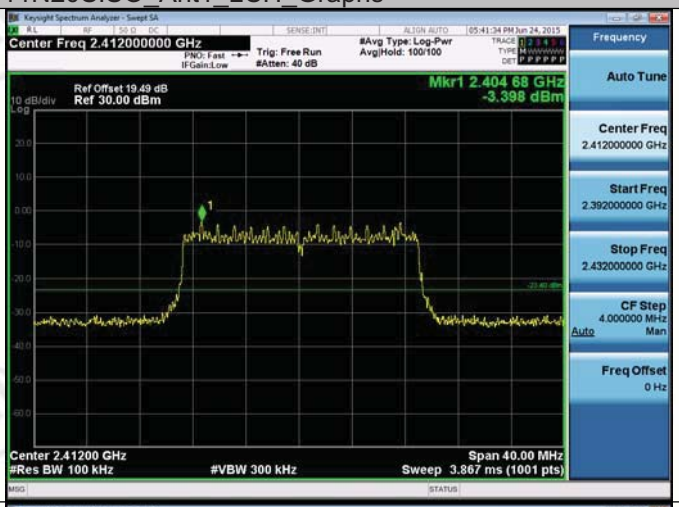
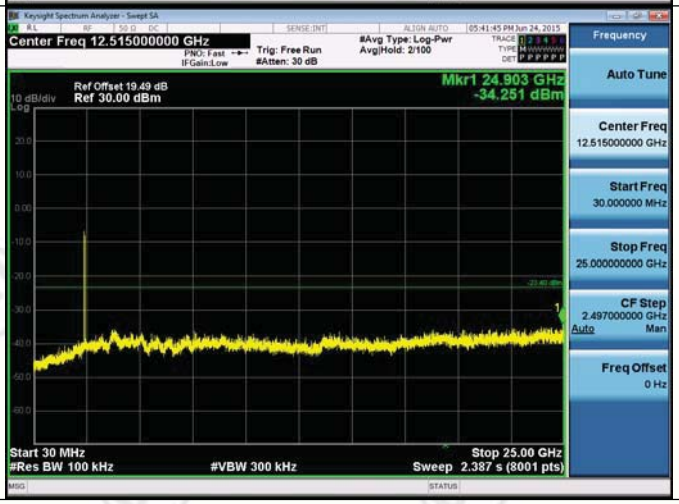
11G_Ant2_HCH_Graphs			
Pref/11G/HCH			
Puw/11G/HCH			

11N20SISO_Ant1_LCH_Graphs			
Pref/11N20SISO/LCH			
Puw/11N20SISO/LCH			

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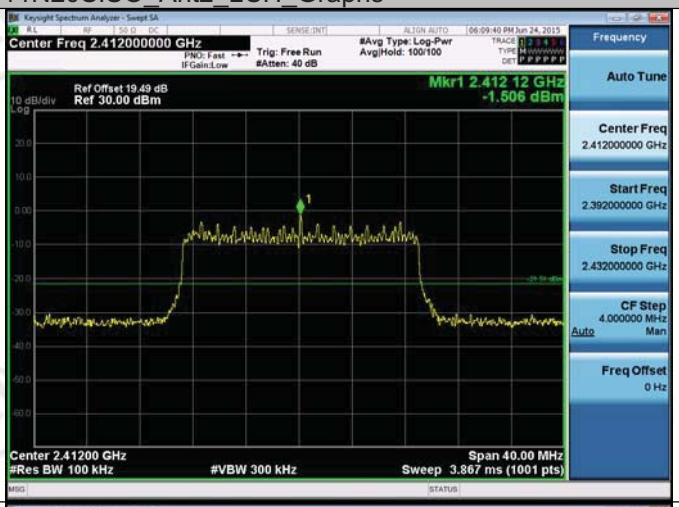
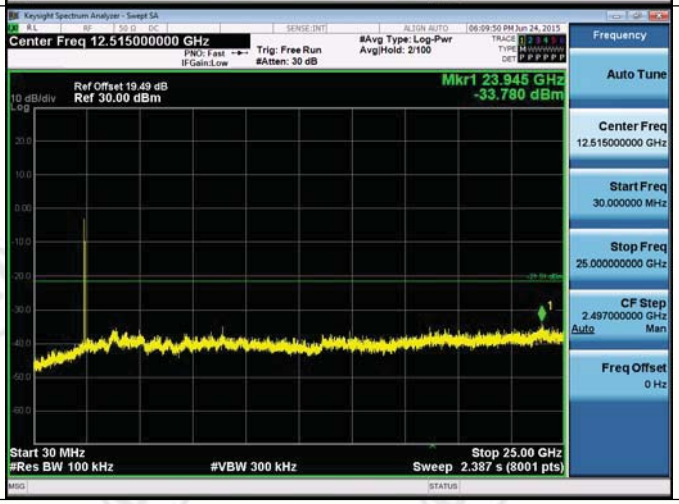
Pref/11N20SISO/LCH			
Puw/11N20SISO/LCH			

11N20SISO_Ant1_MCH_Graphs			
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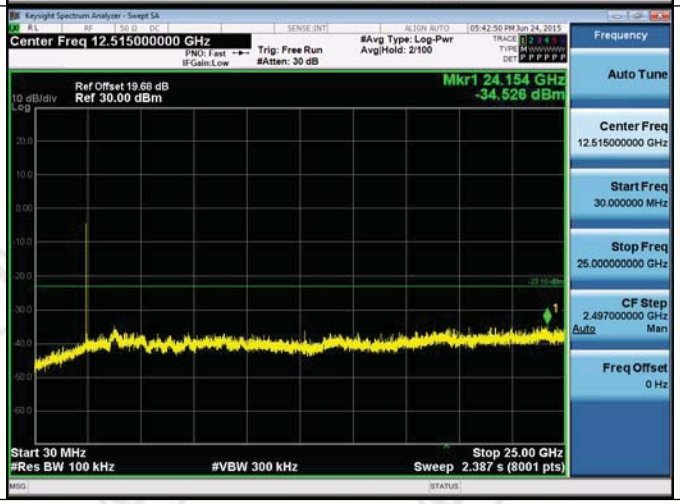
Puw/11N20SISO/MCH			

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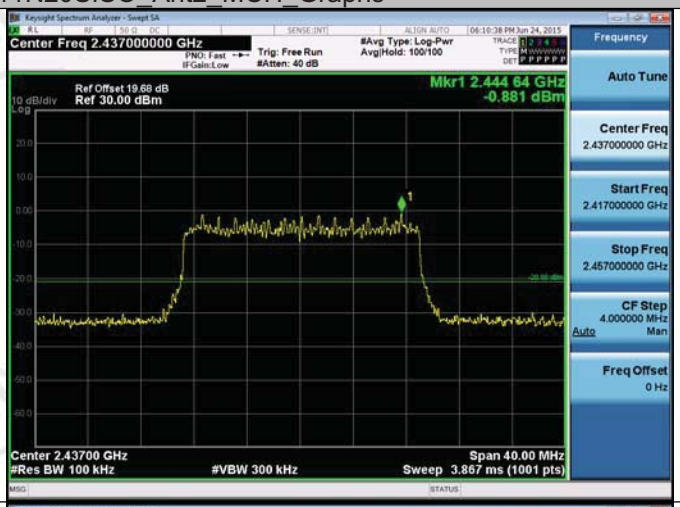
Pref/11N20SISO/MCH			
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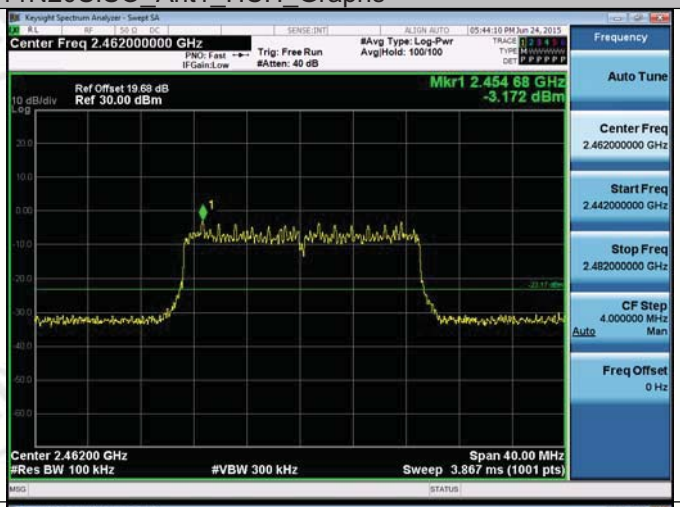
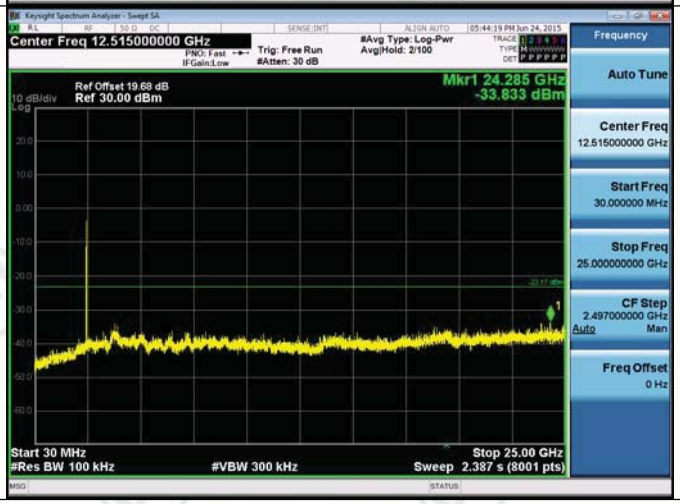
11N20SISO_Ant1_HCH_Graphs			
Pref/11N20SISO/HCH			
Puw/11N20SISO/HCH			

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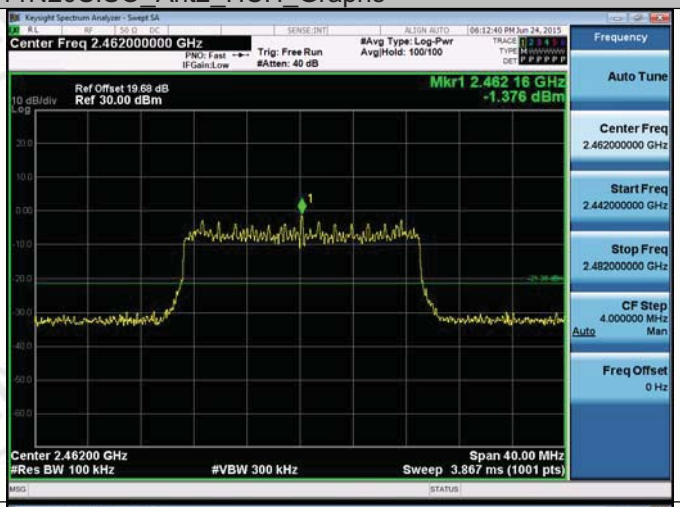
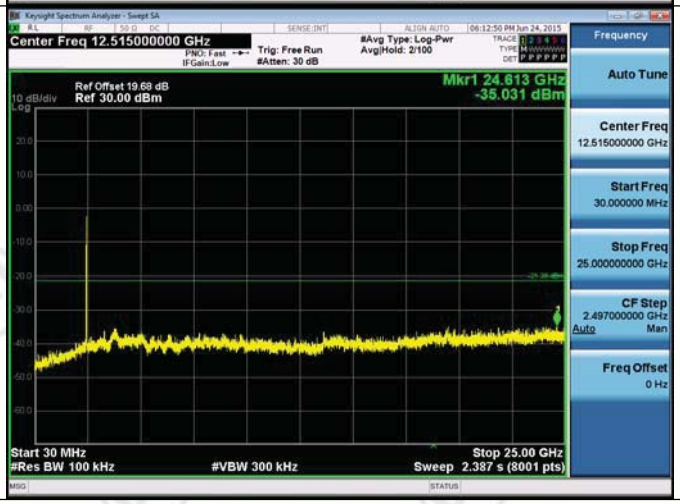
Pref/11N20SISO/HCH			
Puw/11N20SISO/HCH			

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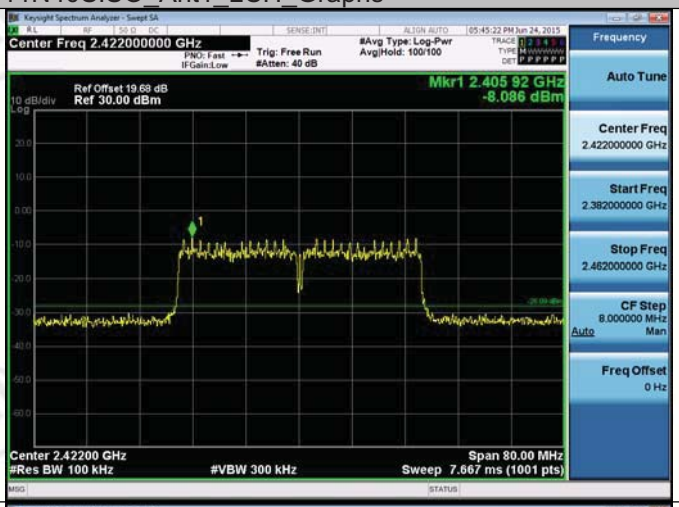
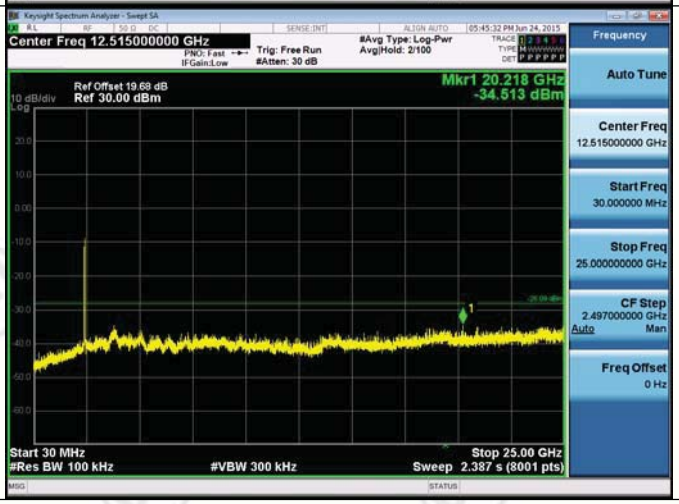
Pref/11N40SISO/LCH			
Puw/11N40SISO/LCH			

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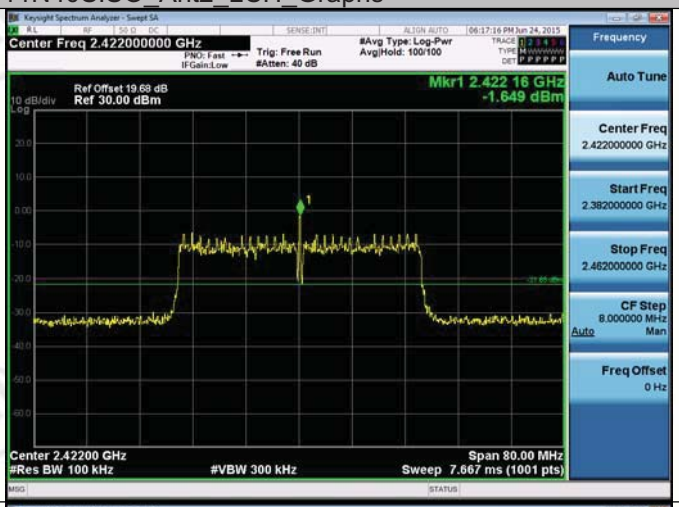
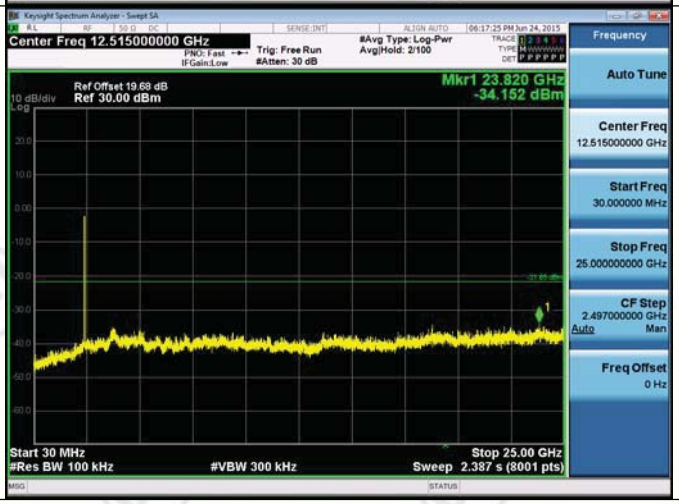
Pref/11N40SISO/LCH			
Puw/11N40SISO/LCH			

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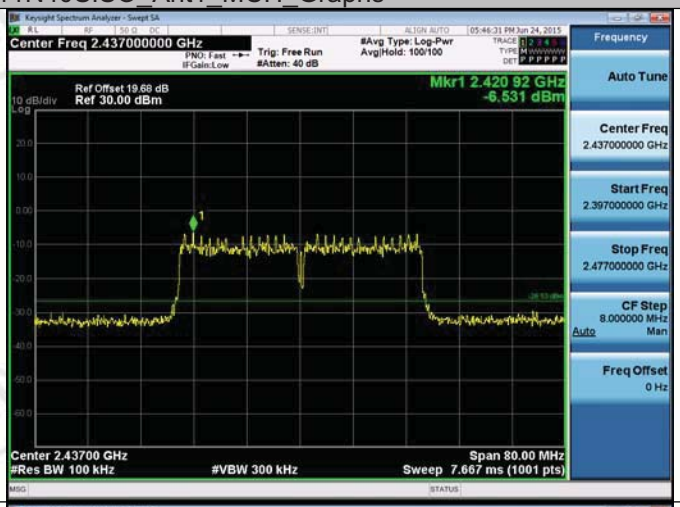
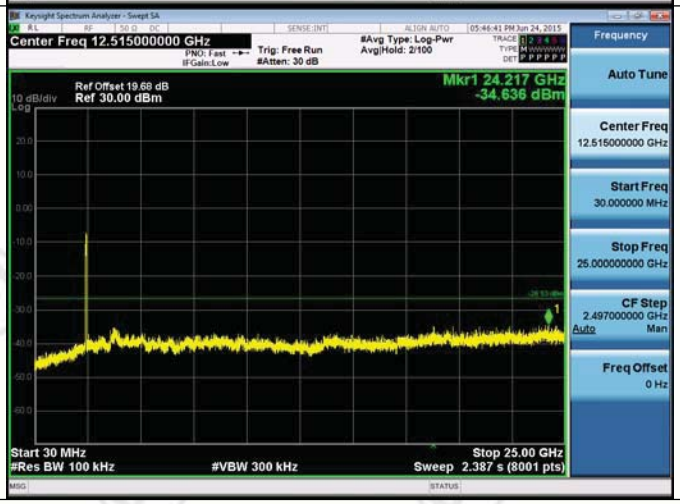
Pref/11N40SISO/MCH			
Puw/11N40SISO/MCH			

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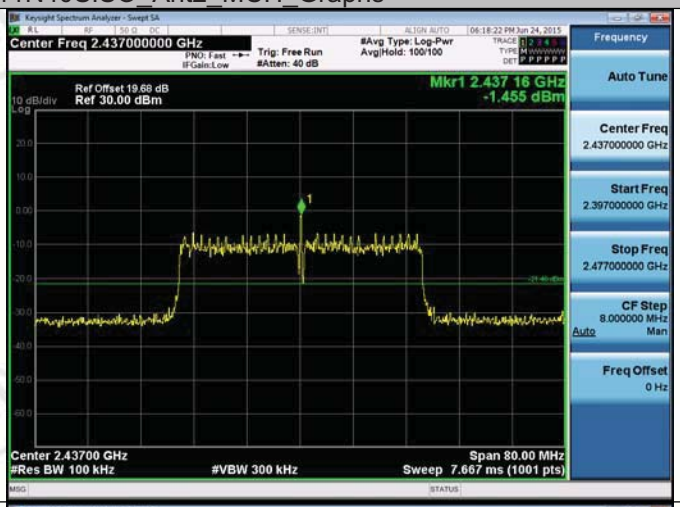
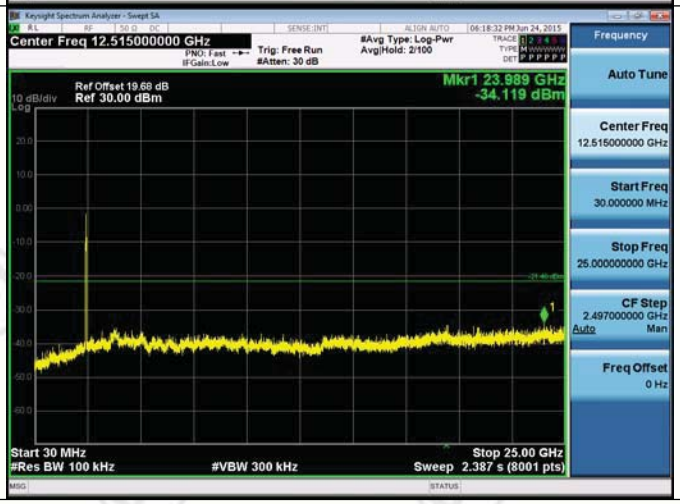
Pref/11N40SISO/MCH			
Puw/11N40SISO/MCH			

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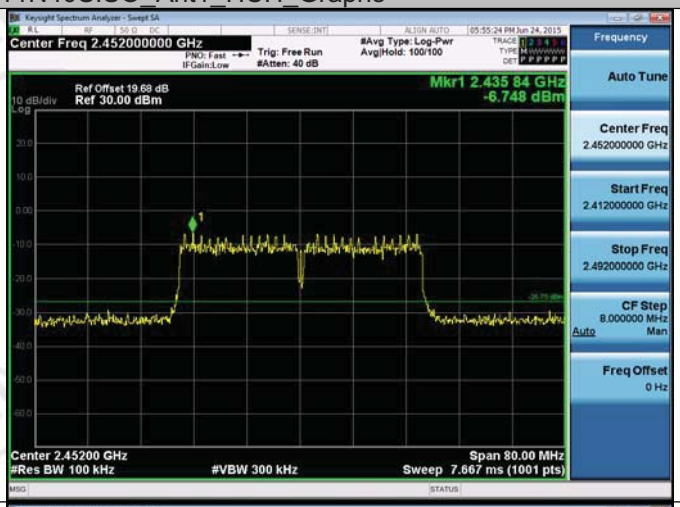
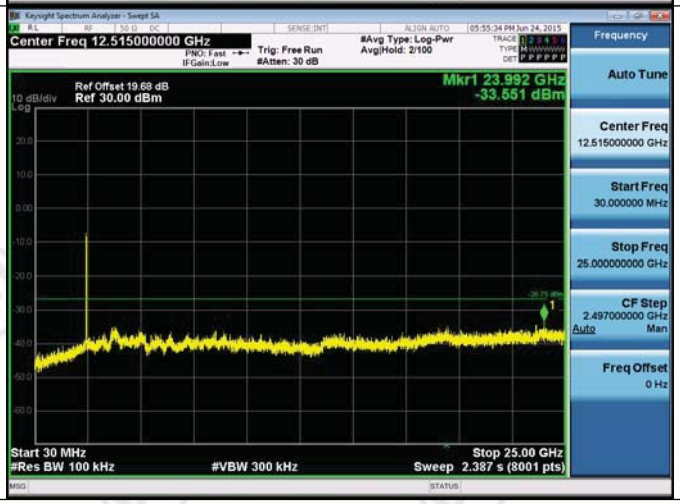
Pref/11N40SISO/HCH			
Puw/11N40SISO/HCH			

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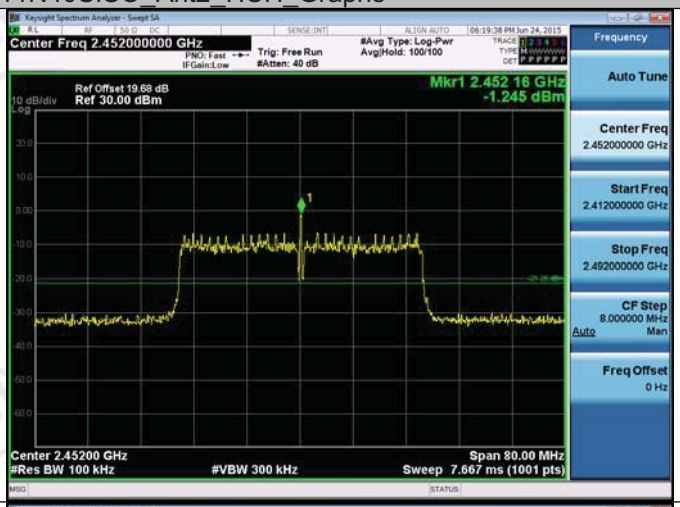
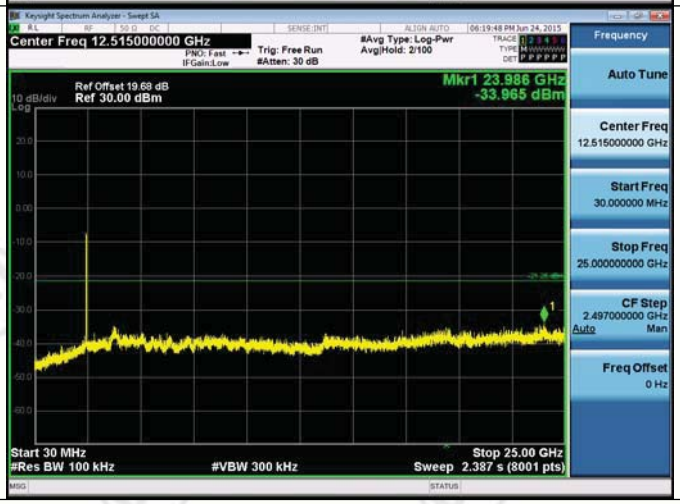
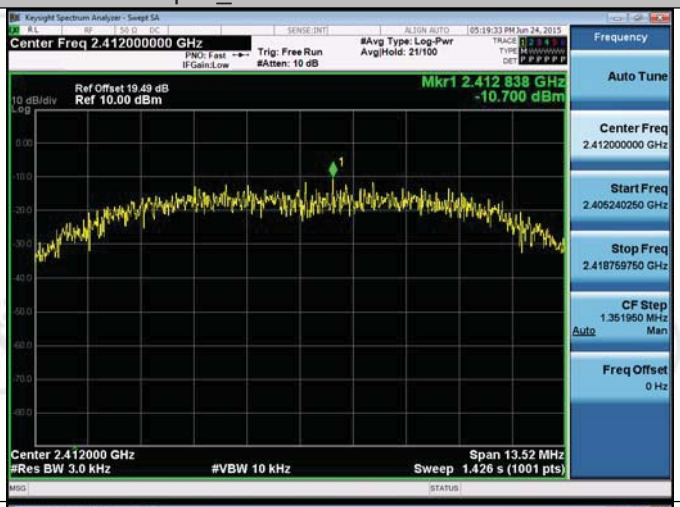
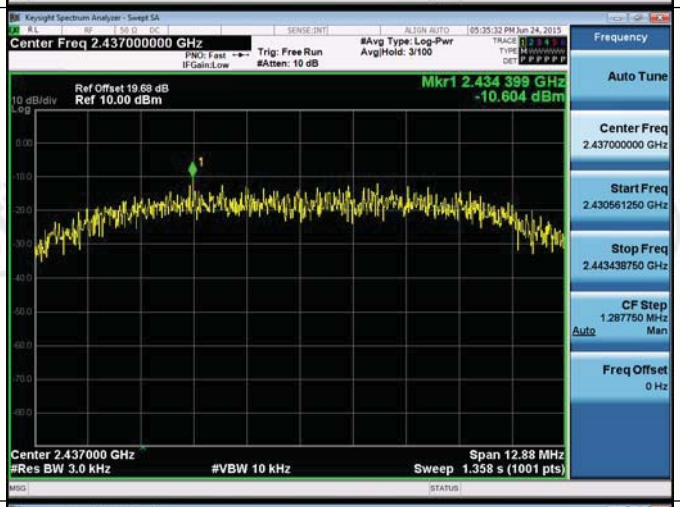
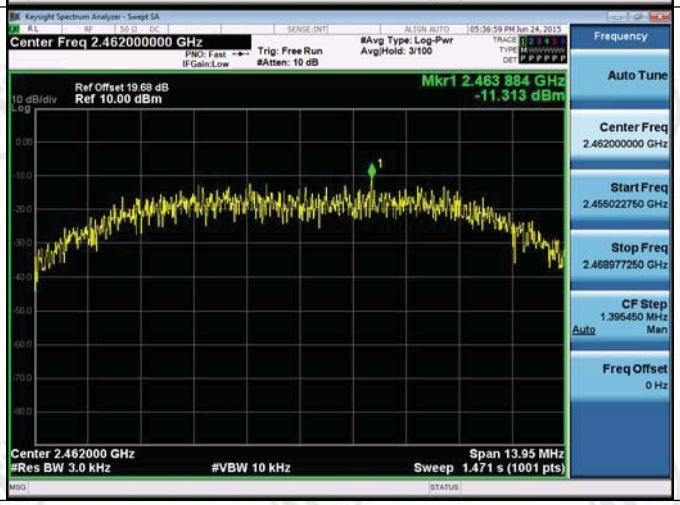
Pref/11N40SISO/HCH			
Puw/11N40SISO/HCH			

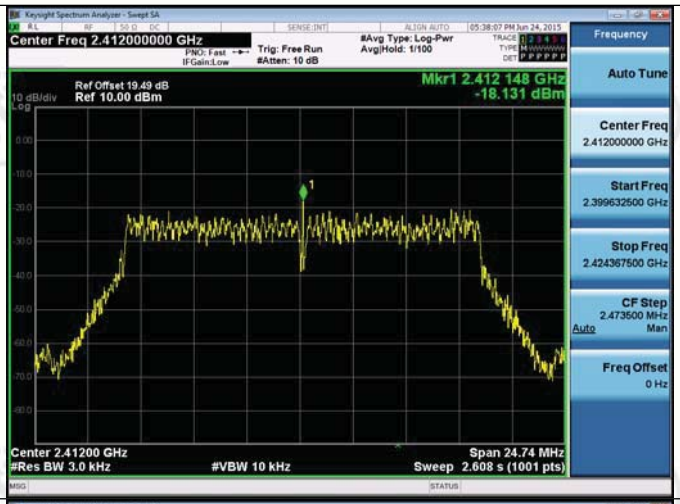
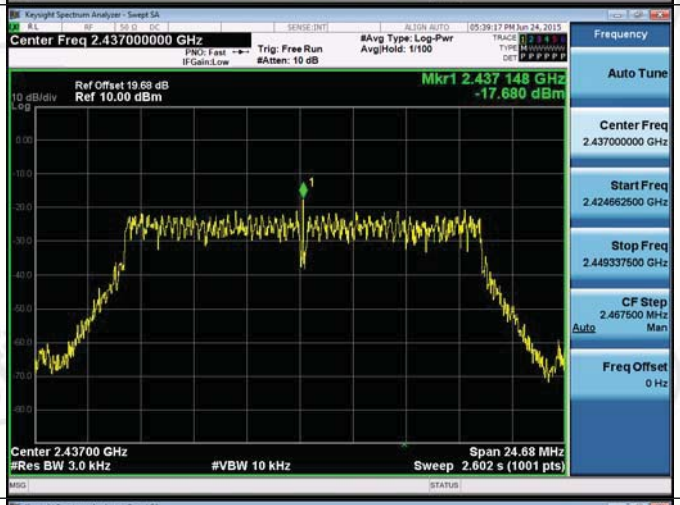
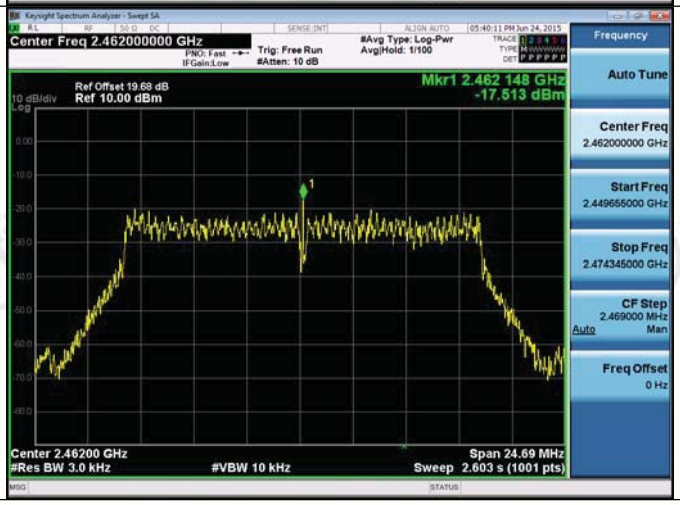
Appendix E) Power Spectral Density

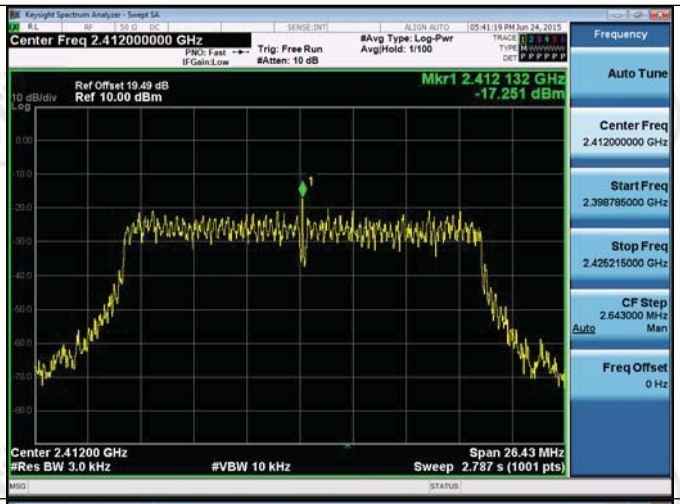
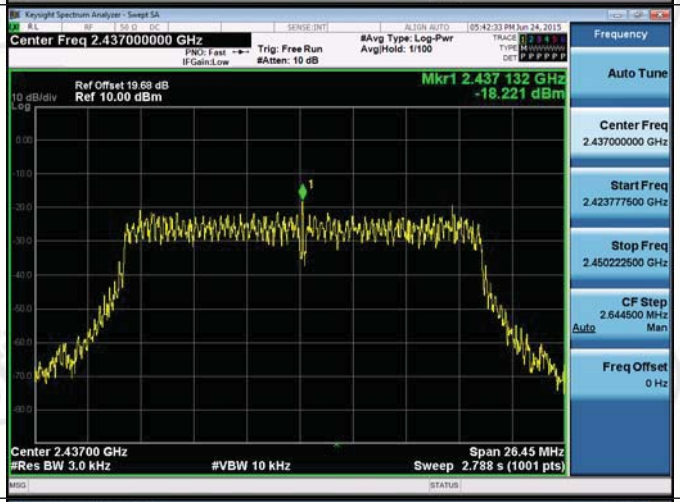
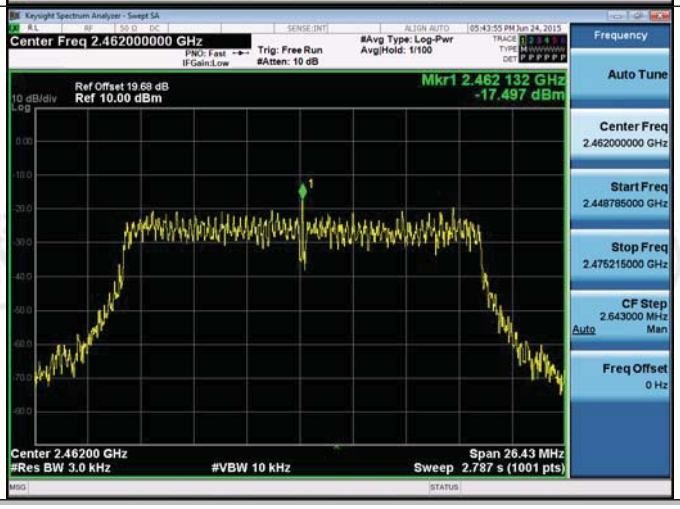
Result Table

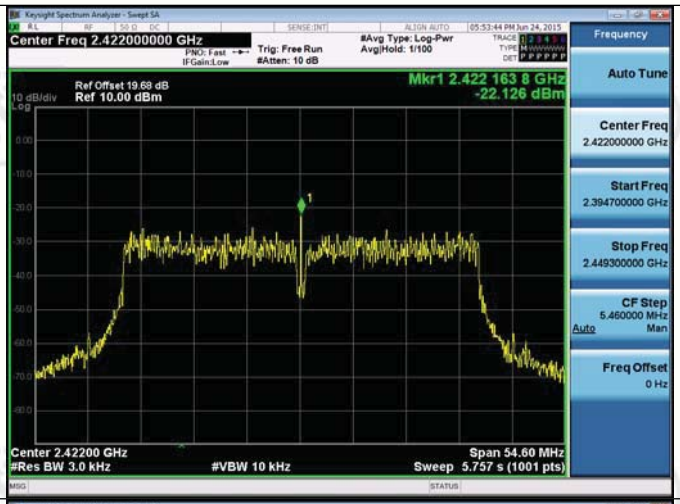
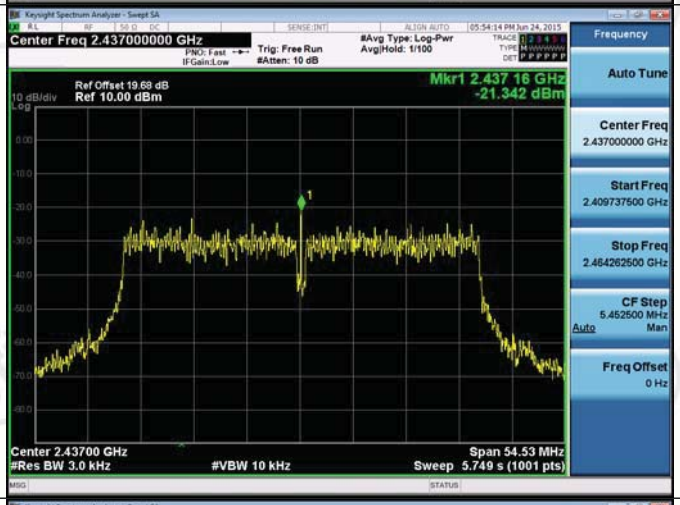
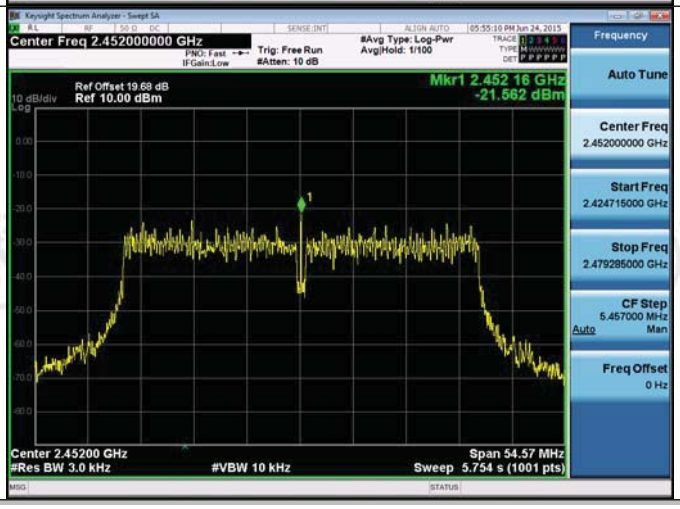
Mode	Antenna	Channel	Power Spectral Density [dBm]	Verdict
11B	Ant1	LCH	-10.700	PASS
11B	Ant2	LCH	-3.893	PASS
11B	Ant1	MCH	-10.604	PASS
11B	Ant2	MCH	-2.599	PASS
11B	Ant1	HCH	-11.313	PASS
11B	Ant2	HCH	-1.613	PASS
11G	Ant1	LCH	-18.131	PASS
11G	Ant2	LCH	-6.103	PASS
11G	Ant1	MCH	-17.680	PASS
11G	Ant2	MCH	-5.397	PASS
11G	Ant1	HCH	-17.513	PASS
11G	Ant2	HCH	-5.810	PASS
11N20SISO	Ant1	LCH	-17.251	PASS
11N20SISO	Ant2	LCH	-6.580	PASS
11N20SISO	Ant1	MCH	-18.221	PASS
11N20SISO	Ant2	MCH	-7.179	PASS
11N20SISO	Ant1	HCH	-17.497	PASS
11N20SISO	Ant2	HCH	-6.101	PASS
11N20MIMO	Ant1+ Ant2	LCH	-6.223	PASS
11N20MIMO	Ant1+ Ant2	MCH	-6.850	PASS
11N20MIMO	Ant1+ Ant2	HCH	-5.797	PASS
11N40SISO	Ant1	LCH	-22.126	PASS
11N40SISO	Ant2	LCH	-9.778	PASS
11N40SISO	Ant1	LCH	-21.342	PASS
11N40SISO	Ant2	MCH	-9.431	PASS
11N40SISO	Ant1	HCH	-21.562	PASS
11N40SISO	Ant2	HCH	-9.300	PASS
11N40MIMO	Ant1+ Ant2	LCH	-9.532	PASS
11N40MIMO	Ant1+ Ant2	MCH	-9.160	PASS
11N40MIMO	Ant1+ Ant2	HCH	-9.049	PASS

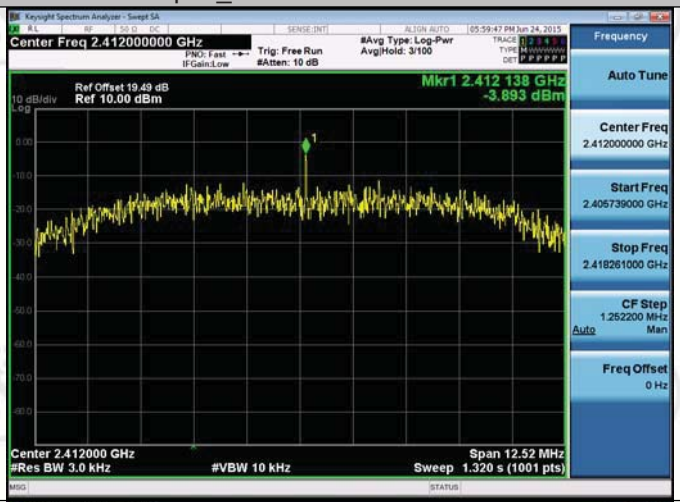
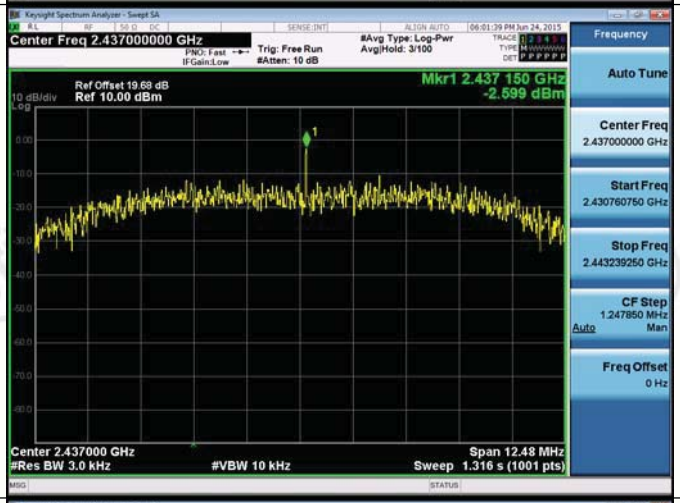
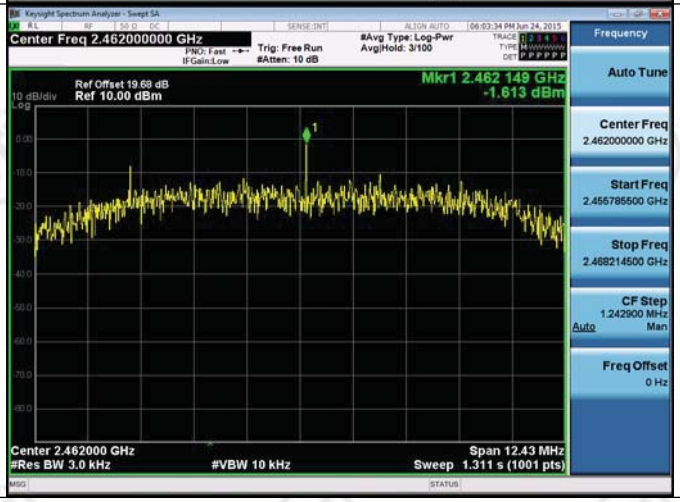
Test Graph

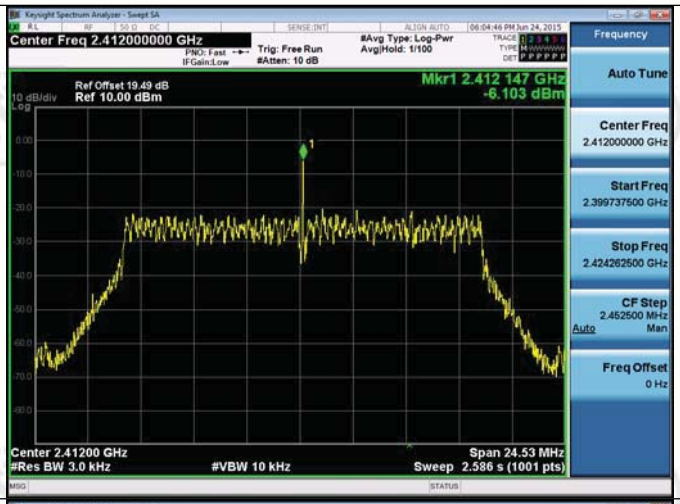
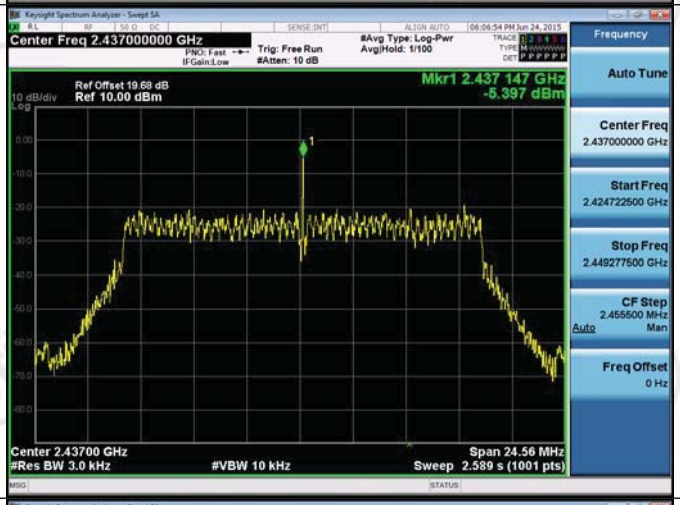
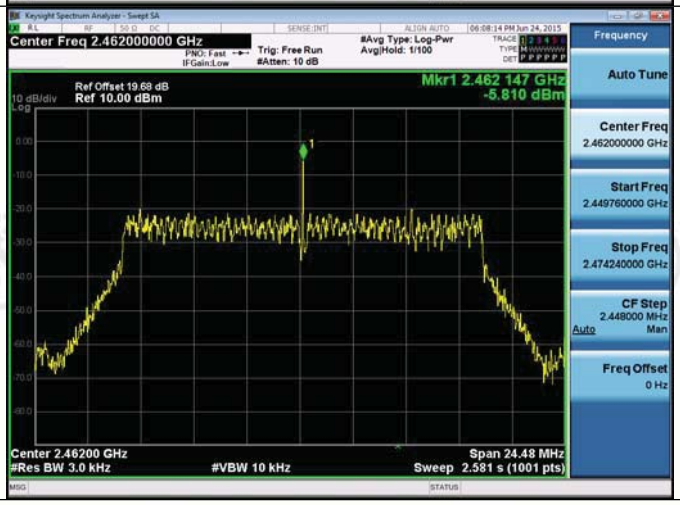
Graphs_Ant1			
11B/LCH			
11B/MCH			
11B/HCH			

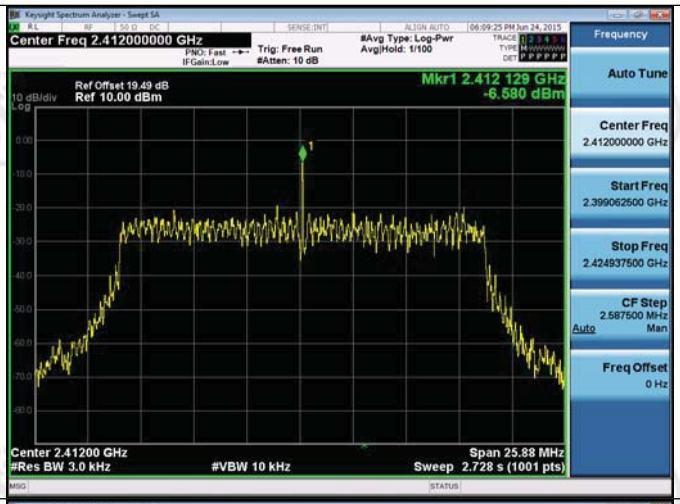
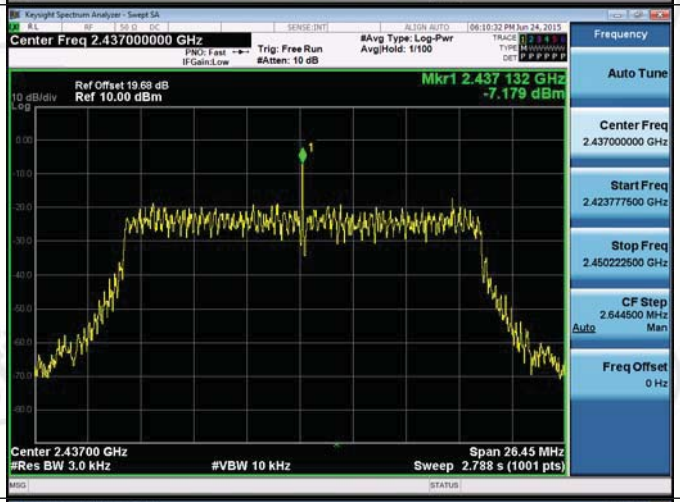
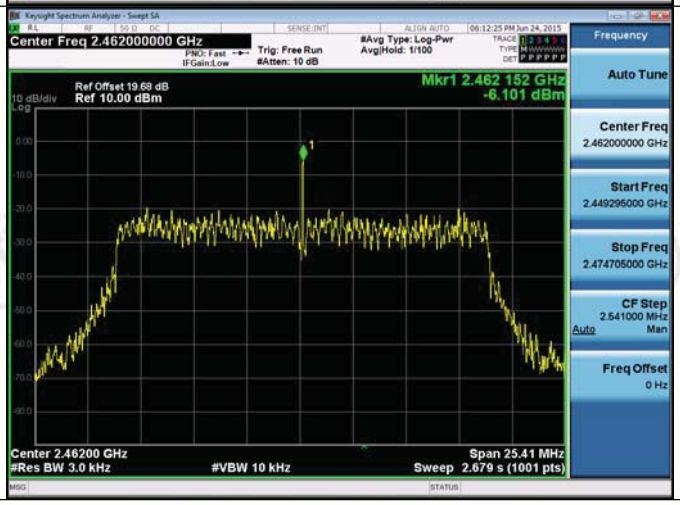
11G/LCH			
11G/MCH			
11G/HCH			

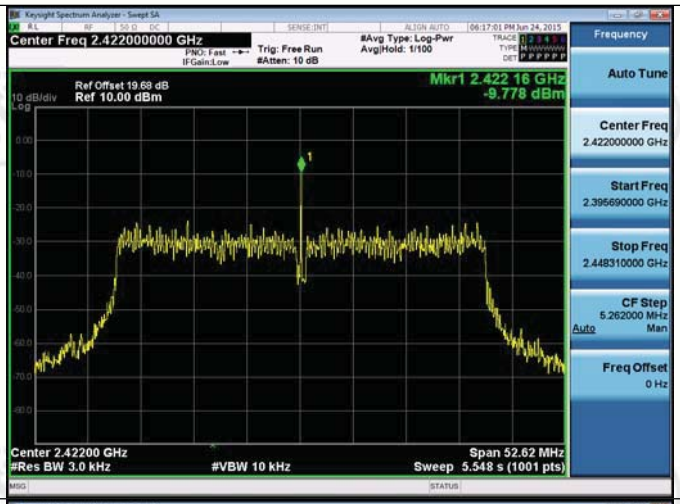
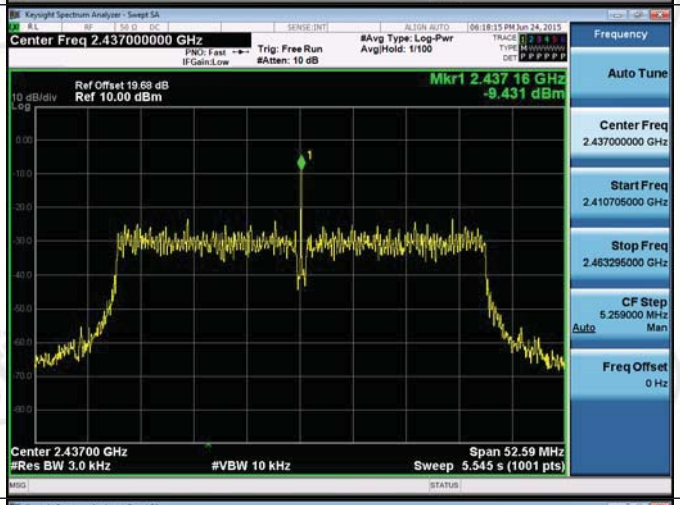
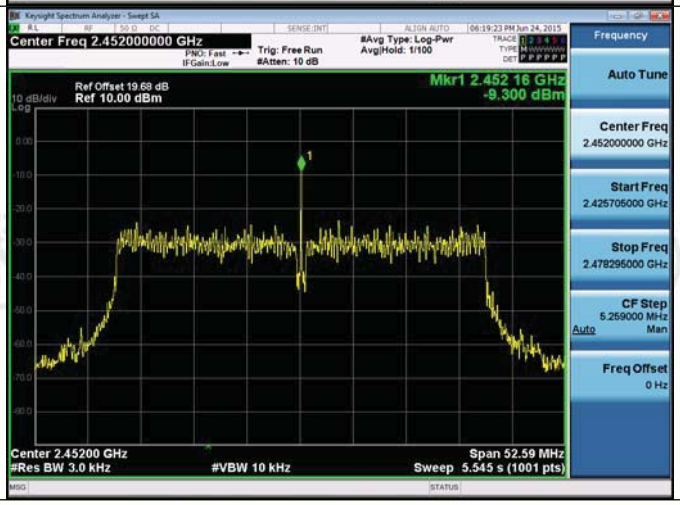
11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

11N40SISO/LCH			
11N40SISO/MCH			
11N40SISO/HCH			

Graphs_Ant2			
11B/LCH			
11B/MCH			
11B/HCH			

11G/LCH			
11G/MCH			
11G/HCH			

11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

11N40SISO/LCH			
11N40SISO/MCH			
11N40SISO/HCH			

Appendix F) Antenna Requirement

15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. **15.247(b) (4) requirement:** The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.	

Appendix G) AC Power Line Conducted Emission

<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBμV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency</td></tr>
</table>

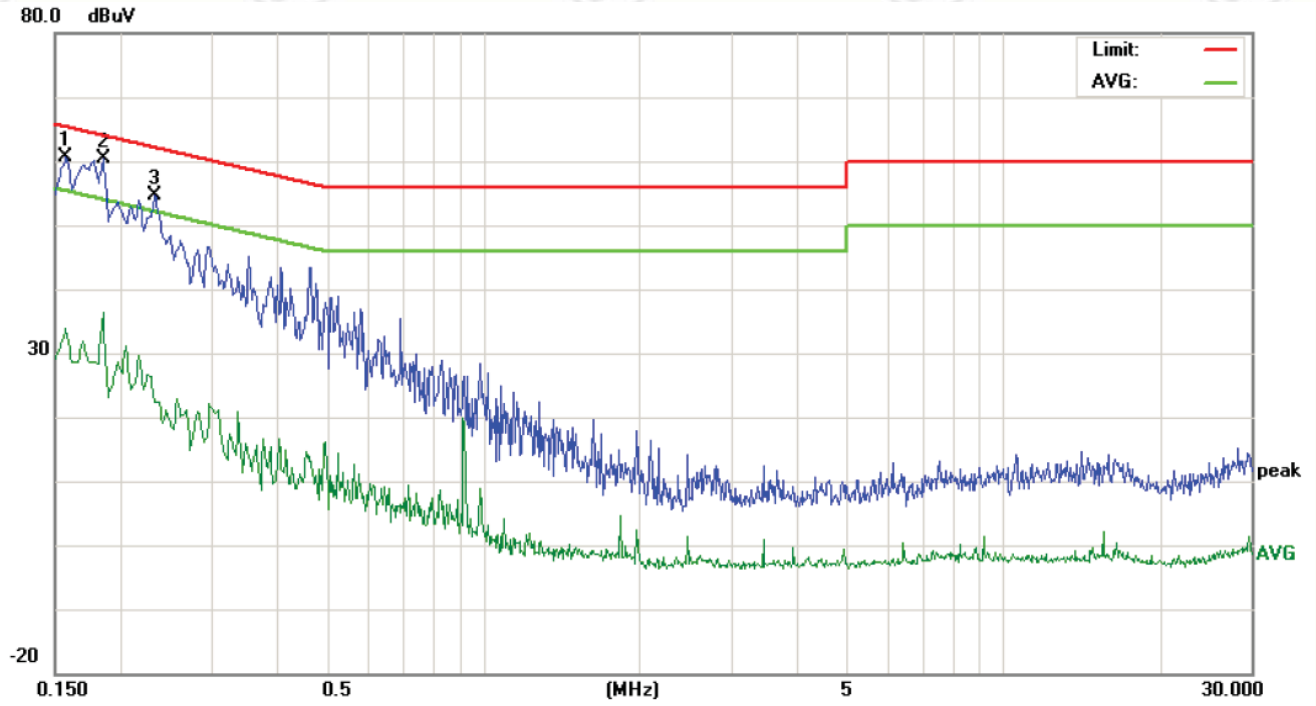
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

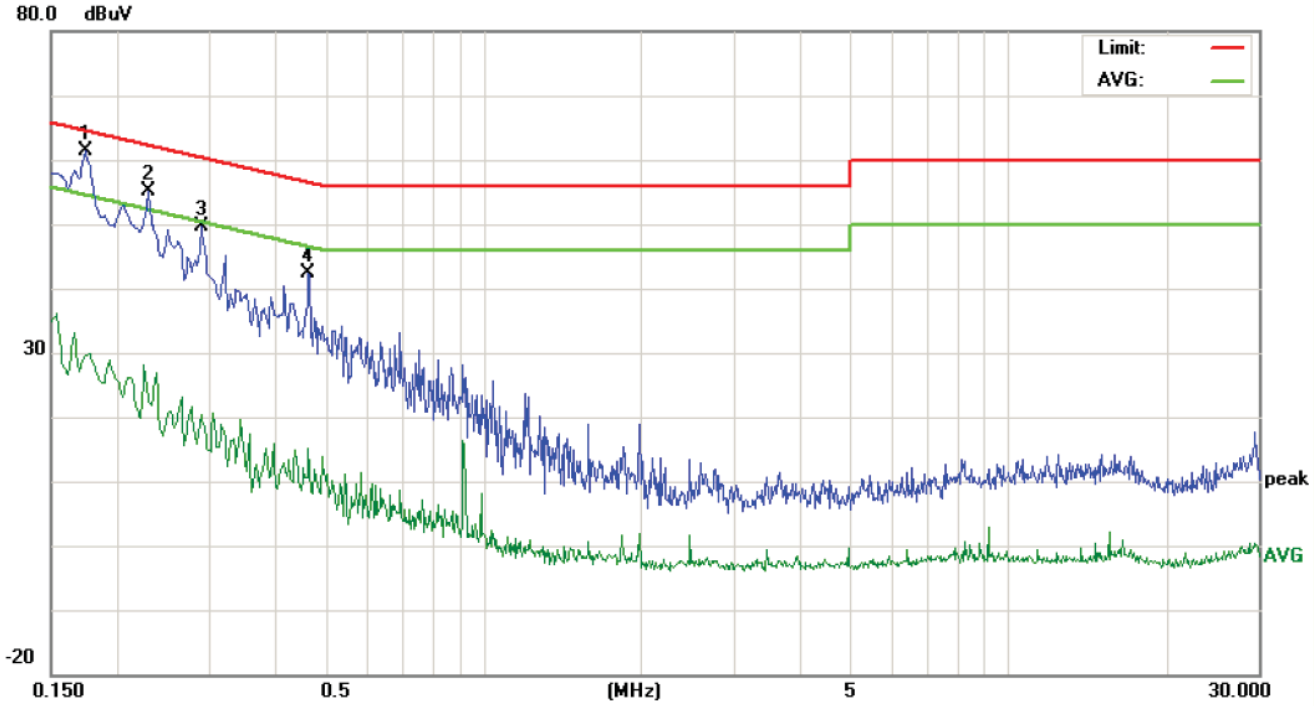
The test data of all SISO and MIMO mode and their low channel, middle channel and high channel all have been tested , only the worse case (802.11b Antenna 1 mode)is reported .

Live line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1580	50.67	41.38	19.72	9.90	60.57	51.28	29.62	65.56	55.56	-14.28	-25.94	P	
2	0.1860	50.50	38.53	16.86	9.90	60.40	48.43	26.76	64.21	54.21	-15.78	-27.45	P	
3	0.2340	44.64	35.68	12.31	9.90	54.54	45.58	22.21	62.30	52.30	-16.72	-30.09	P	

Neutral line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1740	51.40	41.96	18.53	9.90	61.30	51.86	28.43	64.76	54.76	-12.90	-26.33	P	
2	0.2300	45.19		12.88	9.90	55.09		22.78	62.45	52.45	-7.36	-29.67	P	
3	0.2900	39.66		10.45	9.90	49.56		20.35	60.52	50.52	-10.96	-30.17	P	
4	0.4660	32.41		5.22	9.90	42.31		15.12	56.58	46.58	-14.27	-31.46	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix H) Restricted bands around fundamental frequency /Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter)..
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Radiated Spurious Emissions test Data:

All the modes of operation (X, Y, Z) were investigated and the worst-case emissions are reported.

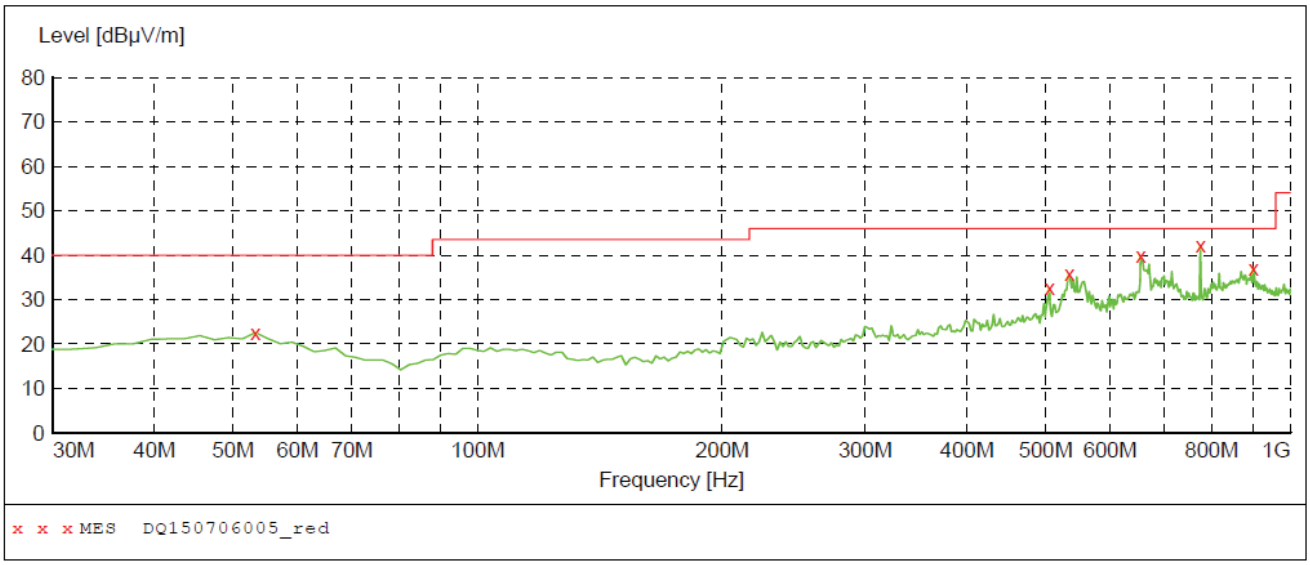
A. Below 30MHz:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

B. 30MHz ～ 1GHz:

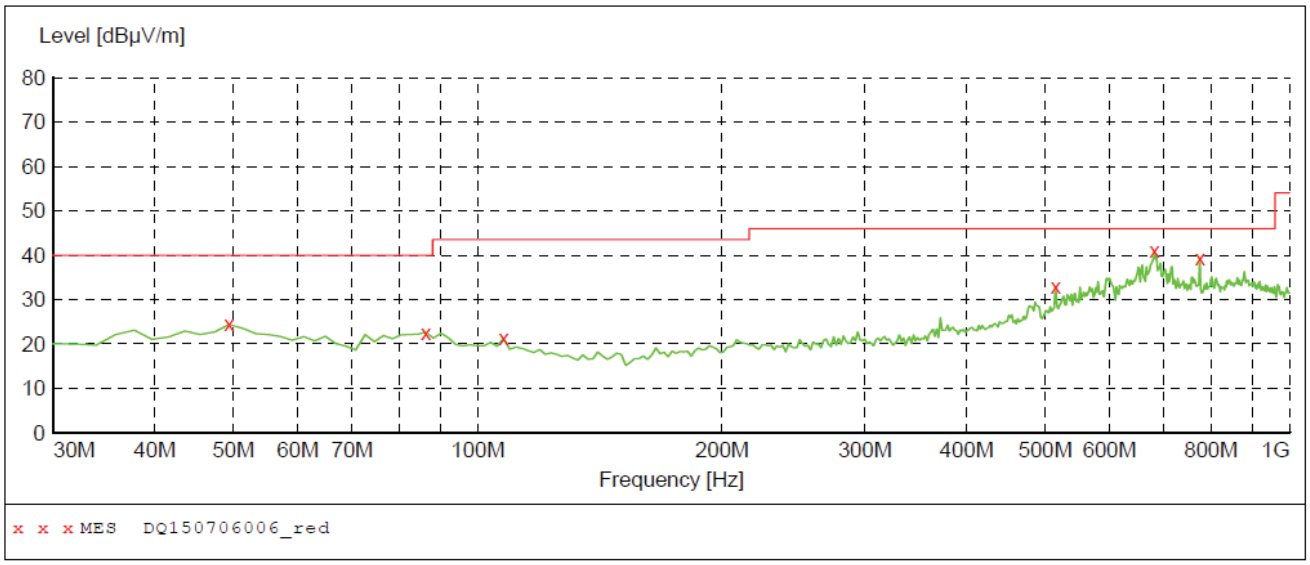
The test data of all SISO and MIMO mode and their low channel, middle channel and high channel all have been tested , only the worse case (802.11b Antenna 1 mode)is reported .

H:



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	22.60	16.1	40.0	17.4	---	100.0	21.00	HORIZONTAL
505.300000	32.50	21.6	46.0	13.5	---	100.0	157.00	HORIZONTAL
534.400000	35.70	21.7	46.0	10.3	---	100.0	168.00	HORIZONTAL
654.680000	39.90	23.3	46.0	6.1	---	100.0	37.00	HORIZONTAL
774.960000	42.20	25.2	46.0	3.8	---	100.0	10.00	HORIZONTAL
901.060000	36.90	26.7	46.0	9.1	---	100.0	329.00	HORIZONTAL

V:



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
49.400000	24.40	16.5	40.0	15.6	---	100.0	100.00	VERTICAL
86.260000	22.60	11.8	40.0	17.4	---	100.0	61.00	VERTICAL
107.600000	21.30	14.1	43.5	22.2	---	100.0	365.00	VERTICAL
515.000000	33.00	21.6	46.0	13.0	---	100.0	337.00	VERTICAL
681.840000	41.00	24.1	46.0	5.0	---	100.0	164.00	VERTICAL
774.960000	39.40	25.2	46.0	6.6	---	100.0	37.00	VERTICAL

C. **Above 1GHz:**

IEEE 802.11b, 11Mbps, antenna 2:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2412MHz)					
2390.0	35.58	74	PK	H	P
2400.0	49.89	74	PK	H	P
4824.0	44.63	74	PK	H	P
2390.0	35.88	74	PK	V	P
2400.0	49.36	74	PK	V	P
4824.0	45.6	74	PK	V	P
Middle channel (2437MHz)					
4874.0	44.54	74	PK	H	P
4874.0	45.21	74	PK	V	P
High channel (2462MHz)					
2483.5	43.16	74	PK	H	P
4924.0	44.53	74	PK	H	P
2483.5	45.27	74	PK	V	P
4924.0	45.13	74	PK	V	P

IEEE 802.11g, 6Mbps, antenna 2:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2412MHz)					
2390.0	35.03	74	PK	H	P
2400.0	49.03	74	PK	H	P
4824.0	44.17	74	PK	H	P
2390.0	35.93	74	PK	V	P
2400.0	49.62	74	PK	V	P
4824.0	45.16	74	PK	V	P
Middle channel (2437MHz)					
4874.0	45.17	74	PK	H	P
4874.0	44.26	74	PK	V	P
High channel (2462MHz)					
2483.5	44.23	74	PK	H	P
4924.0	44.98	74	PK	H	P
2483.5	44.82	74	PK	V	P

4924.0	44.83	74	PK	V	P

IEEE 802.11n HT20, 6.5Mbps, antenna 2:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2412MHz)					
2390.0	35.08	74	PK	H	P
2400.0	49.05	74	PK	H	P
4824.0	44.12	74	PK	H	P
2390.0	36.01	74	PK	V	P
2400.0	49.03	74	PK	V	P
4824.0	46.27	74	PK	V	P
Middle channel (2437MHz)					
4874.0	45.16	74	PK	H	P
4874.0	44.87	74	PK	V	P
High channel (2462MHz)					
2483.5	44.61	74	PK	H	P
4924.0	46.16	74	PK	H	P
2483.5	45.03	74	PK	V	P
4924.0	45.82	74	PK	V	P

IEEE 802.11n HT20, 6.5Mbps, keeping MIMO transmitter mode:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2412MHz)					
2390.0	36.07	74	PK	H	P
2400.0	48.04	74	PK	H	P
4824.0	43.11	74	PK	H	P
2390.0	36.12	74	PK	V	P
2400.0	48.02	74	PK	V	P
4824.0	45.26	74	PK	V	P
Middle channel (2437MHz)					
4874.0	44.15	74	PK	H	P
4874.0	43.79	74	PK	V	P
High channel (2462MHz)					
2483.5	43.59	74	PK	H	P
4924.0	45.15	74	PK	H	P
2483.5	44.02	74	PK	V	P
4924.0	44.81	74	PK	V	P

IEEE 802.11n HT40, 13.5Mpbs, antenna 2:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2422MHz)					
2390.0	35.16	74	PK	H	P
2400.0	49.95	74	PK	H	P
4844.0	45.63	74	PK	H	P
2390.0	36.87	74	PK	V	P
2400.0	49.92	74	PK	V	P
4844.0	47.27	74	PK	V	P
Middle channel (2437MHz)					
4874.0	47.17	74	PK	H	P
4874.0	46.16	74	PK	V	P
High channel (2452MHz)					
2483.5	45.31	74	PK	H	P
4904.0	47.91	74	PK	H	P
2483.5	44.14	74	PK	V	P
4904.0	46.12	74	PK	V	P

IEEE 802.11n HT40, 13.5Mpbs, keeping MIMO transmitter mode:

Frequency (MHz)	Measurement (dBuV/m)	Limit (dBuV/m)	Detector Type	Antenna (H/V)	Result (P/F)
Low channel (2422MHz)					
2390.0	36.15	74	PK	H	P
2400.0	48.94	74	PK	H	P
4844.0	44.59	74	PK	H	P
2390.0	35.86	74	PK	V	P
2400.0	48.89	74	PK	V	P
4844.0	46.26	74	PK	V	P
Middle channel (2437MHz)					
4874.0	46.16	74	PK	H	P
4874.0	45.15	74	PK	V	P
High channel (2452MHz)					
2483.5	44.29	74	PK	H	P
4904.0	46.89	74	PK	H	P
2483.5	43.13	74	PK	V	P
4904.0	45.11	74	PK	V	P

Note:

1) Through Pre-scan with all kind of modulation ,data rate and all SISO and MIMO mode , find the 11Mbps of rate of 802.11b ; 6Mbps of rate of 802.11g ; 6.5Mbps of rate of 802.11n(HT20) ; 13.5Mbps of rate of 802.11n(HT40) are the worse cases, and antenna 2 is the worse case for all SISO mode , and then Only the worst cases is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

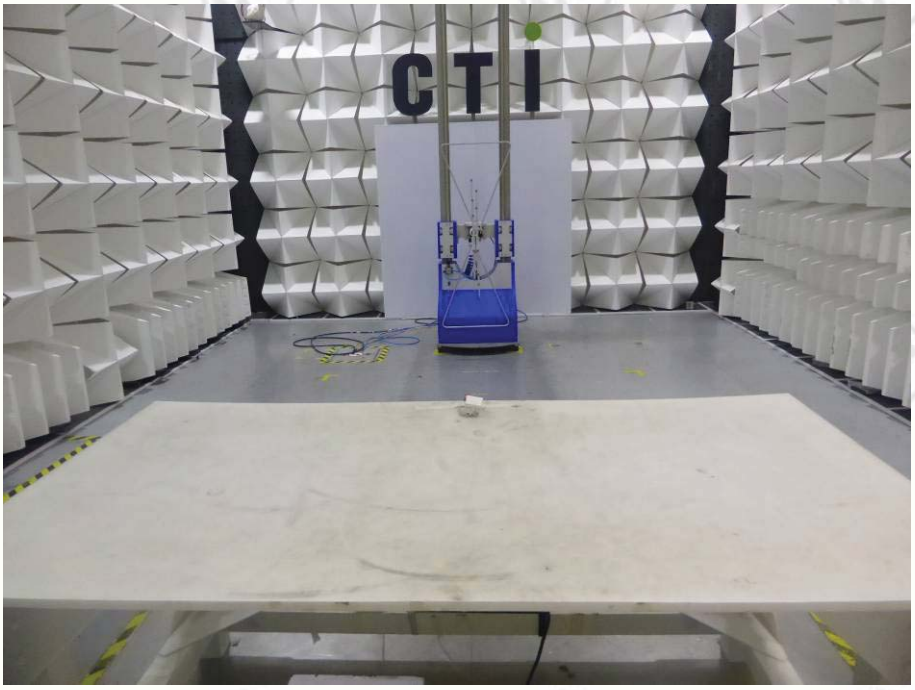
Final Test Level =Receiver Reading - Correct Factor

Correct Factor = *Preamplifier Factor– Antenna Factor–Cable Factor*

3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

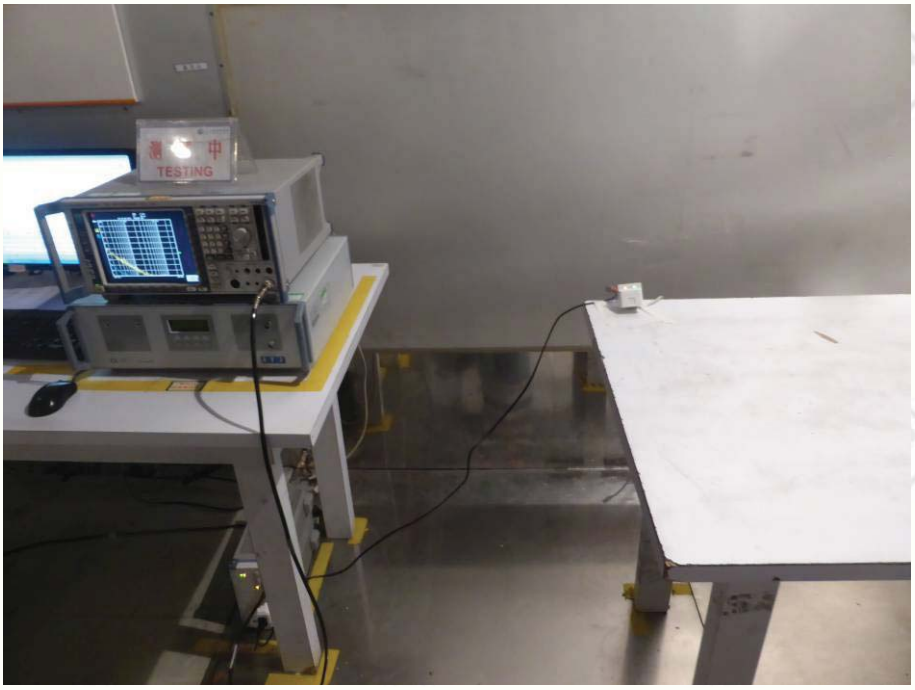
PHOTOGRAPHS OF TEST SETUP

Test mode No.: MR2060



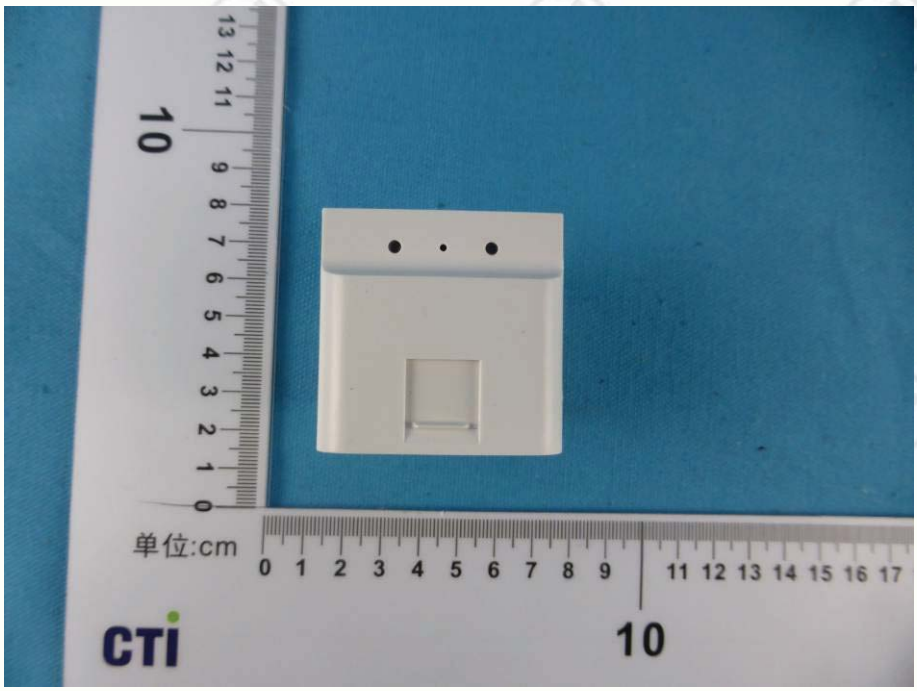
Radiated spurious emission Test Setup-1(Below 1GHz)

Radiated spurious emission Test Setup-2(Above 1GHz)

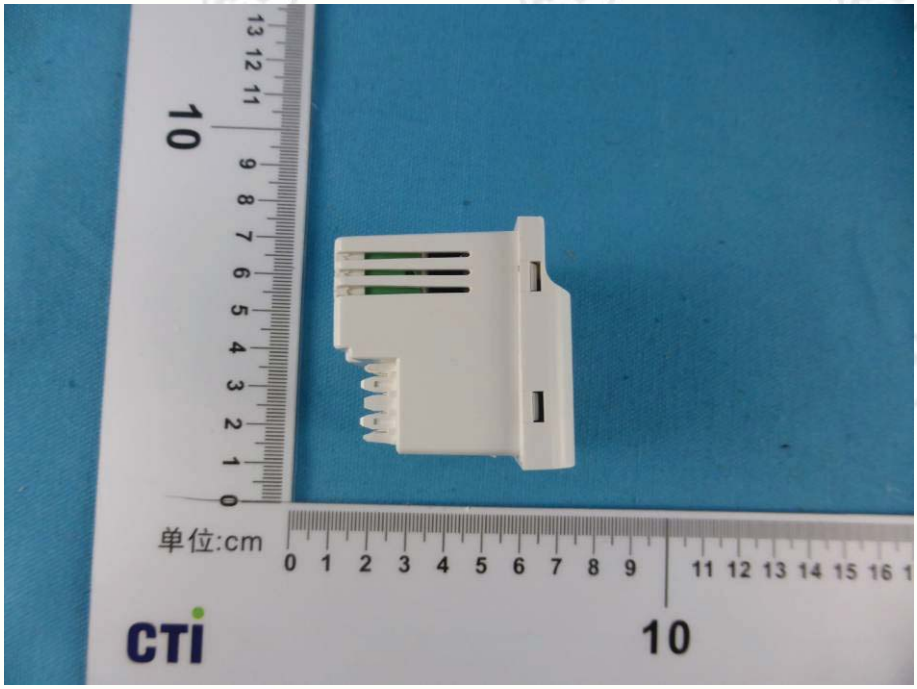


Conducted spurious emission Test Setup

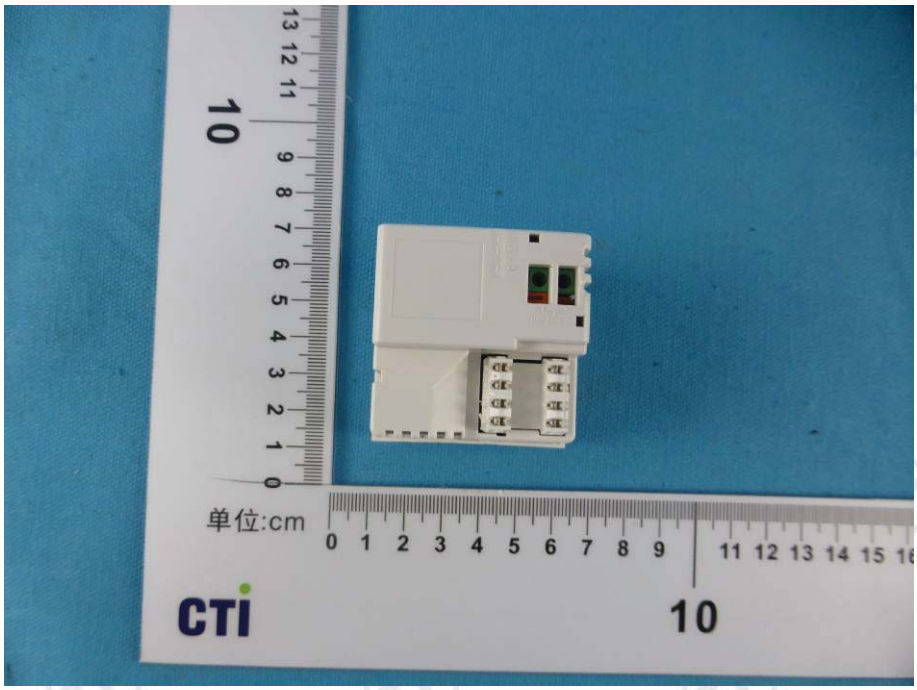
PHOTOGRAPHS OF EUT Constructional Details



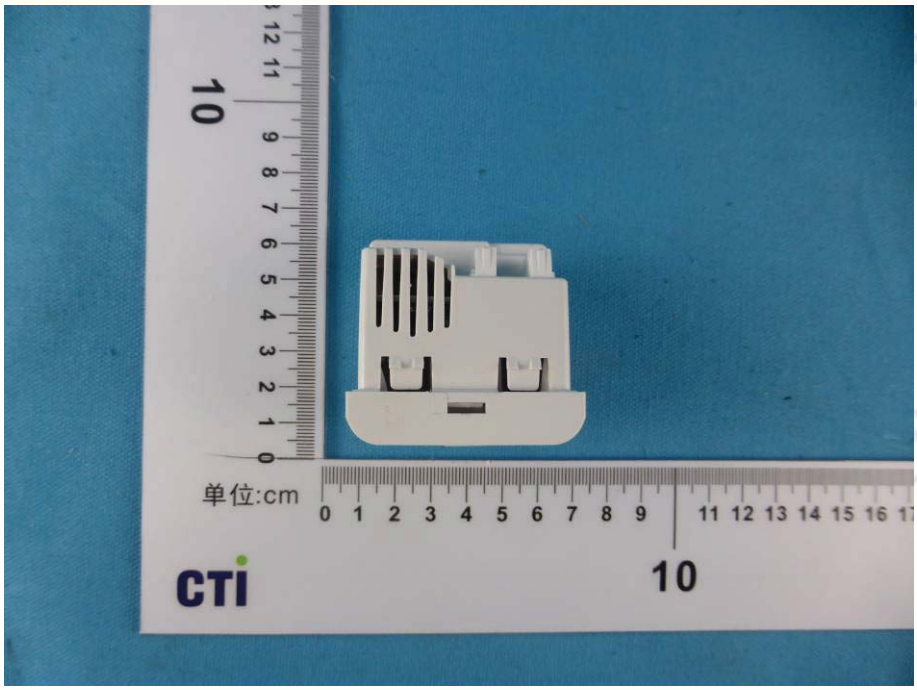
View of external EUT-1



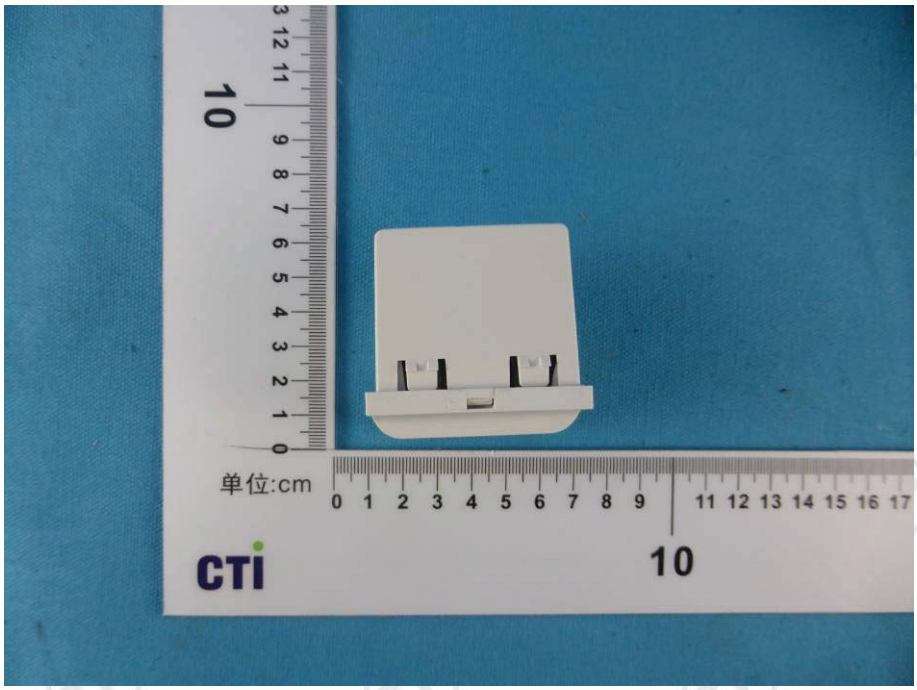
View of external EUT-2



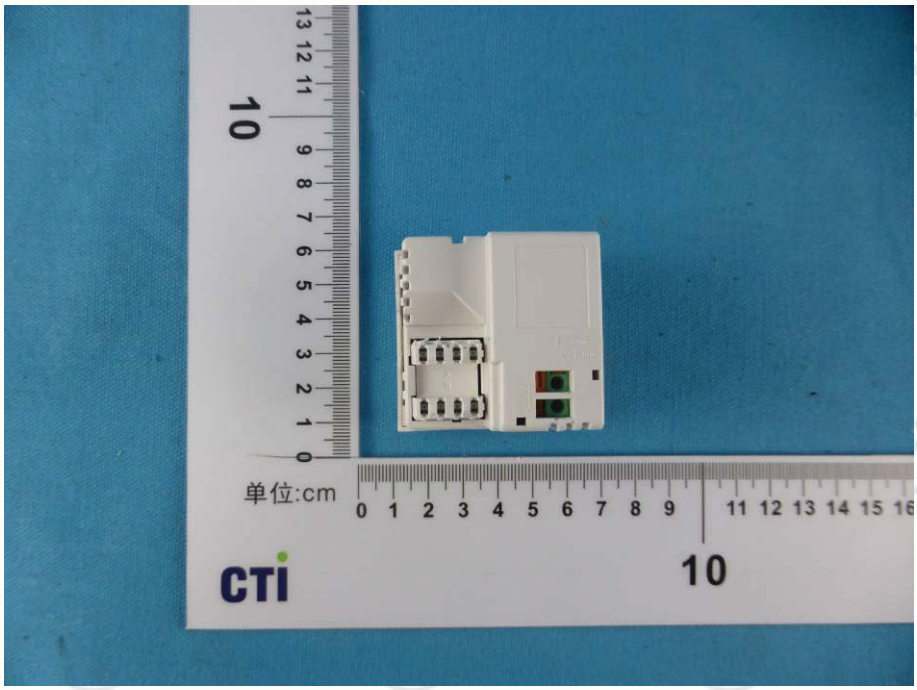
View of external EUT-3



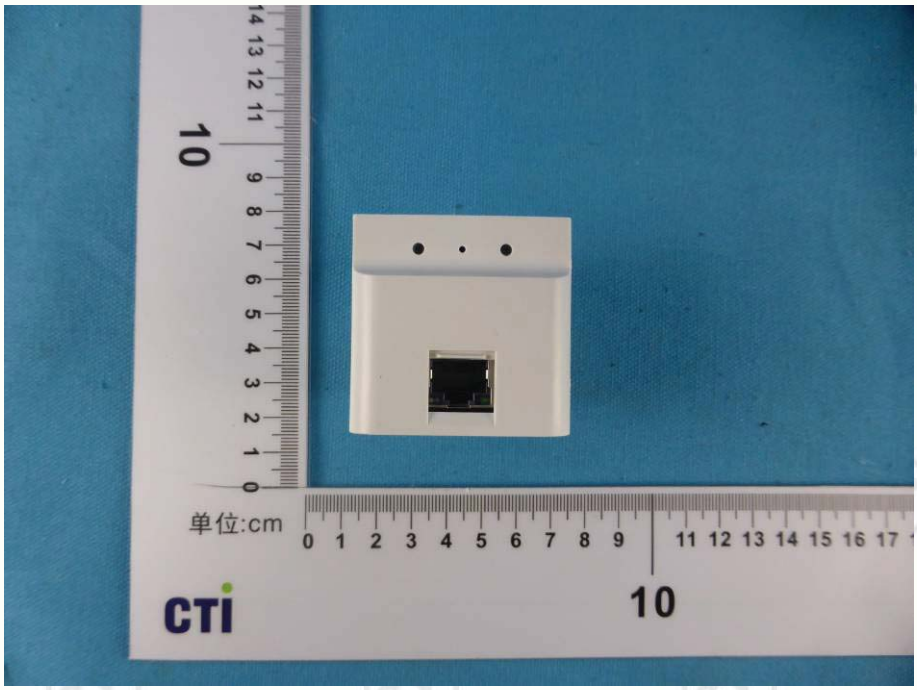
View of external EUT-4



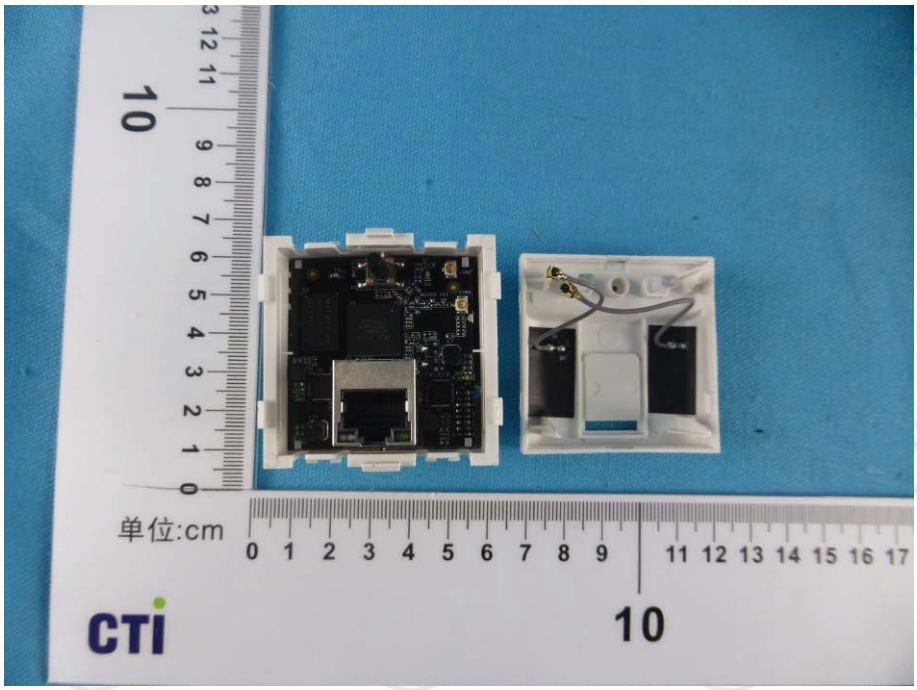
View of external EUT-5



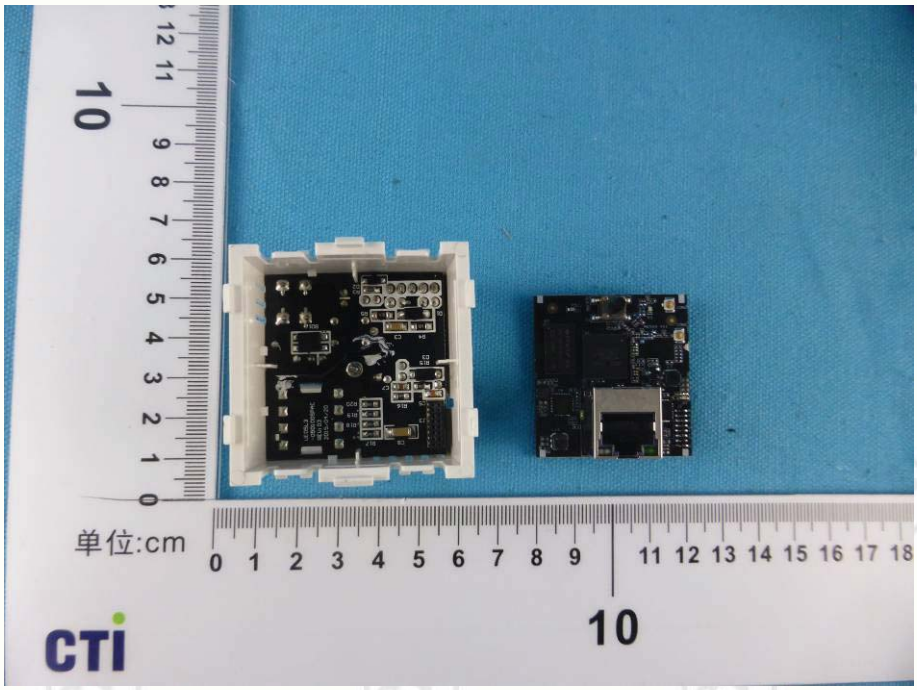
View of external EUT-6



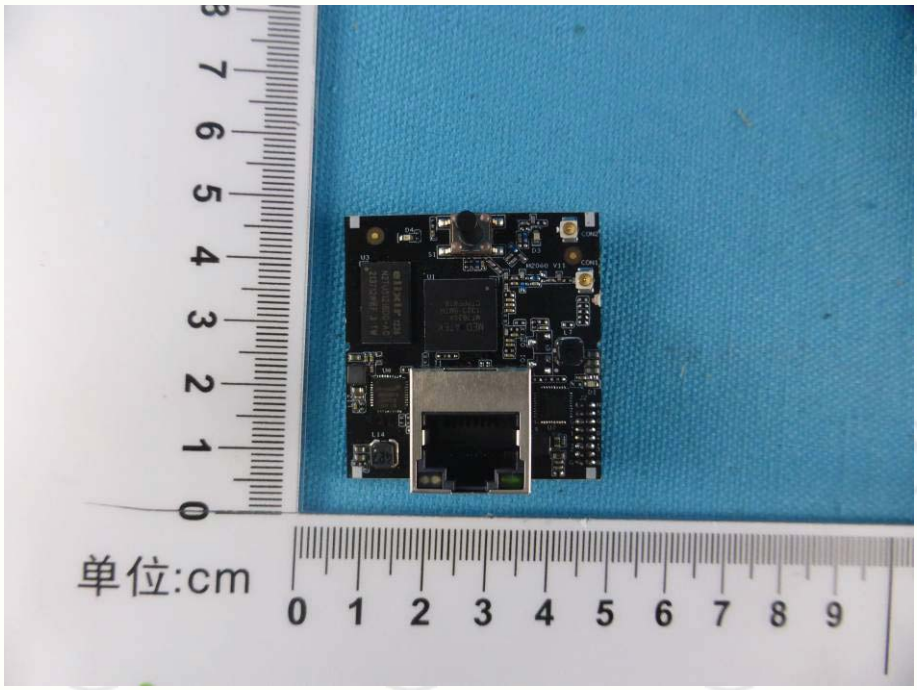
View of internal EUT-1



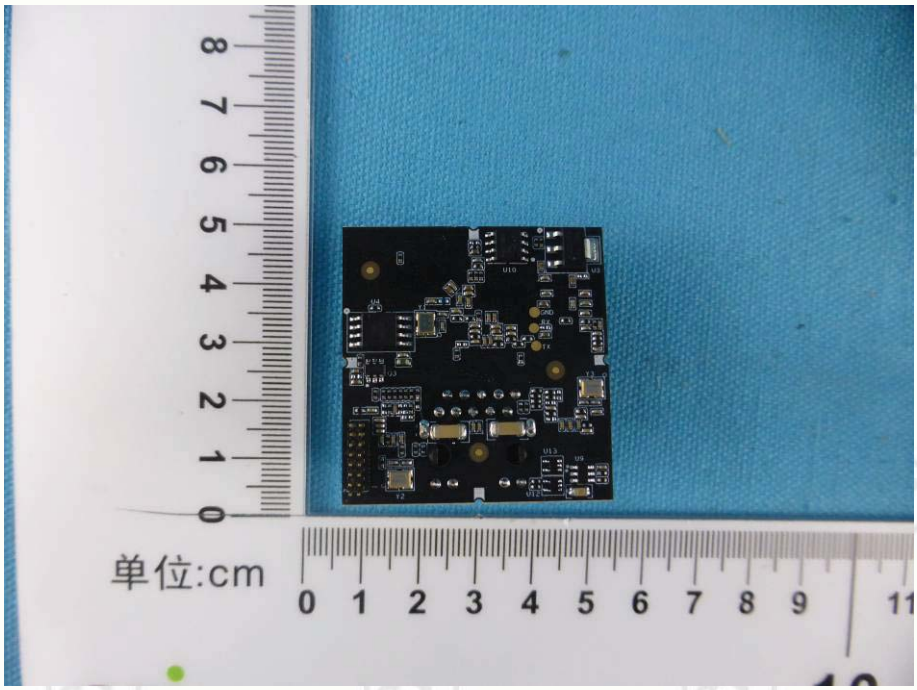
View of internal EUT-2



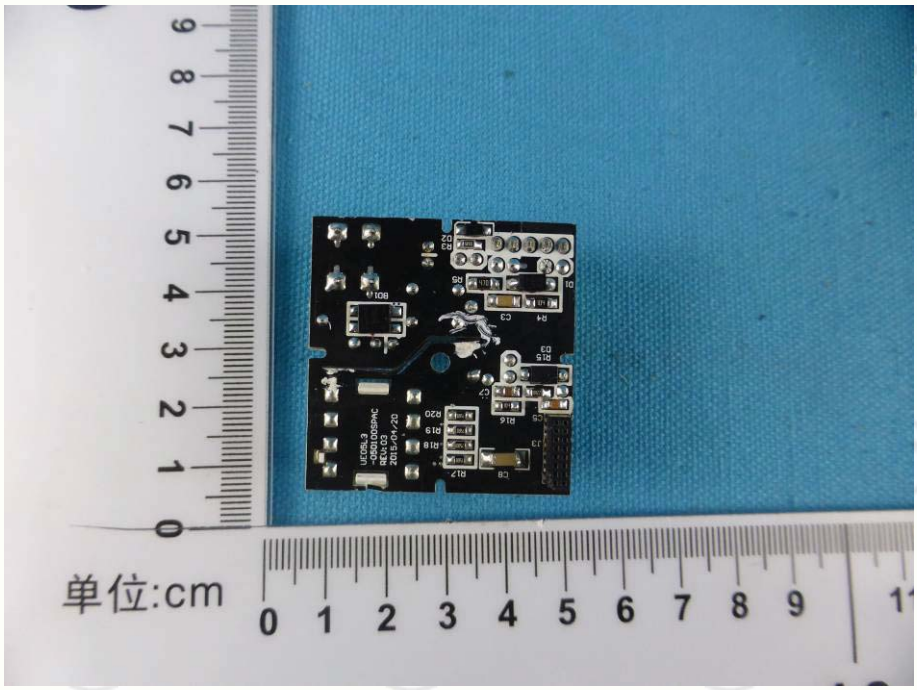
View of internal EUT-3



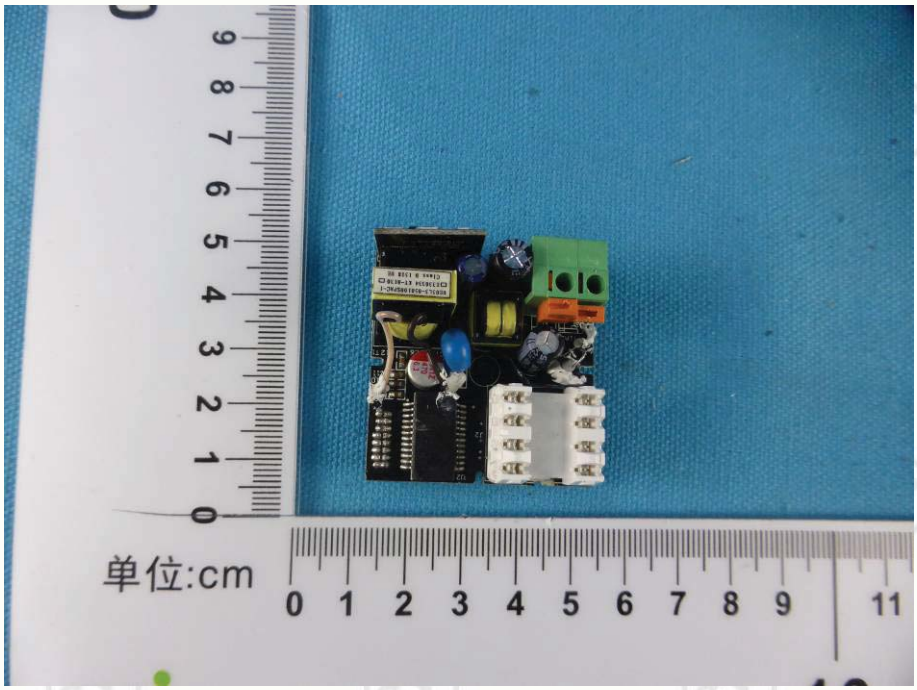
View of internal EUT-4



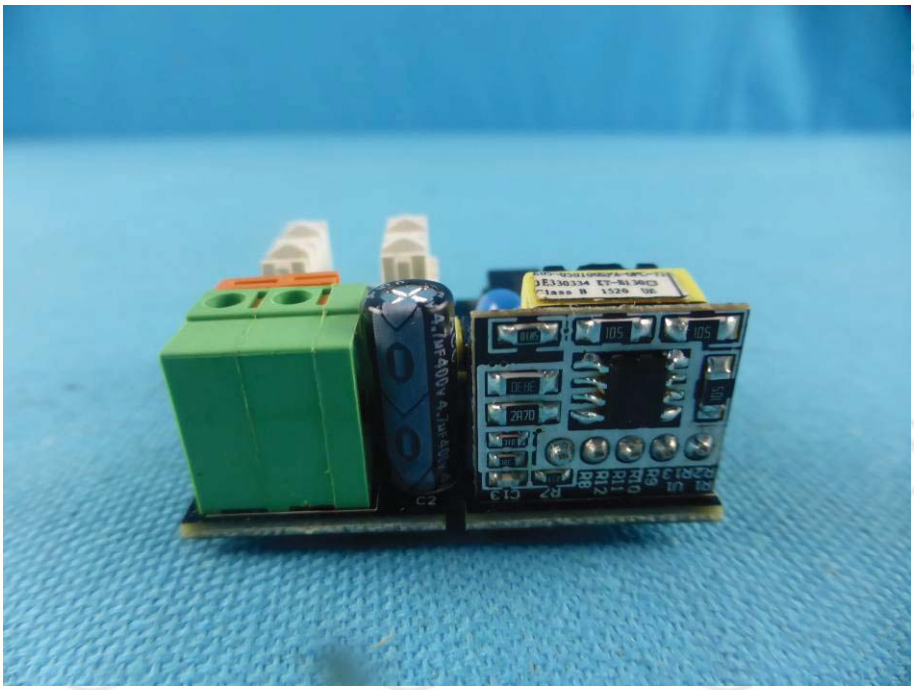
View of internal EUT-5



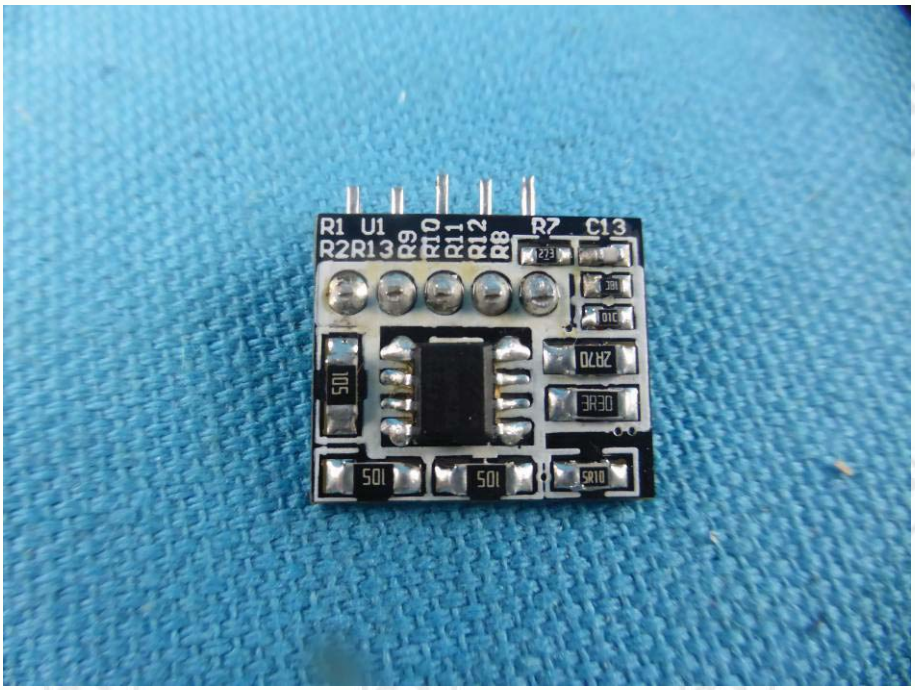
View of internal EUT-6



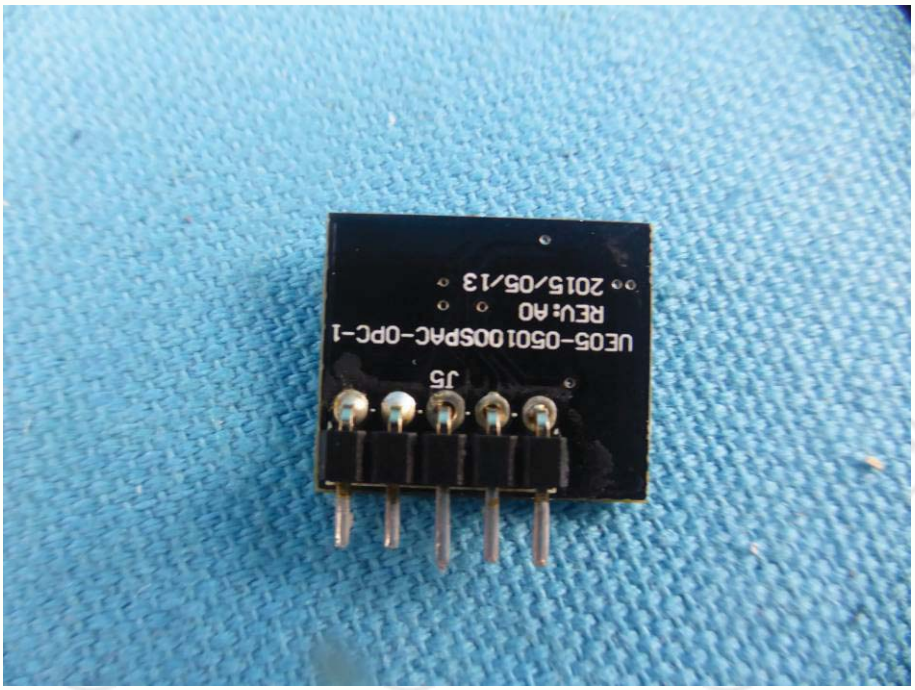
View of internal EUT-7



View of internal EUT-8



View of internal EUT-9



View of internal EUT-10

*** End of Report ***

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