

E.I.R.P. Power

Frequency (MHz)	Field Strength (dBuV/m)	EIRP (dBm)	Over Limit (dB)	Limit (EIPR dBm)
5150.00 MHz	57.76 dBuV/m	-42.24	-15.24	-27.00
5250.00 MHz	58.42 dBuV/m	-41.58	-14.58	-27.00
5150.00 MHz	51.32 dBuV/m	-48.68	-21.68	-27.00
5250.00 MHz	57.92 dBuV/m	-42.08	-15.08	-27.00
5150.00 MHz	65.02 dBuV/m	-34.98	-7.98	-27.00
5250.00 MHz	73.26 dBuV/m	-26.74	0.26	-27.00

Remark: $EIRP = 10 * \log\left(\frac{10^{\left[\left(\text{Field Strength} - 120\right)/20\right] * \text{distance}}}{30 * 10^{\left(\text{Antenna Gain}/10\right)}}\right) / 0.001$

5.7 Band Edges Measurement

5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.7.2 Test Procedure :

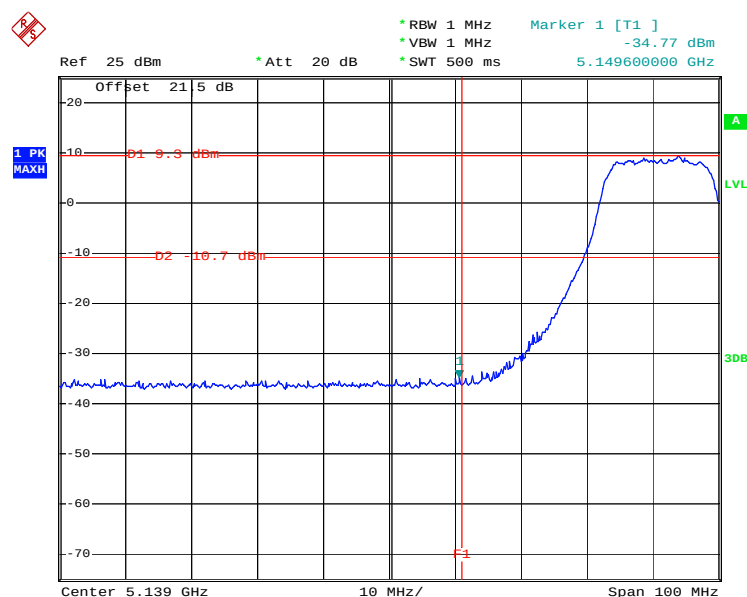
1. Set both RBW and VBW of spectrum analyzer to 1MHz with convenient frequency span including 1MHz bandwidth from band edge.
2. The band edges was measured and recorded.

5.7.3 Test Result :

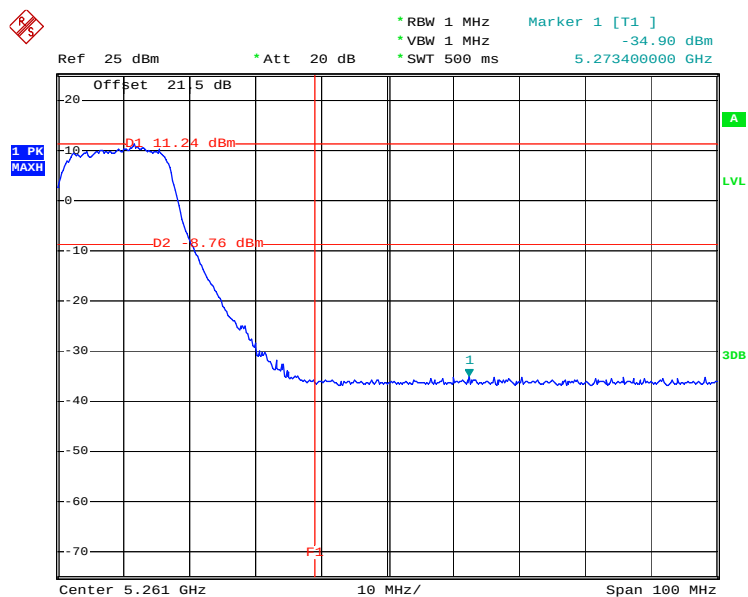
- Temperature : 26~27°C
- Relative Humidity :49~50%

Test Result Mode		Verdict
Test Result for 802.11a	:	PASS

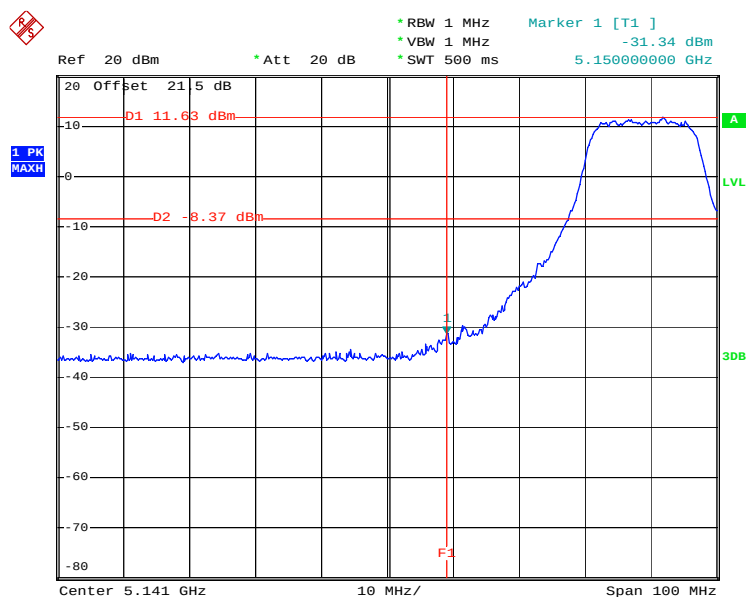
5.7.4 Test Data



Date: 5.OCT.2007 00:19:10 802.11a CH36

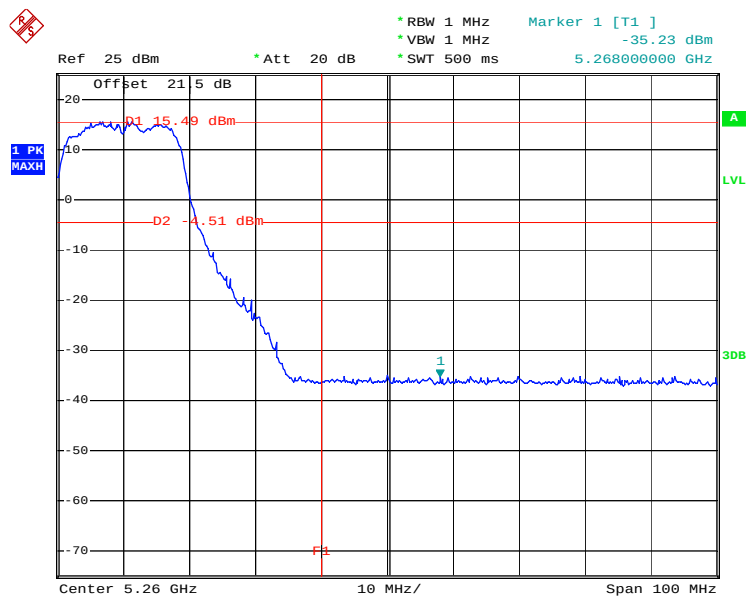


Date: 5.OCT.2007 00:16:45 802.11a CH44

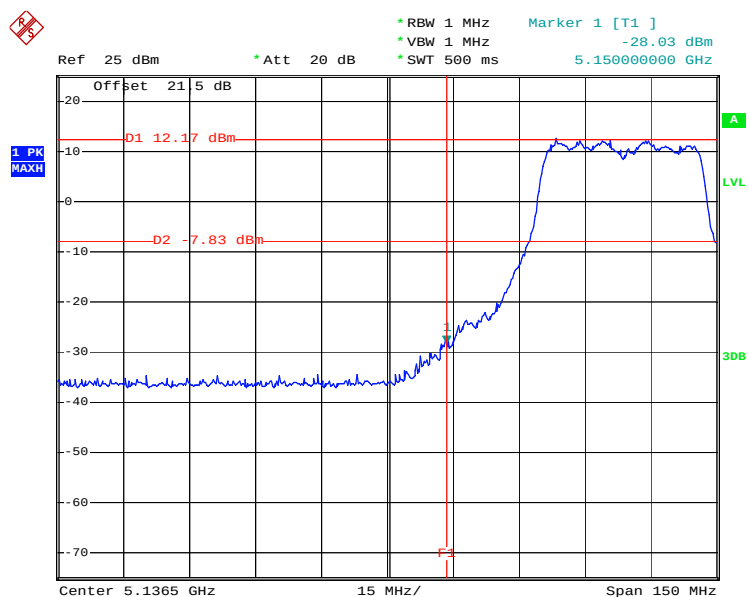


802.11n 20M CH36

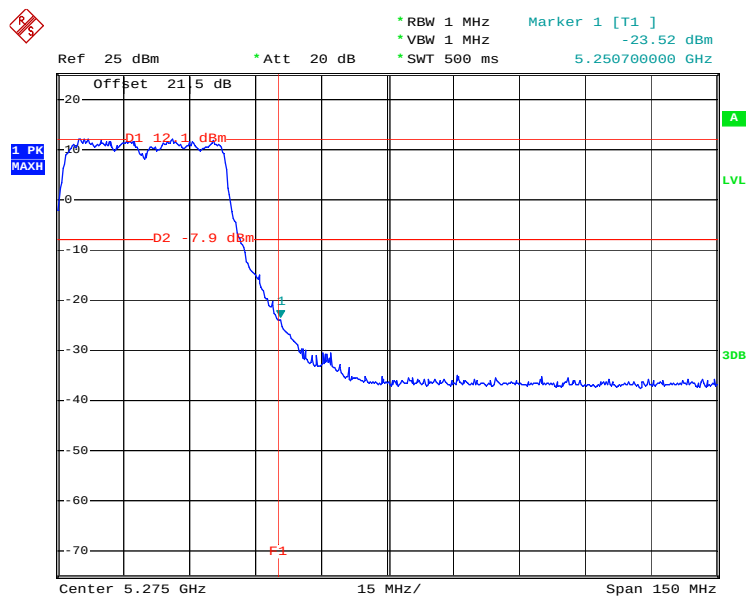
Date: 2.OCT.2007 21:42:16



Date: 4.OCT.2007 21:06:18 802.11n 20M CH44



Date: 1.OCT.2007 22:03:58 802.11n 40M CH38



Date: 4.OCT.2007 20:24:37 802.11n 40M CH44

5.8 Peak Excursion Ratio Measurement

5.8.1 Measuring Instruments :

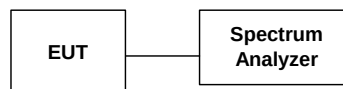
As described in chapter 6 of this test report.

5.8.2 Test Procedure :

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to and maintained at 1 MHz. The video bandwidth is set to 3 MHz. Trace A is set peak detector and to Max Hold, then to View. Then the detector is readjusted to sample detector, max hold to run for 60 seconds, and the signal under this measurement condition is captured in Trace B in Accordance with the method 3 of DA-02-2138.

The difference between the traces is investigated. The marker is placed at the frequency which shows the largest difference. The amplitude delta between the traces at this frequency is the peak excursion.

5.8.3 Test Setup Layout :



5.8.4 Test Result :

- Temperature : 26~27℃
- Relative Humidity :49~50%

➤ 802.11a Normal mode

Channel	Frequency (MHz)	Peak Excursion (dB)	Limits (dB)	Mode Ref. No.
36	5180	-1269	13	1
40	5200	-12.62	13	2
44	5220	-12.66	13	3

➤ 802.11n(a) 20M mode

Channel	Frequency (MHz)	Peak Excursion (dB)	Limits (dB)	Mode Ref. No.
36	5180	-12.48	13	4
40	5200	-11.87	13	5
44	5220	-11.80	13	6

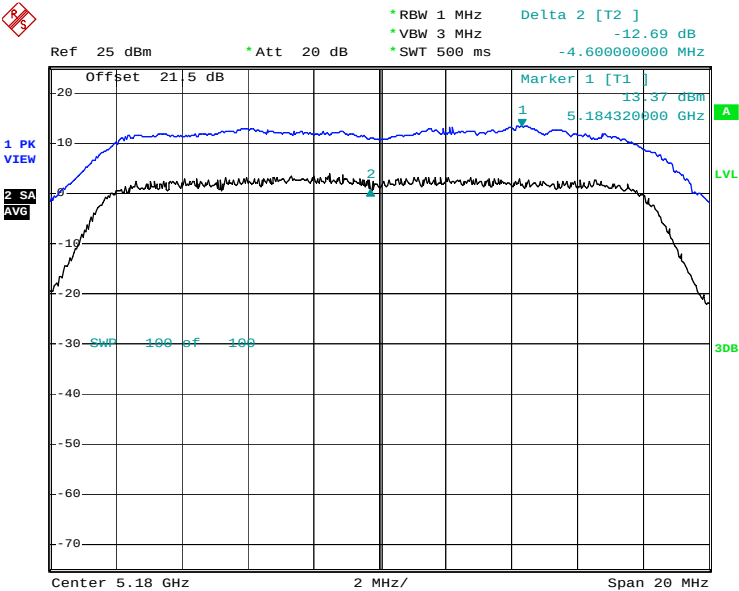
➤ 802.11n(a) 40M mode

Channel	Frequency (MHz)	Peak Excursion (dBm)	Limits (dBm)	Mode Ref. No.
38	5190	-12.50	13	7
44	5220	-12.49	13	8

5.8.5 Test Data

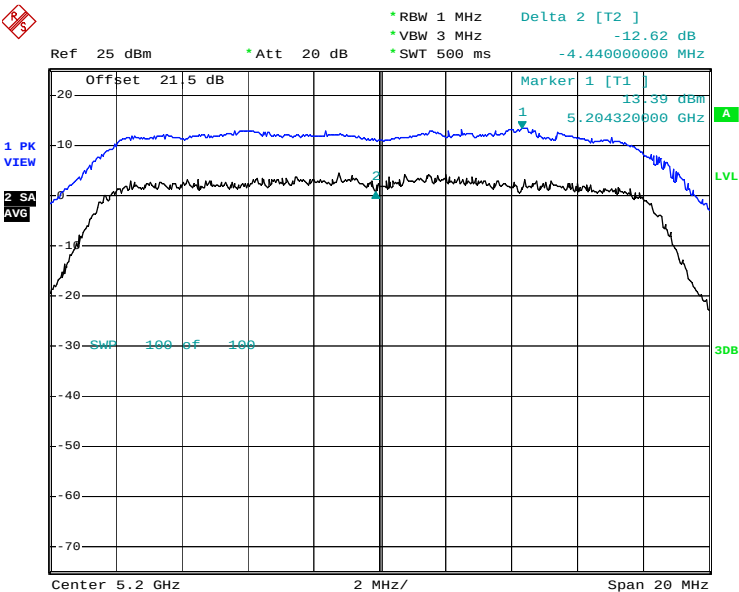
Mode Ref. No.

1

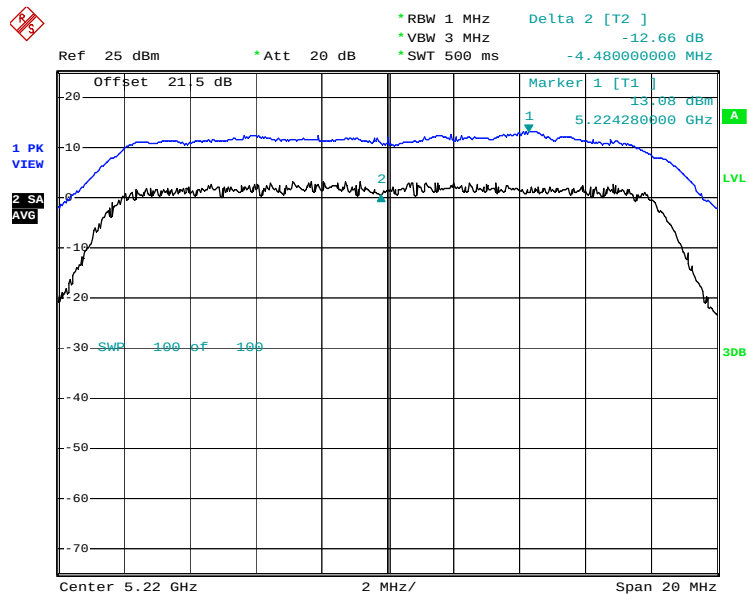


Date: 5.OCT.2007 00:30:27

2

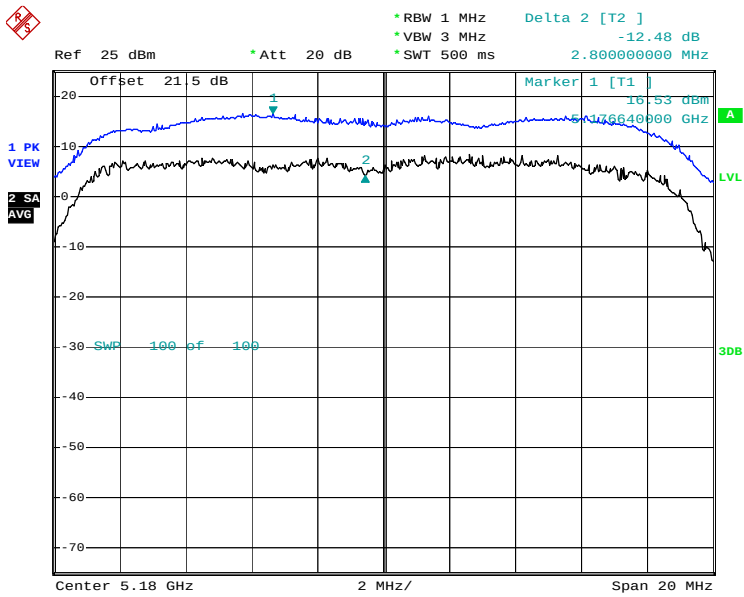


Date: 5.OCT.2007 00:35:25



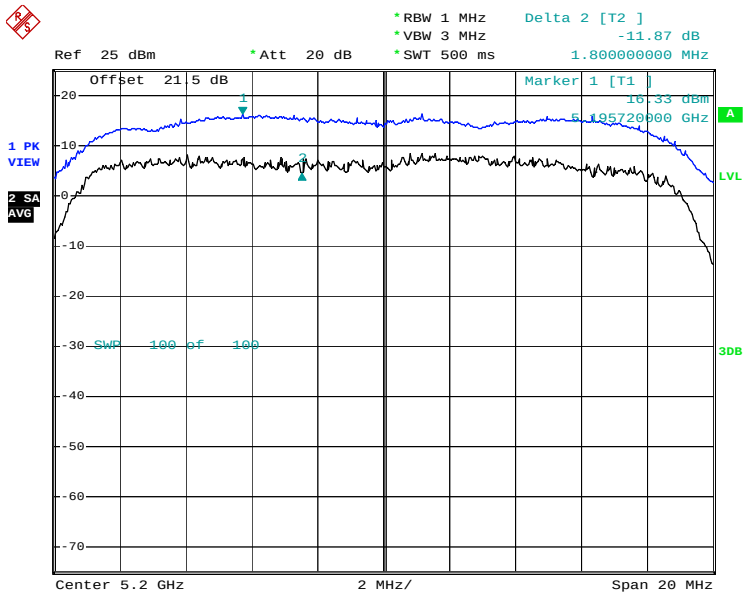
Date: 5.OCT.2007 00:39:40

4



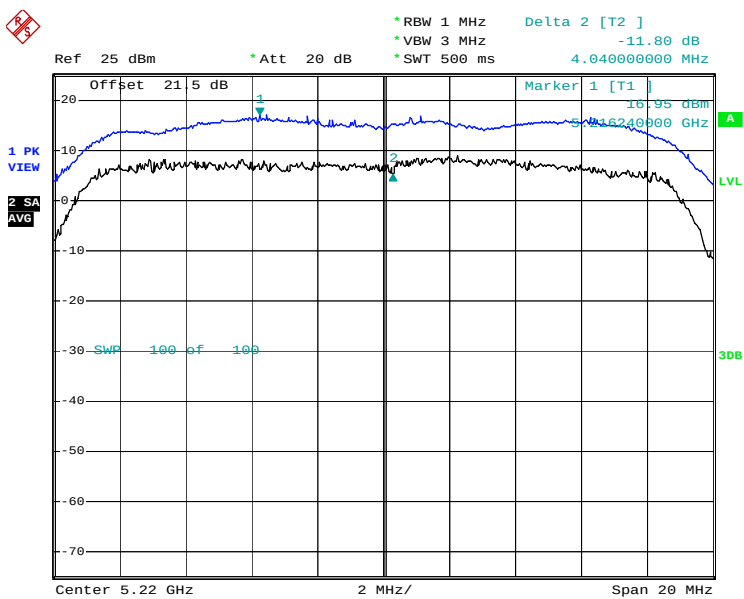
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5



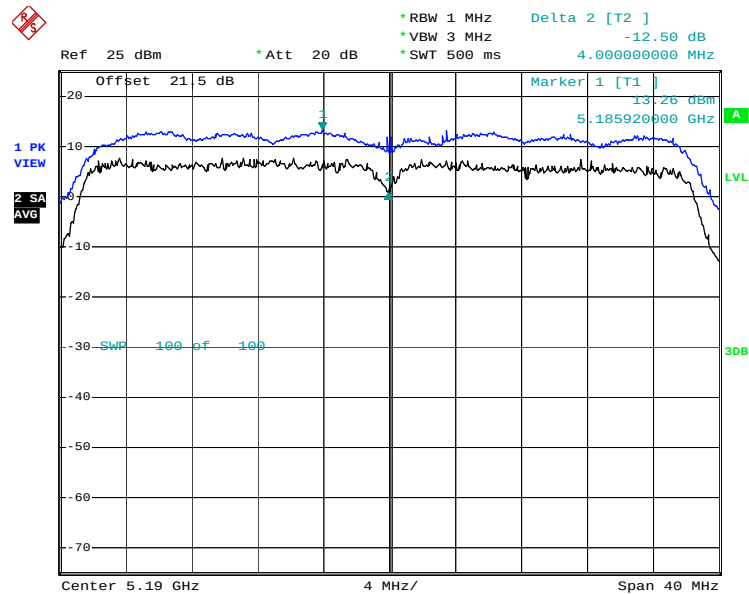
Date: 4.OCT.2007 21:14:34

6



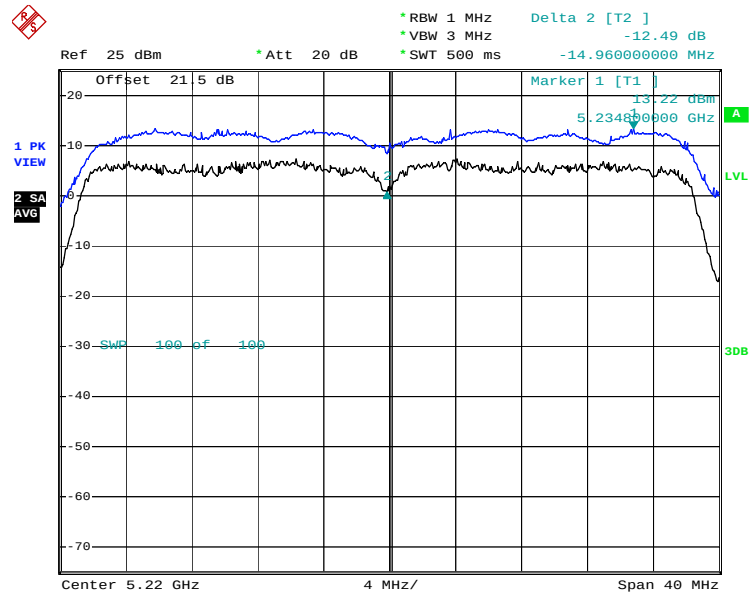
Date: 4.OCT.2007 21:27:20

7



Date: 4.OCT.2007 20:54:17

8



Date: 4.OCT.2007 20:49:00

5.9 Frequency Stability

To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

The EUT was operated at the maximum output power, and connected to the spectrum analyzer which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

Normal mode

Frequency(MHz)	Low Frequency (Fl)	High Frequency (Fh)	Center Frequency (Fc)	Frequency Stability (ppm)
5180	5170.32	5188.96	5179.64	-0.36
5200	5190.92	5209.1	5200.01	0.01
5220	5210.64	5229.01	5219.825	-0.17

11n(a) 20M mode

Frequency(MHz)	Low Frequency (Fl)	High Frequency (Fh)	Center Frequency (Fc)	Frequency Stability (ppm)
5180	5170.56	5189.24	5179.9	-0.10
5200	5190.56	5209.16	5199.86	-20.14
5220	5210.52	5229.24	5219.88	39.88

11n(a) 40M mode

Frequency(MHz)	Low Frequency (Fl)	High Frequency (Fh)	Center Frequency (Fc)	Frequency Stability (ppm)
5190	5171.36	5208.56	5189.96	-0.04
5220	5201.2	5238.64	5219.92	-10.08

5.10 Automatically discontinue transmission

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving .The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission .

5.11 Antenna Requirements

The EUT meets antenna requirement of FCC for the following reasons.

5.11.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.11.2 Antenna Connected Construction

The antenna type used in this product is dipole for WLAN. The connector is reverse SMA on antenna port and it is considered to meet antenna requirement of FCC.

5 List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100359	9kHz – 2.75GHz	Mar. 01, 2007	Feb. 29, 2008	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2007	Mar. 30, 2008	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2007	Mar. 21, 2008	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2007	Apr. 19, 2008	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Mar. 09, 2007	Mar. 08, 2008	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	N/A	Conduction (CO04-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	N/A	Conduction (CO04-HY)
Power Divider	Woken	N/A	0120A04208001S	2GHz~8GHz	N/A	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH04-HY	30 MHz - 1 GHz 3m	Oct. 30, 2006	Oct. 29, 2007	Radiation (03CH04-HY)
Amplifier	Schaffner	CPA9231A	3564	9 kHz - 2 GHz	Aug.31, 2007	Aug.30, 2008	Radiation (03CH04-HY)
Amplifier	Agilent	8449B	3008A01917	1~26.5GHz	Nov. 15, 2007	Nov. 14, 2007	Radiation (03CH04-HY)
Spectrum Analyzer	R&S	FSP40	100055	9KHz~40GHz	June. 25, 2006	June. 24, 2008	Radiation (03CH04-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2724	30 MHz - 1 GHz	Aug. 13, 2007	Aug. 12, 2008	Radiation (03CH04-HY)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170-249	14G~40G	Nov. 20, 2006	Nov. 19, 2008	Radiation (03CH04-HY)
Turn Table	HD	Deis HD 2000	420/610	0 - 360 degree	N/A	N/A	Radiation (03CH04-HY)
Antenna Mast	Chaintek	3000	N/A	1 m - 4 m	N/A	N/A	Radiation (03CH04-HY)

6 Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	1.13		
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	2.26		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	± 0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	± 1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	± 0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 \Gamma_2 \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	2.36				
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	4.72				



Appendix A. External Photographs of EUT

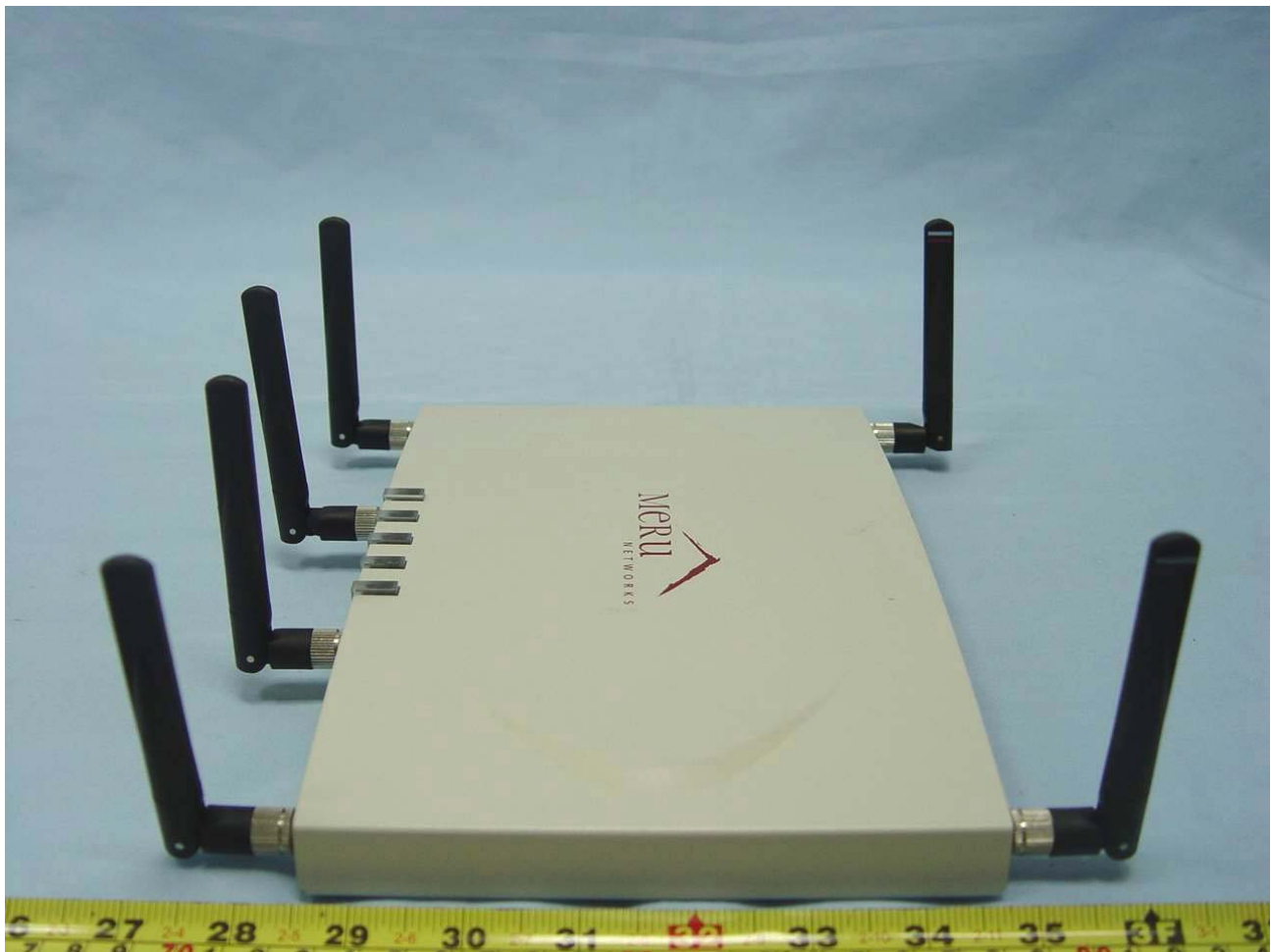


































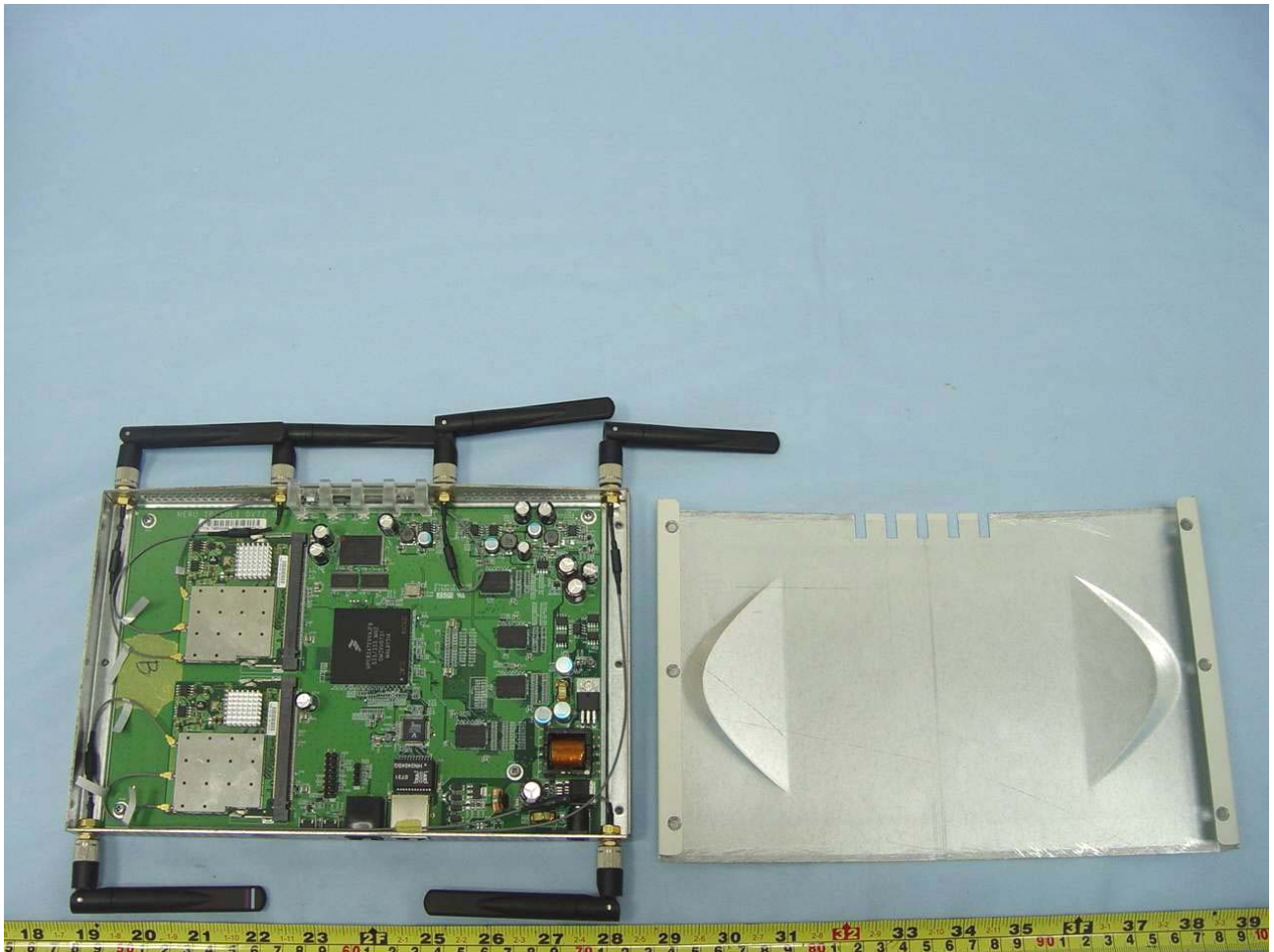


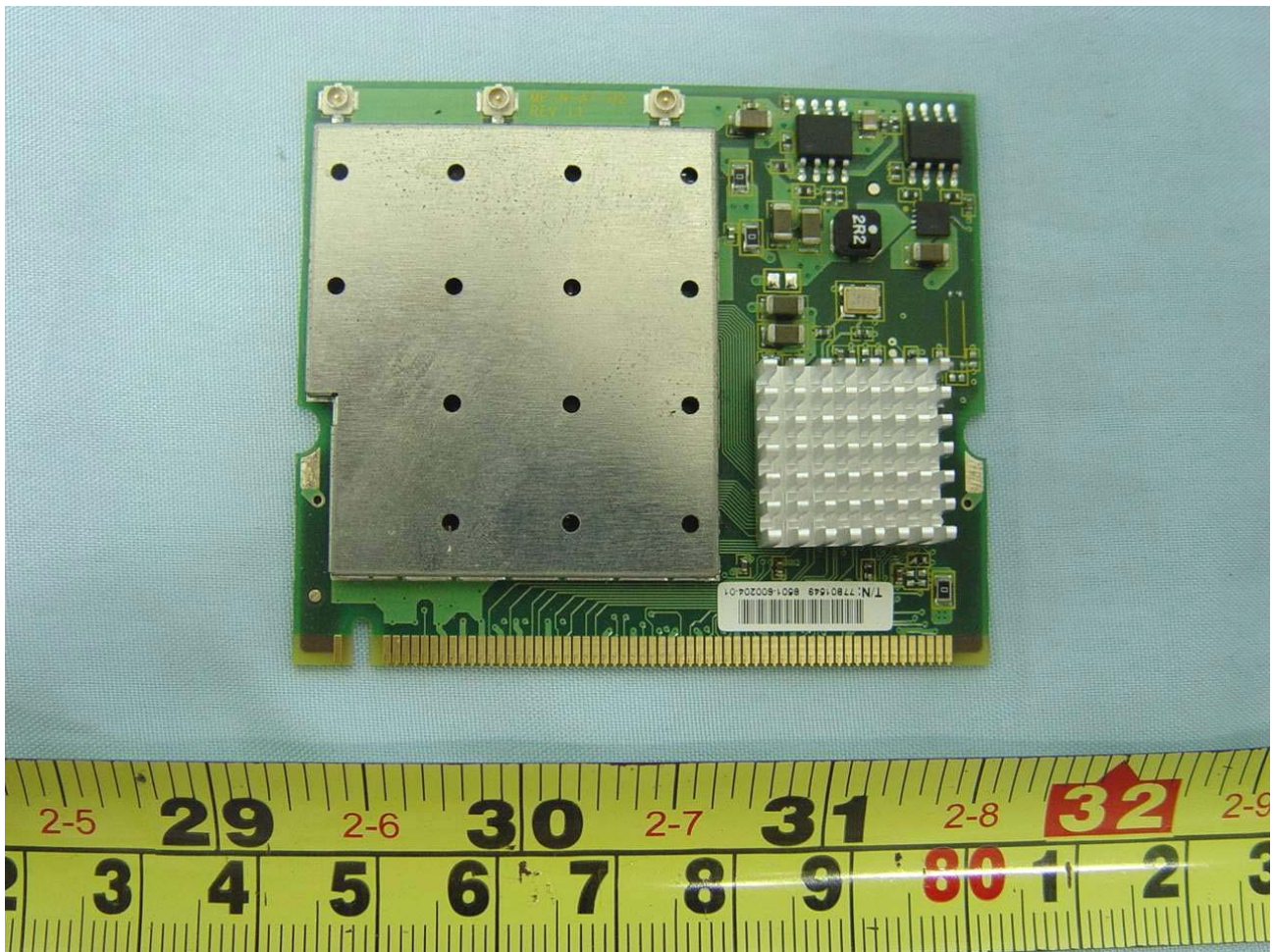




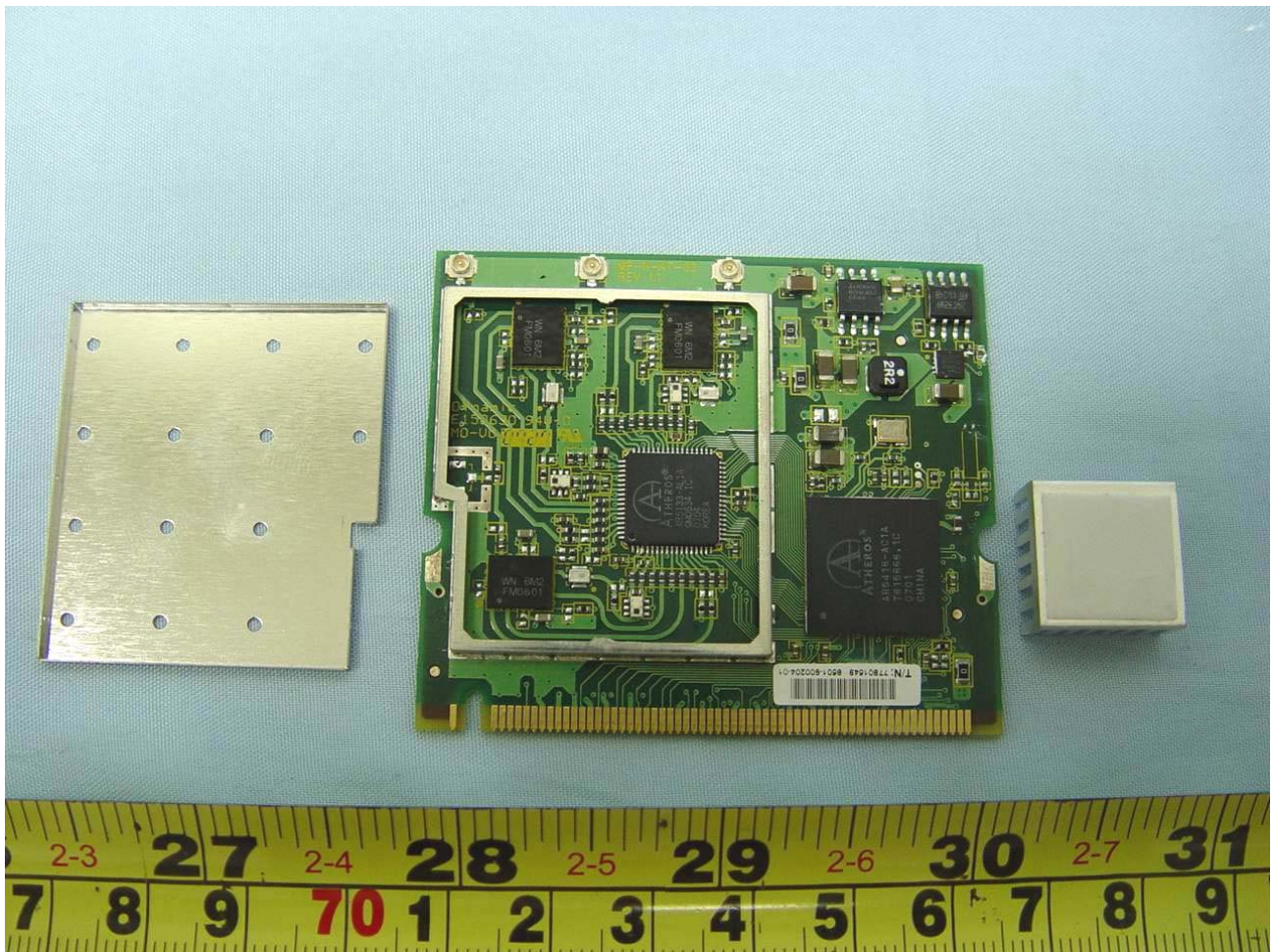


Appendix B. Internal Photographs of EUT

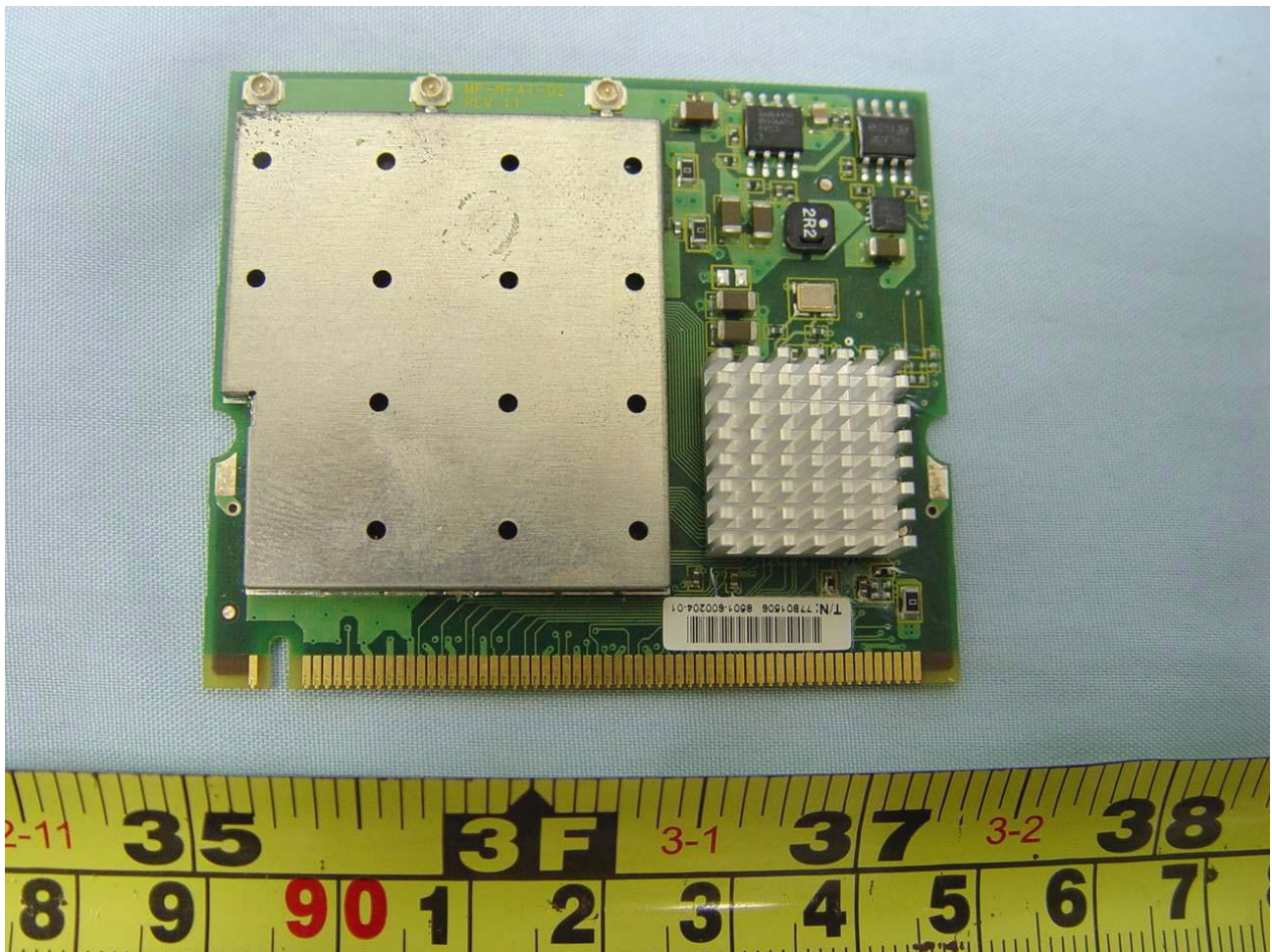


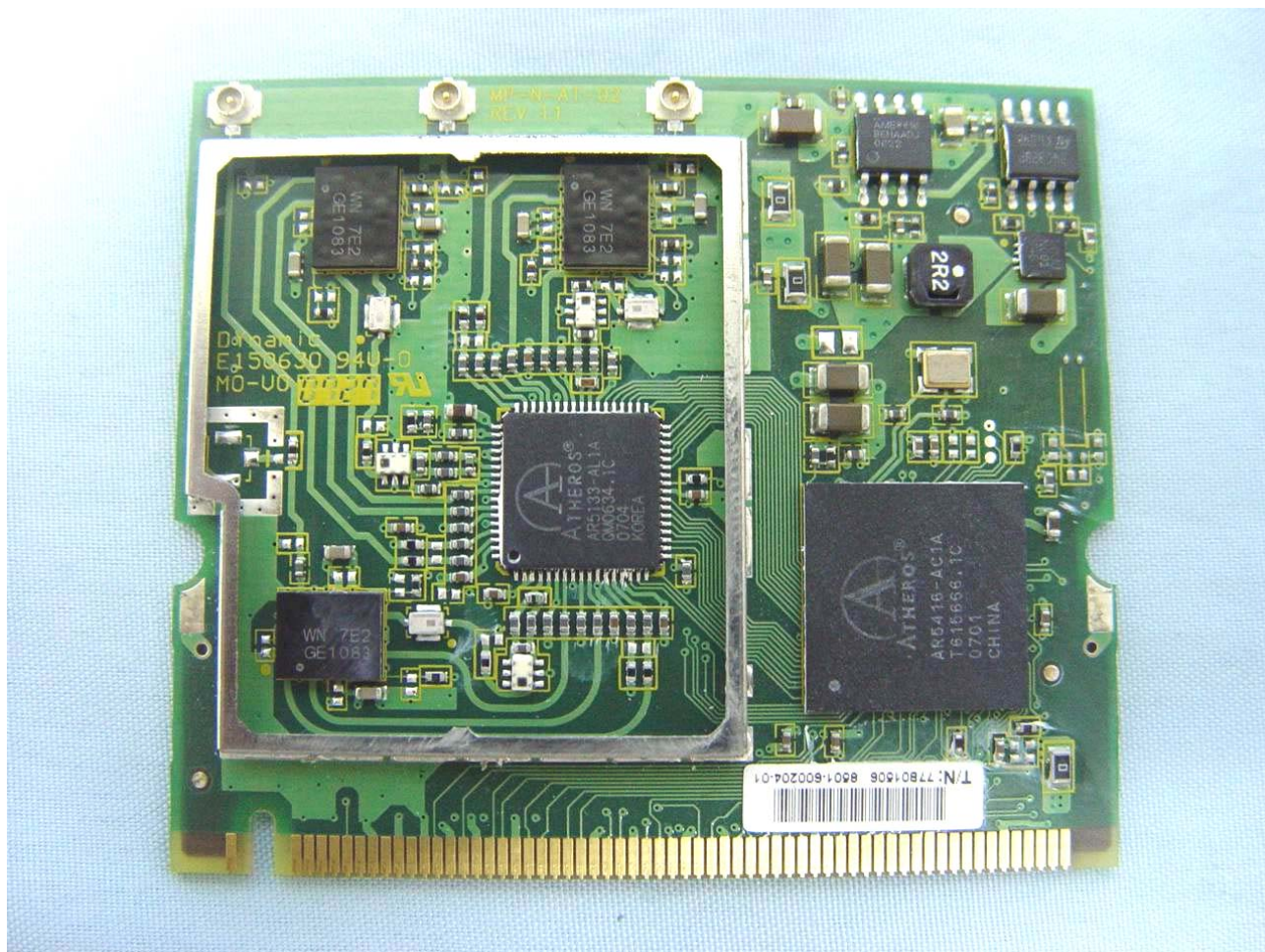




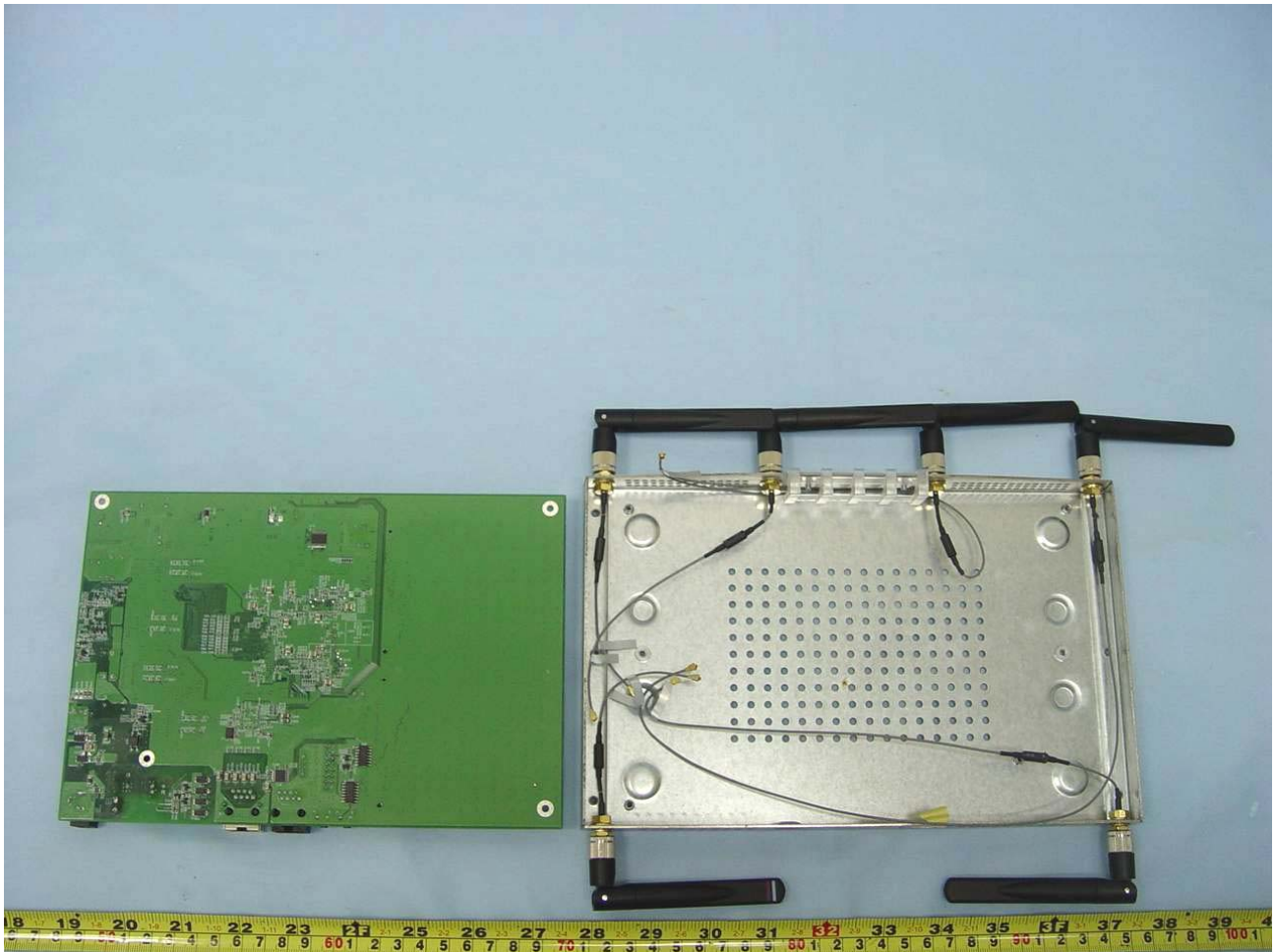


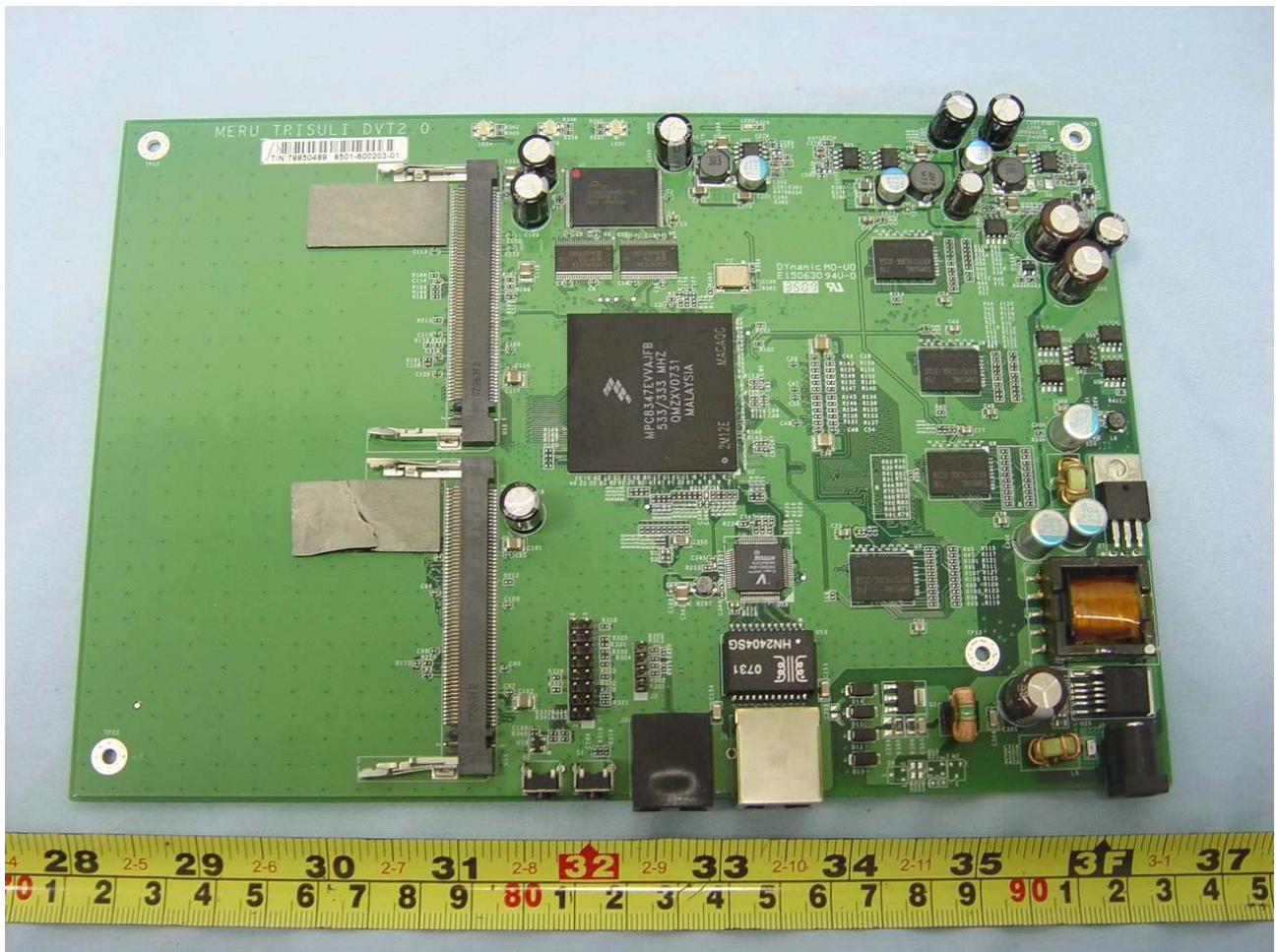


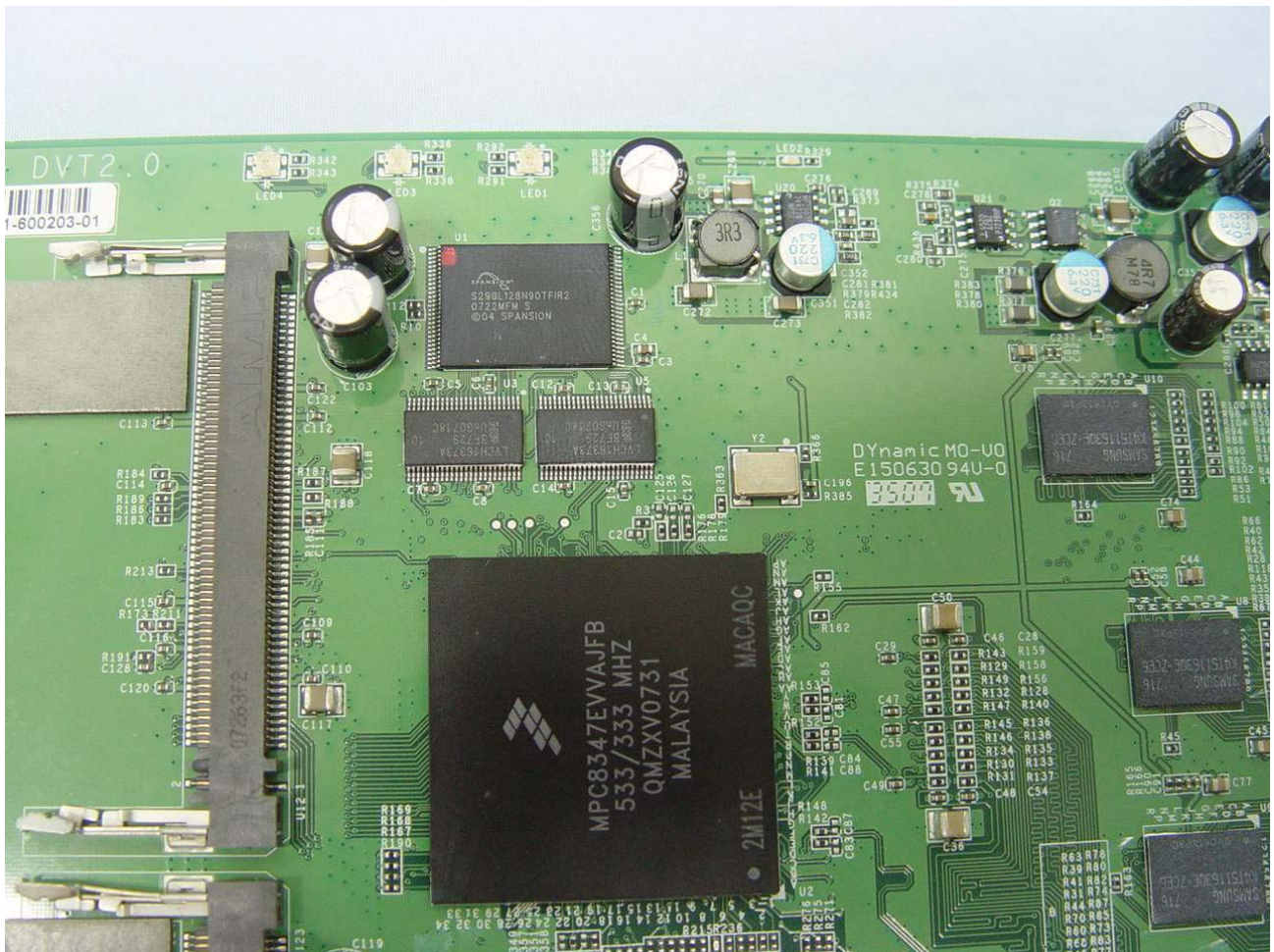


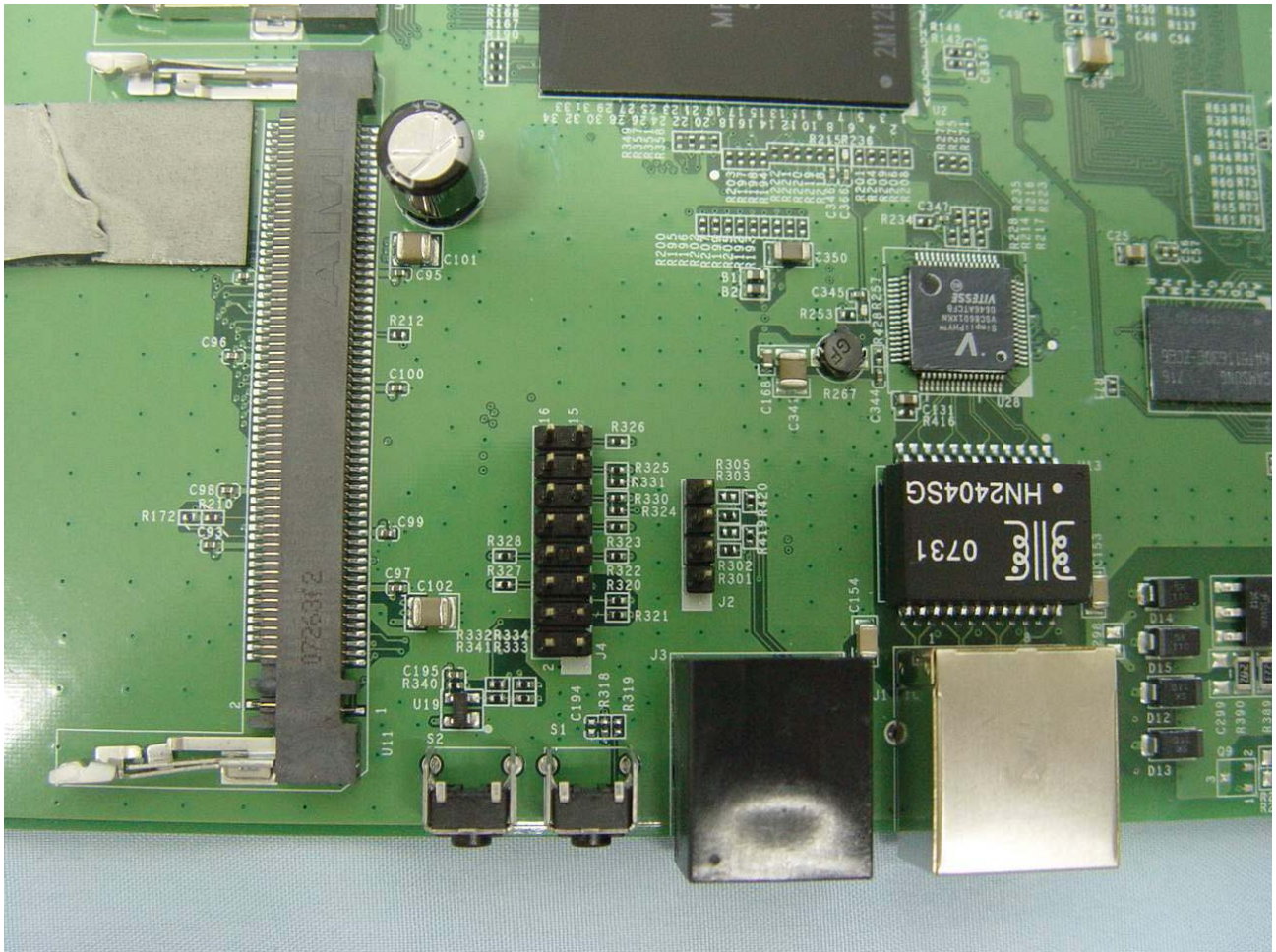


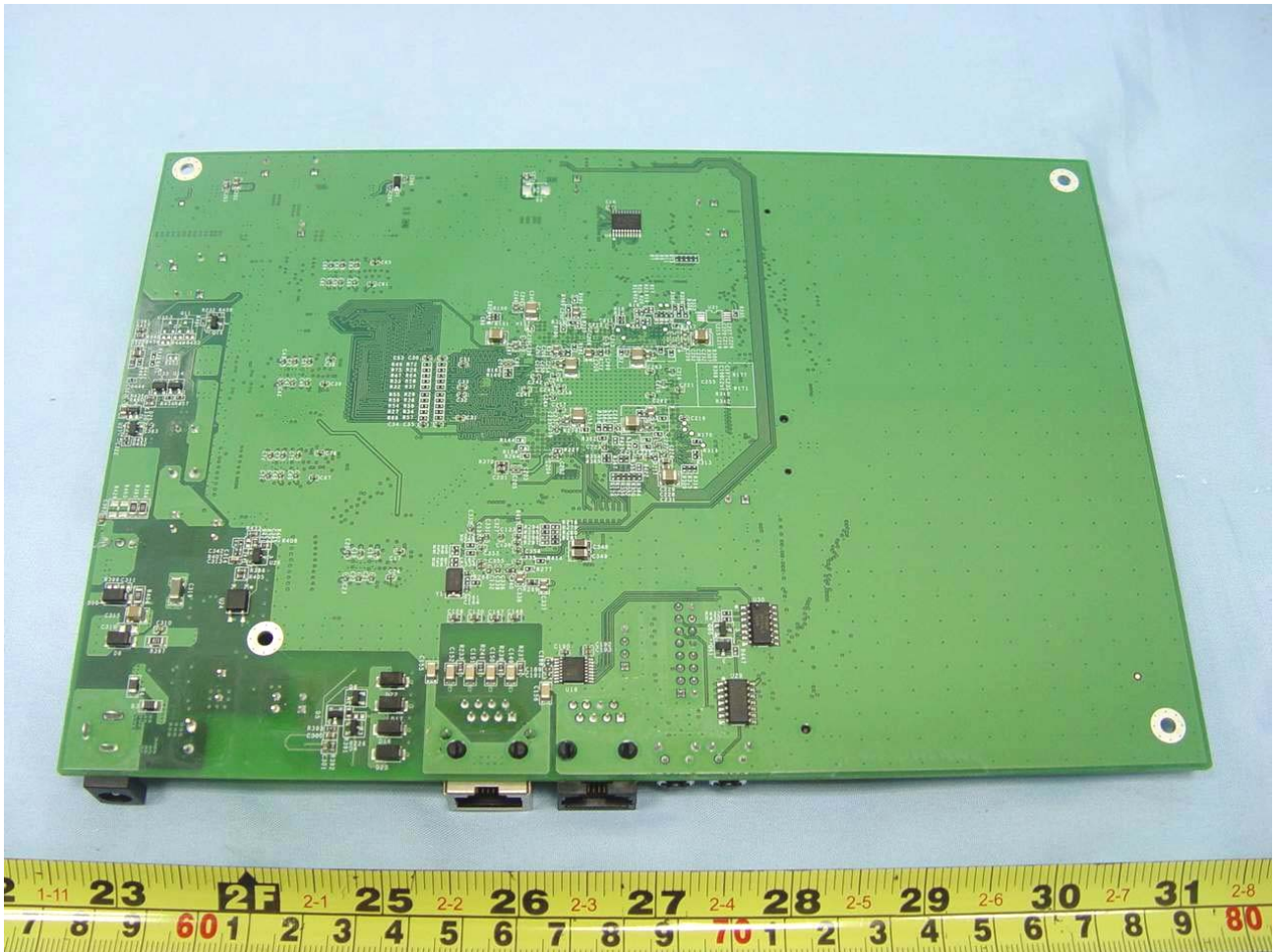










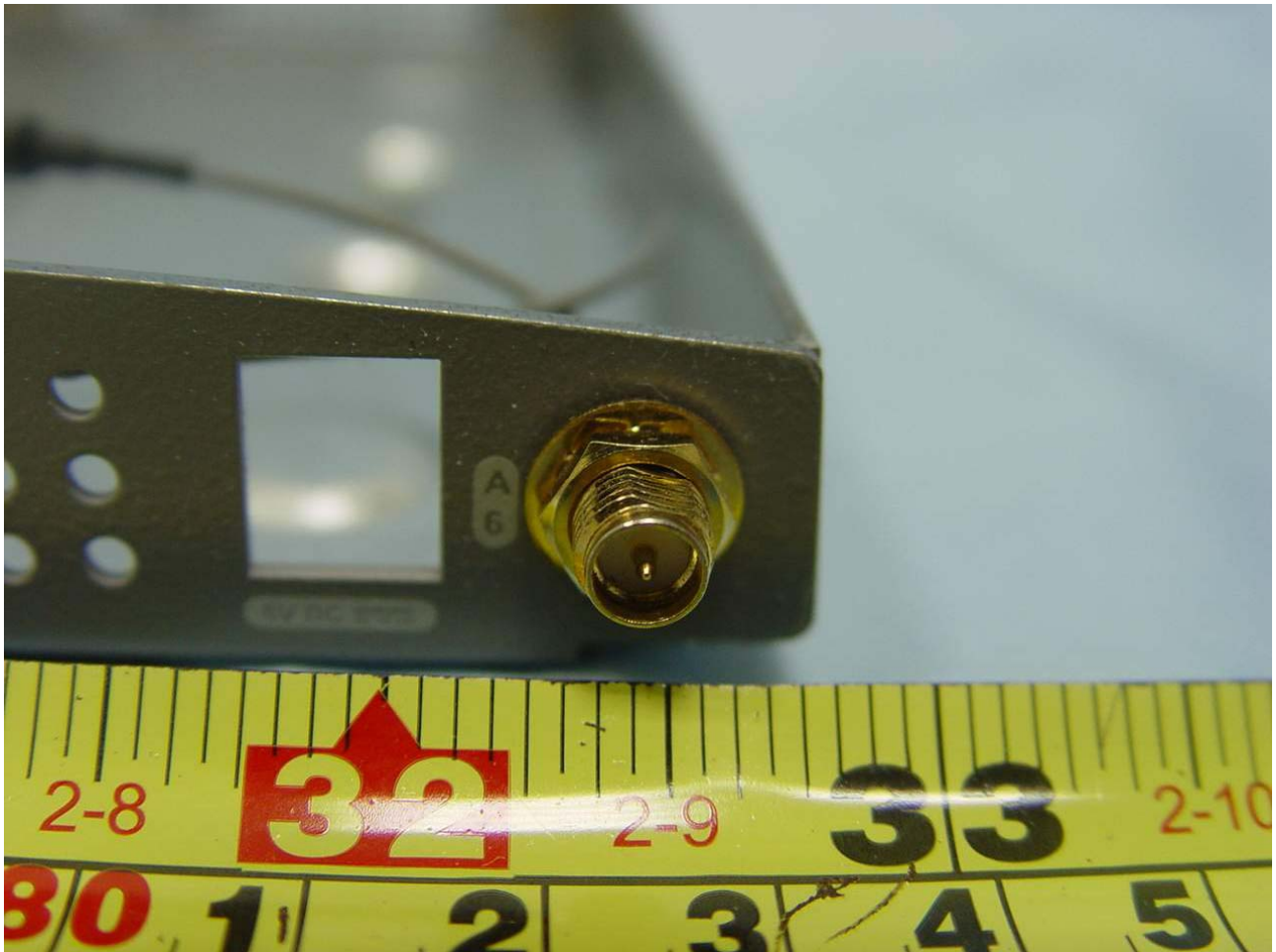




Antenna 2



All antenna (antenna 2) connectors are reverse type.



All RF connectors are unique type.



Antenna 1



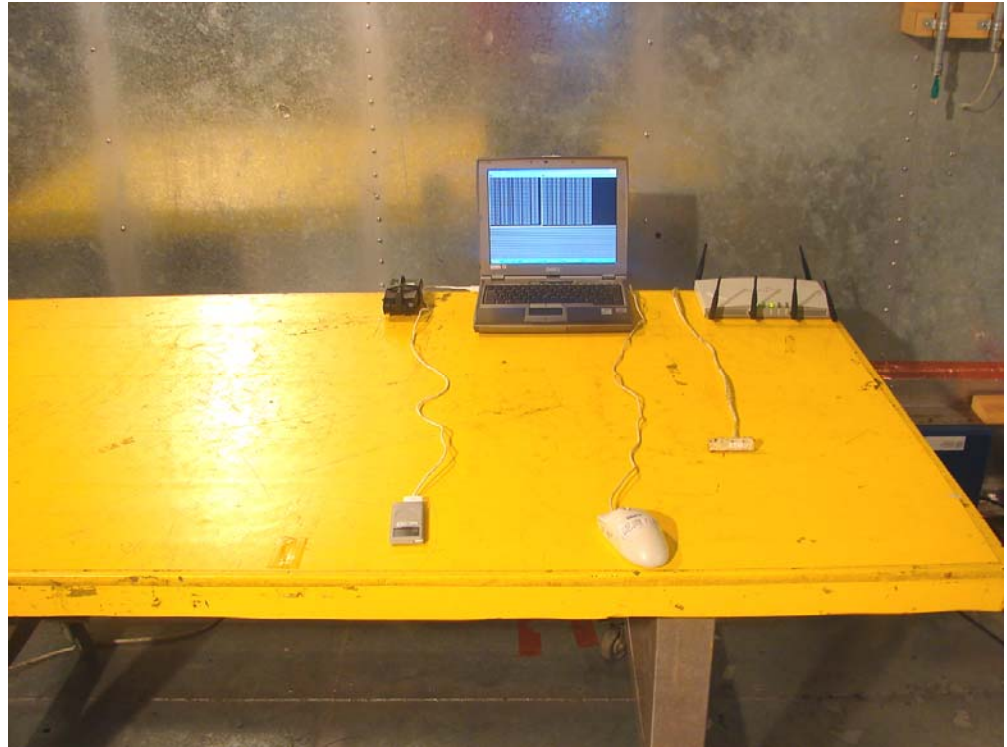
Antenna 1

Appendix C. Set up Photograph

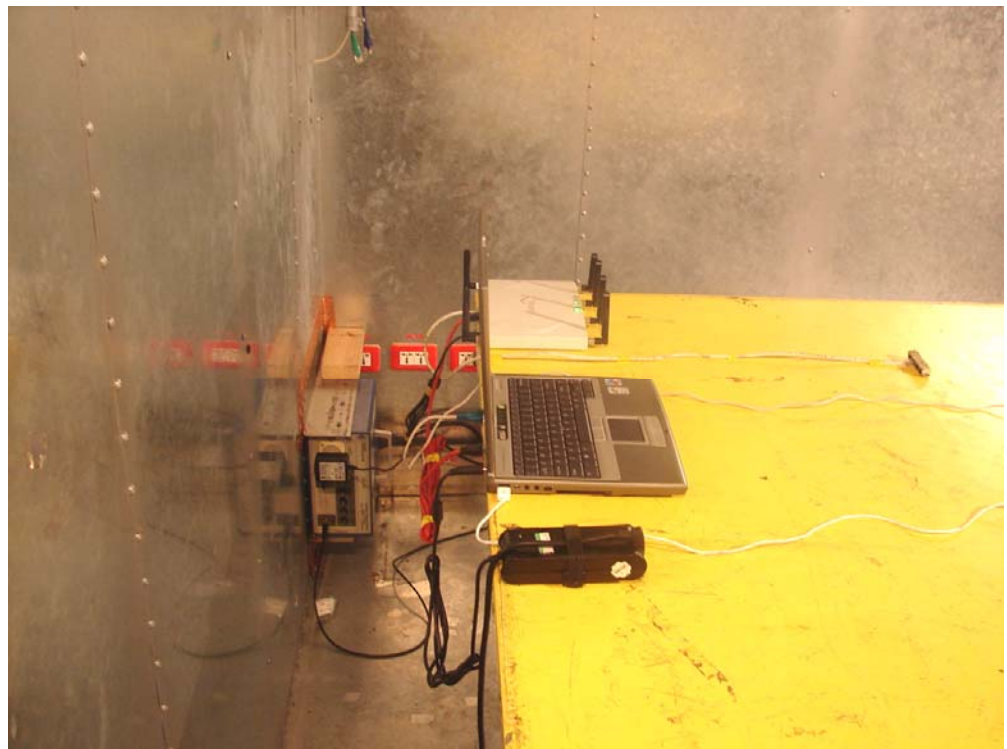
Conducted Emission

Mode 1

FRONT VIEW



REAR VIEW

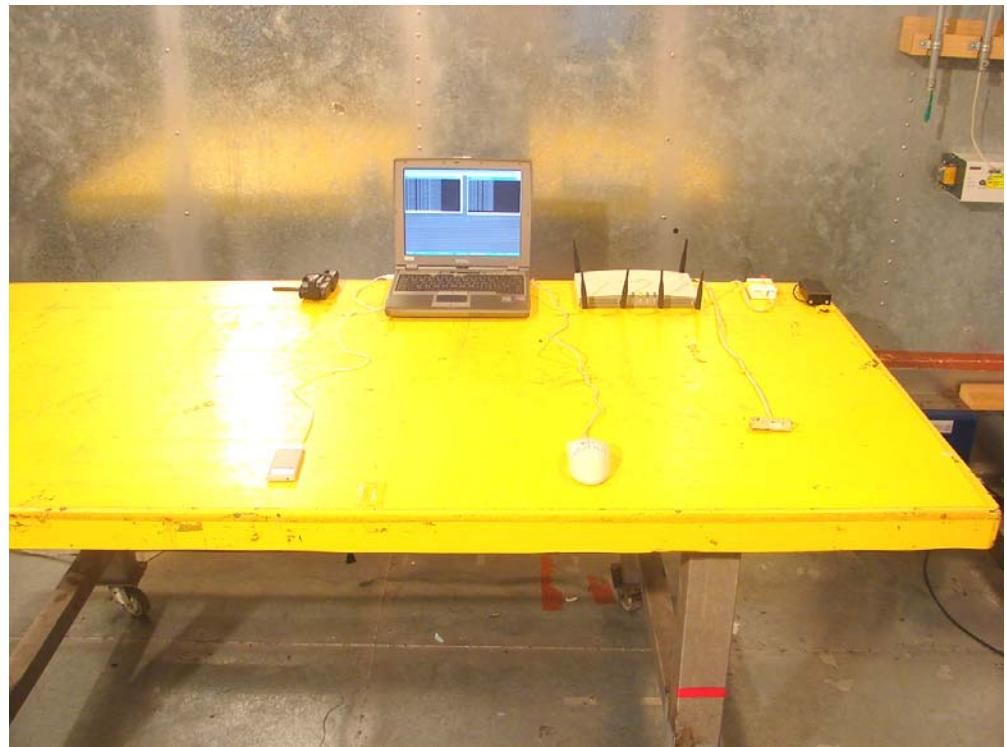


SIDE VIEW

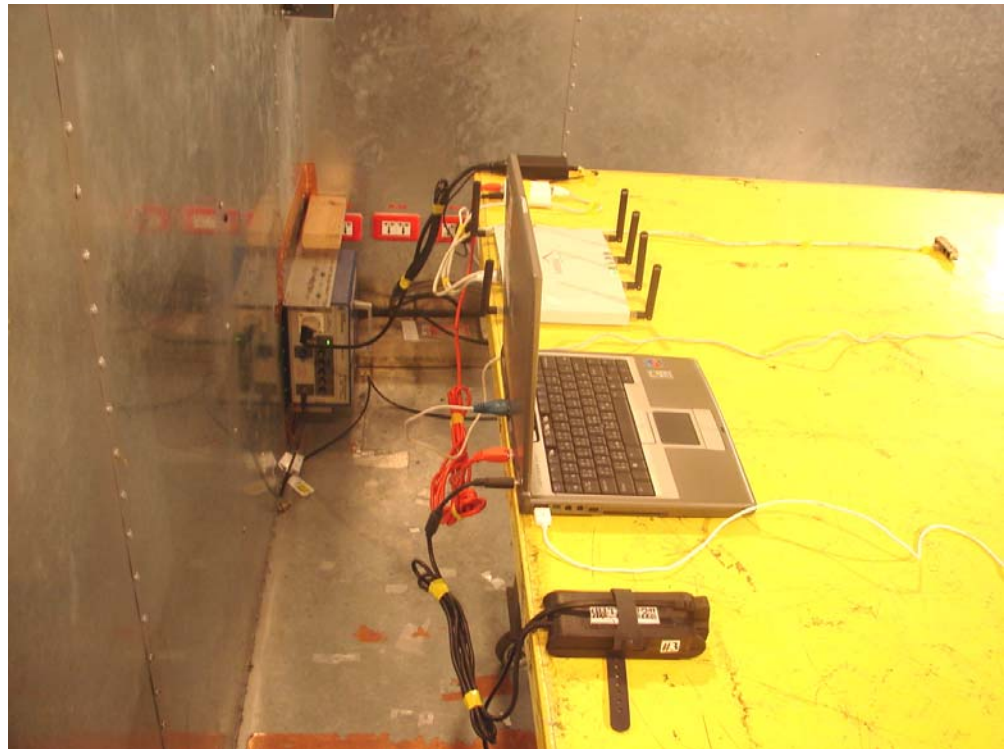


Mode 2

FRONT VIEW



REAR VIEW

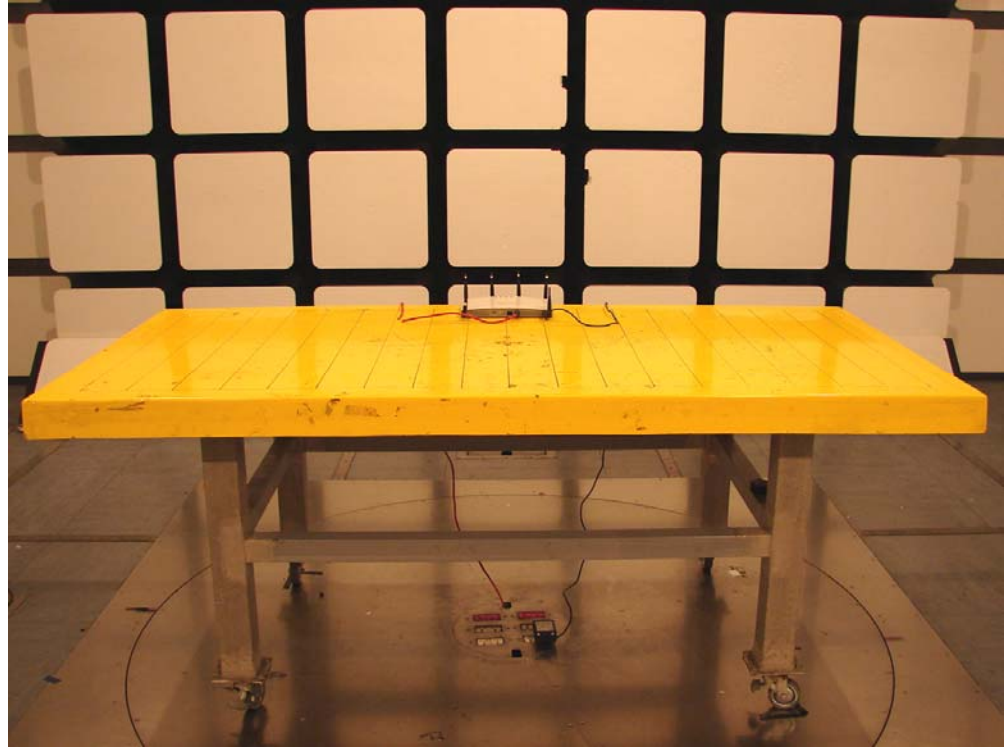


SIDE VIEW



Radiation Emission

FRONT VIEW



REAR VIEW

