4.9. Receiver Radiated Spurious Emssion

TEST APPLICABLE

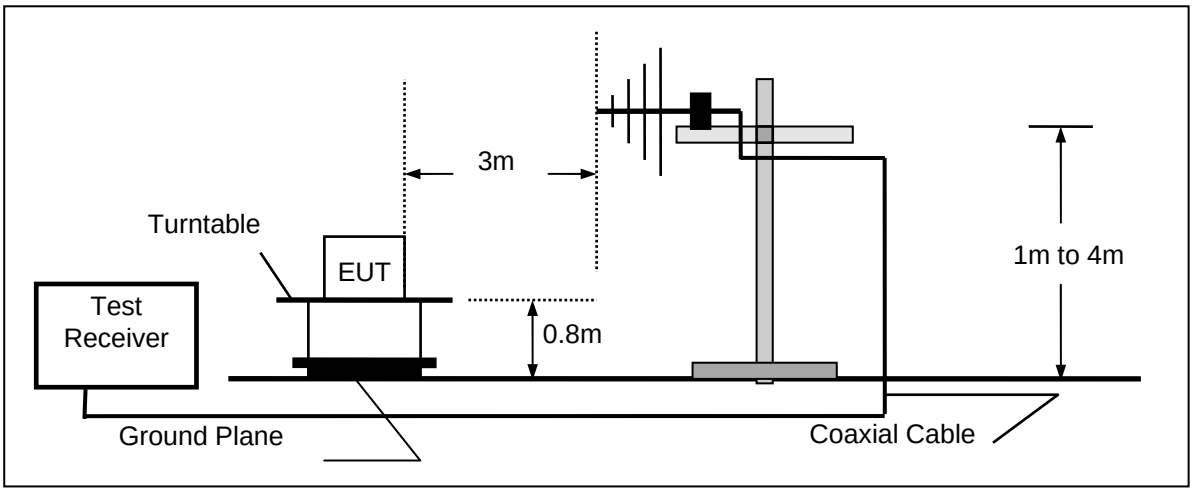
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

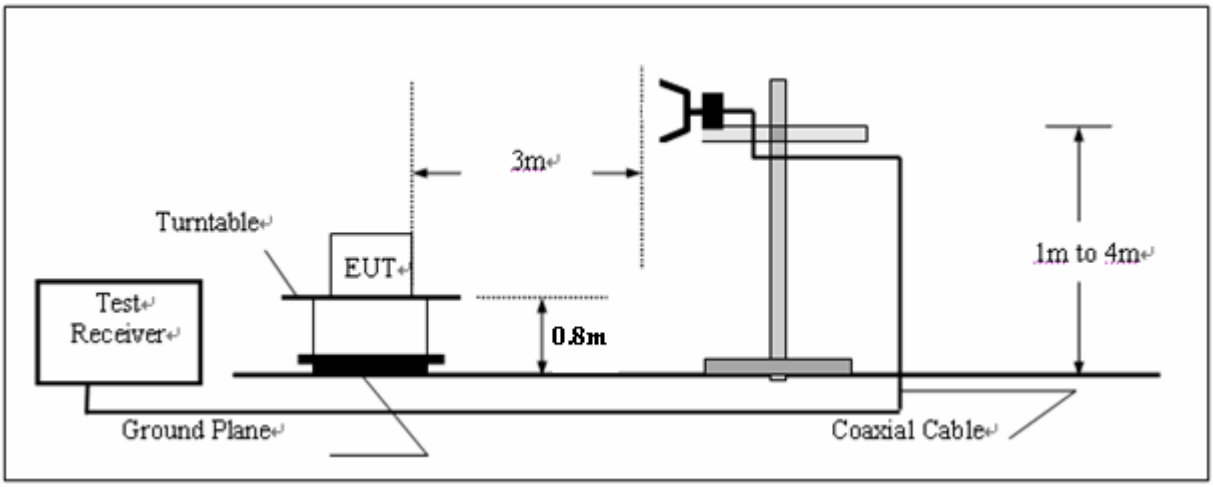
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz



(B) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4 Repeat above procedures until all frequency measurements have been completed.

RECEIVER RADIATED SPOUIOUS LIMIT

For unintentional device, according to § 15.109(a) and RSS-Gen, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

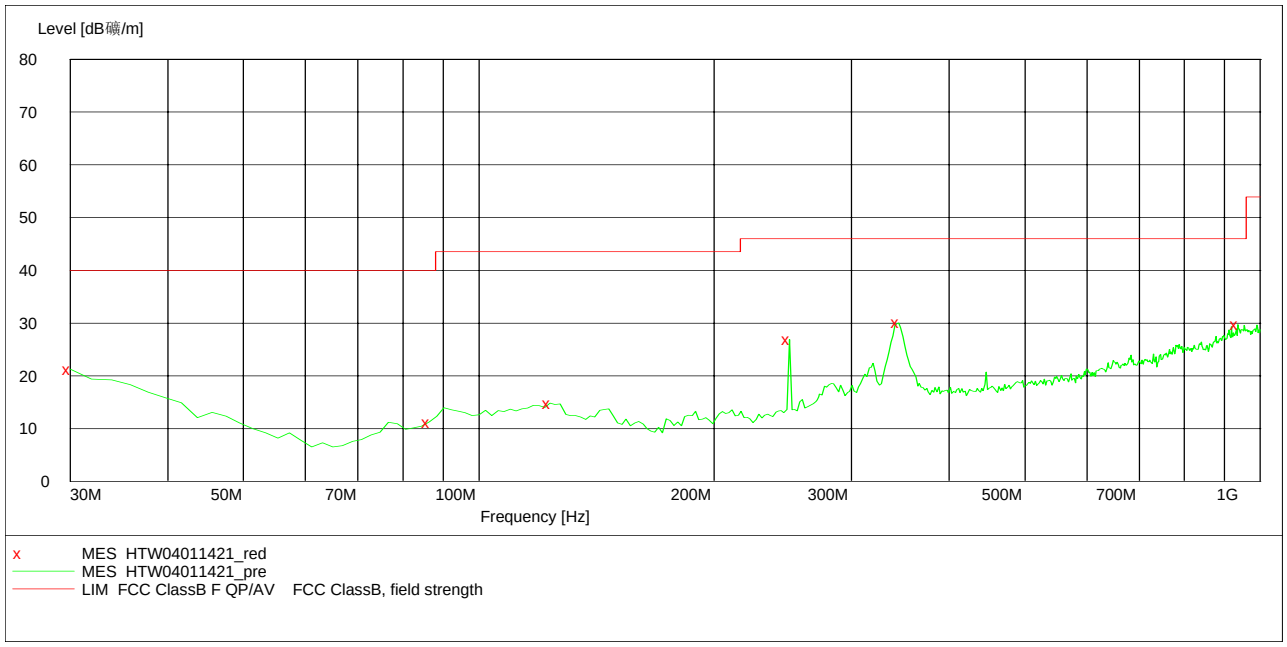
TEST RESULTS

The Radiated Measurement are performed to the three channels (the high channel, the middle channel and the low channel), the datum recorded below is the worst case for each channel separation;and the EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m
				Frequency (MHz)	Datum (dBuV/m)	
FM	12.5 KHz	450.5000	H	344.91	30.10	46.00
			V	342.97	30.20	46.00
Test Results			Compliance			

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 2011



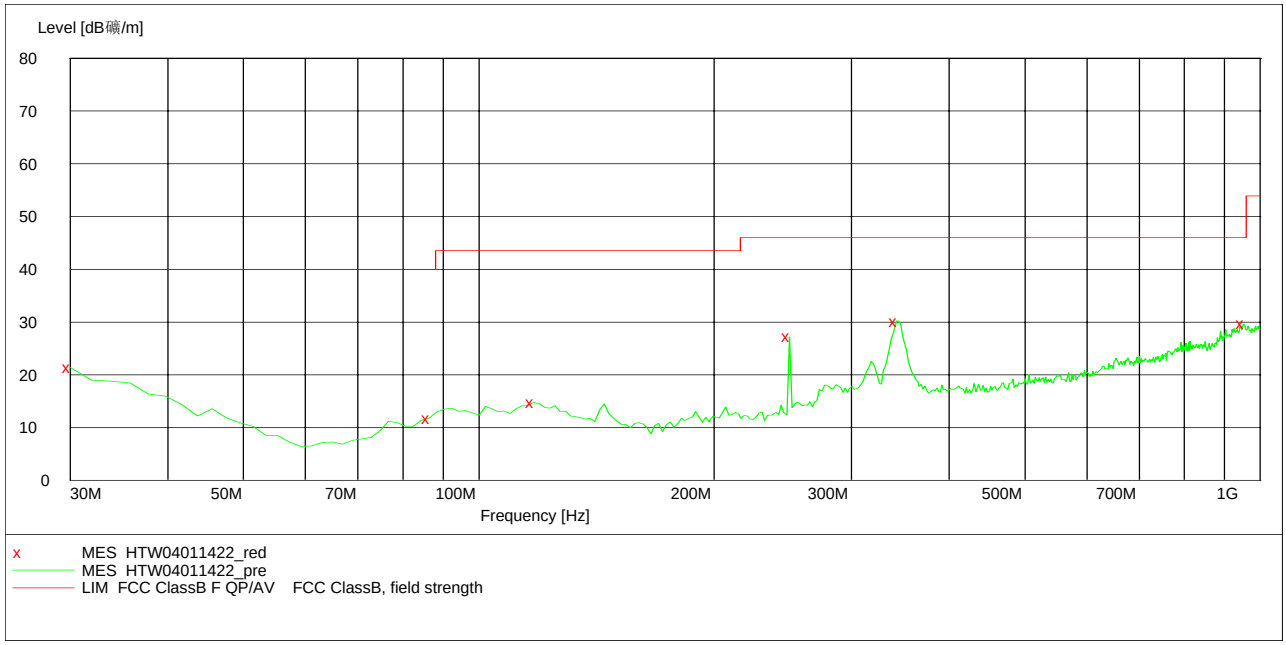
MEASUREMENT RESULT: "HTW04011421_red"

4/11/2011 9:53PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	21.30	-10.2	40.0	18.7	Peak	300.0	254.00	HORIZONTAL
86.372745	11.20	-21.7	40.0	28.8	Peak	300.0	360.00	HORIZONTAL
123.306613	14.80	-18.4	43.5	28.7	Peak	300.0	23.00	HORIZONTAL
249.659319	26.90	-20.0	46.0	19.1	Peak	100.0	291.00	HORIZONTAL
344.909820	30.10	-16.9	46.0	15.9	Peak	100.0	278.00	HORIZONTAL
935.851703	29.70	-5.7	46.0	16.3	Peak	100.0	239.00	HORIZONTAL

SWEEP TABLE: "test (30M-1G)"

```
Short Description:            Field Strength
Start      Stop       Detector  Meas.     IF         Transducer
Frequency  Frequency            Time      Bandw.
30.0 MHz   1.0 GHz    MaxPeak   Coupled   120 kHz    HL562 2011
```



MEASUREMENT RESULT: "HTW04011422_red"

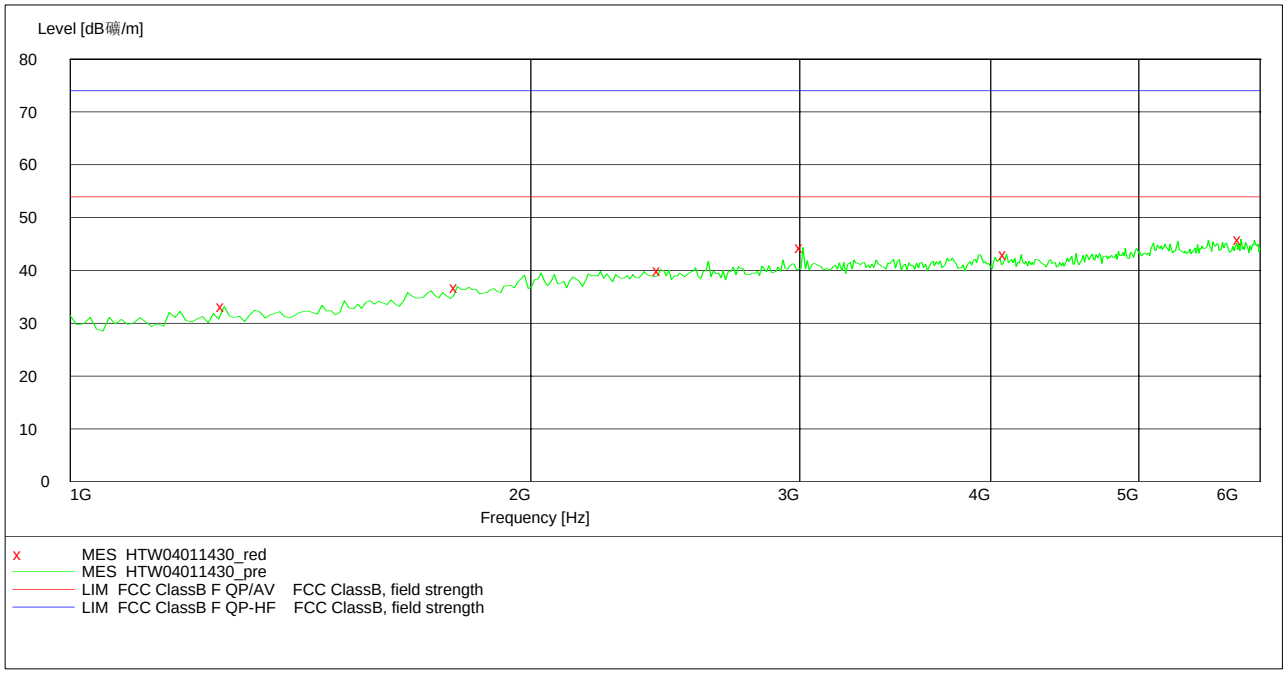
4/11/2011 9:57PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	21.40	-10.2	40.0	18.6	Peak	300.0	45.00	HORIZONTAL
86.372745	11.80	-21.7	40.0	28.2	Peak	300.0	349.00	HORIZONTAL
117.474950	14.80	-18.5	43.5	28.7	Peak	100.0	46.00	HORIZONTAL
249.659319	27.20	-20.0	46.0	18.8	Peak	100.0	298.00	HORIZONTAL
342.965932	30.20	-17.0	46.0	15.8	Peak	100.0	275.00	HORIZONTAL
951.402806	29.70	-5.1	46.0	16.3	Peak	100.0	56.00	HORIZONTAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m
				Frequency (MHz)	Datum (dBuV/m)	
FM	12.5 KHz	450.5000	H	5829.66	45.90	54.00
			V	5909.82	45.90	54.00
Test Results			Compliance			

SWEEP TABLE: "test (1G-18G) P"

Short Description:			EN 55022 Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak Average	Coupled	1 MHz	HF906 2011



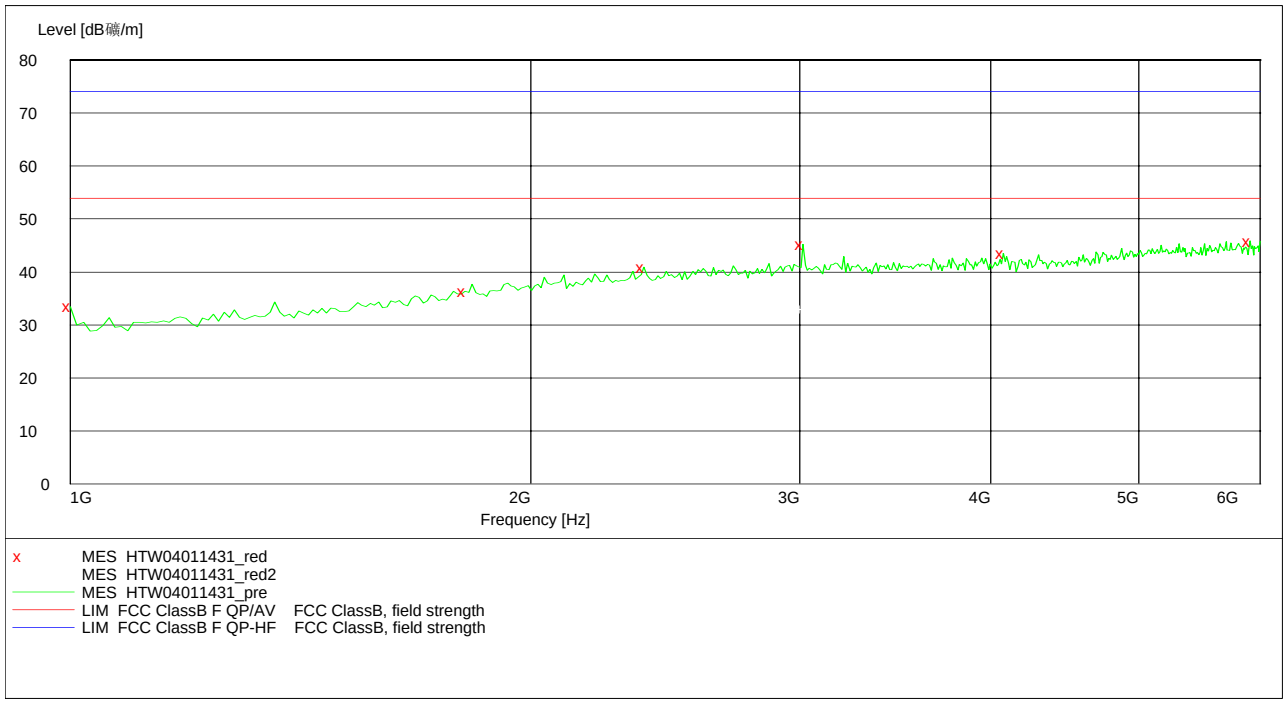
MEASUREMENT RESULT: "HTW04011430_red"

4/12/2011 2:55PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1260.521042	33.10	-7.6	54.0	20.9	Peak	100.0	65.00	HORIZONTAL
1791.583166	36.90	-3.1	54.0	17.1	Peak	100.0	84.00	HORIZONTAL
2432.865731	40.10	0.6	54.0	13.9	Peak	100.0	26.00	HORIZONTAL
3014.028056	44.30	2.1	54.0	9.7	Peak	100.0	148.00	HORIZONTAL
4096.192385	43.00	3.6	54.0	11.0	Peak	100.0	255.00	HORIZONTAL
5829.659319	45.90	7.1	54.0	8.1	Peak	100.0	302.00	HORIZONTAL

SWEEP TABLE: "test (1G-18G) P"

```
Short Description:              EN 55022 Field Strength
Start       Stop        Detector  Meas.      IF         Transducer
Frequency   Frequency             Time       Bandw.
1.0 GHz     18.0 GHz    MaxPeak   Coupled    1 MHz      HF906 2011
                        Average
```



MEASUREMENT RESULT: "HTW04011431_red"

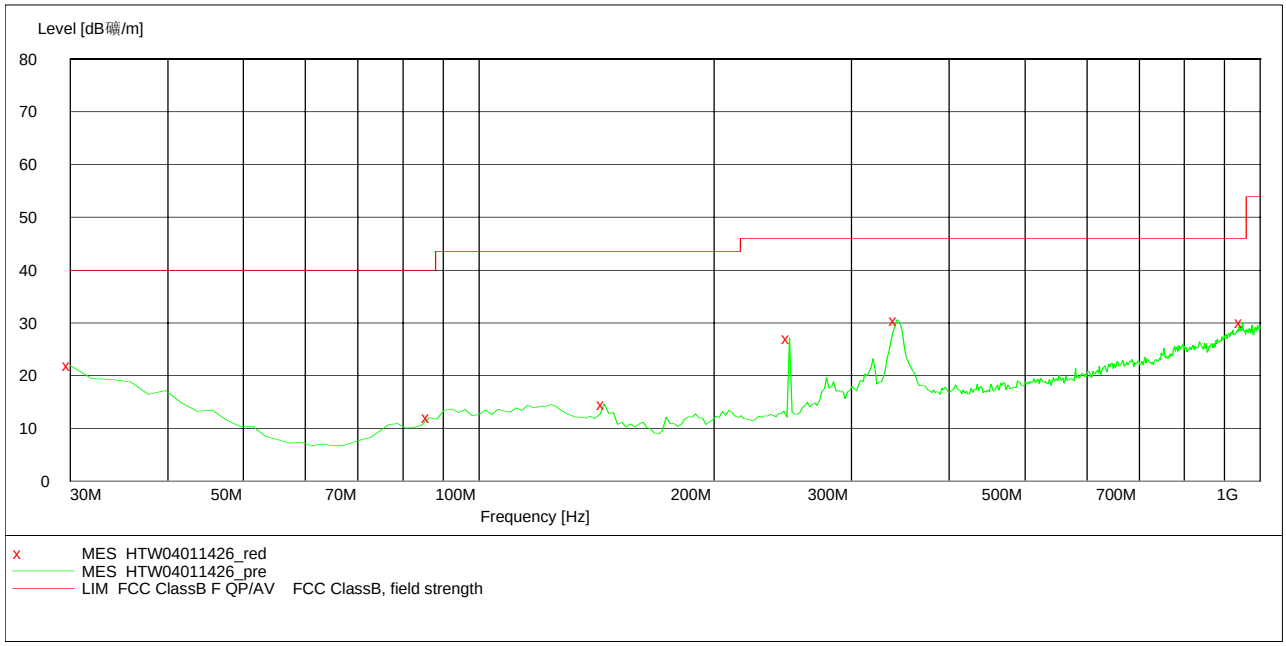
4/12/2011 2:55PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1000.000000	33.50	-9.8	54.0	20.5	Peak	100.0	318.00	VERTICAL
1811.623246	36.30	-3.0	54.0	17.7	Peak	100.0	258.00	VERTICAL
2372.745491	40.90	0.3	54.0	13.1	Peak	100.0	197.00	VERTICAL
3014.028056	45.20	2.1	54.0	8.8	Peak	100.0	177.00	VERTICAL
4076.152305	43.50	3.6	54.0	10.5	Peak	100.0	47.00	VERTICAL
5909.819639	45.90	7.2	54.0	8.1	Peak	100.0	217.00	VERTICAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m
				Frequency (MHz)	Datum (dBuV/m)	
4FSK	12.5 KHz	450.5000	H	342.97	30.60	46.00
			V	955.29	29.30	46.00
Test Results			Compliance			

SWEEP TABLE: "test (30M-1G)"

```
Short Description:            Field Strength
Start      Stop       Detector  Meas.     IF         Transducer
Frequency  Frequency            Time      Bandw.
30.0 MHz   1.0 GHz    MaxPeak   Coupled   120 kHz    HL562 2011
```



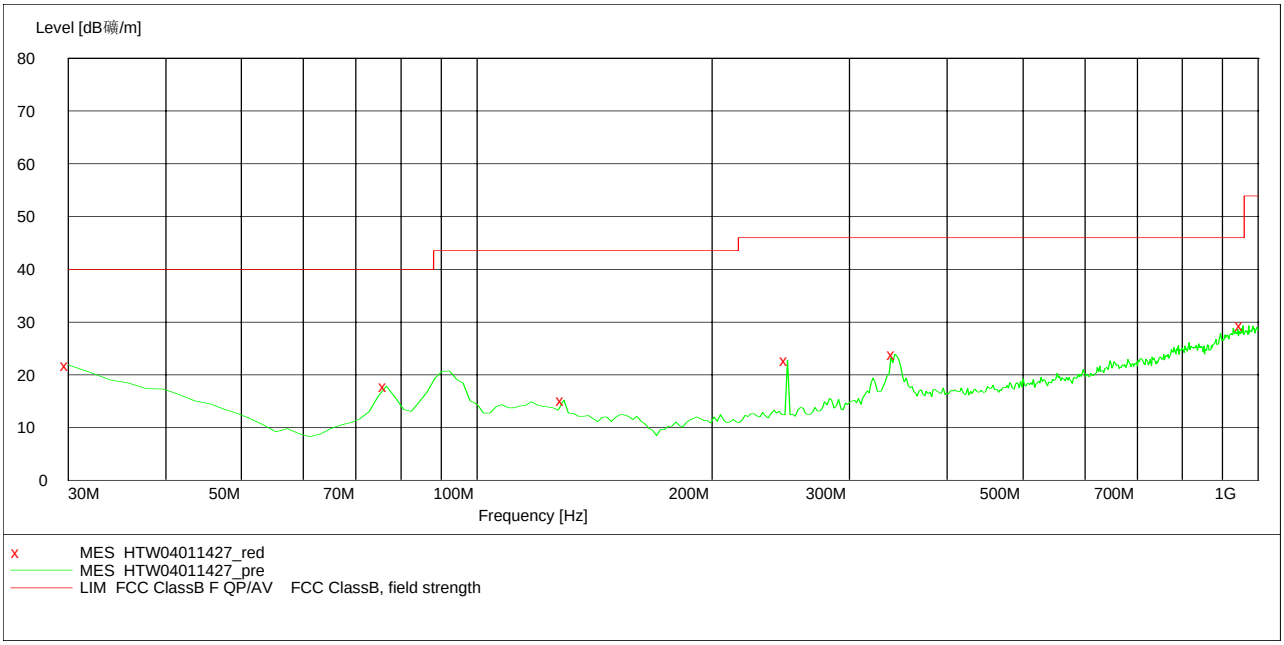
MEASUREMENT RESULT: "HTW04011426_red"

```
4/11/2011  10:06PM
   Frequency     Level  Transd   Limit  Margin  Det.  Height  Azimuth Polarization
         MHz    dBµV/m      dB  dBµV/m      dB            cm      deg

    30.000000    21.90   -10.2    40.0    18.1  Peak   100.0   151.00  HORIZONTAL
    86.372745    12.00   -21.7    40.0    28.0  Peak   300.0   352.00  HORIZONTAL
   144.689379    14.60   -21.8    43.5    28.9  Peak   300.0    88.00  HORIZONTAL
   249.659319    27.10   -20.0    46.0    18.9  Peak   100.0   303.00  HORIZONTAL
   342.965932    30.60   -17.0    46.0    15.4  Peak   100.0   262.00  HORIZONTAL
   949.458918    30.10    -5.1    46.0    15.9  Peak   100.0   100.00  HORIZONTAL
```

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 2011



MEASUREMENT RESULT: "HTW04011427_red"

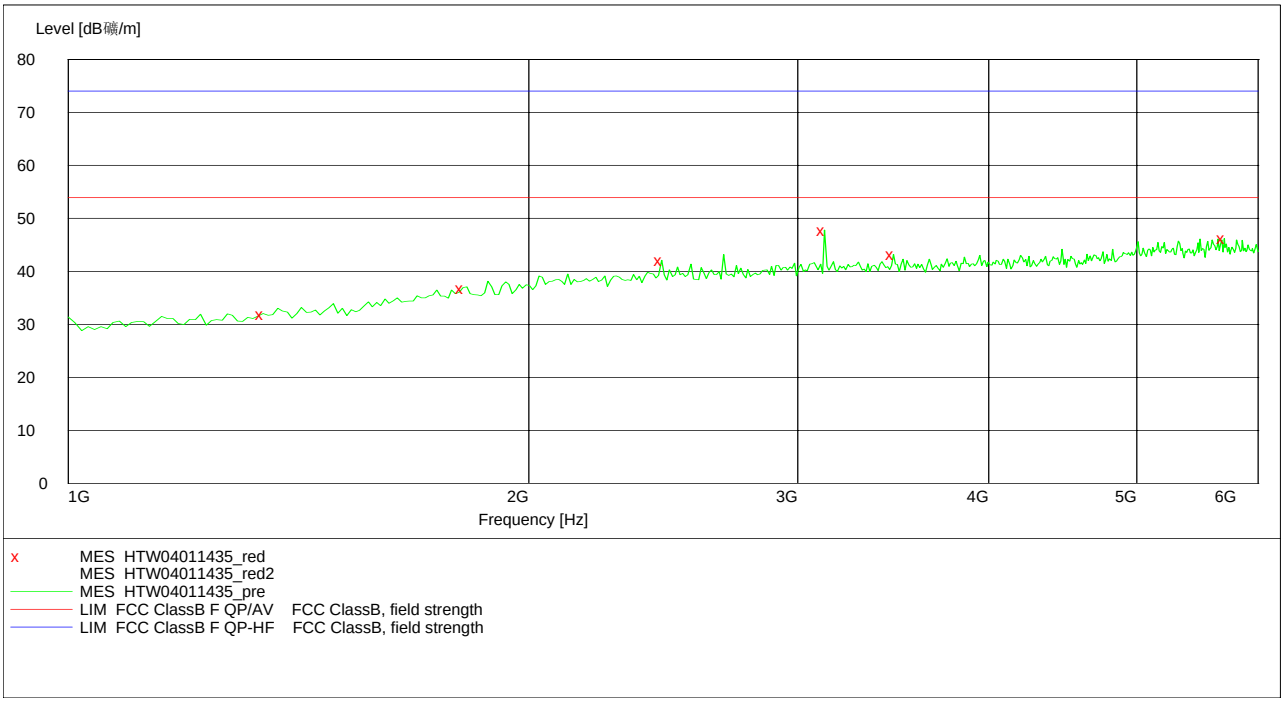
4/11/2011 10:08PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	21.80	-10.2	40.0	18.2	Peak	100.0	322.00	VERTICAL
76.653307	17.80	-23.0	40.0	22.2	Peak	100.0	138.00	VERTICAL
129.138277	15.20	-19.3	43.5	28.3	Peak	100.0	255.00	VERTICAL
249.659319	22.70	-20.0	46.0	23.3	Peak	100.0	299.00	VERTICAL
342.965932	23.90	-17.0	46.0	22.1	Peak	100.0	148.00	VERTICAL
955.290581	29.30	-5.2	46.0	16.7	Peak	100.0	340.00	VERTICAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m
				Frequency (MHz)	Datum (dBuV/m)	
4FSK	12.5 KHz	450.5000	H	3124.25	47.80	54.00
			V	5649.30	46.80	54.00
Test Results			Compliance			

SWEEP TABLE: "test (1G-18G) P"

```
Short Description:              EN 55022 Field Strength
Start       Stop        Detector  Meas.     IF         Transducer
Frequency   Frequency              Time      Bandw.
1.0 GHz     18.0 GHz    MaxPeak   Coupled   1 MHz      HF906 2011
                        Average
```



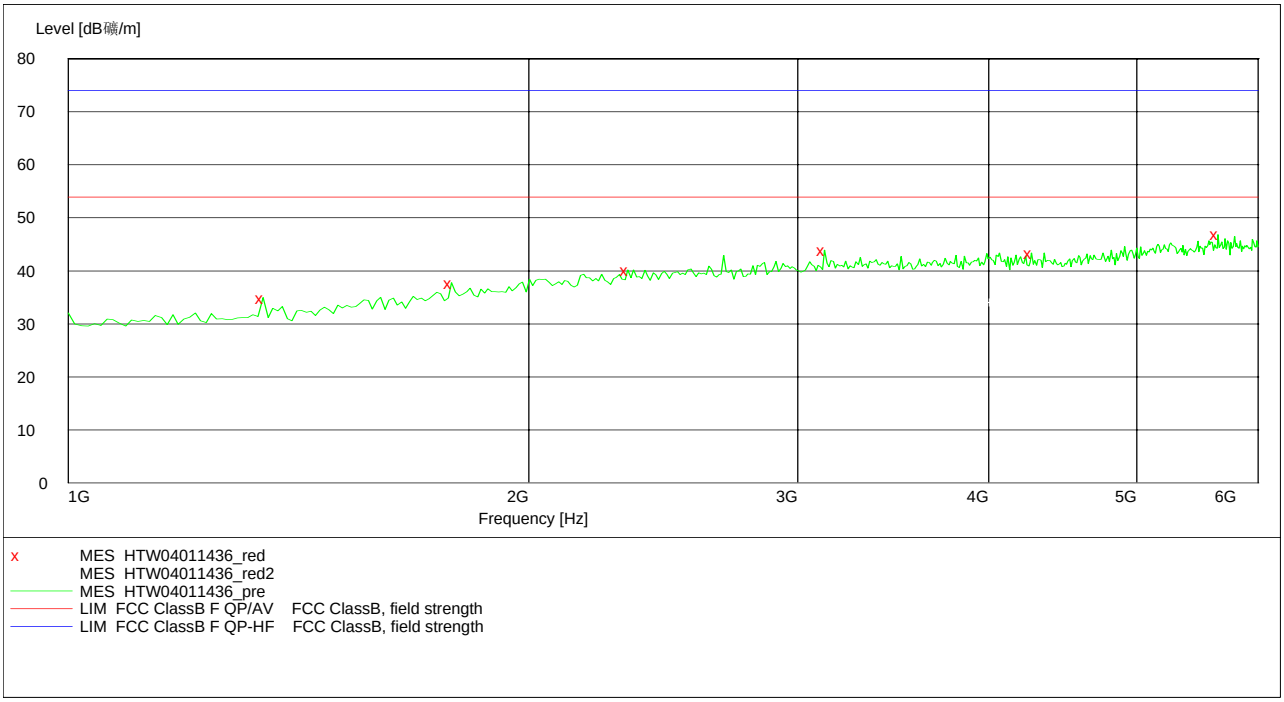
MEASUREMENT RESULT: "HTW04011435_red"

4/12/2011 2:53PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1340.681363	32.00	-7.0	54.0	22.0	Peak	100.0	151.00	HORIZONTAL
1811.623246	36.90	-3.0	54.0	17.1	Peak	100.0	117.00	HORIZONTAL
2442.885772	42.10	0.6	54.0	11.9	Peak	100.0	70.00	HORIZONTAL
3124.248497	47.80	2.2	54.0	6.2	Peak	100.0	124.00	HORIZONTAL
3464.929860	43.20	2.6	54.0	10.8	Peak	100.0	23.00	HORIZONTAL
5699.398798	46.20	6.9	54.0	7.8	Peak	100.0	269.00	HORIZONTAL

SWEEP TABLE: "test (1G-18G) P"

Short Description:		EN 55022 Field Strength			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak Average	Coupled	1 MHz	HF906 2011



MEASUREMENT RESULT: "HTW04011436_red"

4/12/2011 2:53PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1340.681363	34.90	-7.0	54.0	19.1	Peak	100.0	145.00	VERTICAL
1781.563126	37.70	-3.2	54.0	16.3	Peak	100.0	145.00	VERTICAL
2322.645291	40.20	0.1	54.0	13.8	Peak	100.0	80.00	VERTICAL
3124.248497	43.90	2.2	54.0	10.1	Peak	100.0	353.00	VERTICAL
4266.533066	43.40	3.5	54.0	10.6	Peak	100.0	3.00	VERTICAL
5649.298597	46.80	6.8	54.0	7.2	Peak	100.0	178.00	VERTICAL

4.10. Receiver Conducted Spurious Emssion

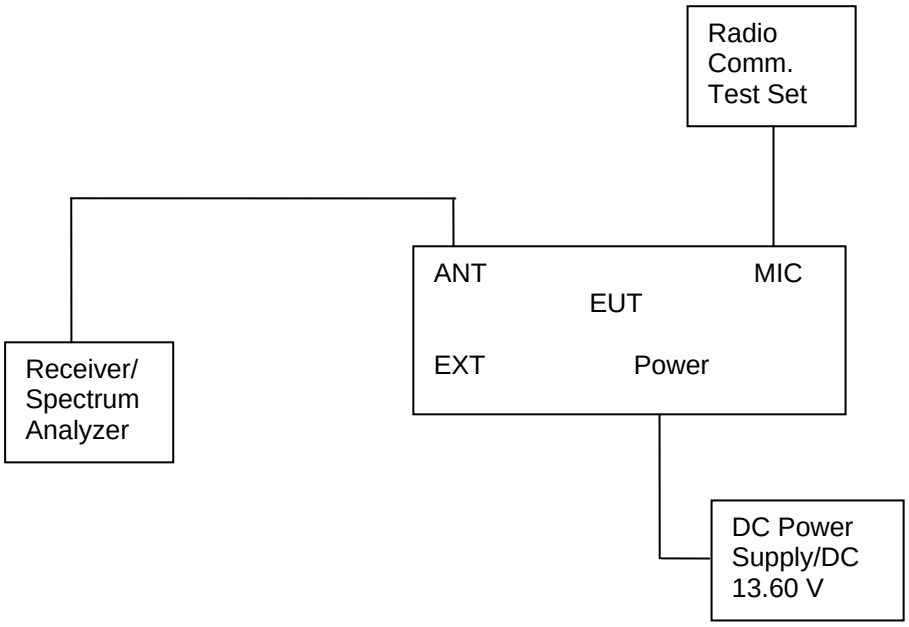
TEST APPLICABLE

The same as Section 4.3

TEST PROCEDURE

The spectrum analyzer was connected to the RF output power of the EUT, the EUT was setup in receiving mode; The RBW of the spectrum analyzer was set to 100 kHz and the VBW set to 300 KHz below the test frequency 1GHz. While the RBW of the spectrum analyzer was set to the 1MHz and VBW set to the 3MHz from 1GHz to the 10^{th} harmonic.

TEST CONFIGURATION



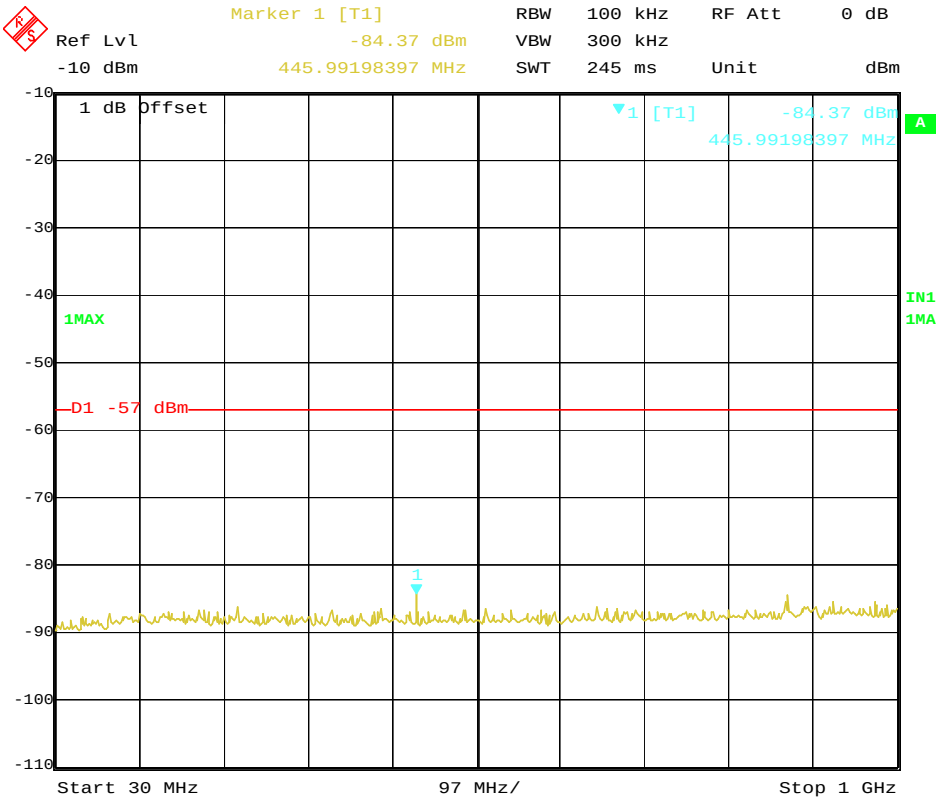
LIMIT

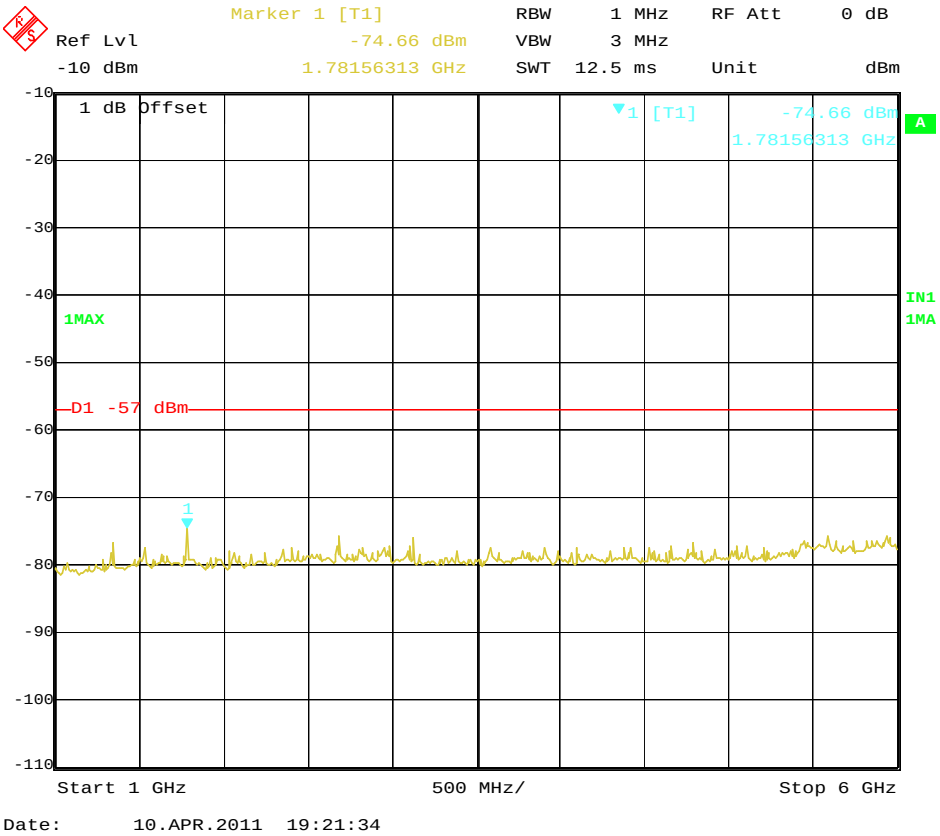
The power at the antenna terminal shall not exceed 2.0 nanowatts (-57dBm).

TEST RESULTS

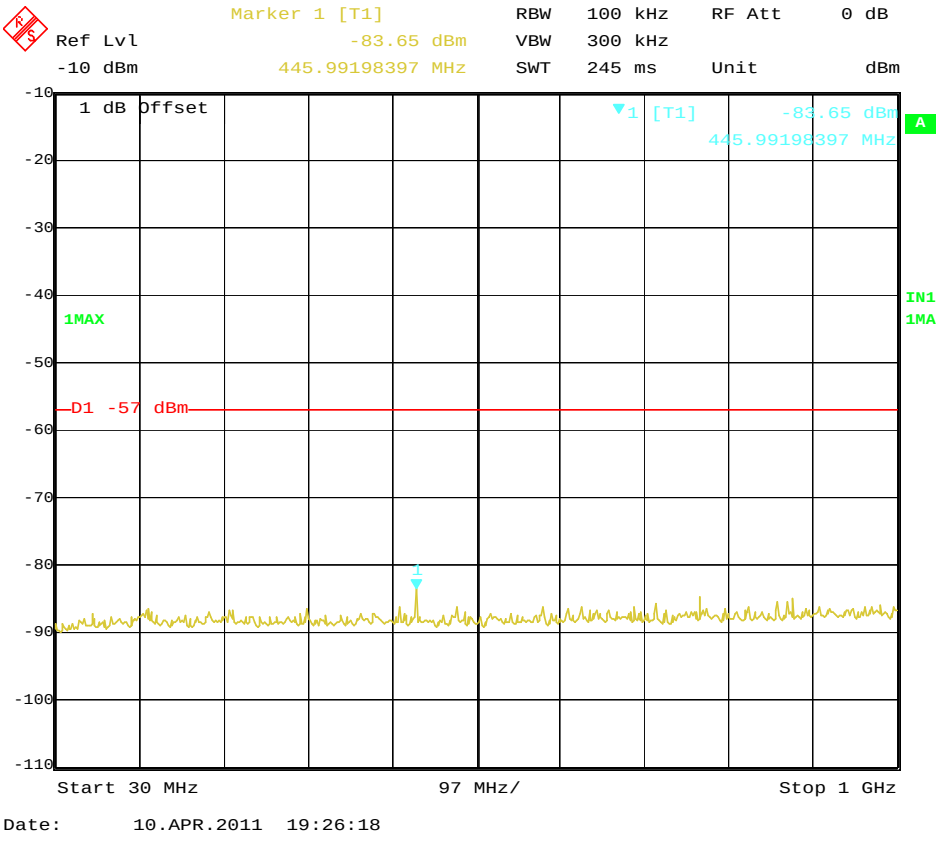
The Receiver Conducted Spurious Emssions Measurement is performed to the three channels (the top channel, the middle channel and the bottom channel), the datums recorded below were for the three channels; and the EUT shall be scanned from 30 MHz to the 6GHz.

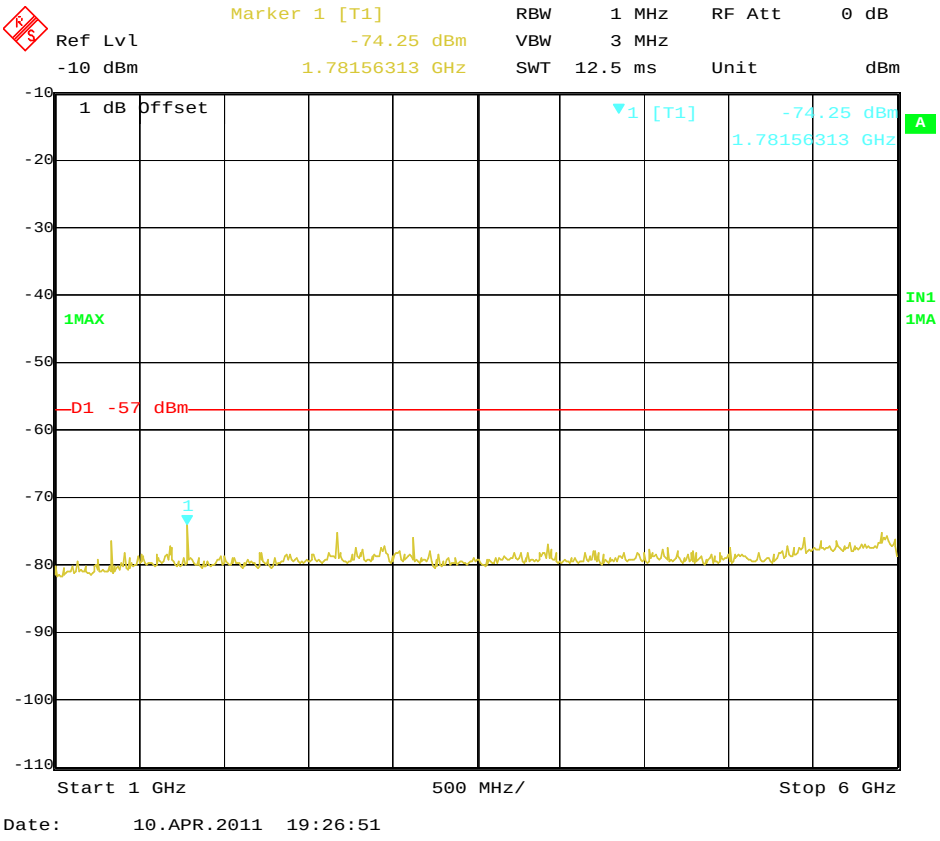
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Low	450.5000	445.99	-84.37	1781.56	-74.66	-57dBm
Test Results				Compliance				



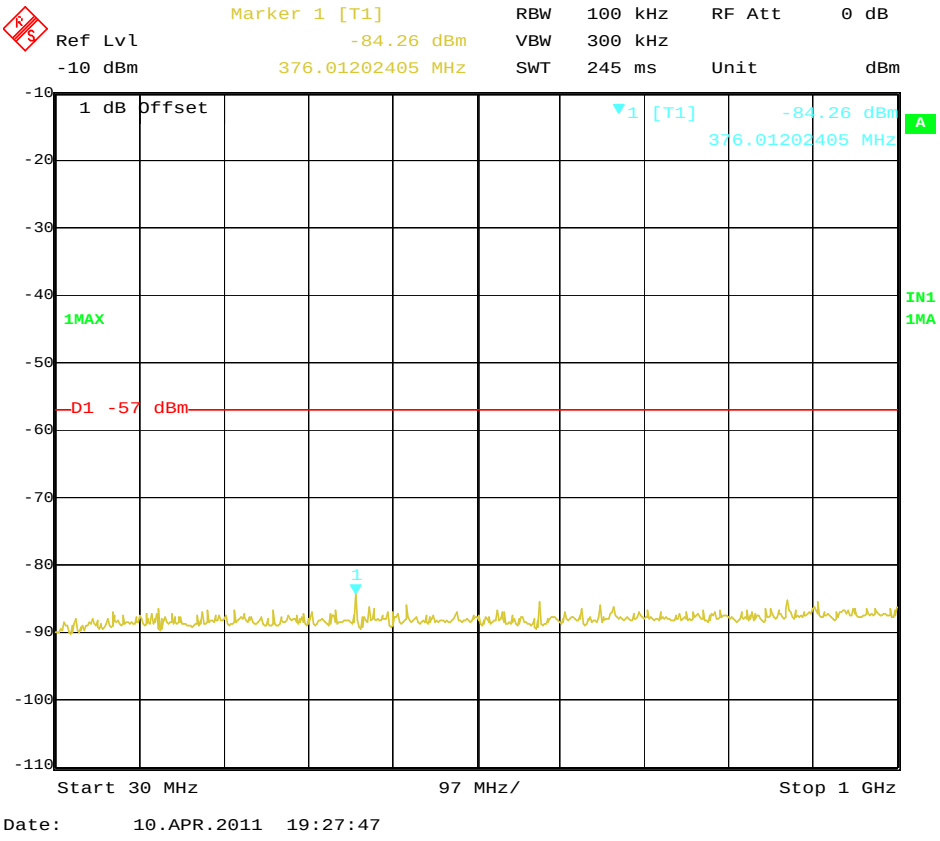


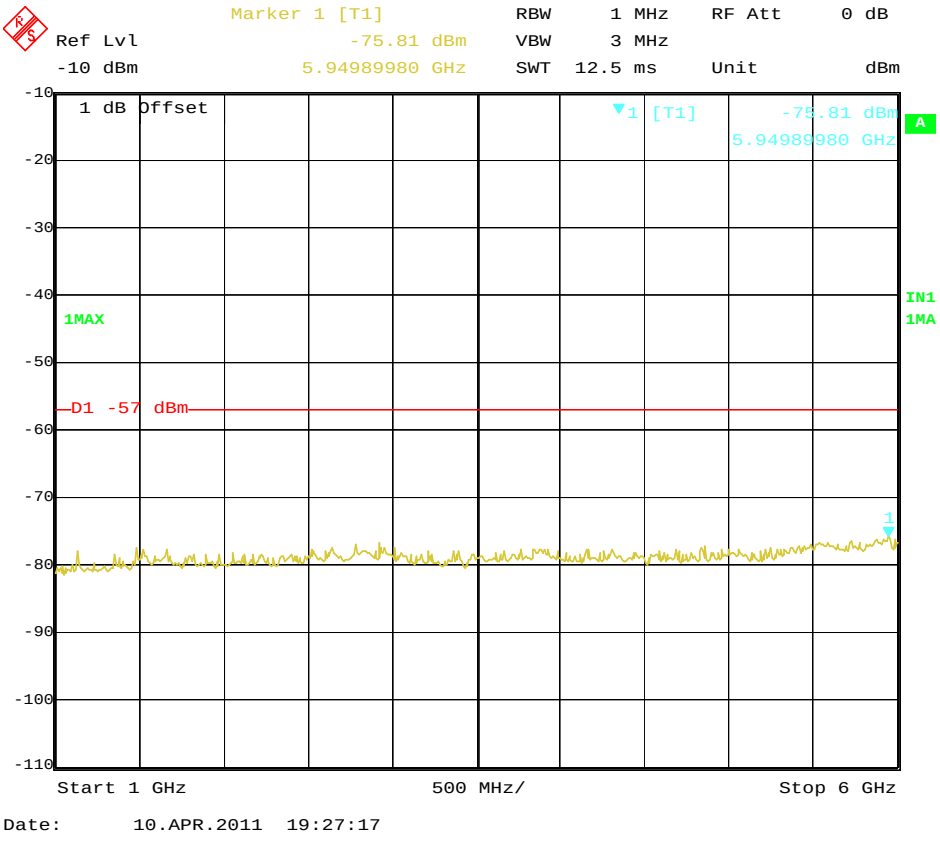
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Middle	485.0000	445.99	-83.65	1781.56	-74.25	-57dBm
Test Results				Compliance				



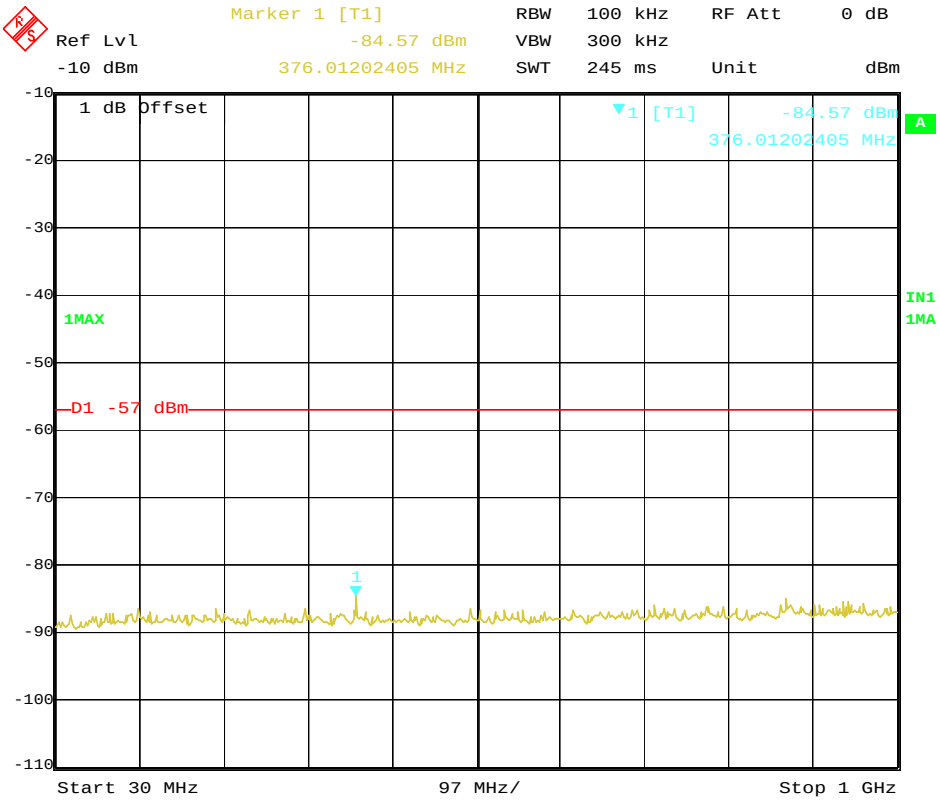


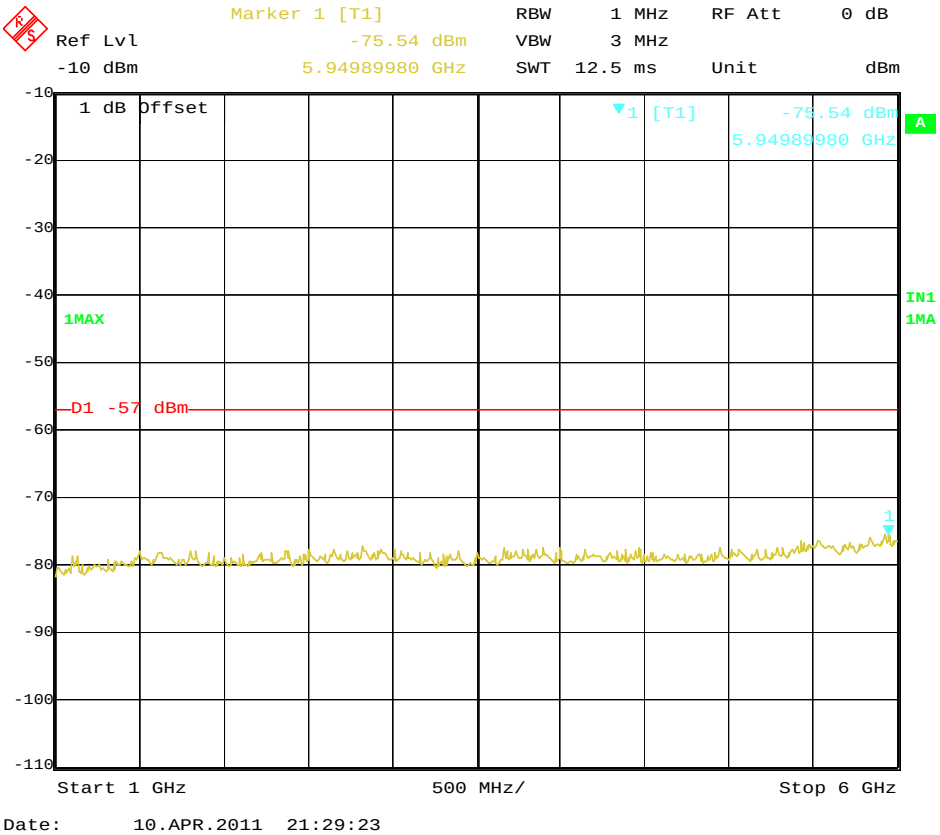
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	High	519.50000	376.01	-84.26	5949.90	-75.81	-57dBm
Test Results				Compliance				



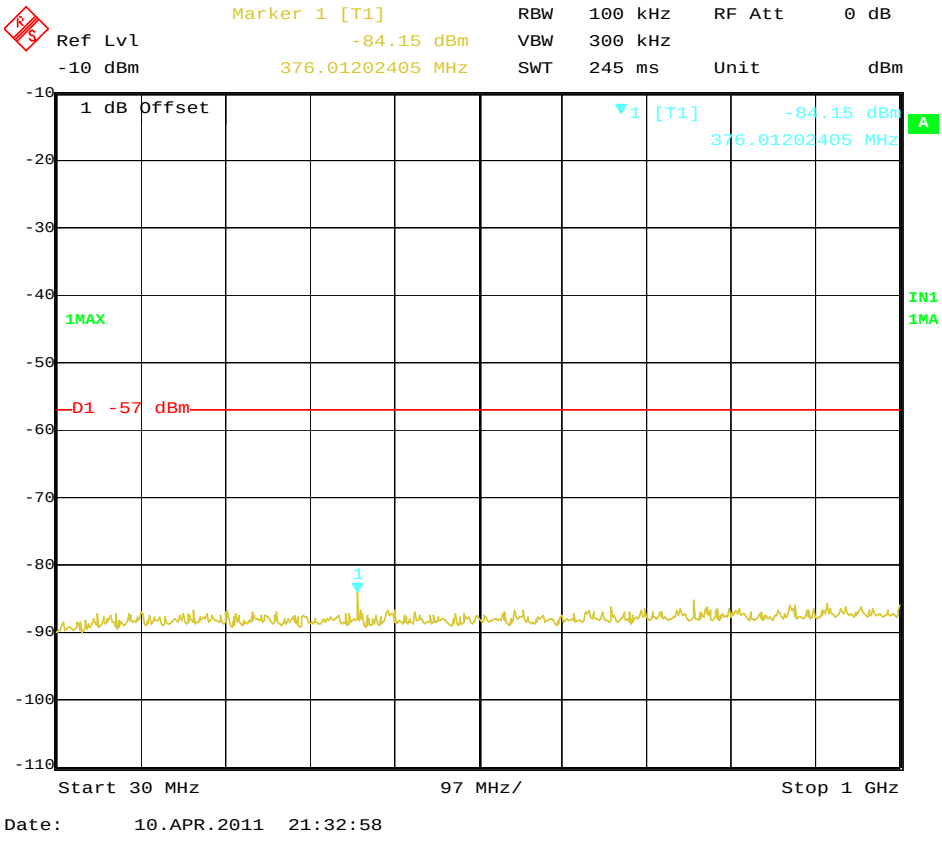


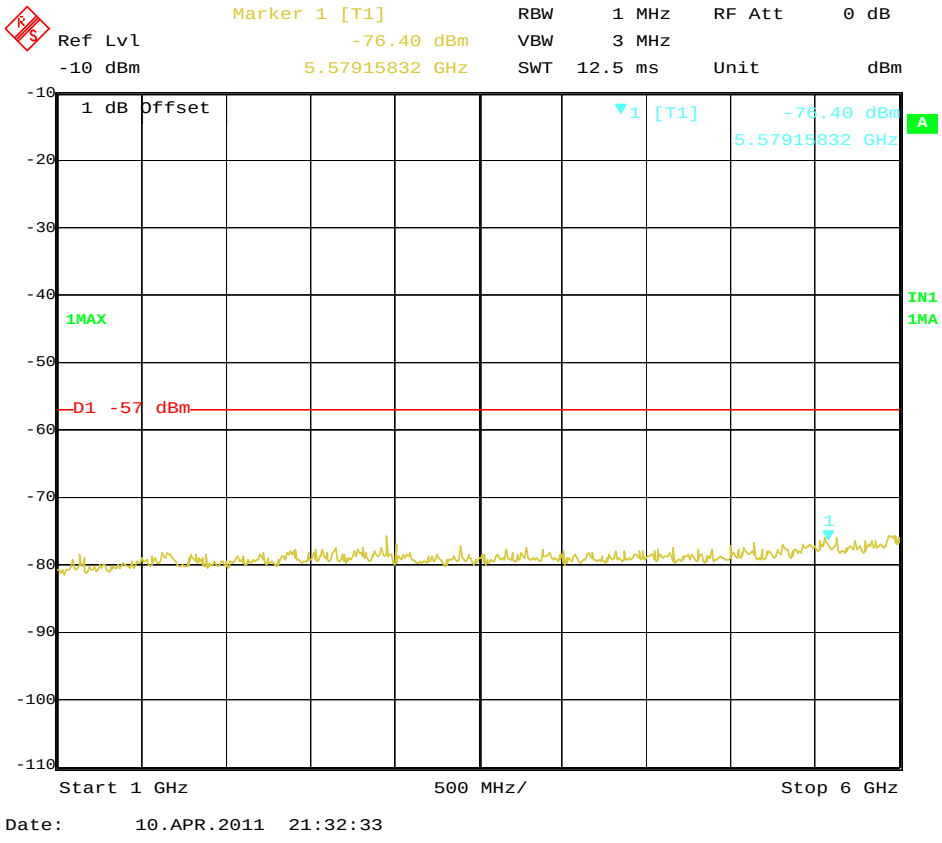
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Low	450.5000	376.01	-84.57	5949.90	-75.54	-57dBm
Test Results				Compliance				



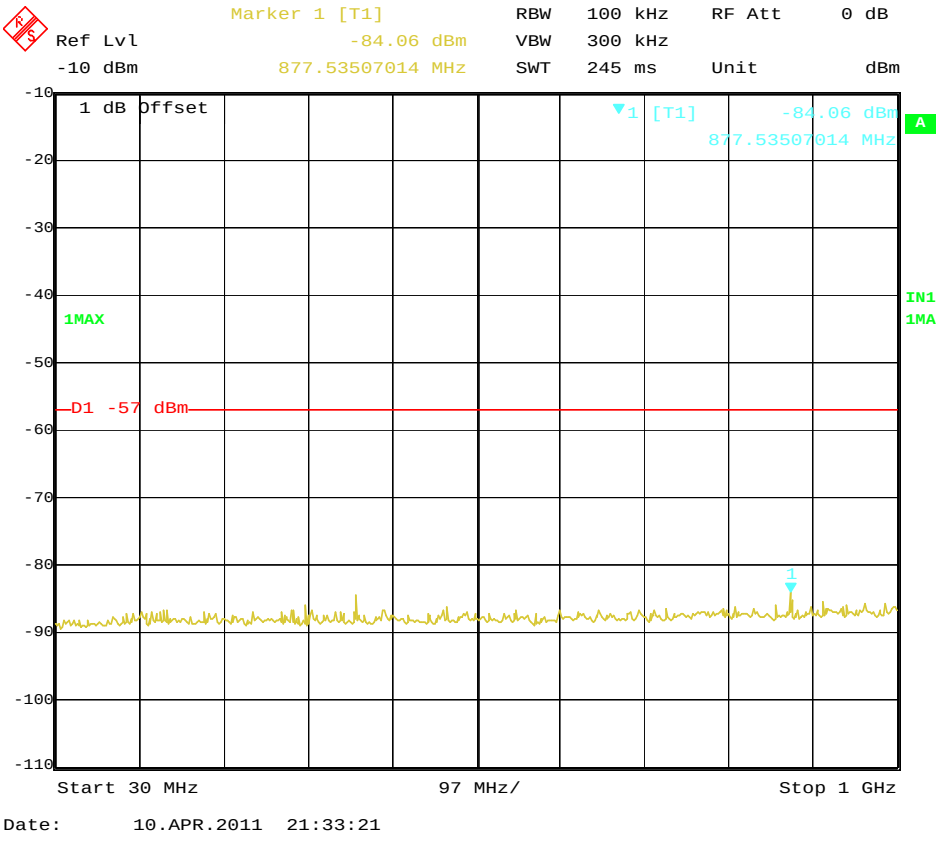


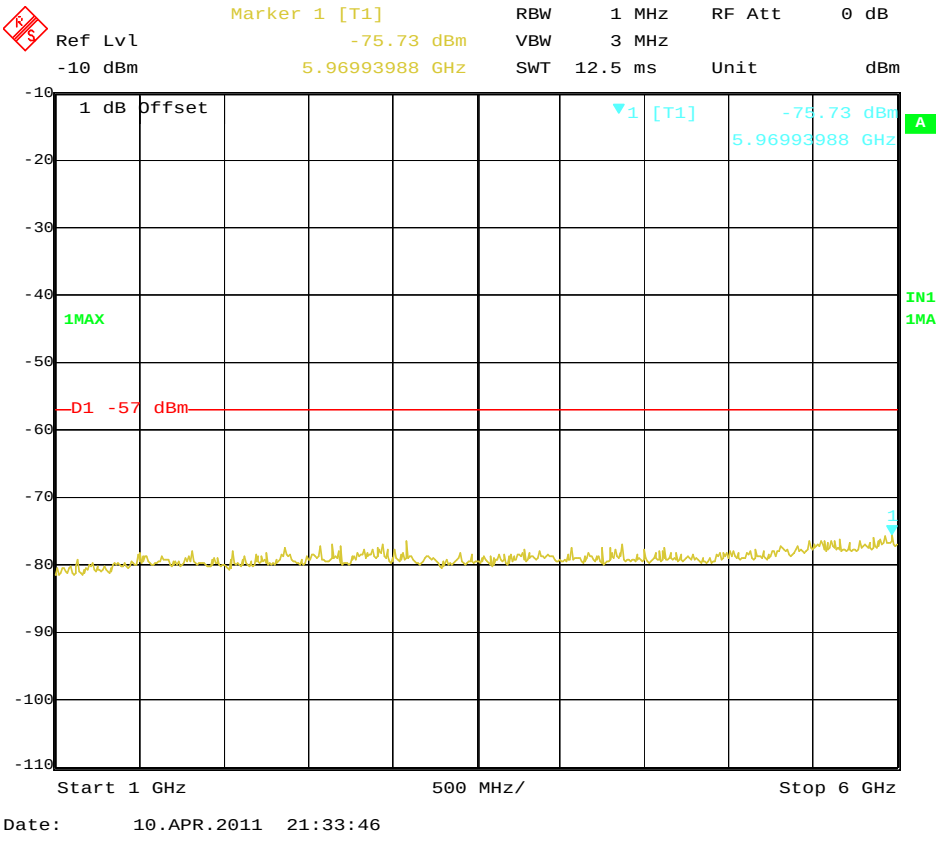
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Middle	485.0000	376.01		5579.16	-76.40	-57dBm
Test Results				Compliance				



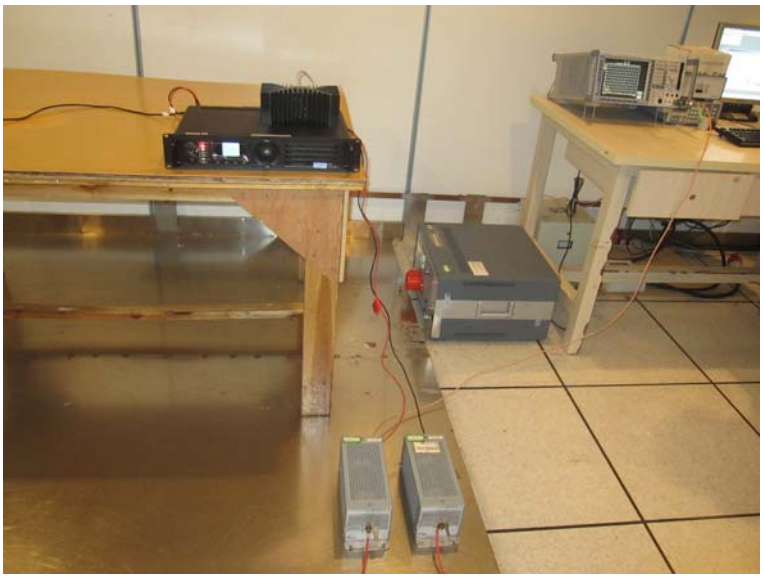


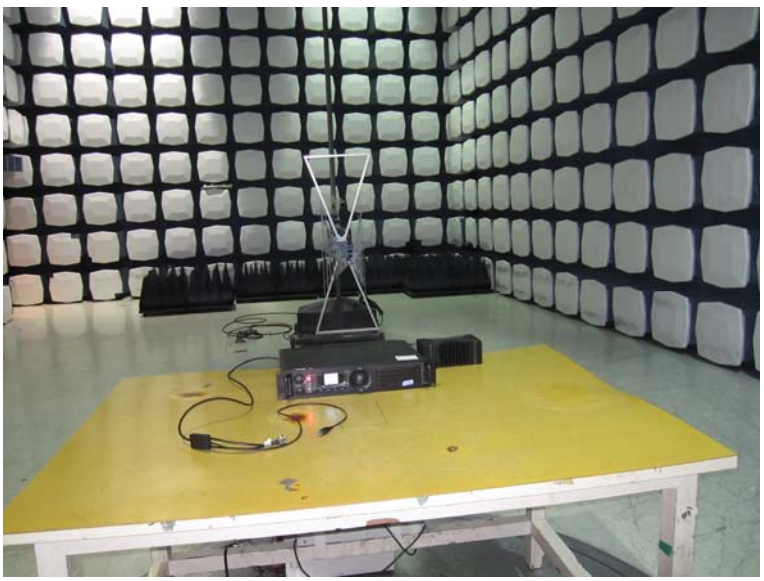
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	High	519.5000	877.54	-84.06	5969.94	-75.73	-57dBm
Test Results				Compliance				

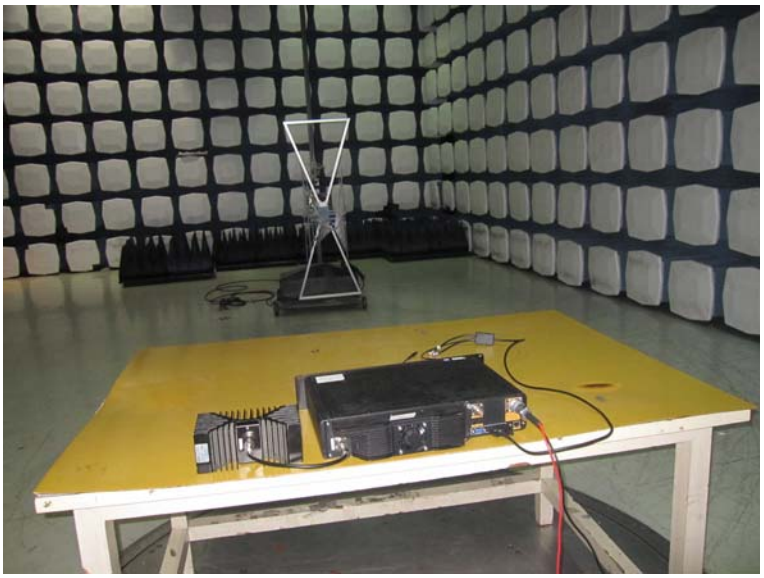


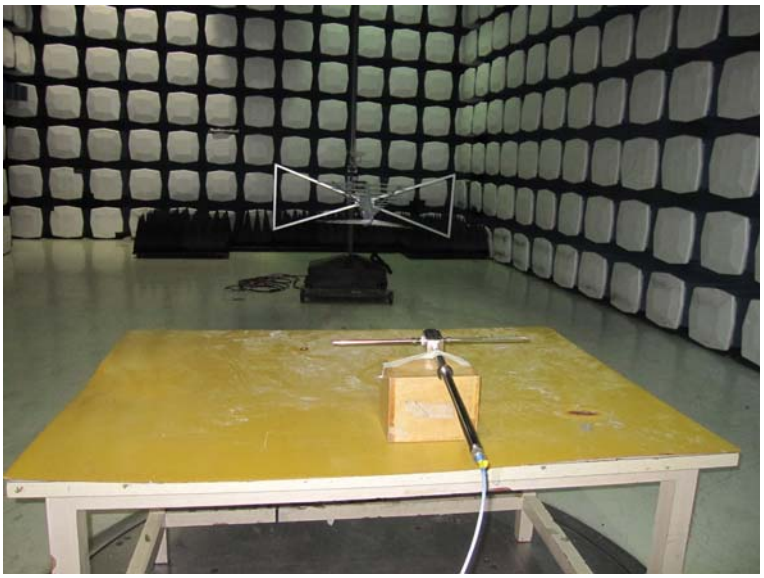


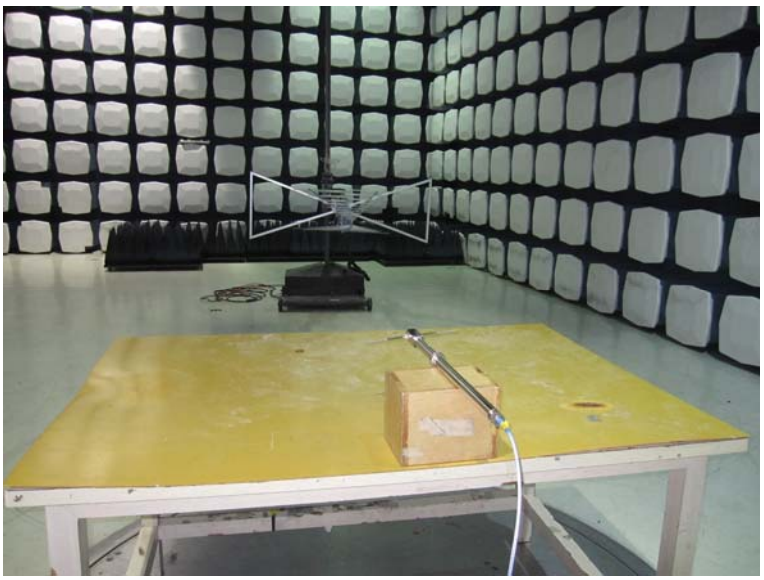
5. Test Setup Photos of the EUT

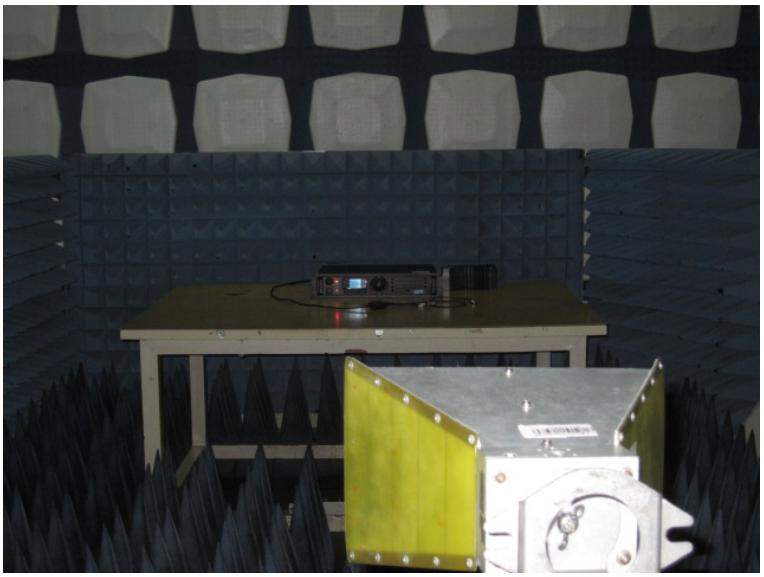


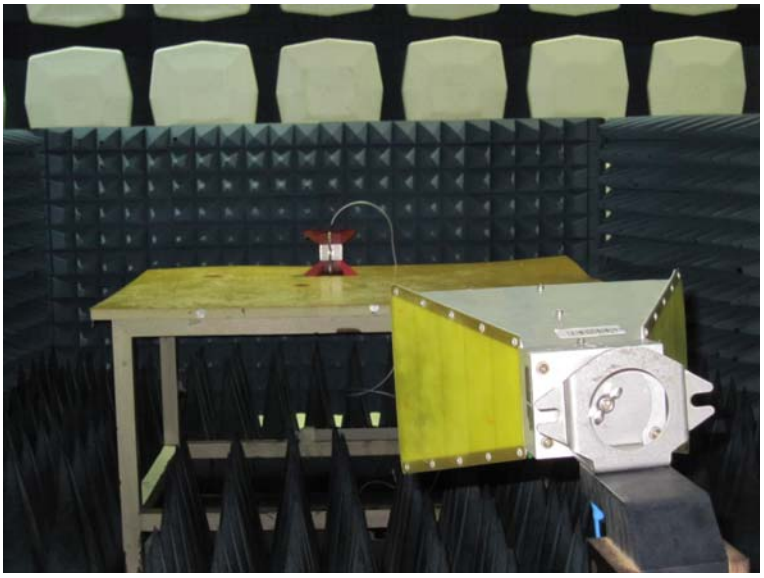


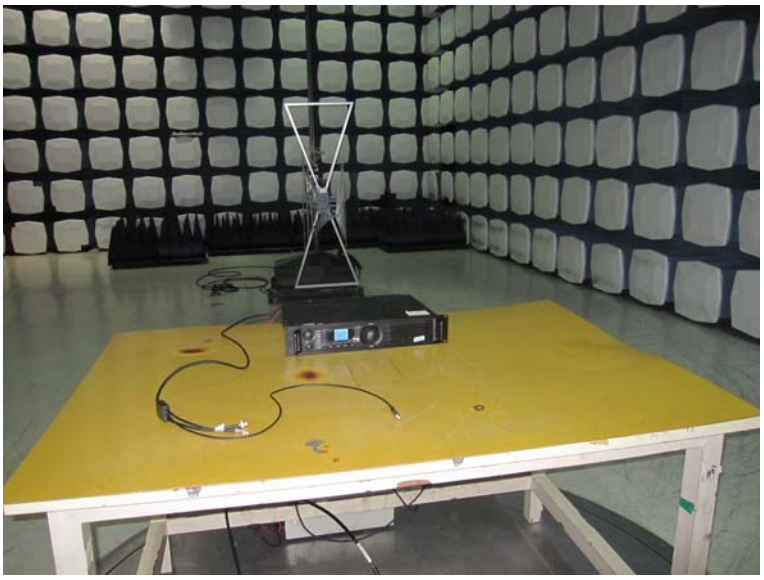


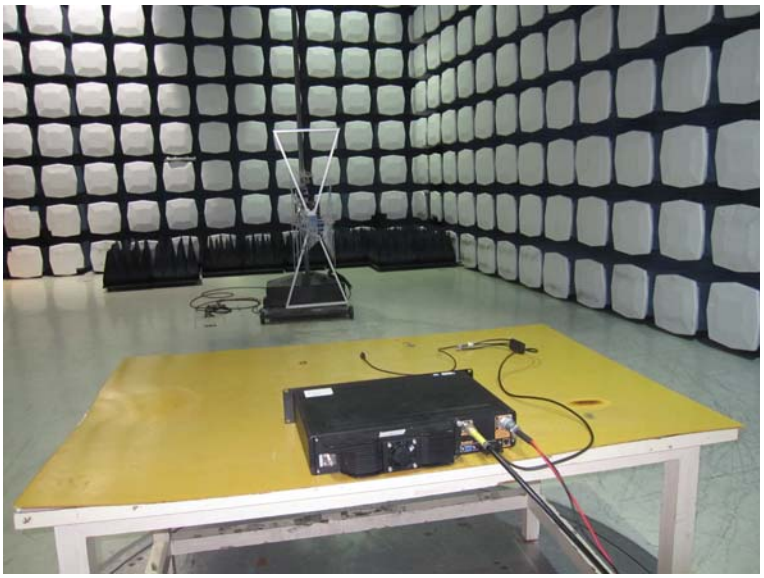


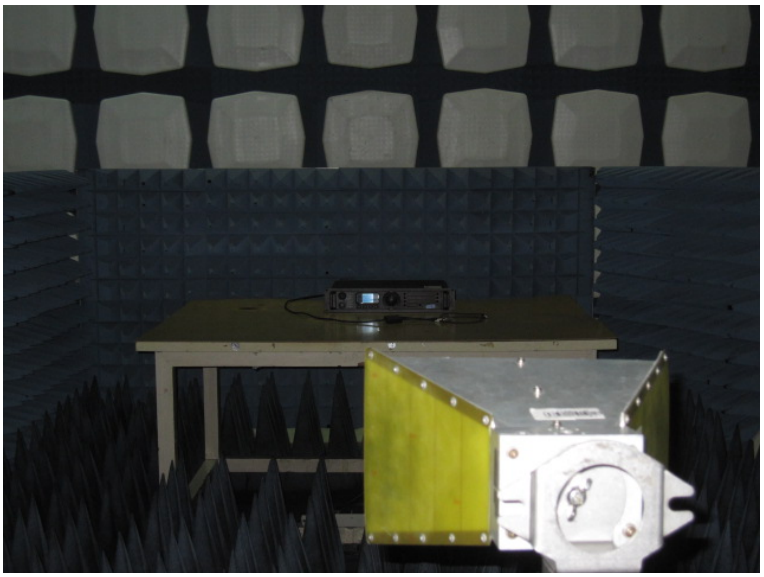








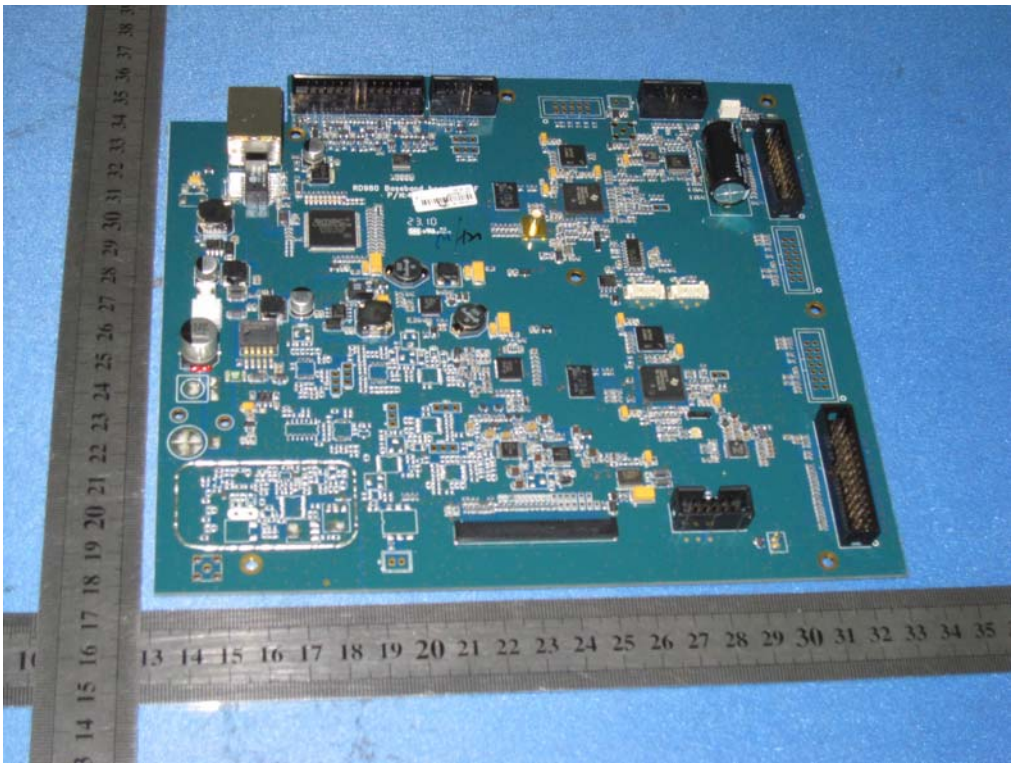


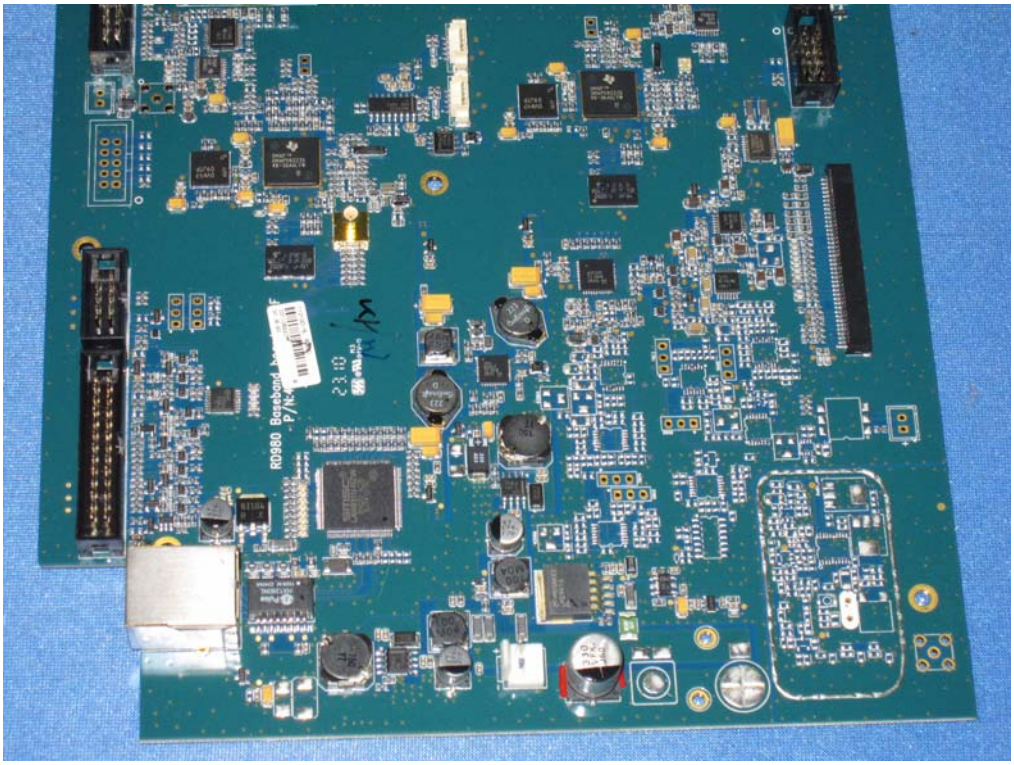


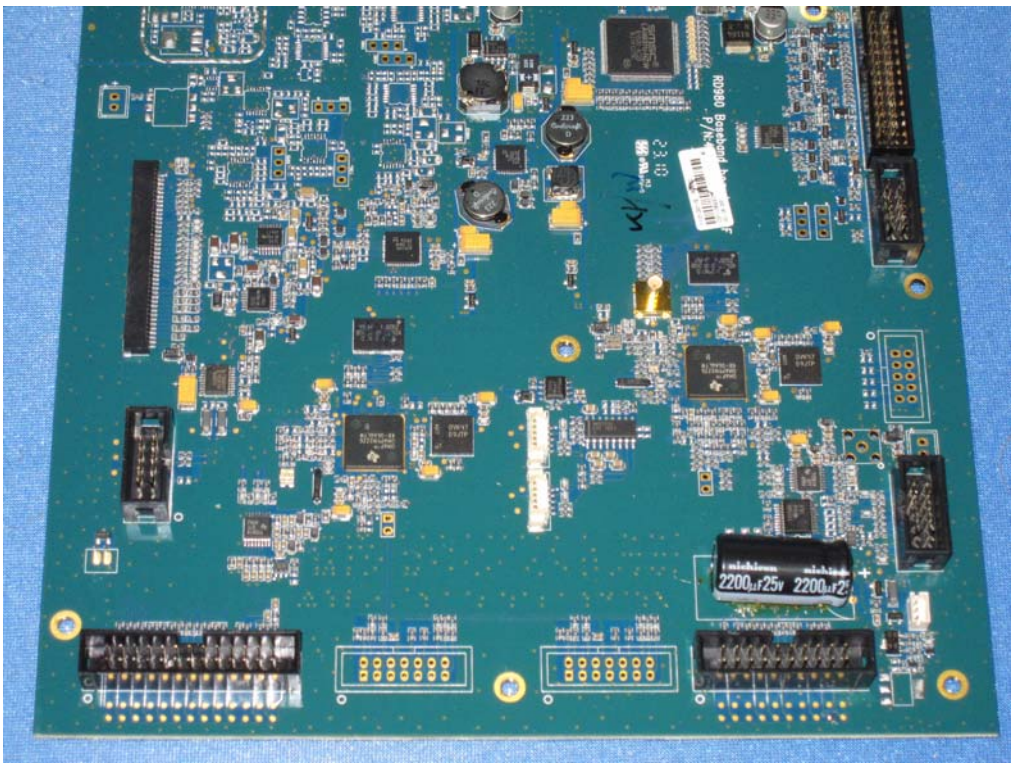
6. External and Internal Photos of the EUT

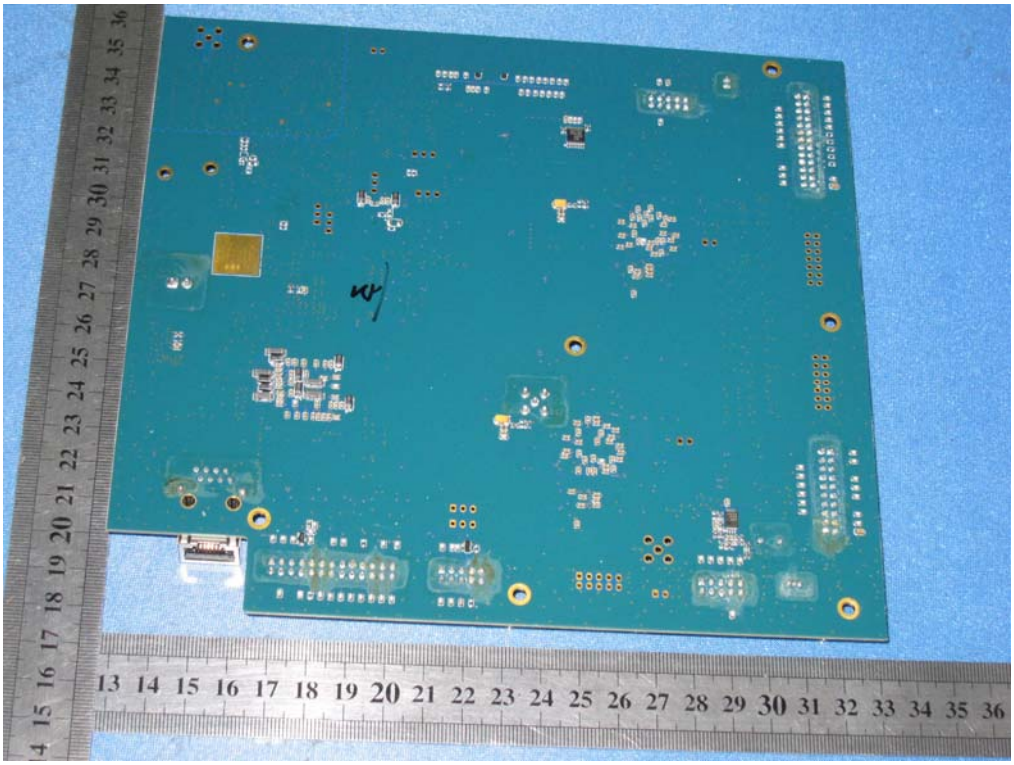
External photos of the EUT

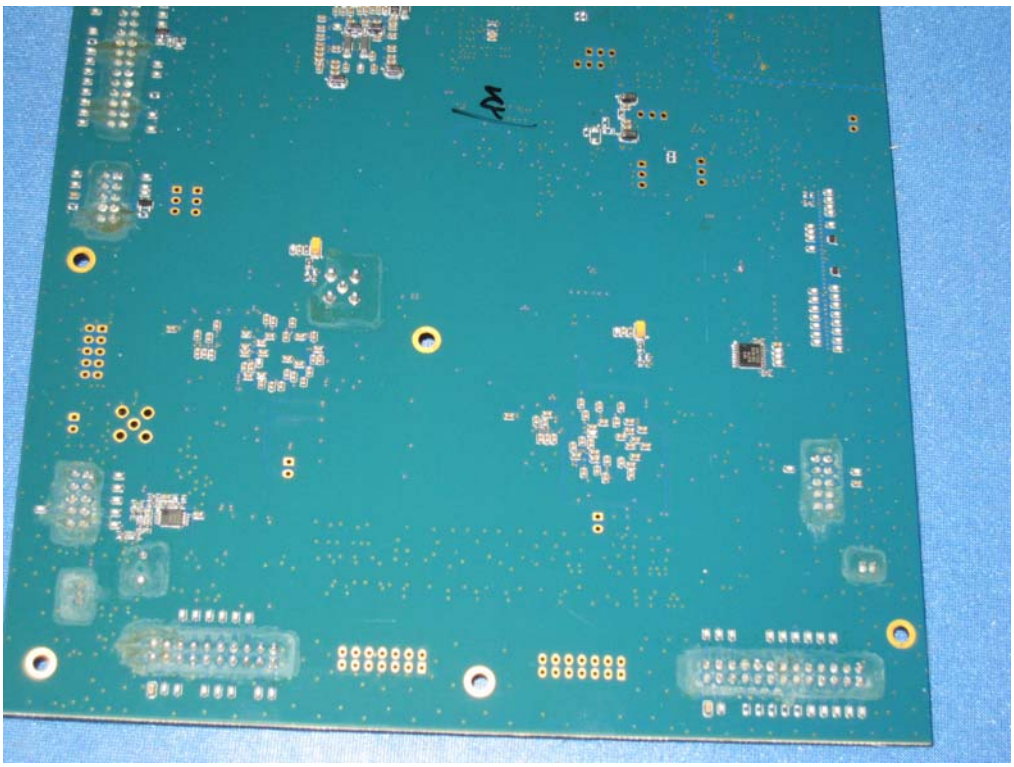
Internal photos of the EUT

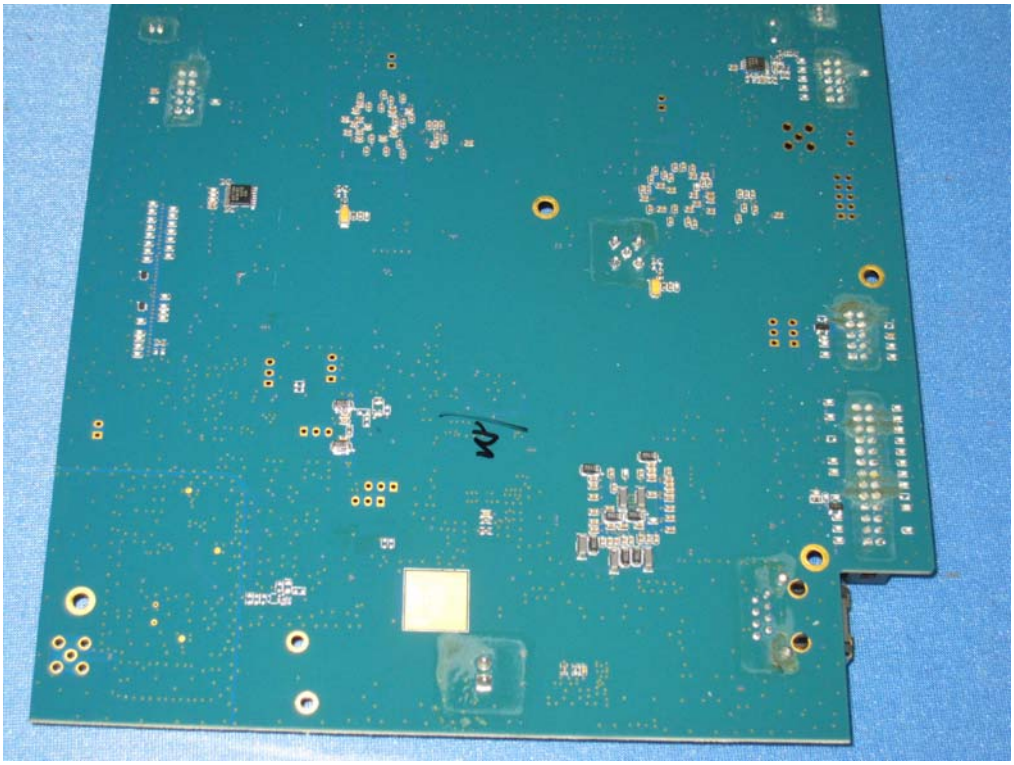


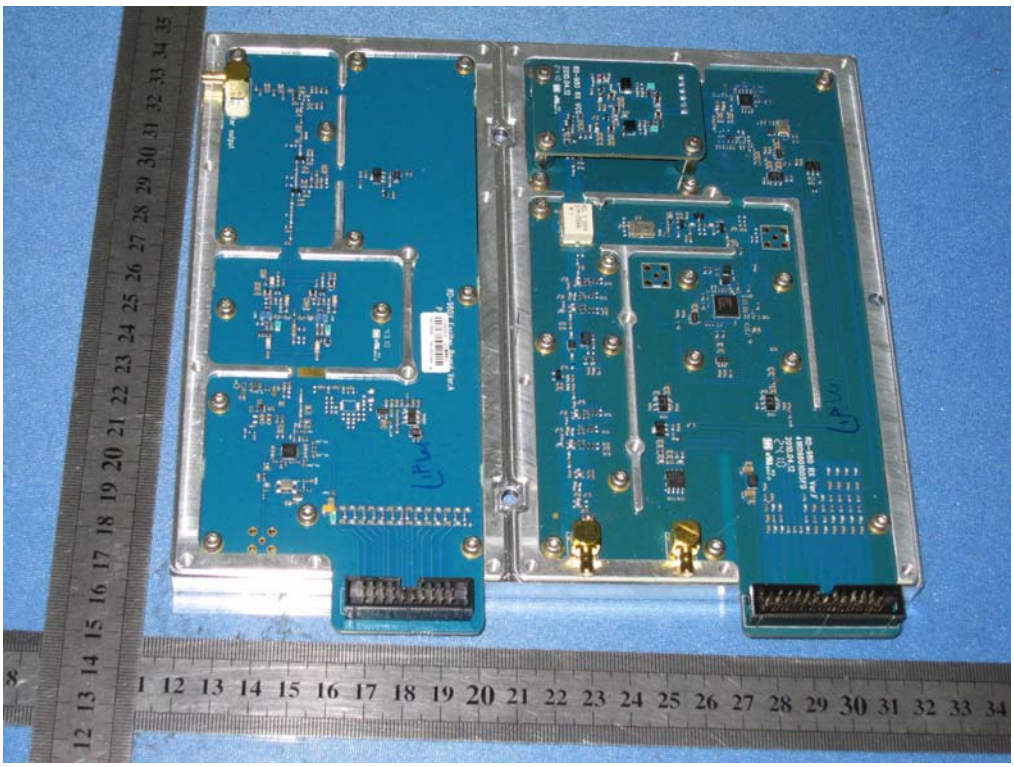


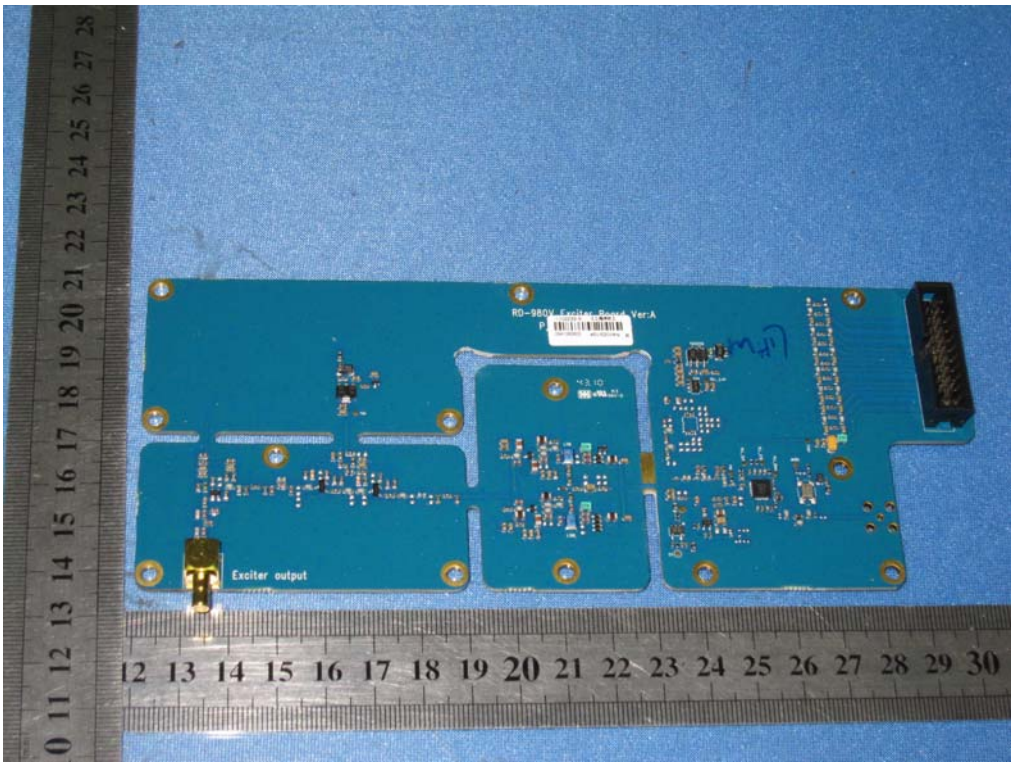


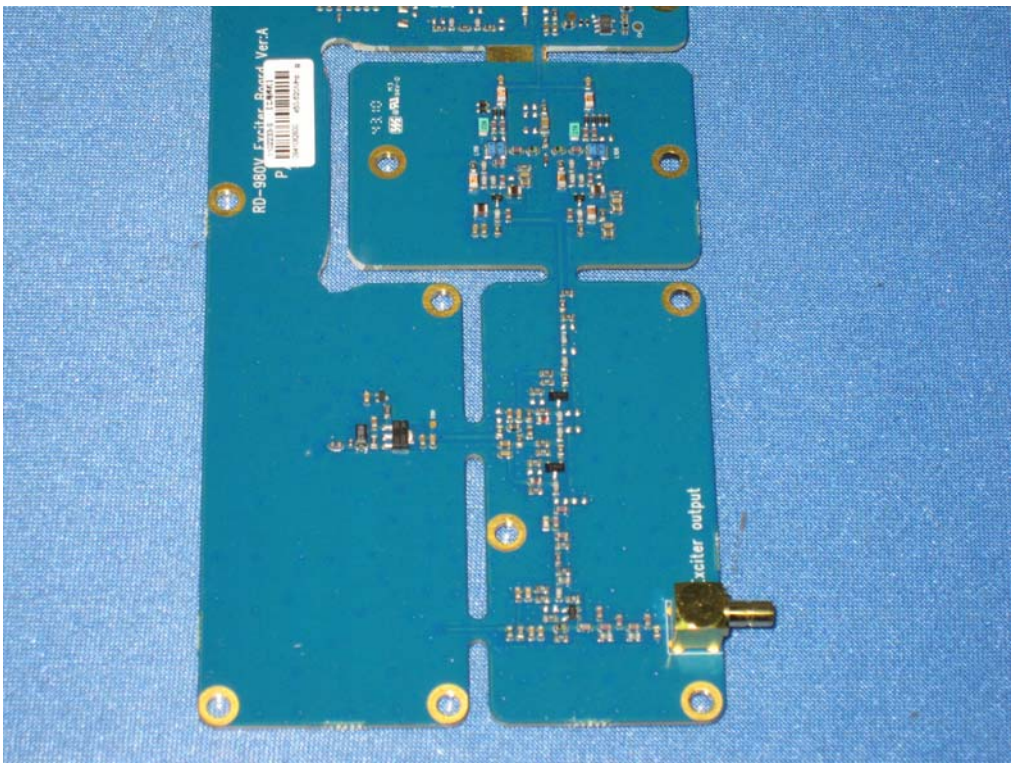









Exciter output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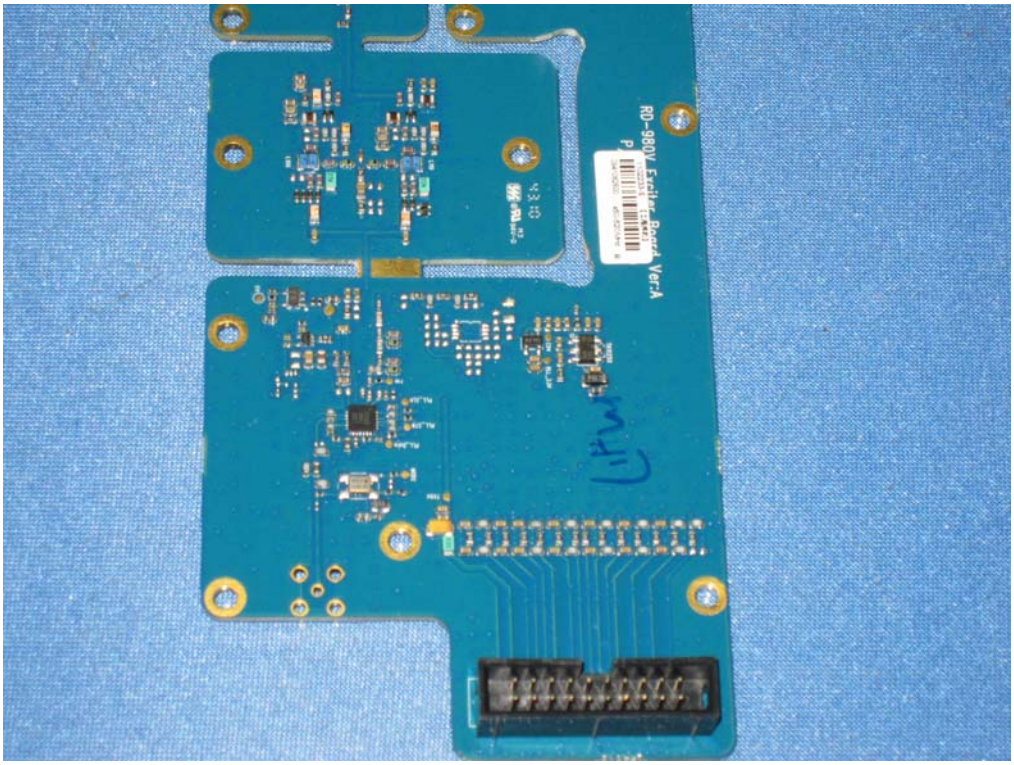
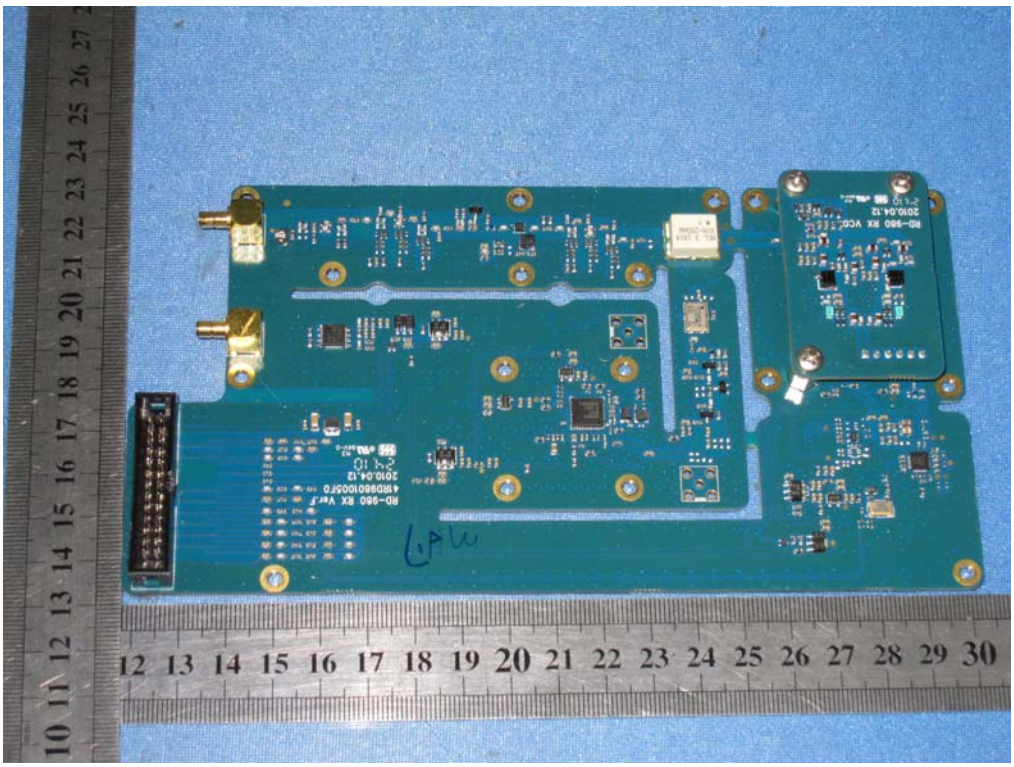
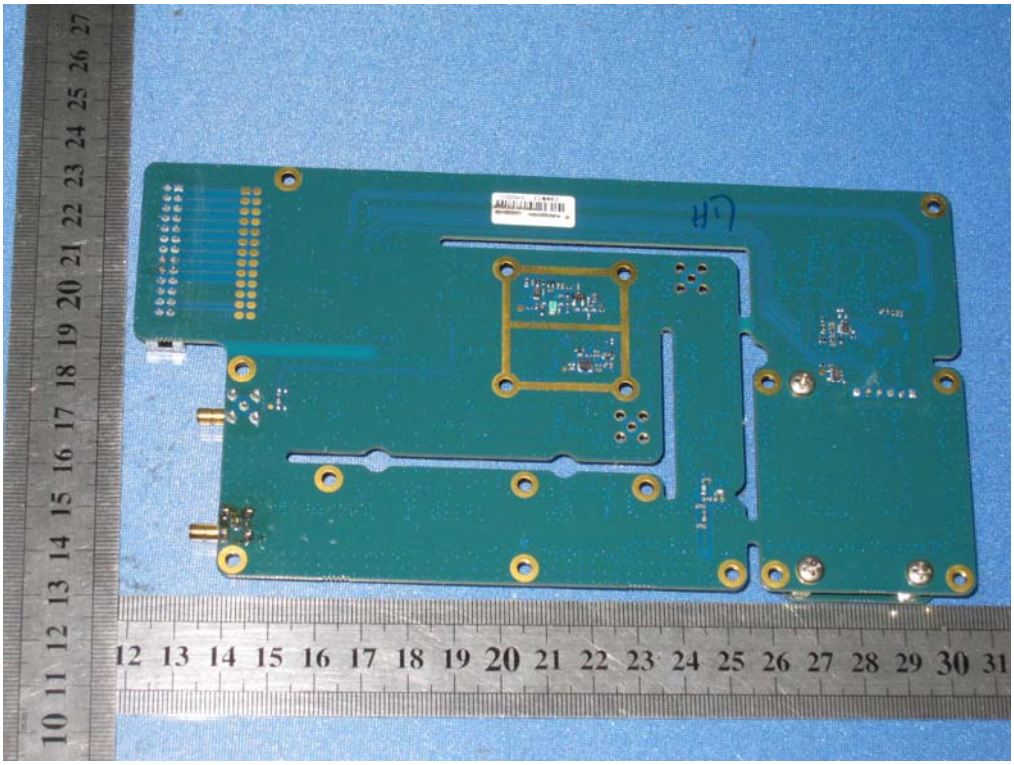
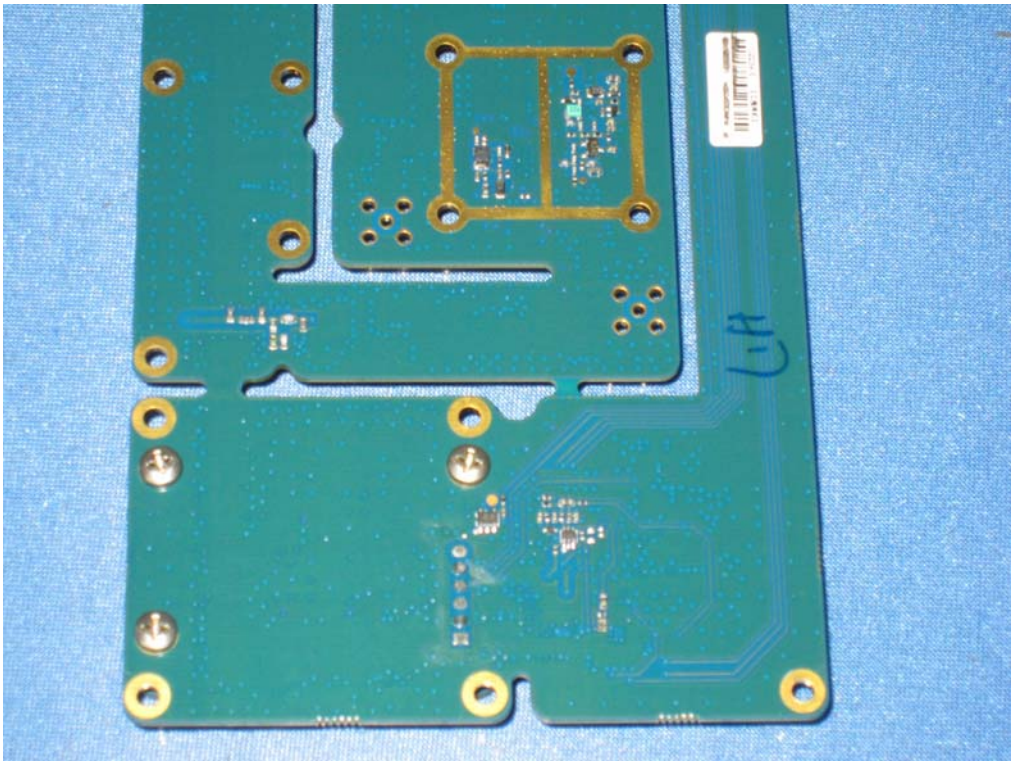
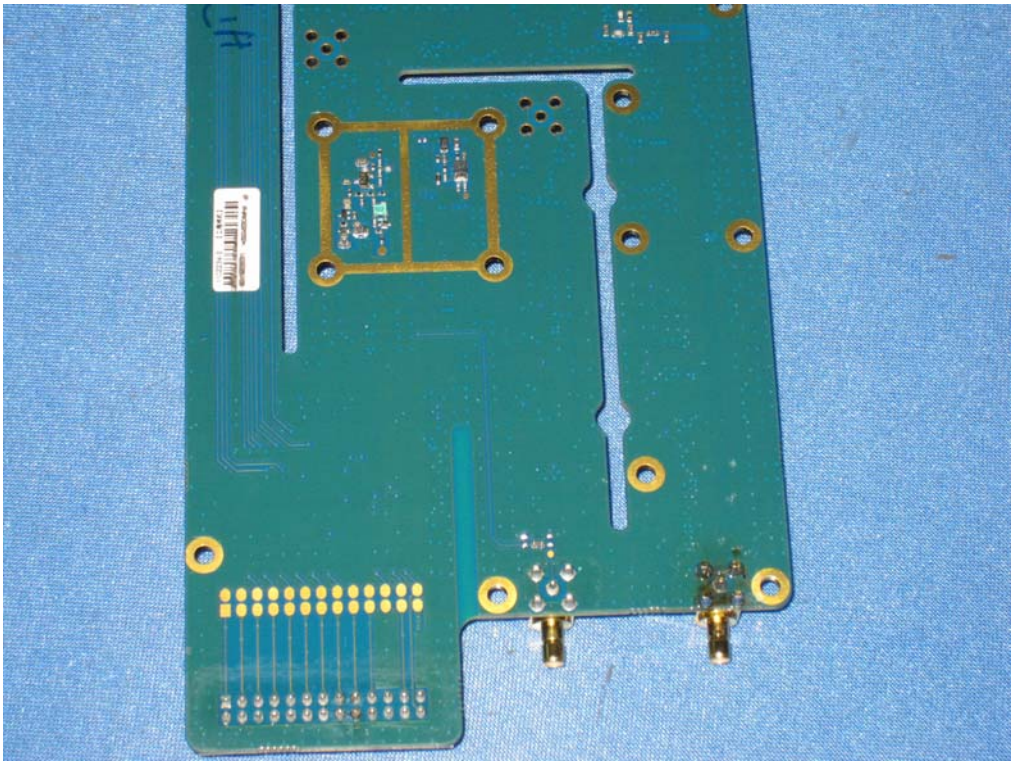
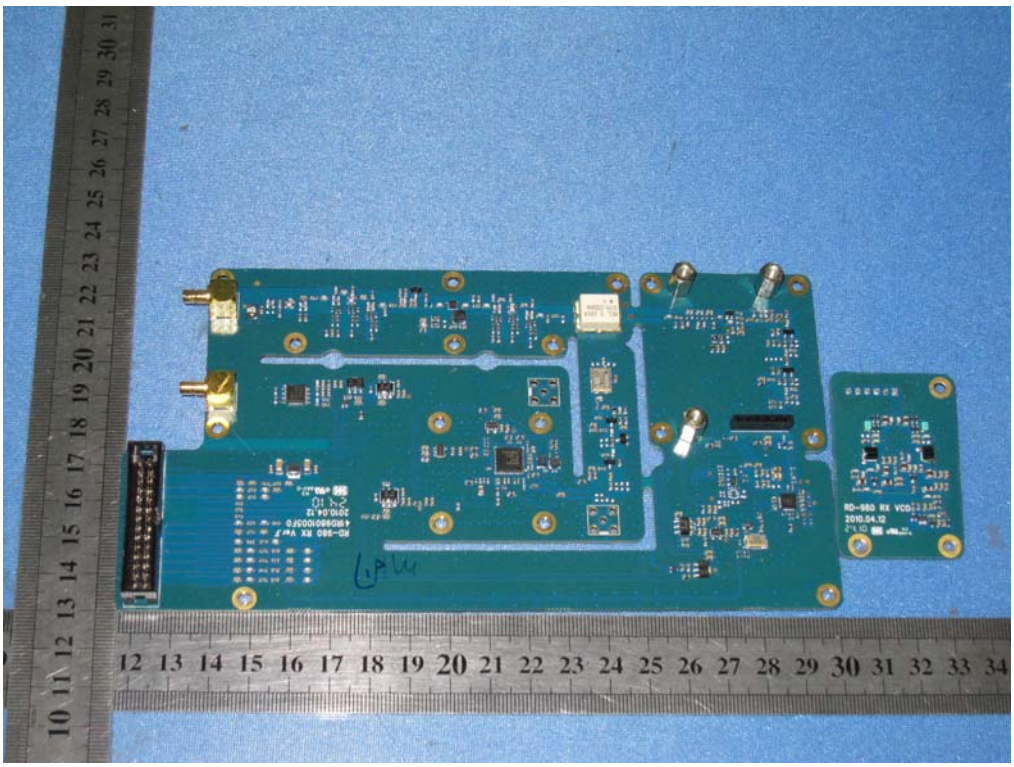

RD-980V Exciter Board Ver.A

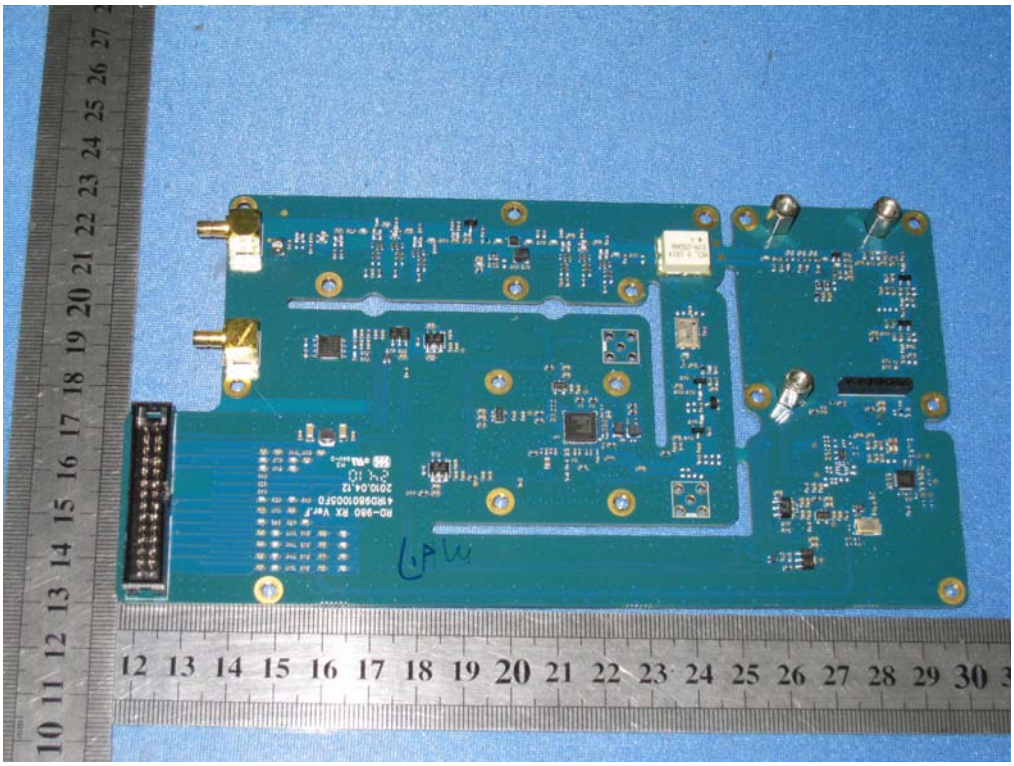


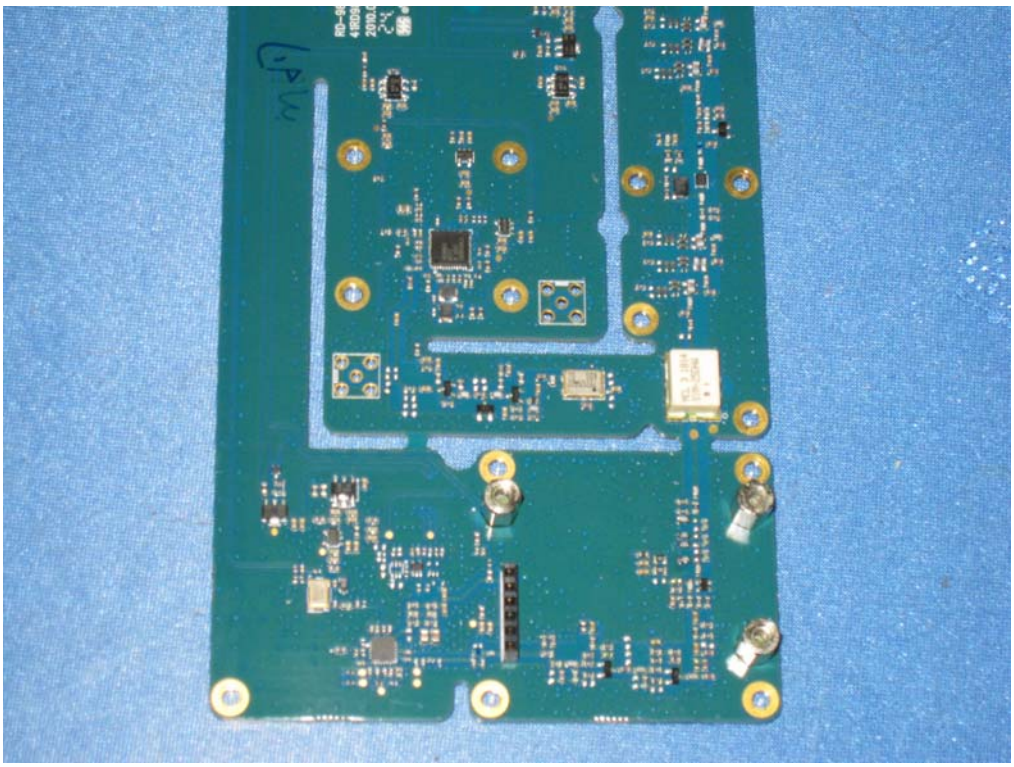


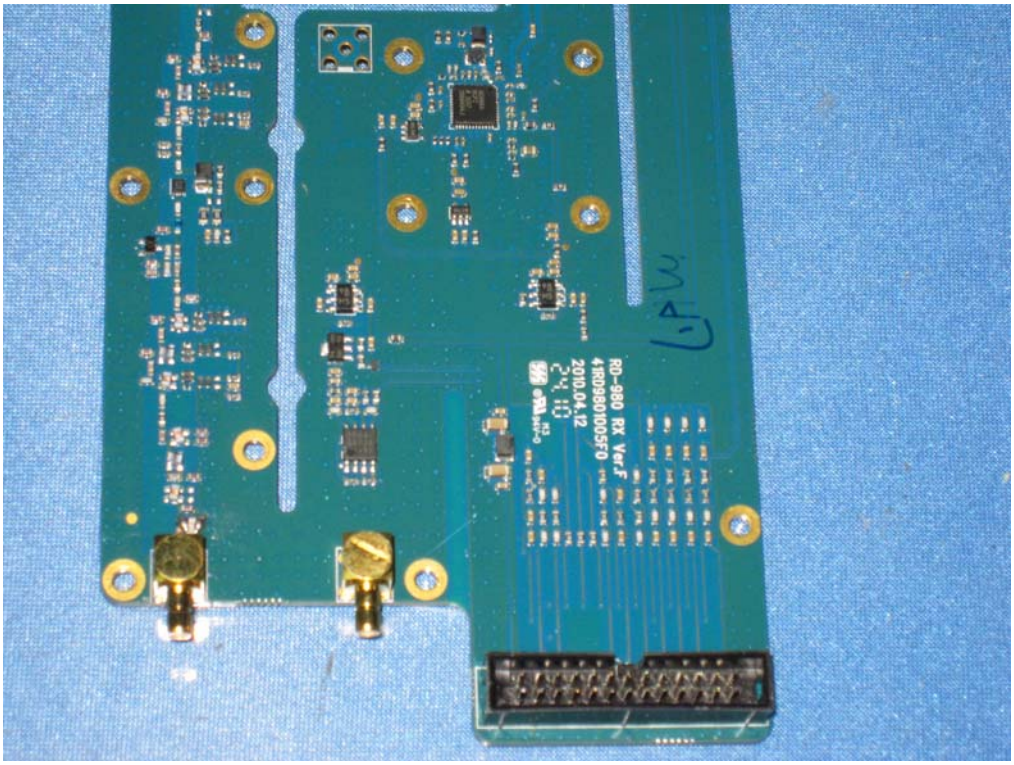








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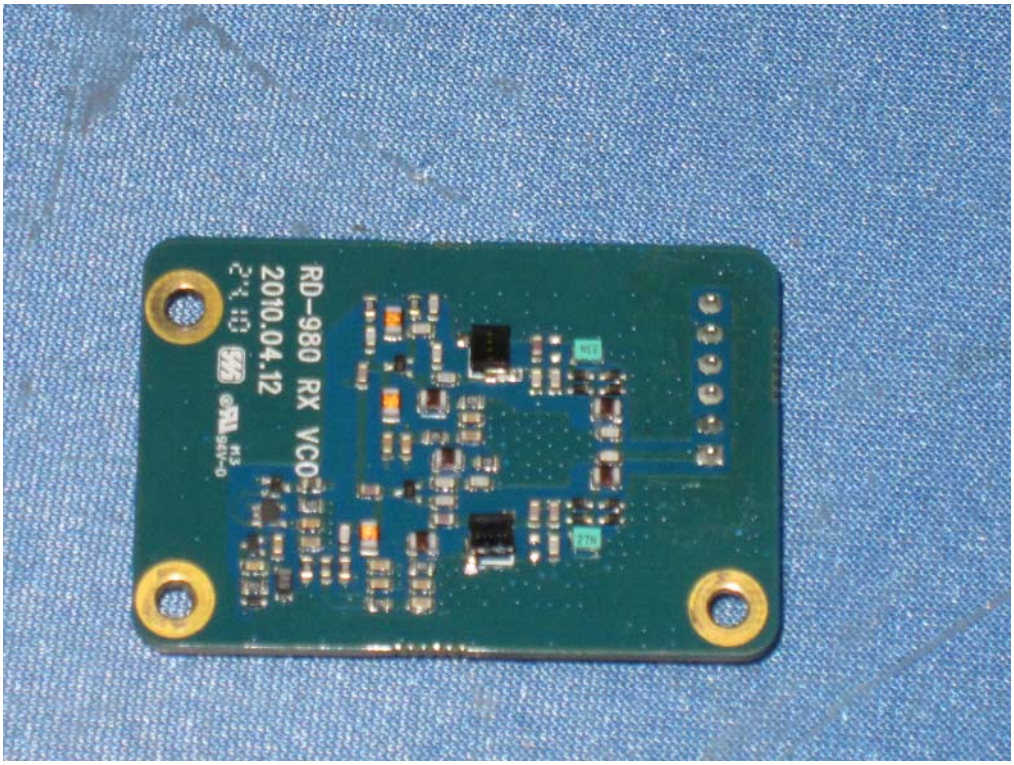
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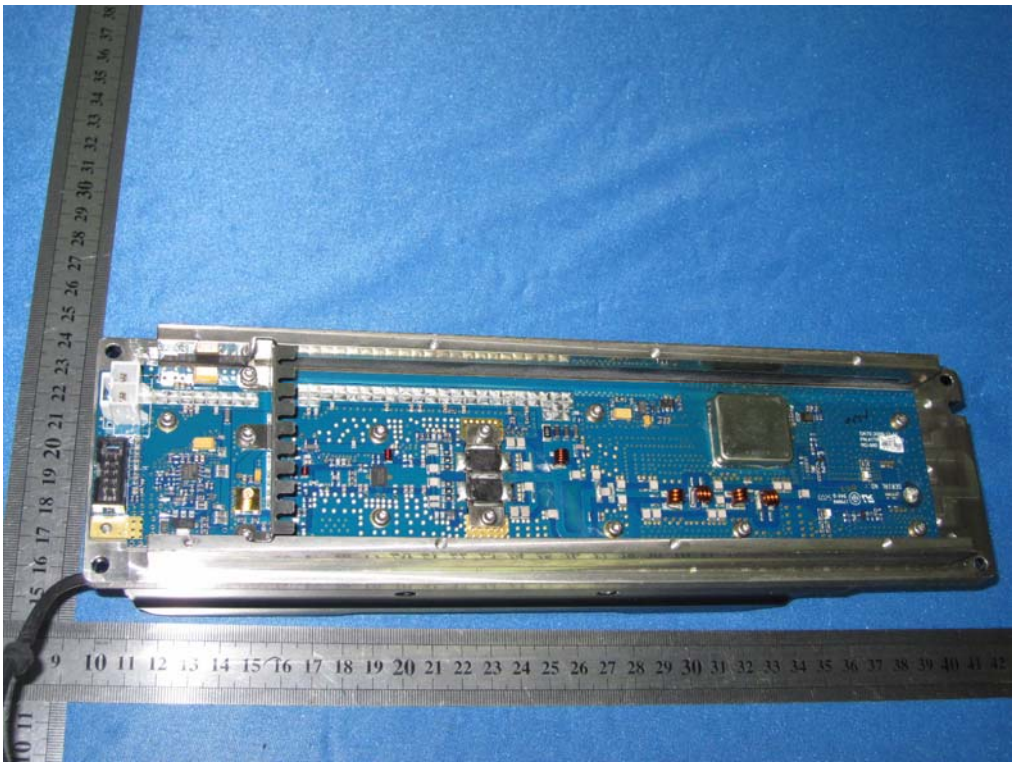

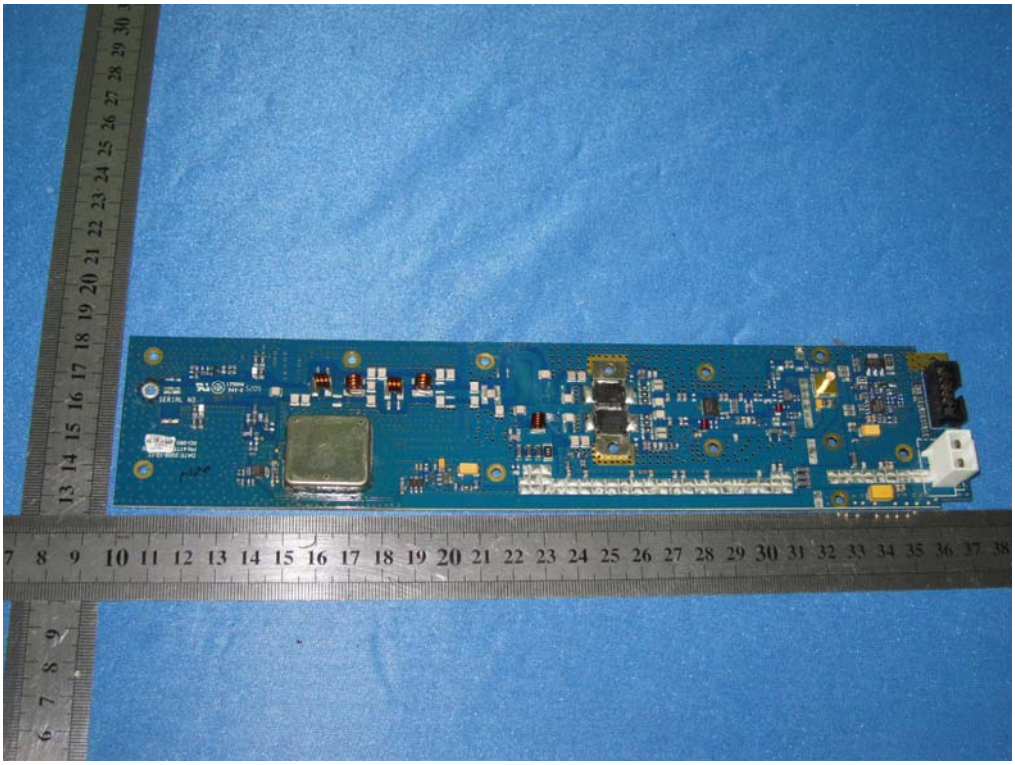

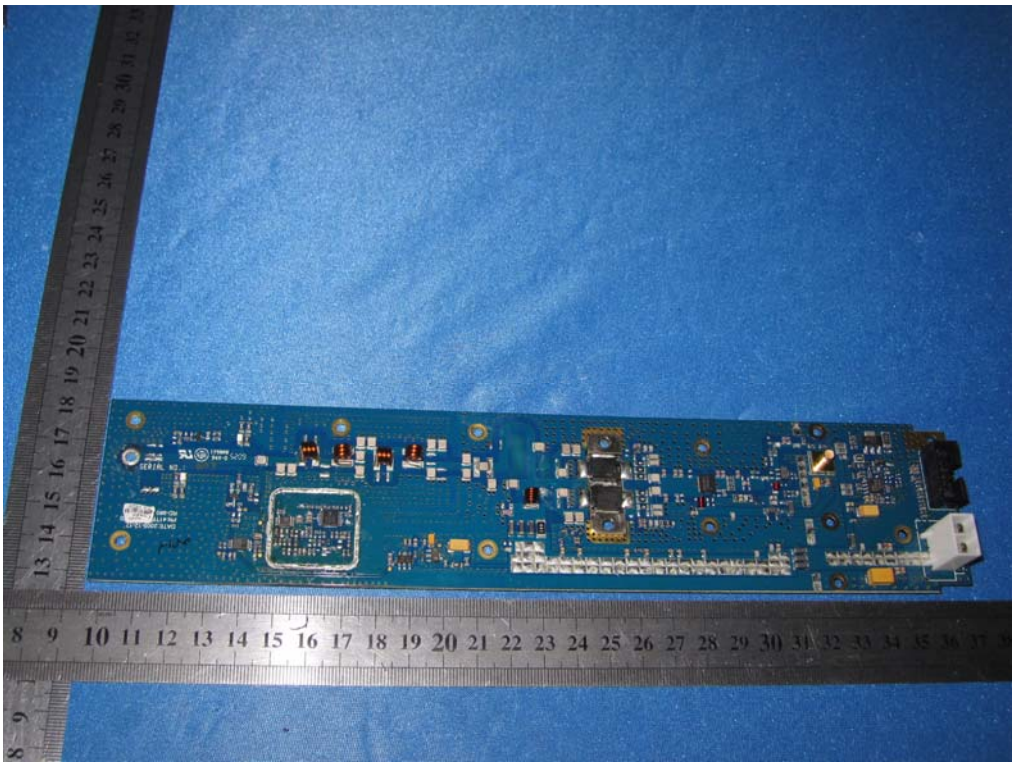

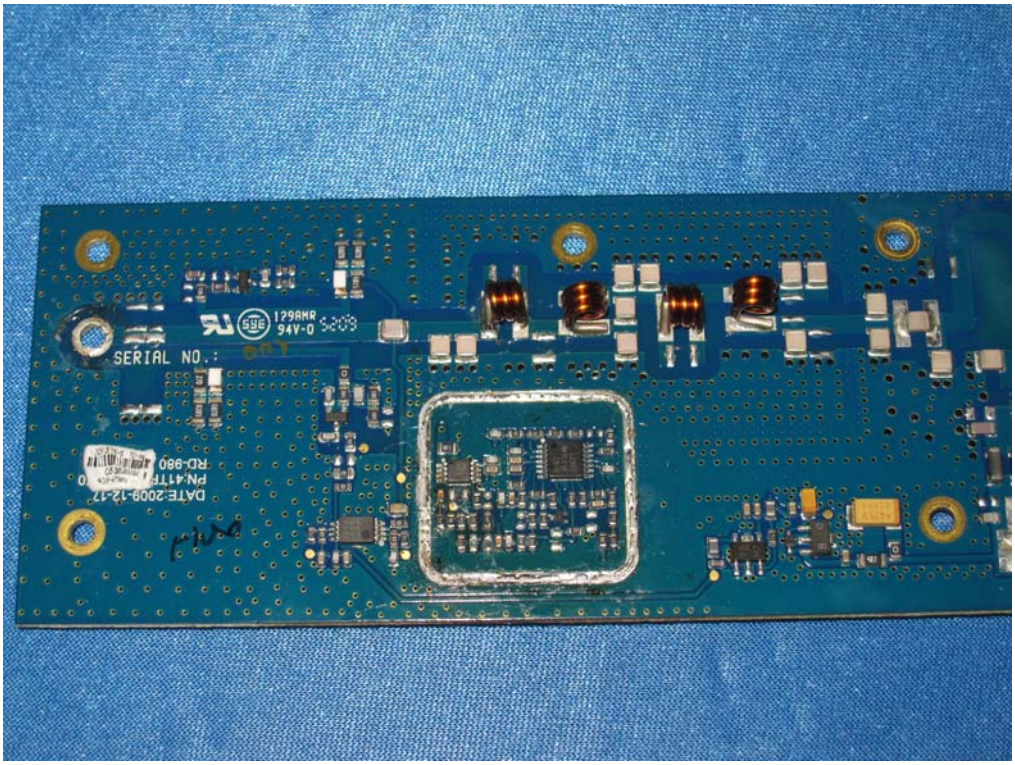
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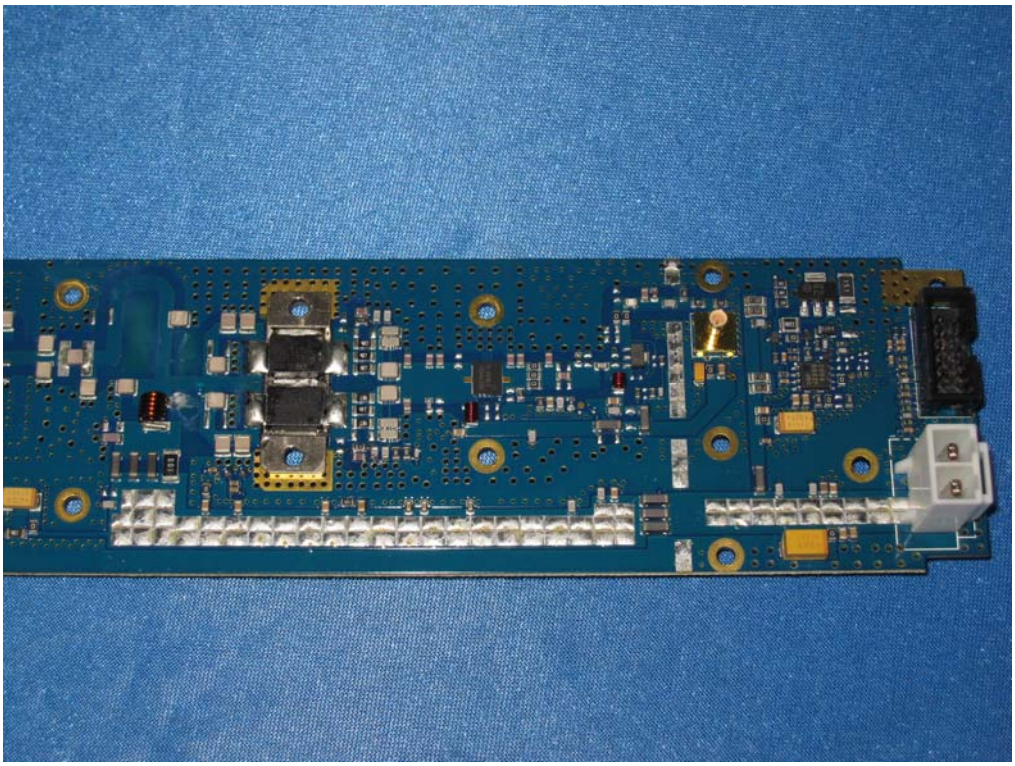

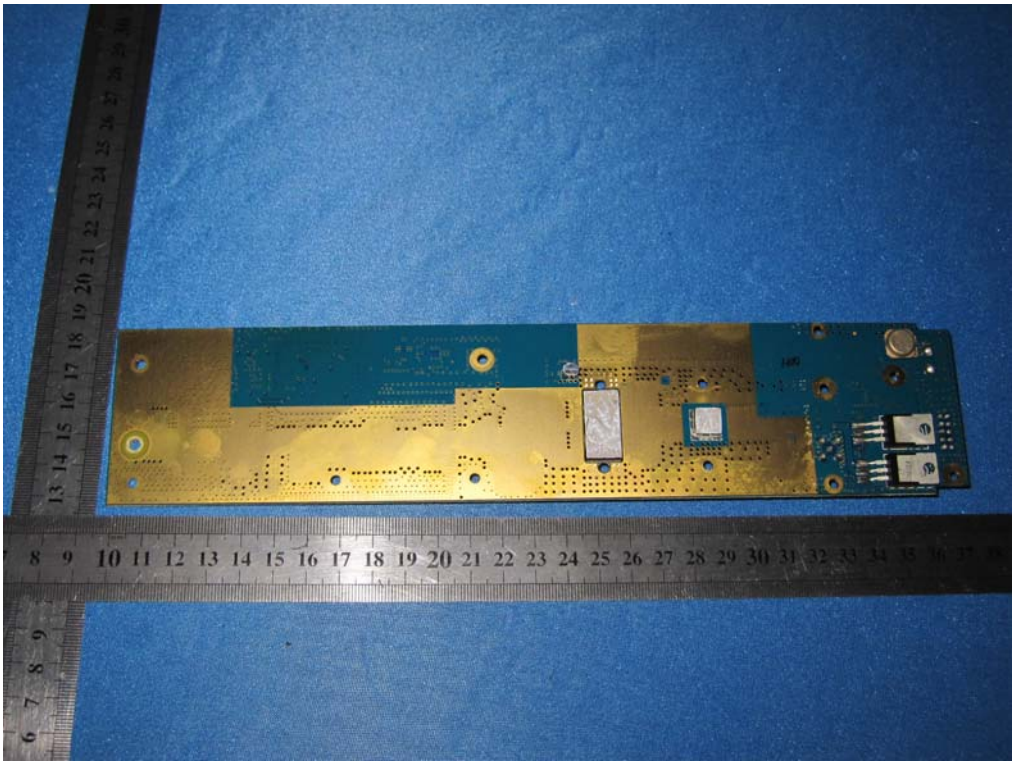

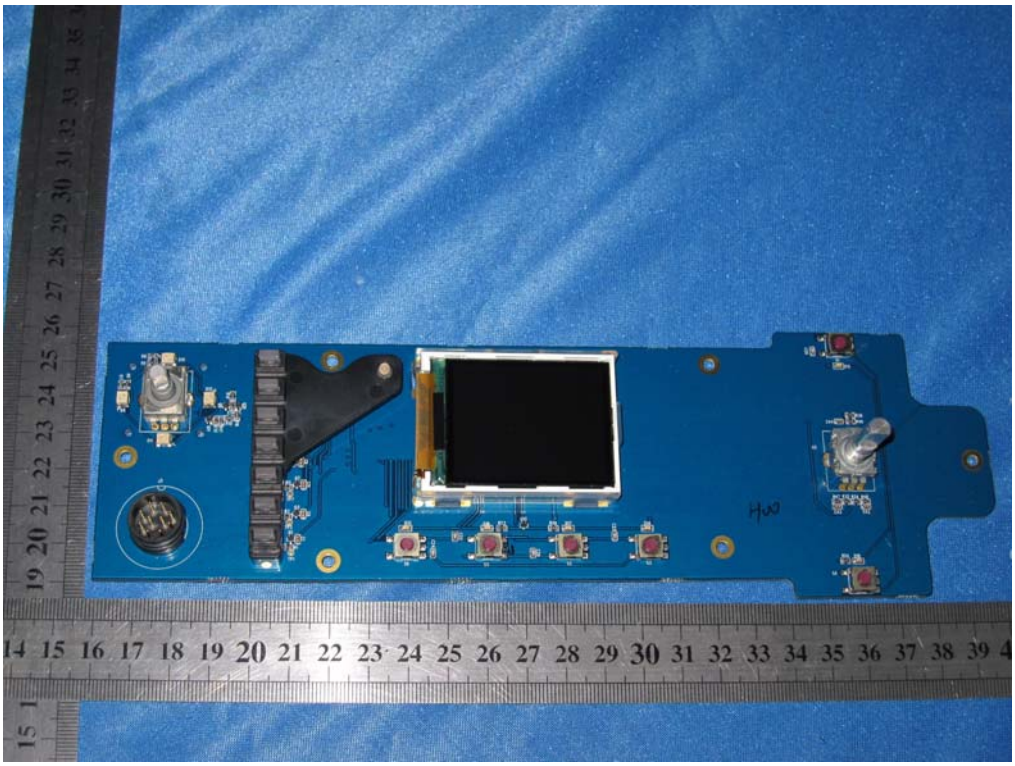

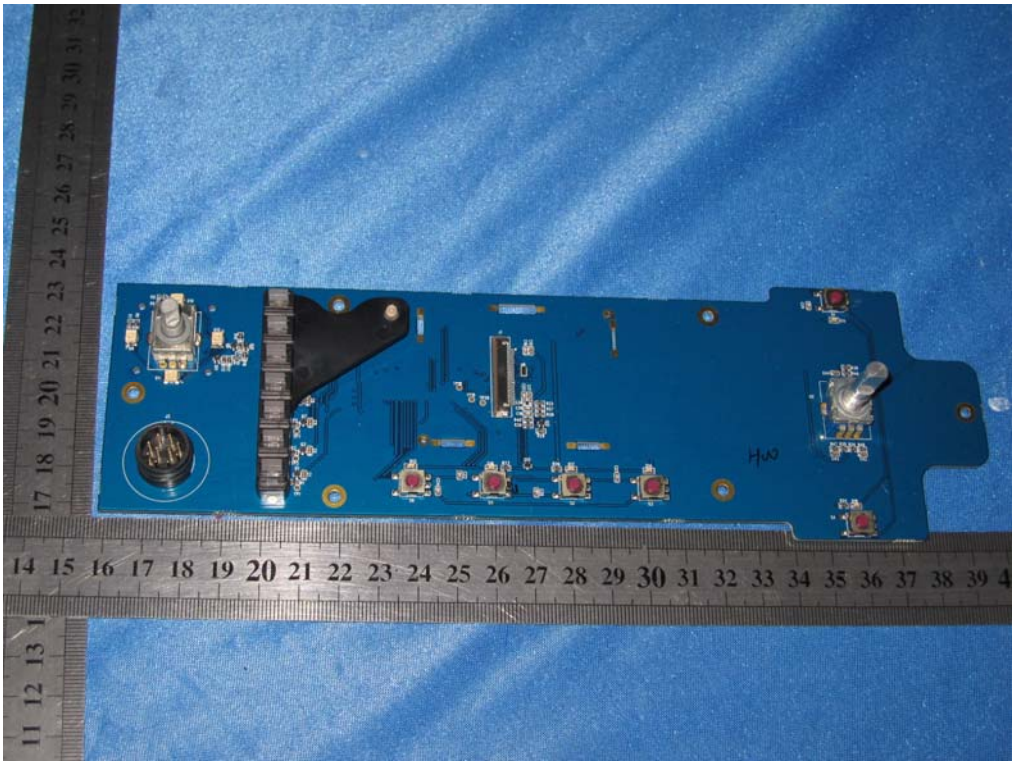

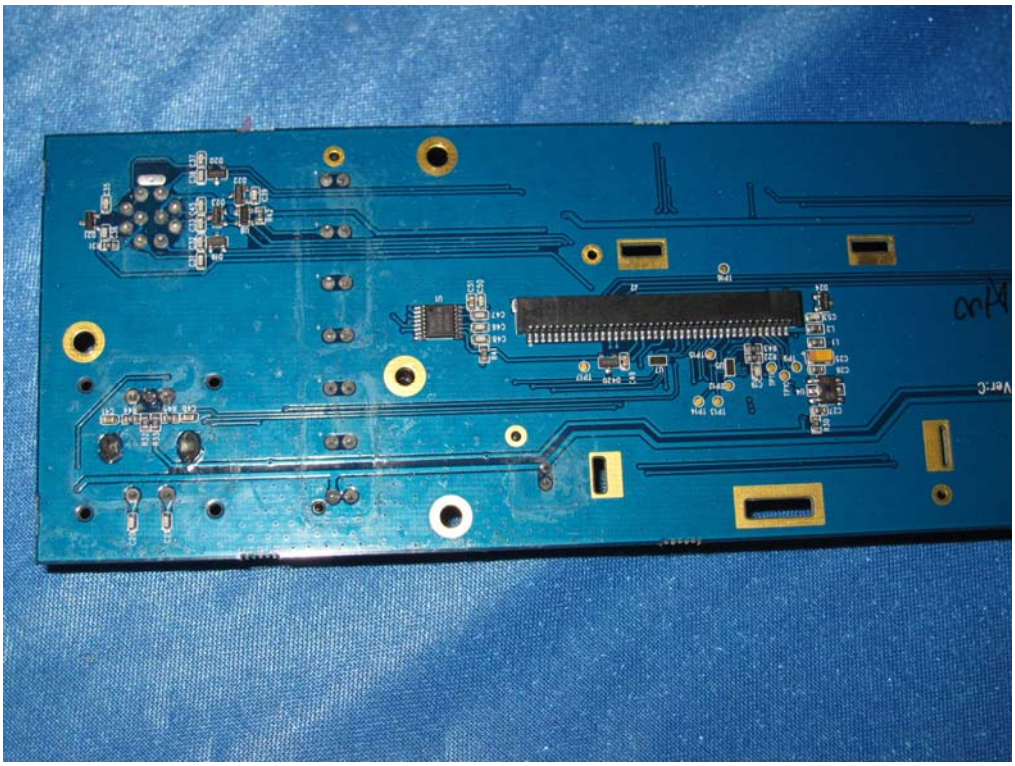

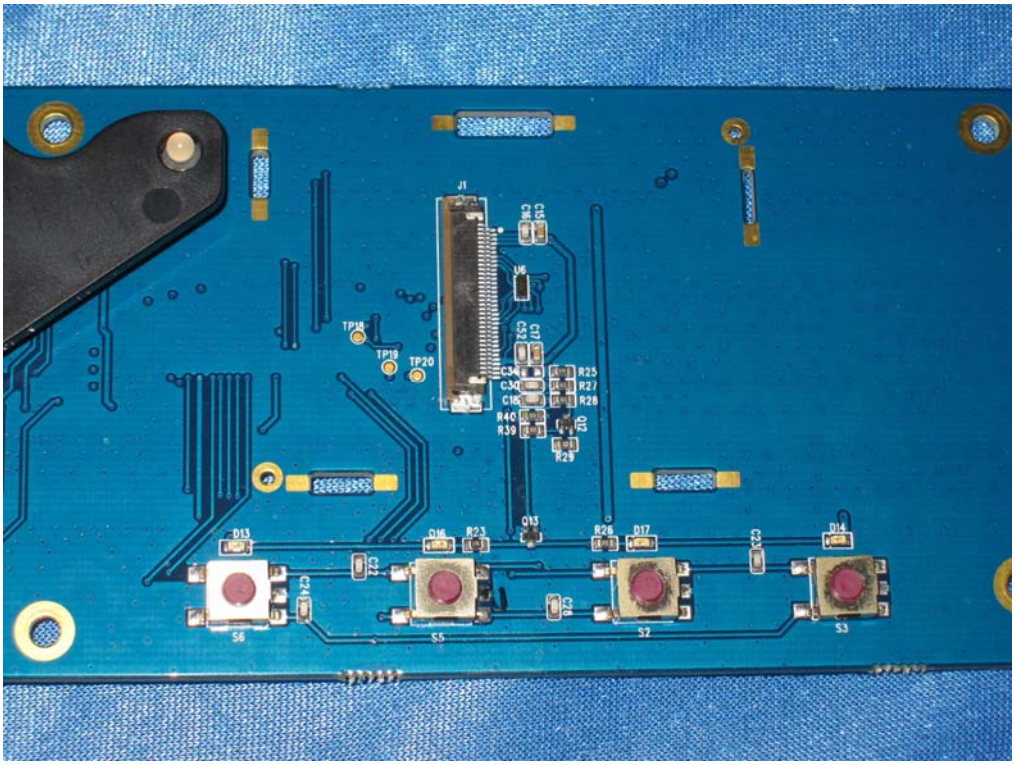
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TP19
TP20
R25
R27
R28
R29
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D16
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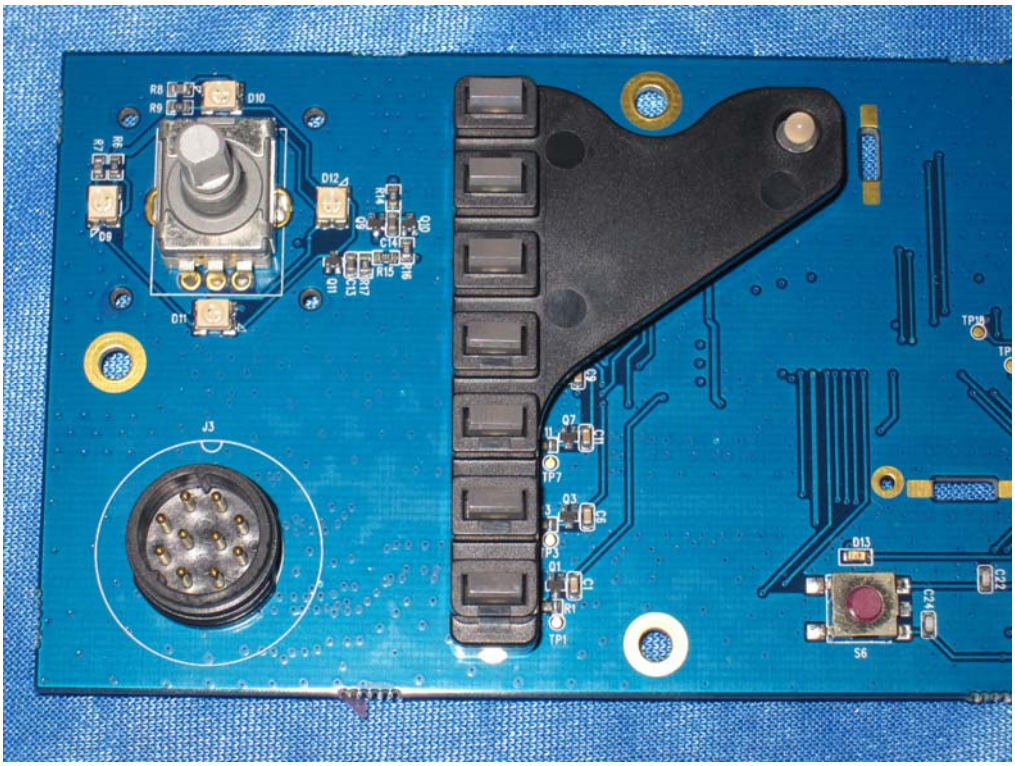
D17
D14
S6
S5
S2
S3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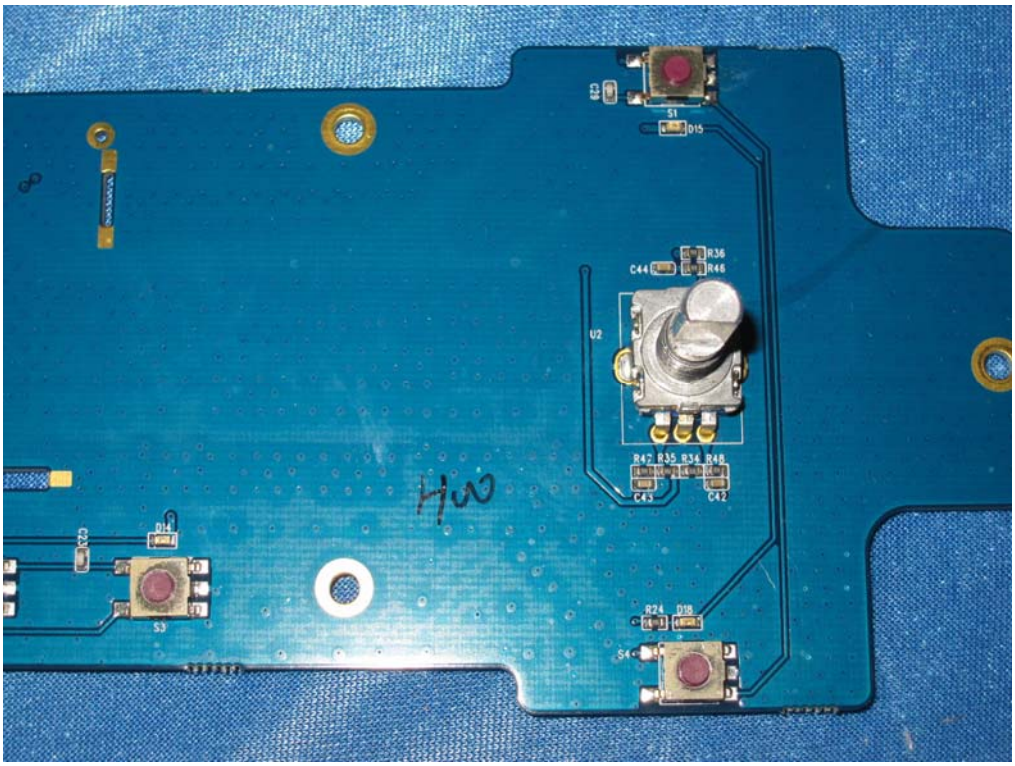

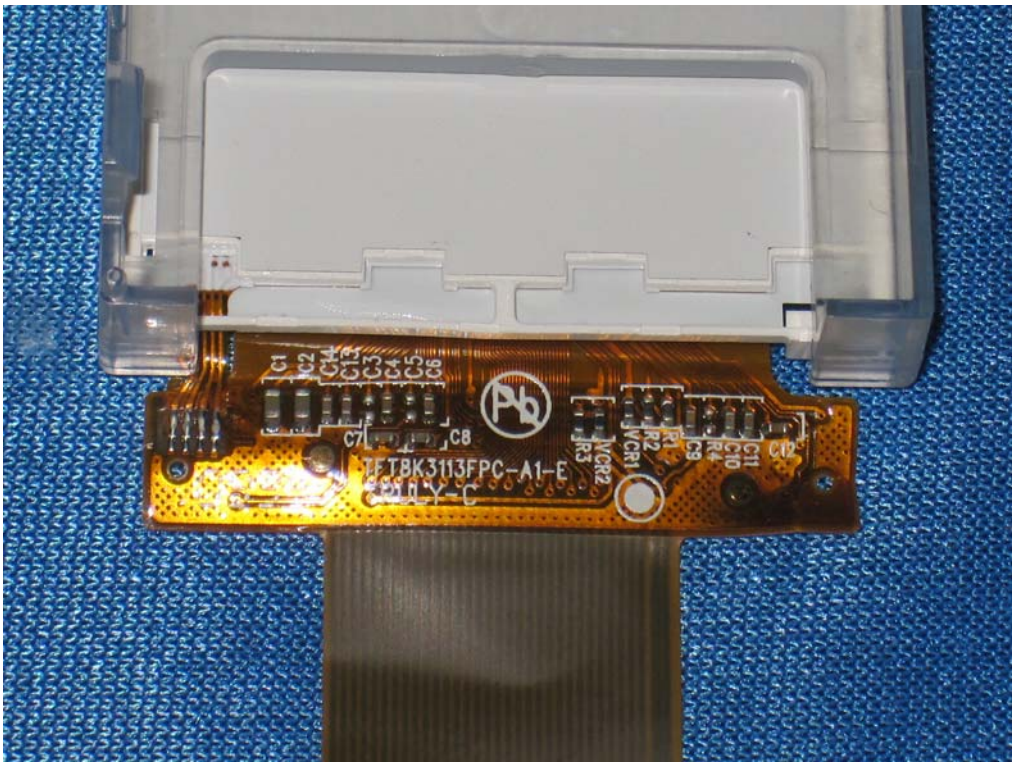

.....End of Report.....