4.9. Receiver Radiated Spurious Emssion

TEST APPLICABLE

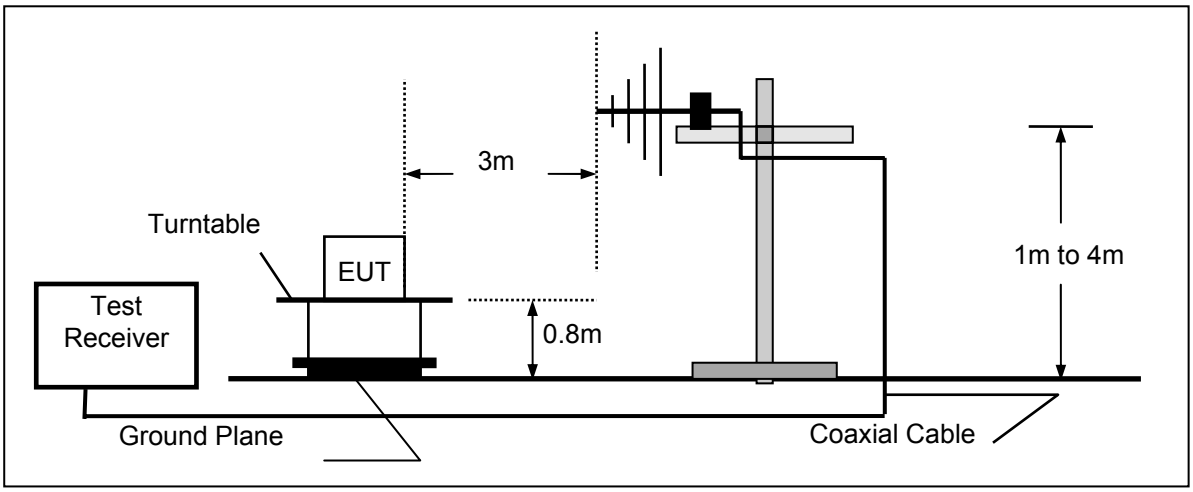
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

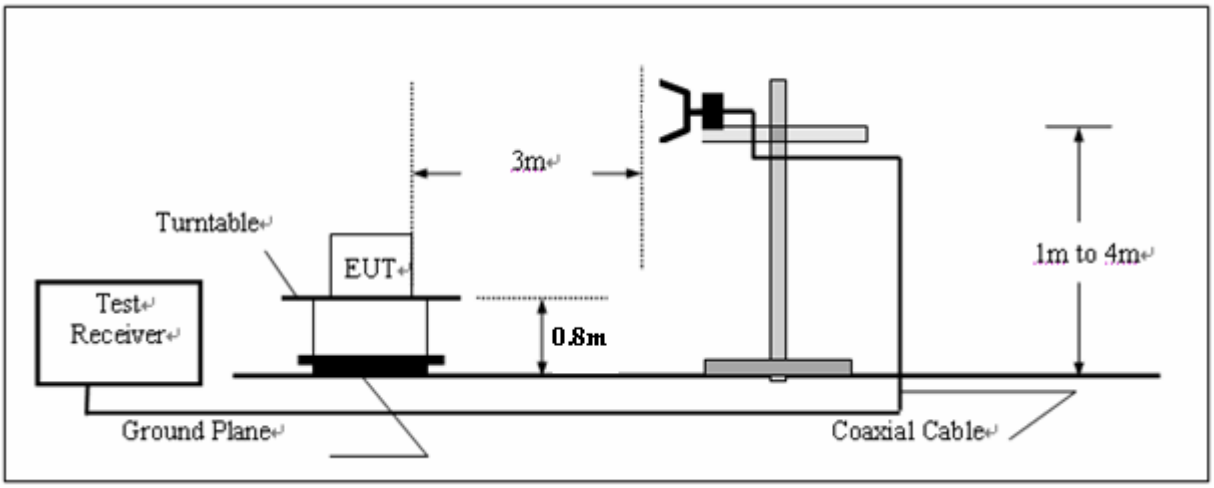
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

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.

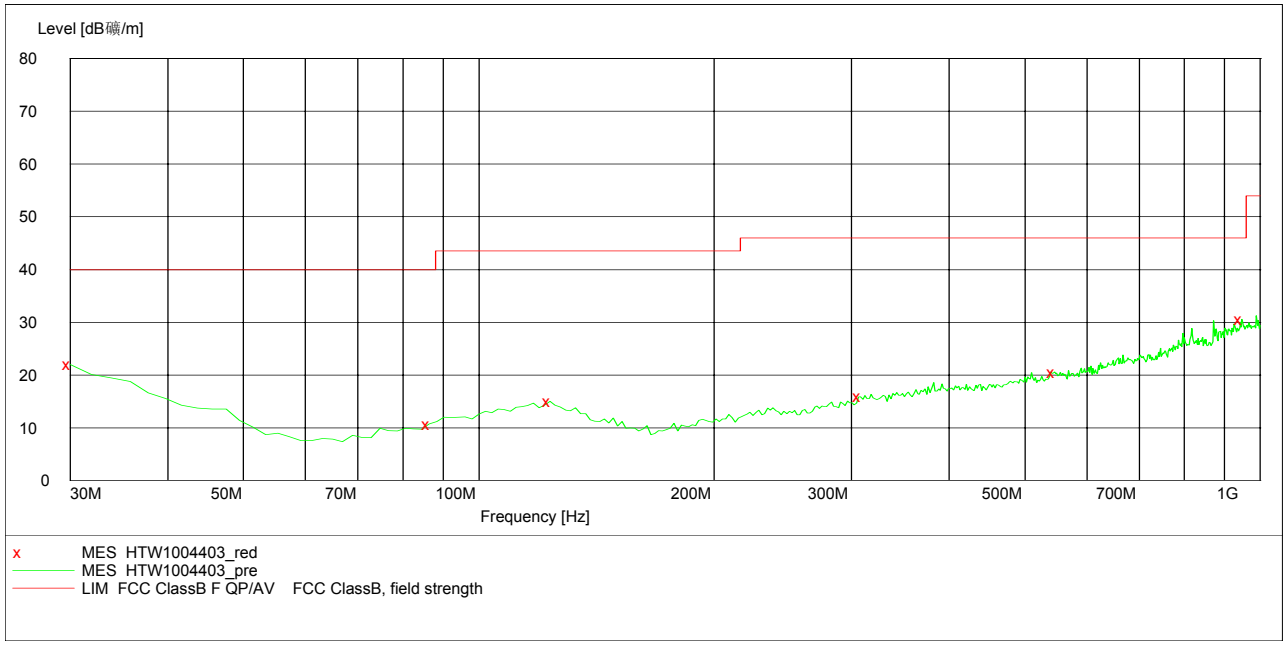
TEST RESULTS

The Radiated Measurement are performed to the three channels (the top channel, the middle channel and the bottom 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	25 KHz	173.9875	H	947.52	30.50	46
			V	873.65	29.50	46
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 10



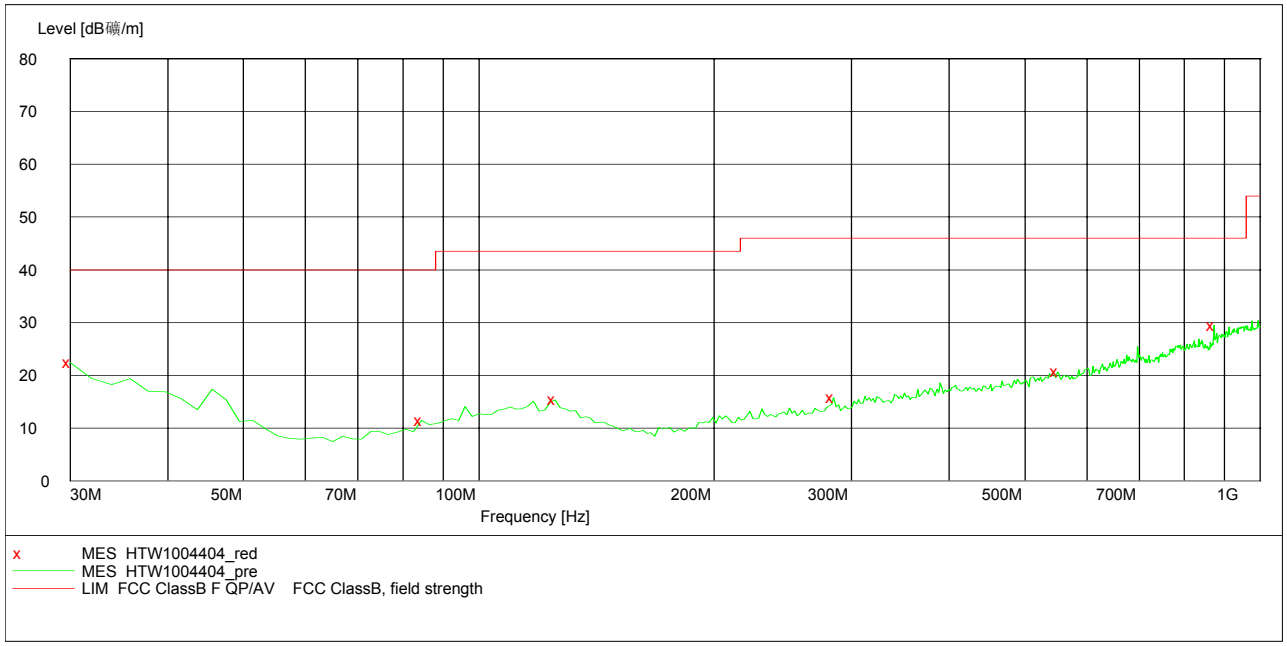
MEASUREMENT RESULT: "HTW1004403_red"

10/4/2010 8:06PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.00	-10.1	40.0	18.0	Peak	300.0	156.00	HORIZONTAL
86.372745	10.70	-21.5	40.0	29.3	Peak	100.0	54.00	HORIZONTAL
123.306613	15.00	-18.4	43.5	28.5	Peak	300.0	198.00	HORIZONTAL
307.975952	15.90	-17.7	46.0	30.1	Peak	100.0	67.00	HORIZONTAL
545.130261	20.60	-12.9	46.0	25.4	Peak	300.0	3.00	HORIZONTAL
947.515030	30.50	-4.9	46.0	15.5	Peak	100.0	242.00	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 10



MEASUREMENT RESULT: "HTW1004404_red"

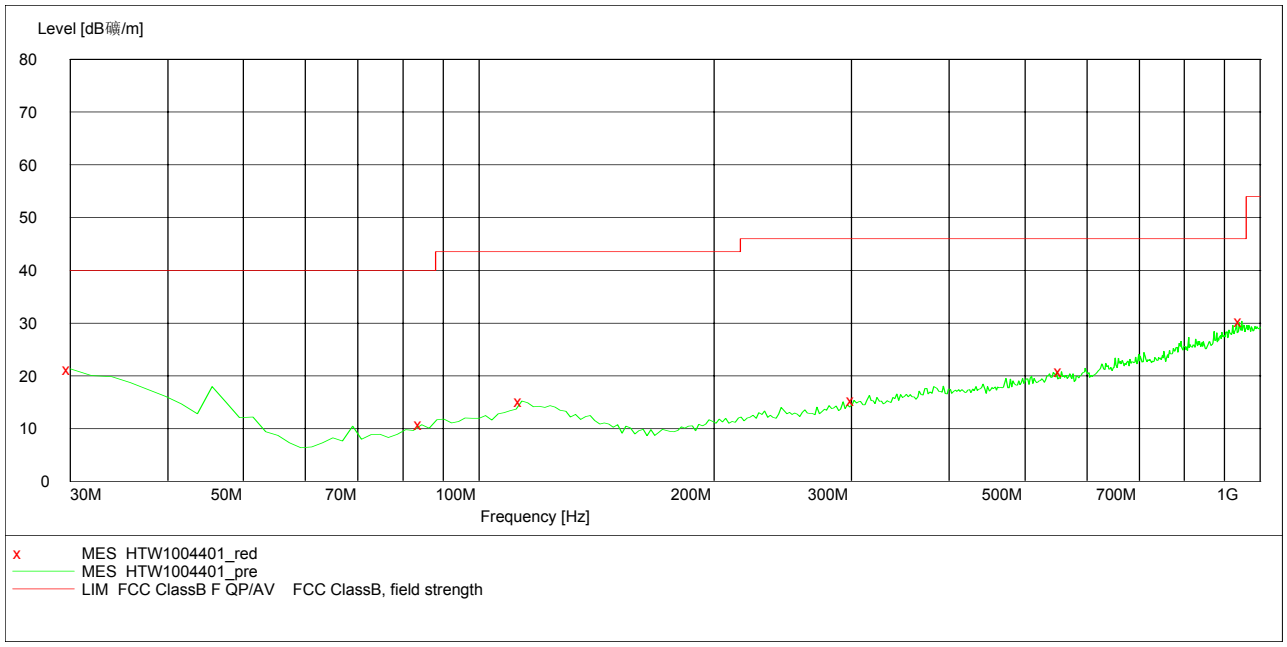
10/4/2010 8:08PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.40	-10.1	40.0	17.6	Peak	100.0	121.00	VERTICAL
84.428858	11.50	-22.0	40.0	28.5	Peak	100.0	172.00	VERTICAL
125.250501	15.40	-18.5	43.5	28.1	Peak	100.0	14.00	VERTICAL
284.649299	15.80	-18.4	46.0	30.2	Peak	100.0	47.00	VERTICAL
550.961924	20.70	-13.0	46.0	25.3	Peak	100.0	360.00	VERTICAL
873.647295	29.50	-7.5	46.0	16.5	Peak	100.0	226.00	VERTICAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
FM	12.5 KHz	173.9875	H	957.23	30.20	46
			V	947.52	30.40	46
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 10



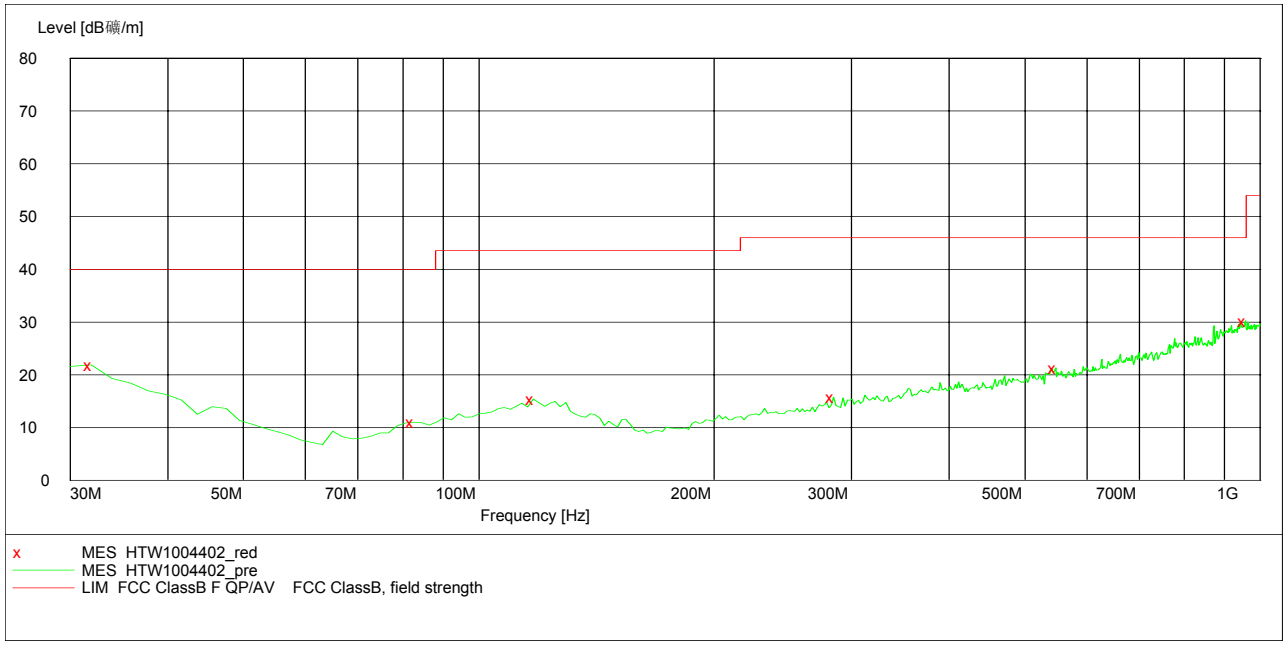
MEASUREMENT RESULT: "HTW1004401_red"

10/4/2010 8:01PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	21.30	-10.1	40.0	18.7	Peak	100.0	293.00	VERTICAL
84.428858	10.70	-22.0	40.0	29.3	Peak	100.0	9.00	VERTICAL
113.587174	15.20	-18.6	43.5	28.3	Peak	100.0	93.00	VERTICAL
302.144289	15.30	-17.9	46.0	30.7	Peak	100.0	182.00	VERTICAL
556.793587	20.80	-13.1	46.0	25.2	Peak	100.0	111.00	VERTICAL
947.515030	30.40	-4.9	46.0	15.6	Peak	100.0	27.00	VERTICAL

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 10



MEASUREMENT RESULT: "HTW1004402_red"

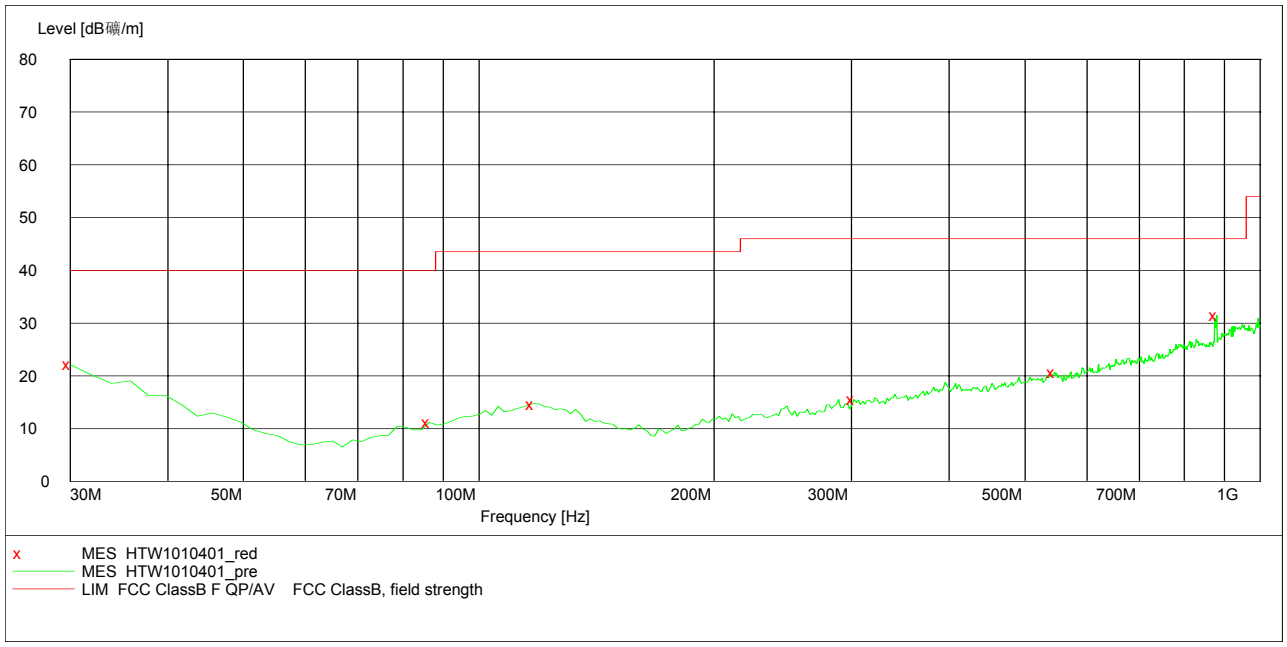
10/4/2010 8:03PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.943888	21.80	-11.1	40.0	18.2	Peak	300.0	19.00	HORIZONTAL
82.484970	11.00	-22.2	40.0	29.0	Peak	100.0	293.00	HORIZONTAL
117.474950	15.40	-18.4	43.5	28.1	Peak	300.0	143.00	HORIZONTAL
284.649299	15.70	-18.4	46.0	30.3	Peak	300.0	158.00	HORIZONTAL
547.074148	21.30	-12.9	46.0	24.7	Peak	100.0	47.00	HORIZONTAL
957.234469	30.20	-5.0	46.0	15.8	Peak	300.0	9.00	HORIZONTAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
4FSK	12.5 KHz	156.1250	H	879.48	31.40	46
			V	926.13	29.40	46
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 10



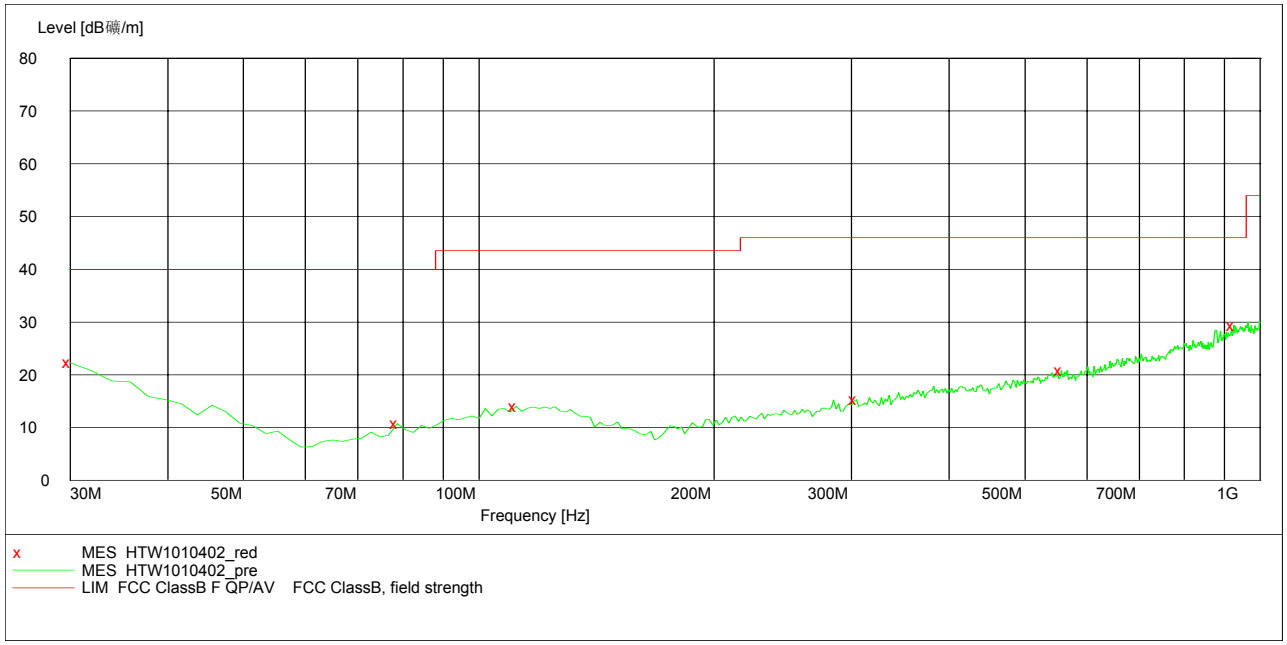
MEASUREMENT RESULT: "HTW1010401_red"

10/10/2010 2:02PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.10	-10.1	40.0	17.9	Peak	100.0	189.00	HORIZONTAL
86.372745	11.20	-21.5	40.0	28.8	Peak	300.0	219.00	HORIZONTAL
117.474950	14.70	-18.4	43.5	28.8	Peak	100.0	3.00	HORIZONTAL
302.144289	15.50	-17.9	46.0	30.5	Peak	100.0	162.00	HORIZONTAL
545.130261	20.70	-12.9	46.0	25.3	Peak	100.0	19.00	HORIZONTAL
879.478958	31.40	-7.2	46.0	14.6	Peak	100.0	156.00	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 10



MEASUREMENT RESULT: "HTW1010402_red"

10/10/2010 2:09PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.30	-10.1	40.0	17.7	Peak	100.0	7.00	VERTICAL
78.597194	10.70	-22.6	40.0	29.3	Peak	100.0	162.00	VERTICAL
111.643287	14.00	-18.8	43.5	29.5	Peak	100.0	357.00	VERTICAL
304.088176	15.30	-17.8	46.0	30.7	Peak	100.0	19.00	VERTICAL
556.793587	20.80	-13.1	46.0	25.2	Peak	100.0	55.00	VERTICAL
926.132265	29.40	-5.7	46.0	16.6	Peak	100.0	0.00	VERTICAL

4.10. Receiver Conducted Spurious Emssion

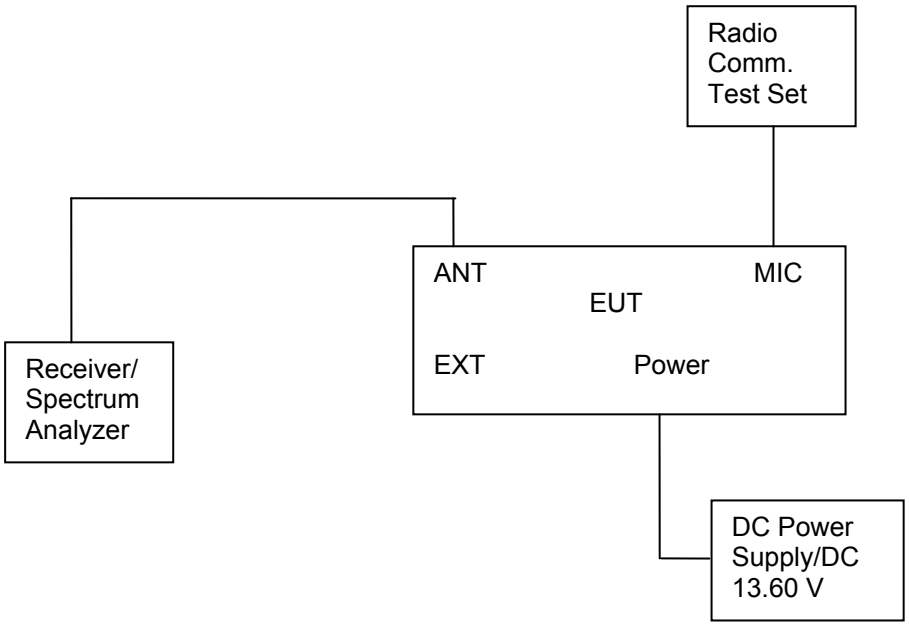
TEST APPLICABLE

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



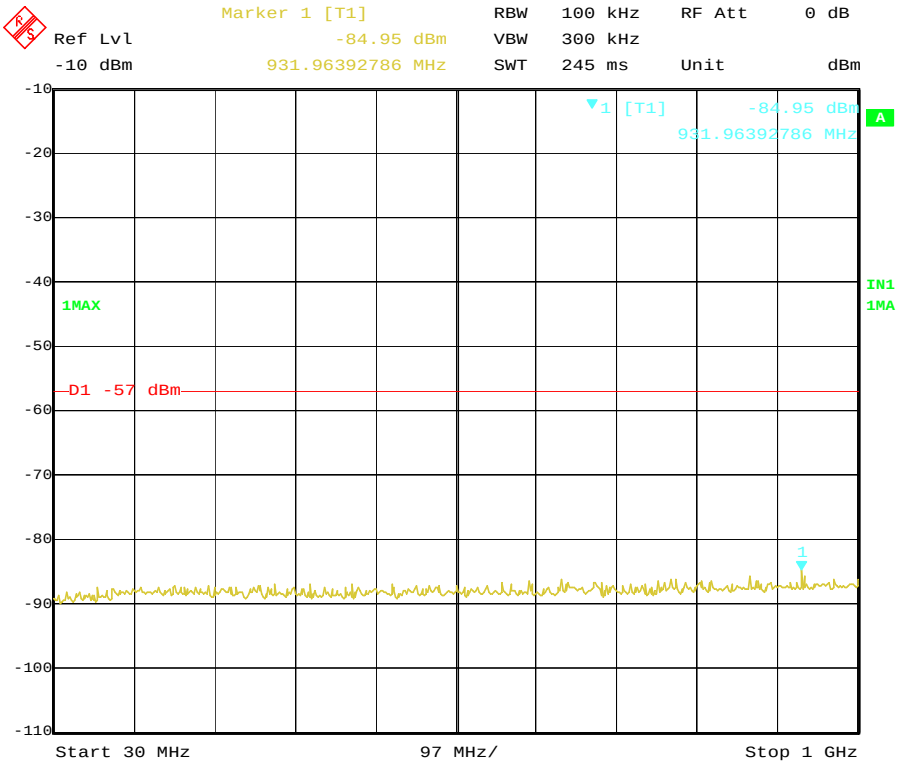
LIMIT

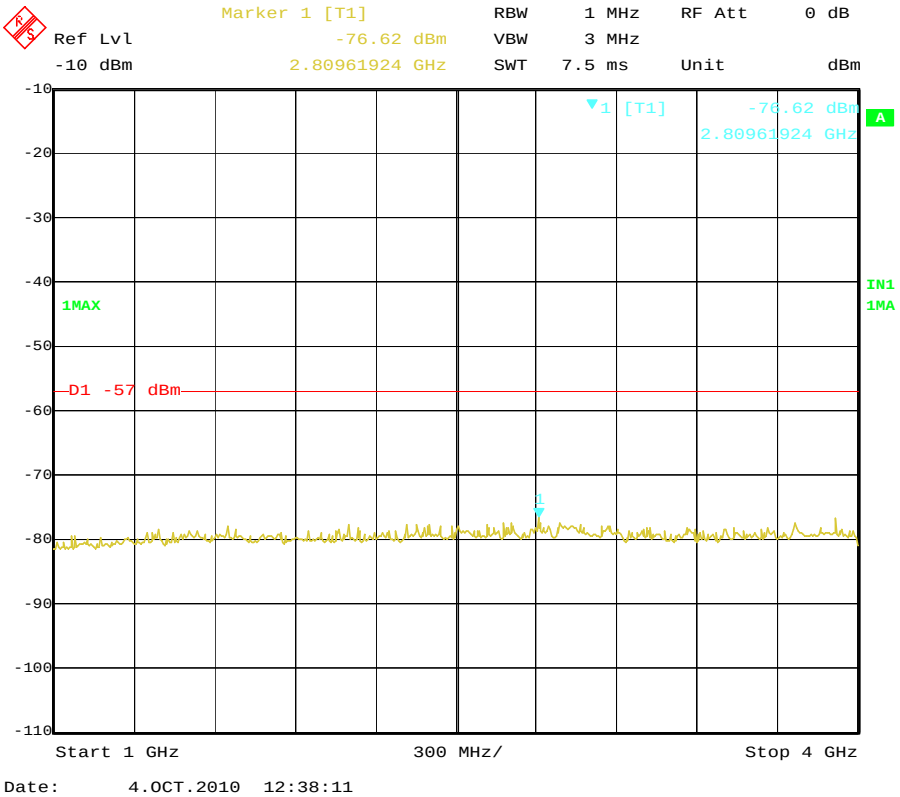
The power at the antenna terminal shall not exceed 2.0 nanowatts (-57dBm).

TEST RESULTS

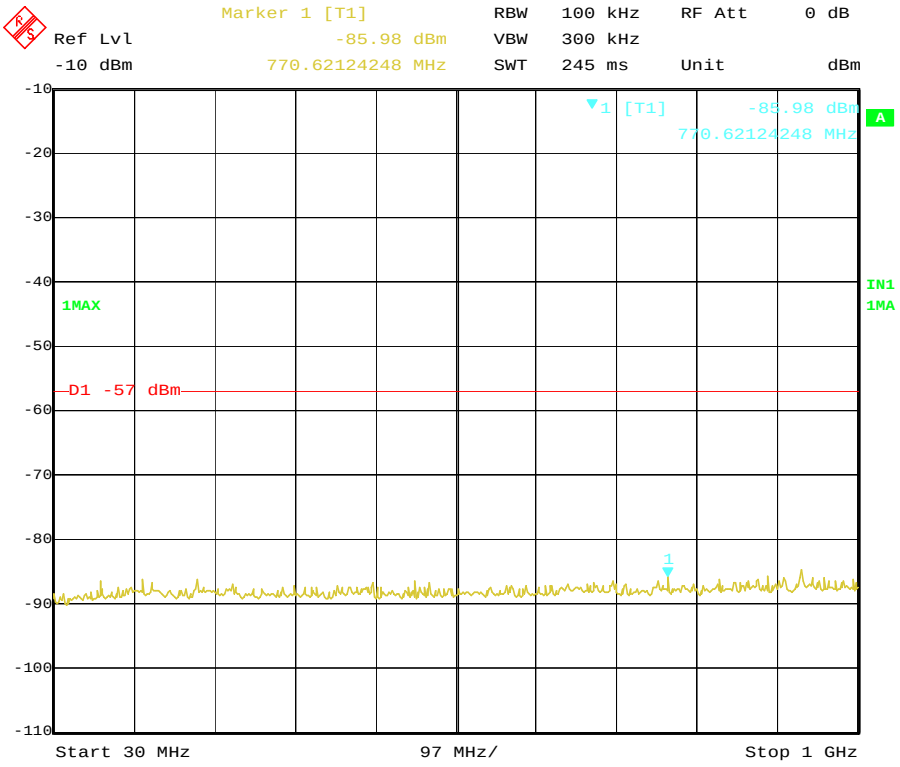
The Receiver Conducted Spurious Emssions Measurement is performed to the three channels (the high channel, the middle channel and the low channel), the datums recorded below were for the three channels; and the EUT shall be scanned from 30 MHz to the 4 GHz.

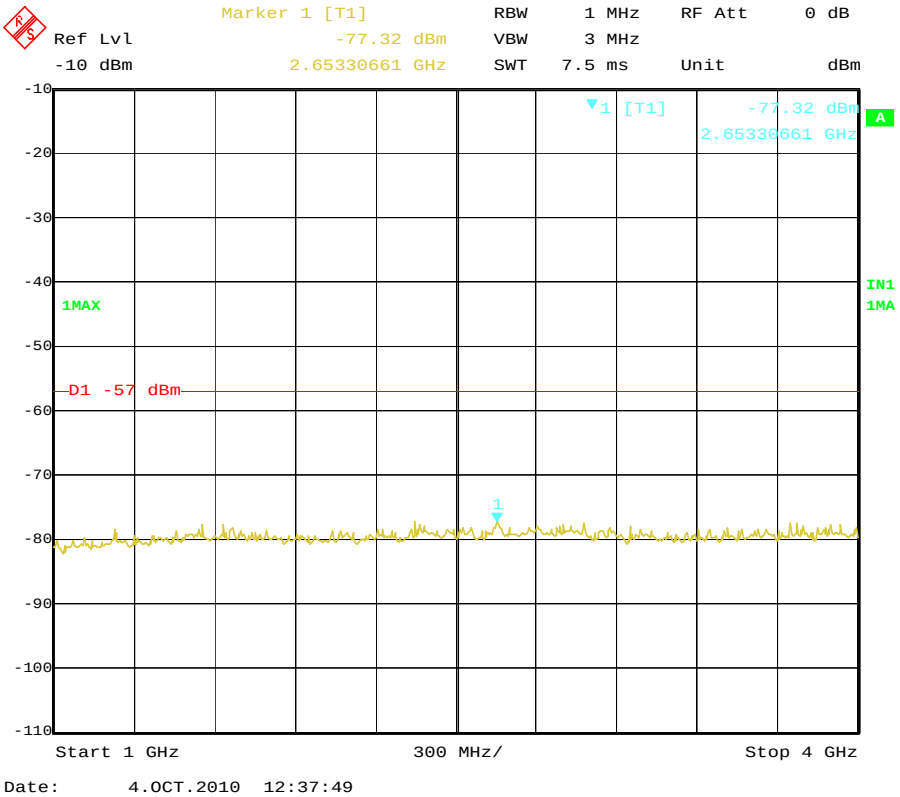
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	25KHz	Low	136.1250	931.96	-84.95	2809.62	-76.62	-57dBm
Test Results				Compliance				



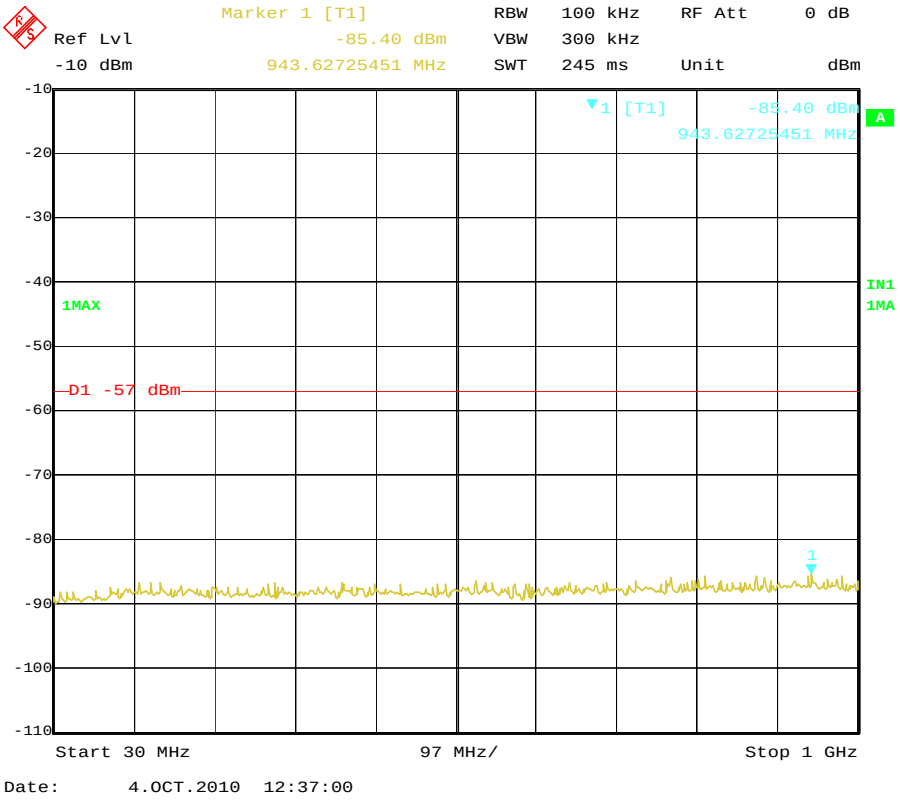


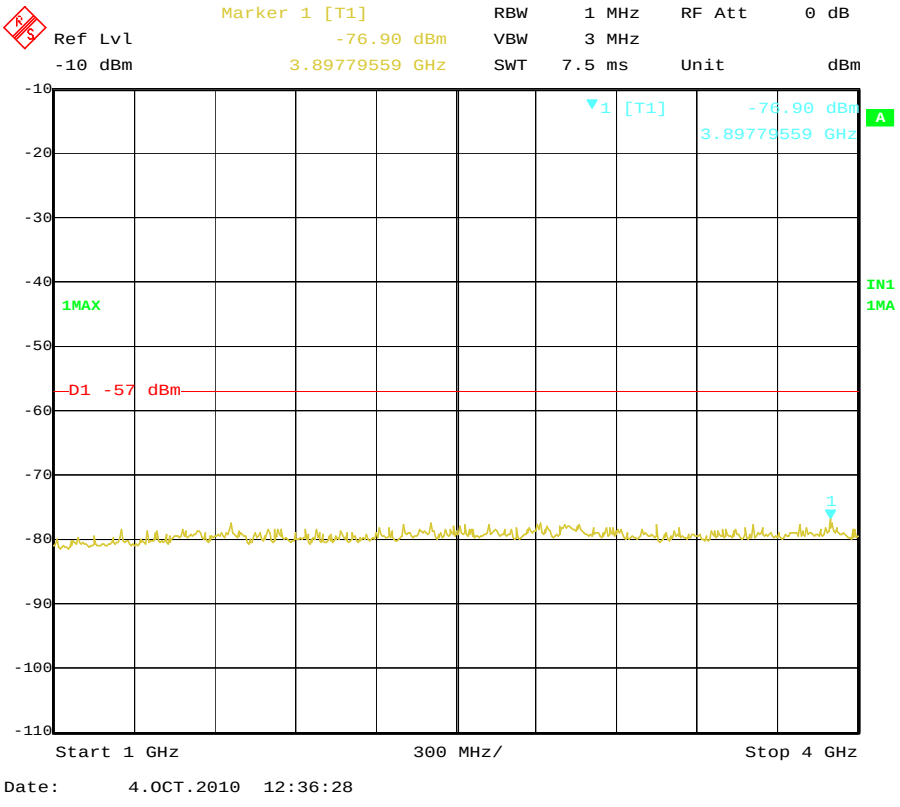
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	25KHz	Middle	156.1250	770.62	-85.98	2653.31	-77.32	-57dBm
Test Results				Compliance				



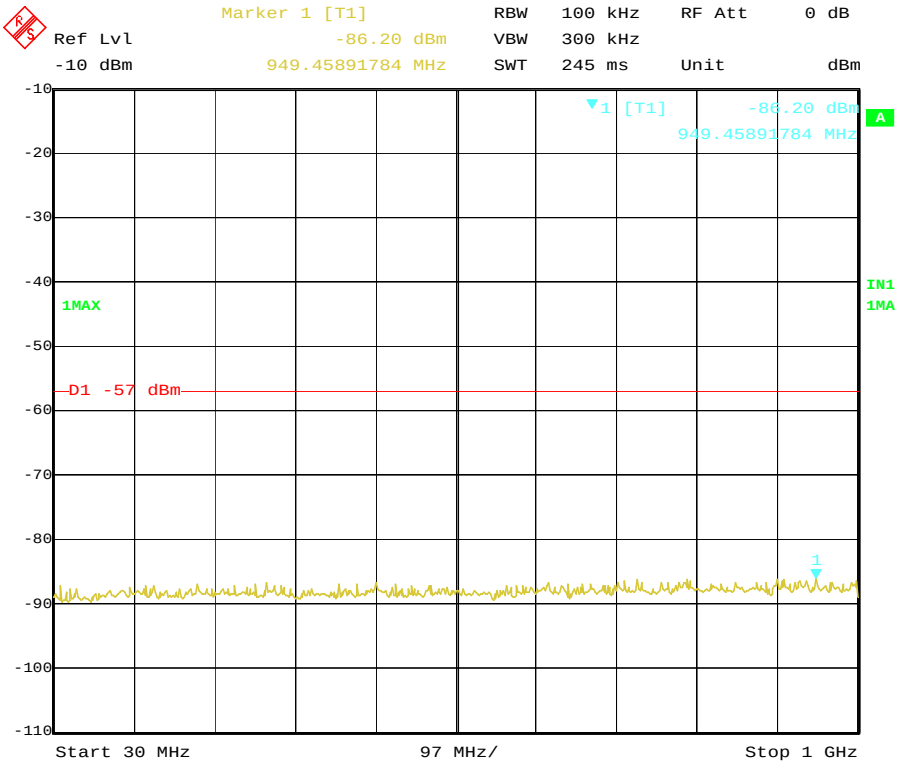


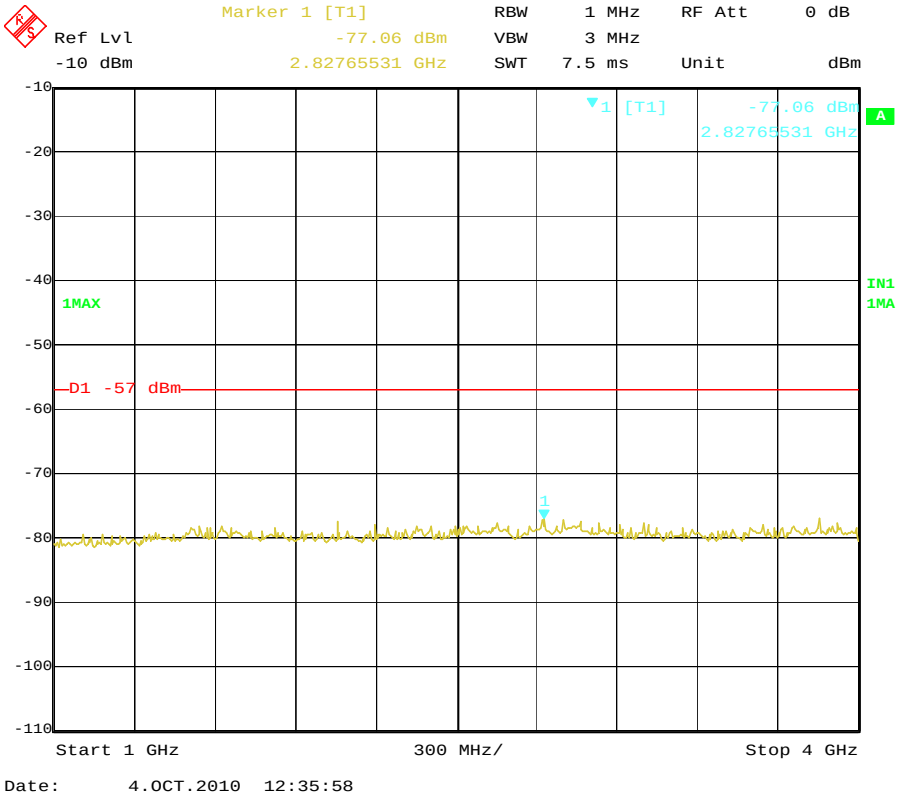
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	25KHz	Top	173.9875	943.63	-85.40	3897.80	-76.90	-57dBm
Test Results				Compliance				



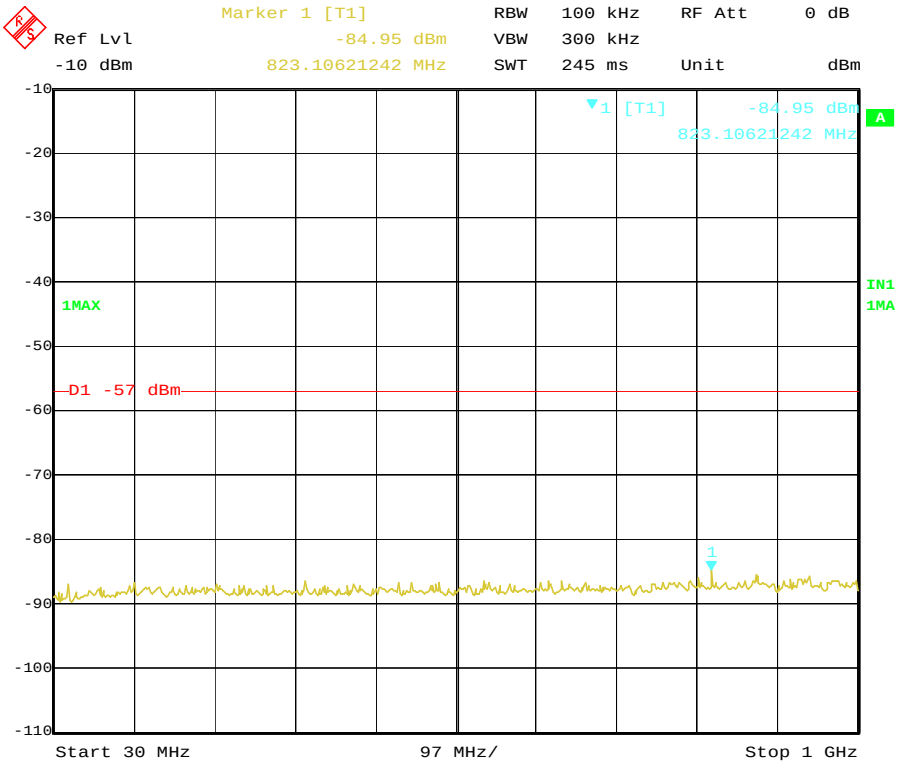


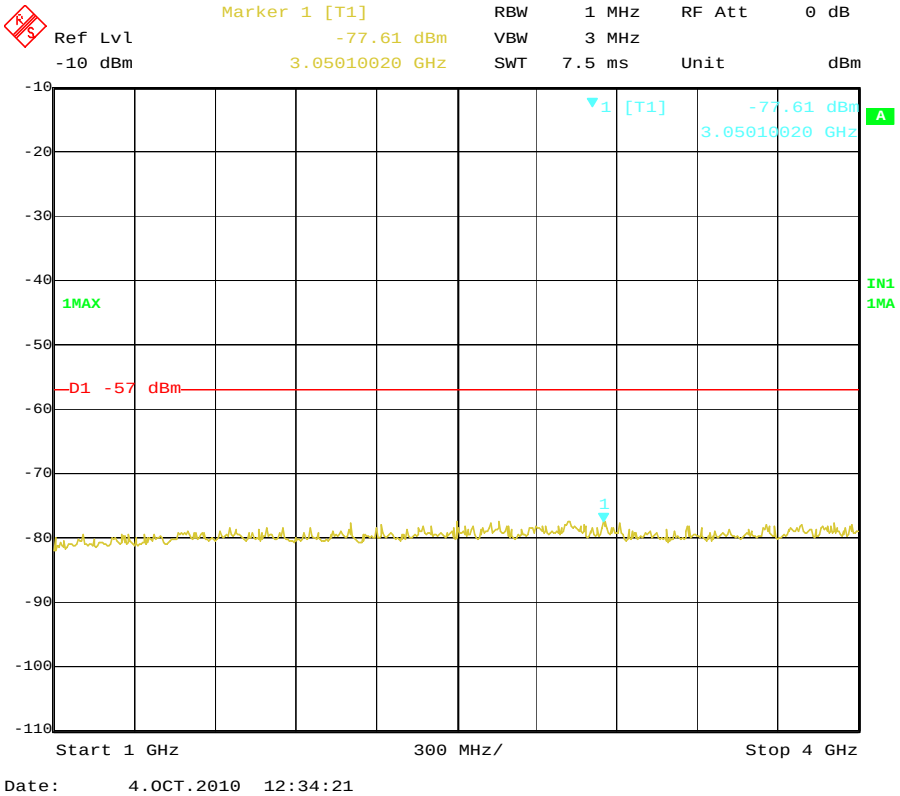
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Low	136.1250	949.46	-86.20	2827.66	-77.06	-57dBm
Test Results				Compliance				



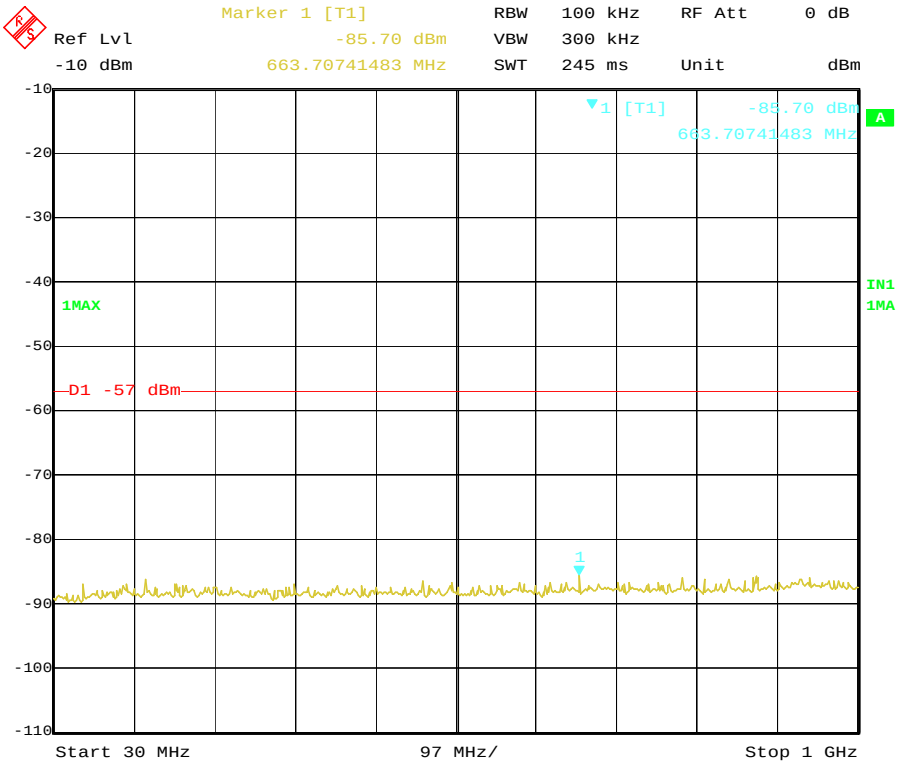


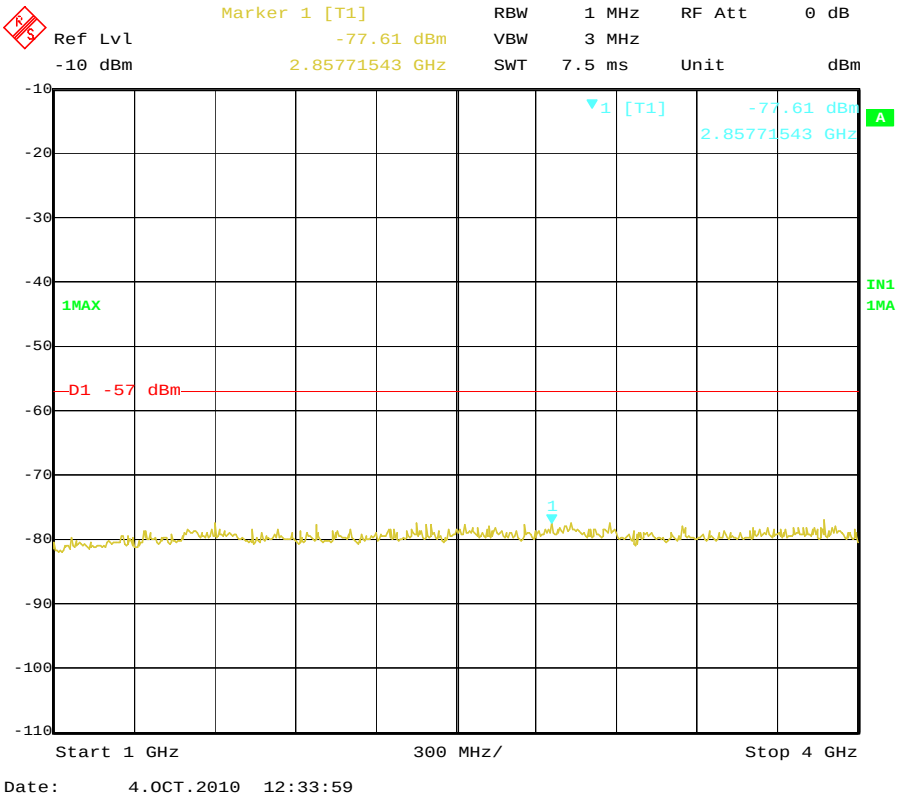
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Middle	156.1250	823.11	-84.95	3050.10	-77.61	-57dBm
Test Results				Compliance				



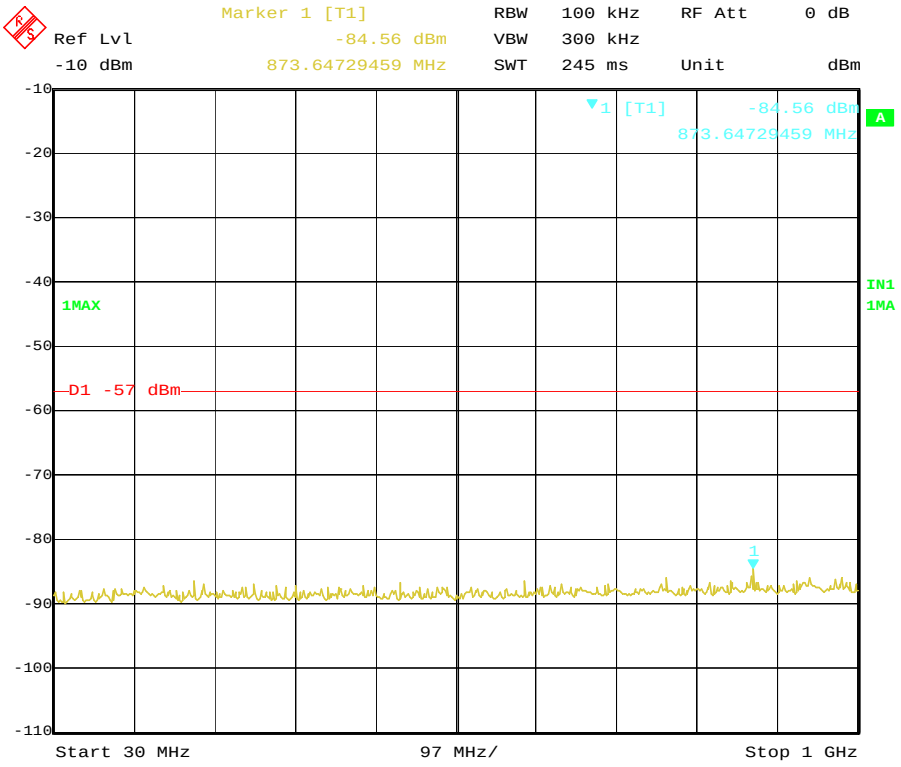


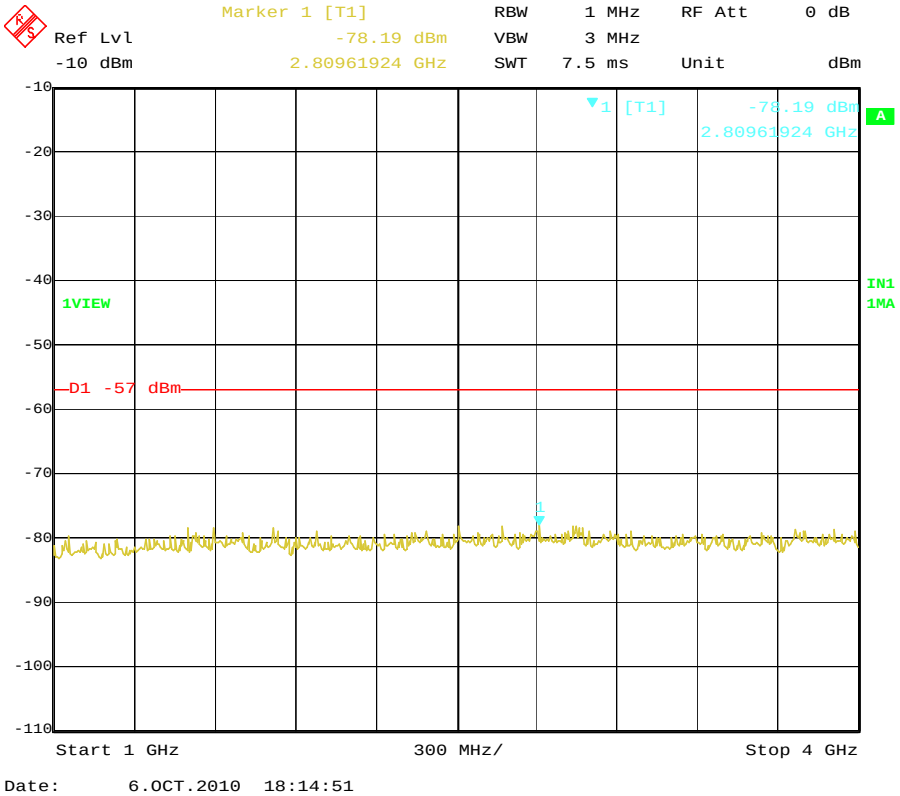
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	High	173.9875	663.71	-85.70	2557.72	-77.61	-57dBm
Test Results				Compliance				



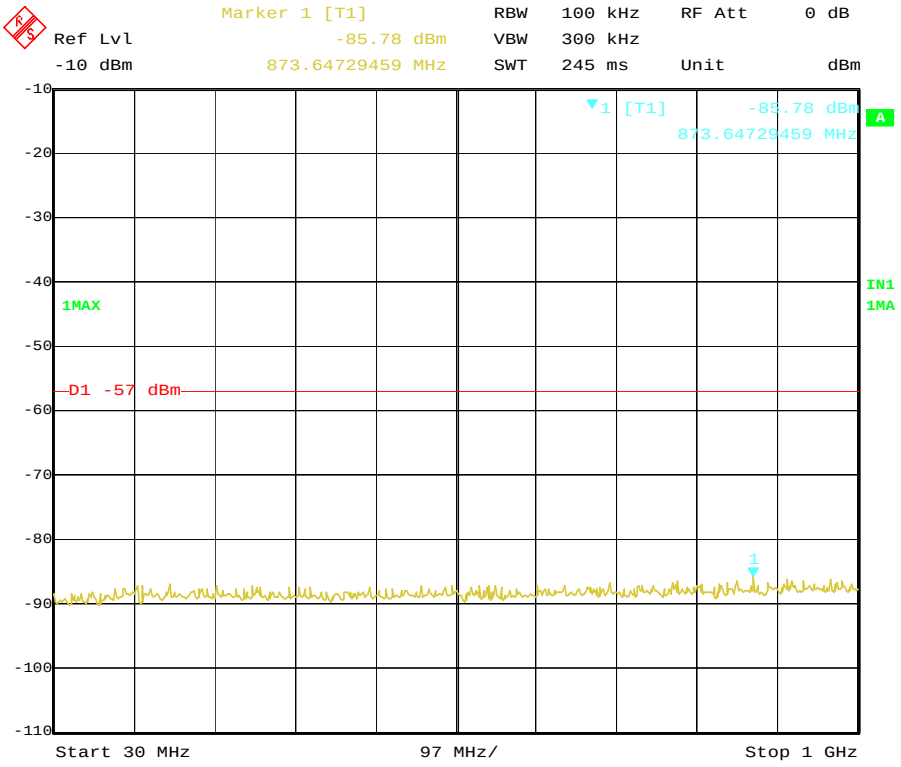


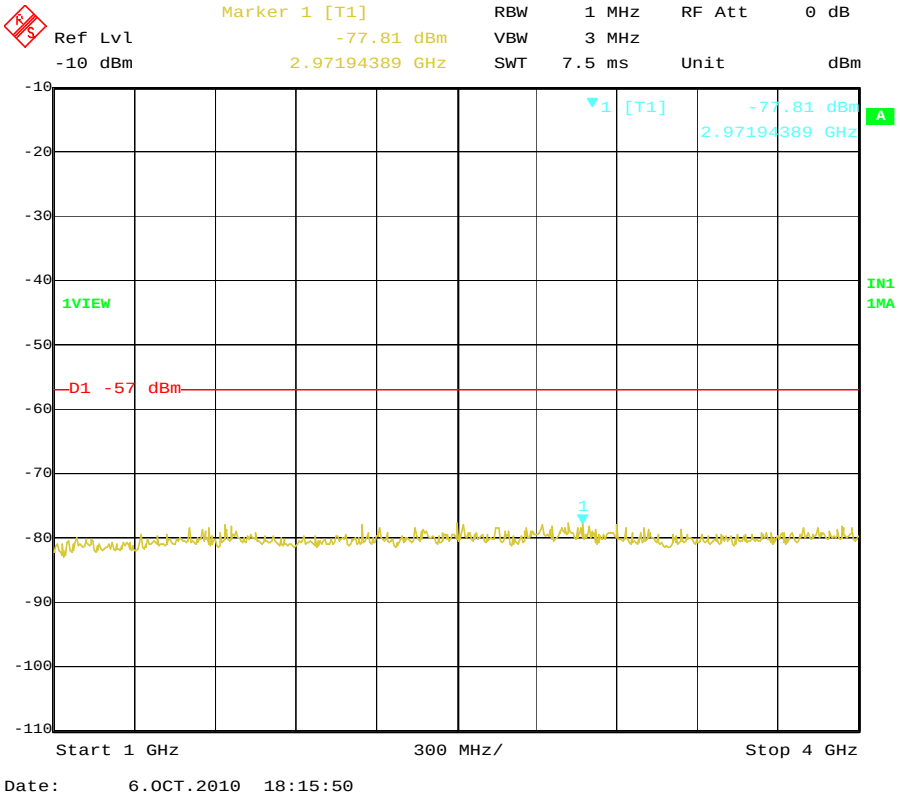
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Low	136.1250	873.65	-84.56	2809.62	-78.19	-57dBm
Test Results				Compliance				



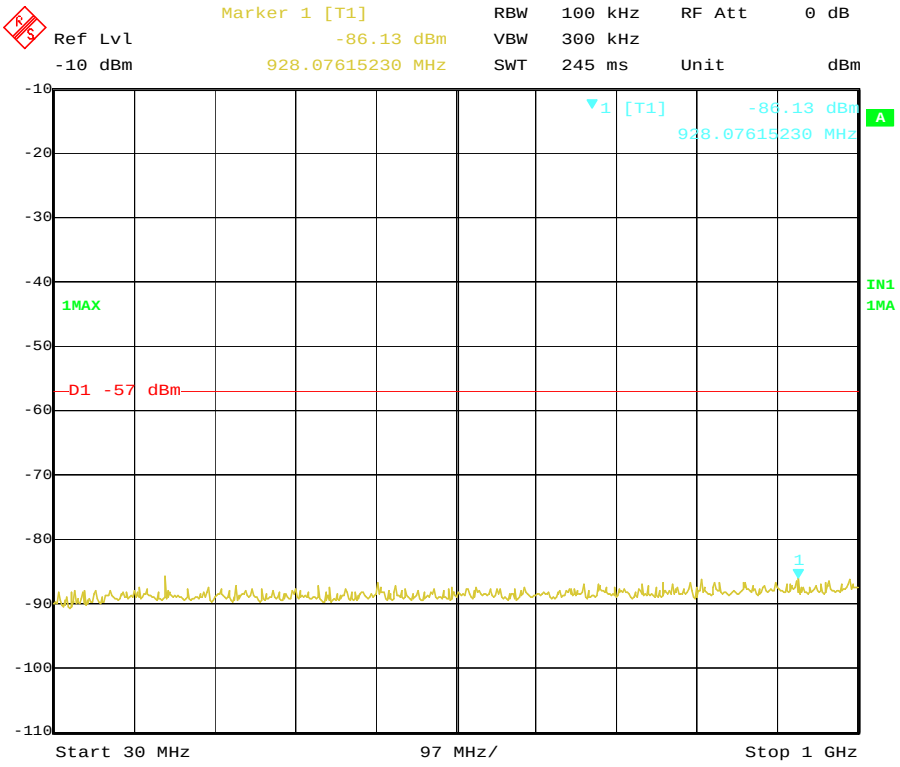


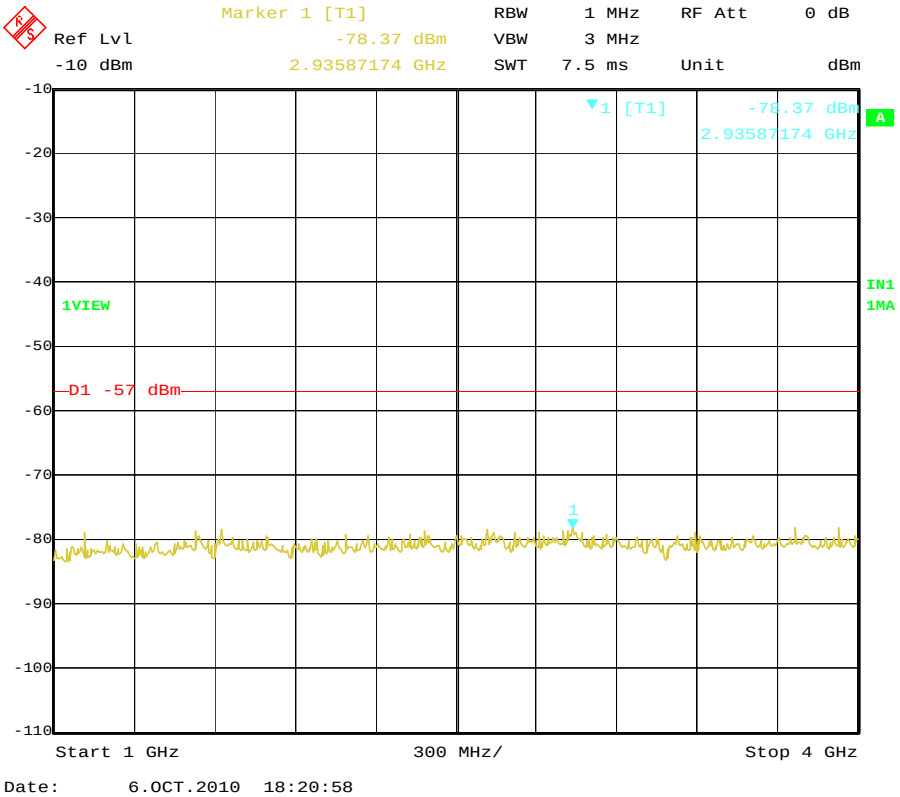
Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Middle	156.1250	873.65	-85.78	2971.94	-77.81	-57dBm
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	High	173.9875	928.08	-86.13	2935.87	-78.37	-57dBm
Test Results				Compliance				





4.11. RF Exposure Evaluation

Applicable Standard

According to §1.1307(b)(1) and RSS-102,systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
According to §1.1310 and §2.1091 and RSS-102 RF exposure is calculated.

LIMIT

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz
*=Plane-wave equivalent power density

MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the center of radiation of the antenna

As declared by the Applicant, the EUT transmits with the maximum soure-baed Duty Cycle of 50%-see the User manual, and the EUT is a wireless device used in a mobile application, at least 100cm from any body part of the user or nearby persons; from the peak EUT RF output power, the minimum mobile separation distance, R=100cm, as well as the gain of the used antenna is 3.5dBi, the RF power density can be obtained.

TEST RESULTS

For FM Modulation @ 25 KHz Channel Spacing

Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm^2)	Power Density At 100 cm (mW/cm^2)	Test Results
136.1250	100.00	47.22	52723.00	2.2387	1.000	0.9393	Compliance
156.1250	100.00	47.39	54827.70	2.2387	1.000	0.9768	Compliance
173.9875	100.00	47.32	53951.10	2.2387	1.000	0.9611	Compliance

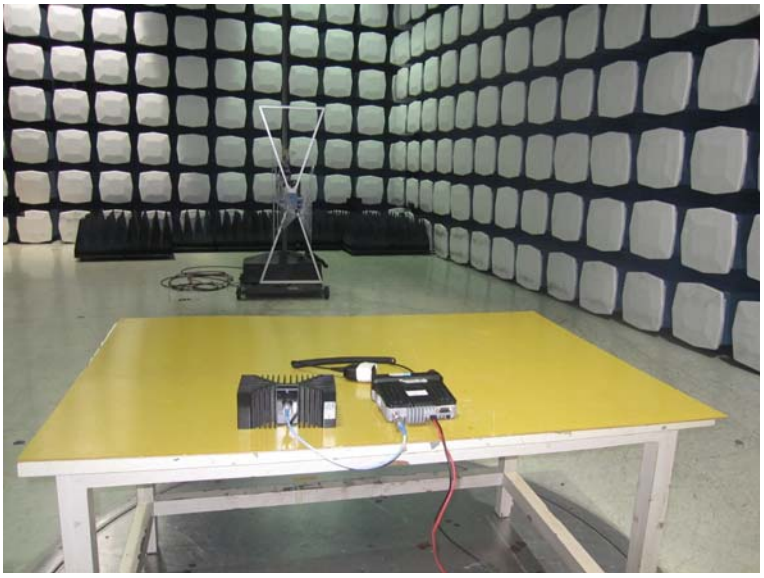
For FM Modulation @ 12.5 KHz Channel Spacing

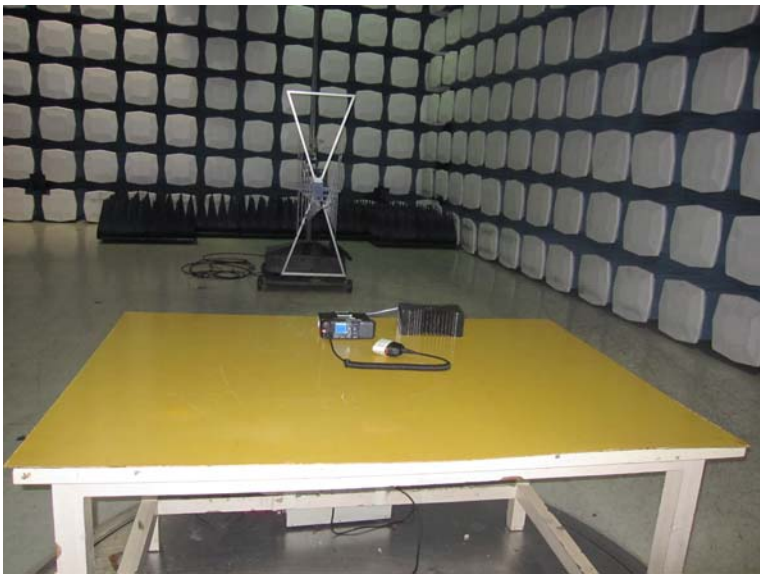
Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm^2)	Power Density At 100 cm (mW/cm^2)	Test Results
136.1250	100.00	47.22	52723.00	2.2387	1.000	0.9393	Compliance
156.1250	100.00	47.37	54575.80	2.2387	1.000	0.9723	Compliance
173.9875	100.00	47.30	53703.20	2.2387	1.000	0.9567	Compliance

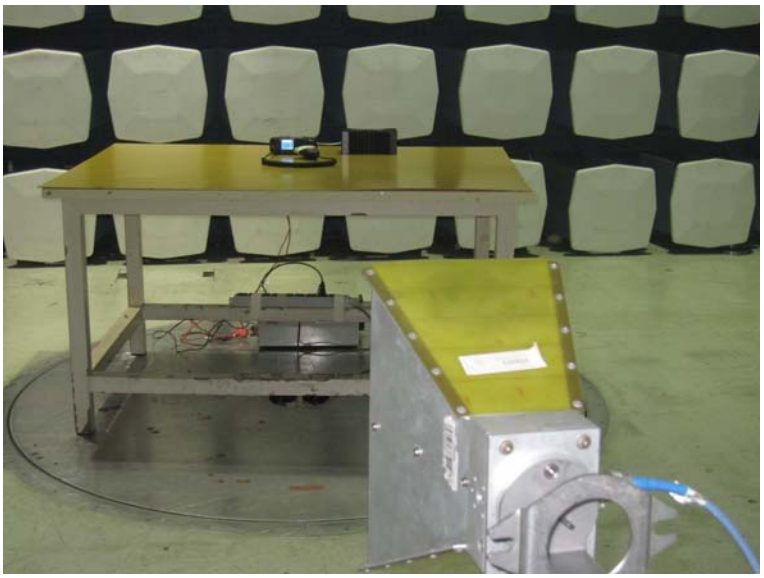
For 4FSK Modulation @ 12.5 KHz Channel Spacing

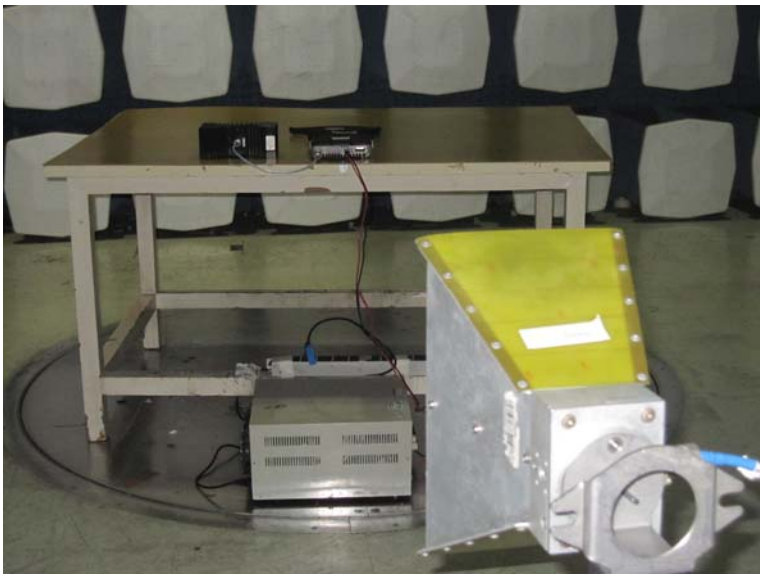
Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm^2)	Power Density At 100 cm (mW/cm^2)	Test Results
136.1250	100.00	47.36	54450.30	2.2387	1.000	0.9700	Compliance
156.1250	100.00	47.45	55590.40	2.2387	1.000	0.9904	Compliance
173.9875	100.00	47.39	54827.70	2.2387	1.000	0.9768	Compliance

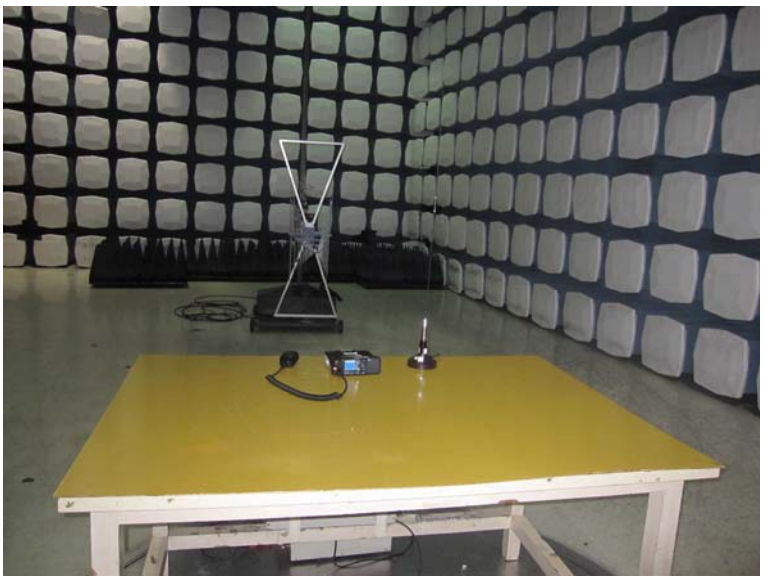
5. Test Setup Photos of the EUT

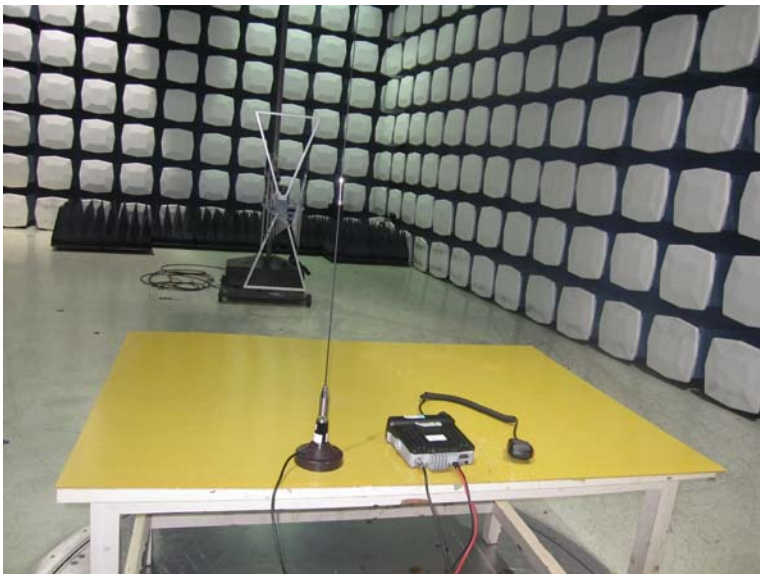








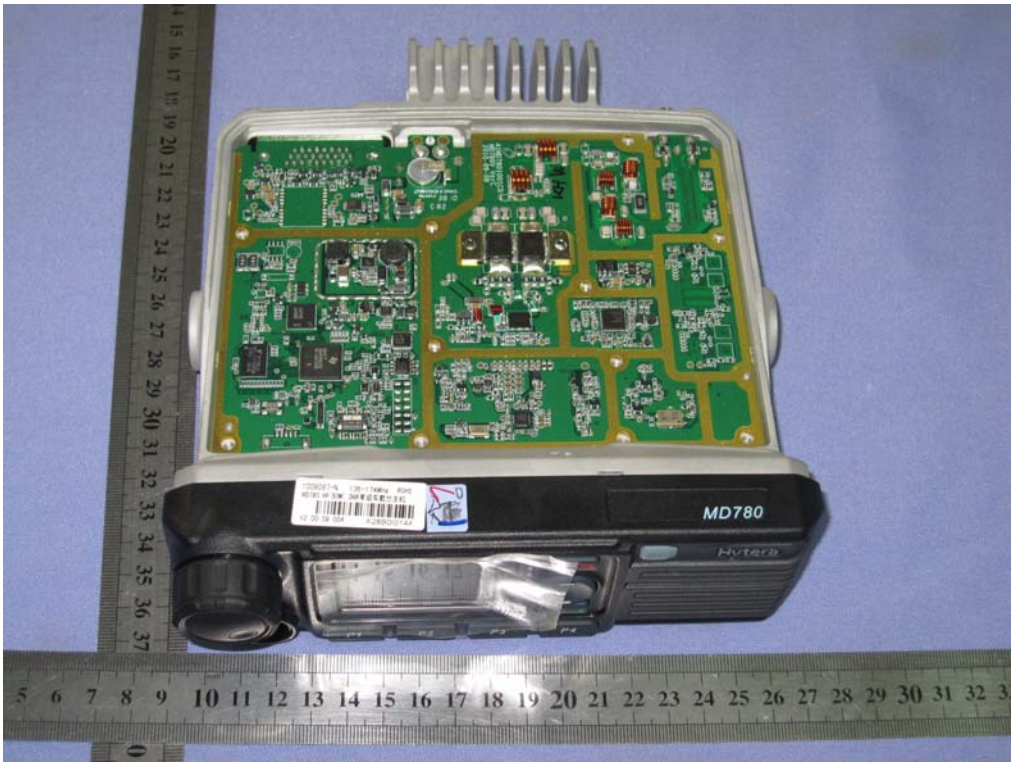


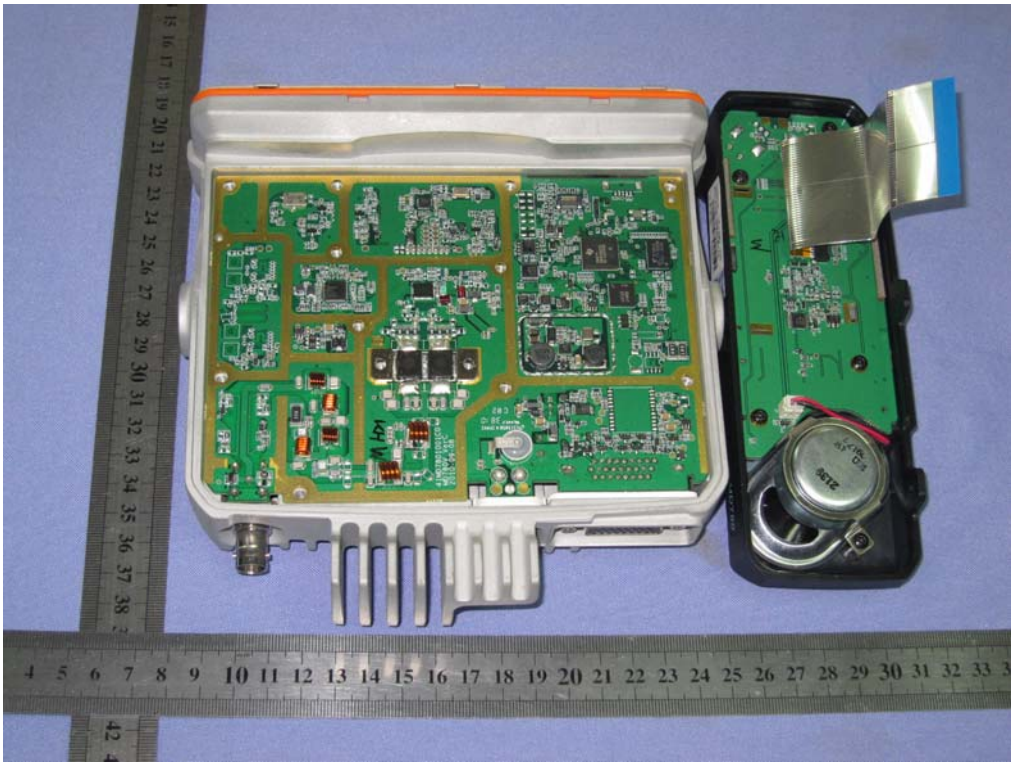


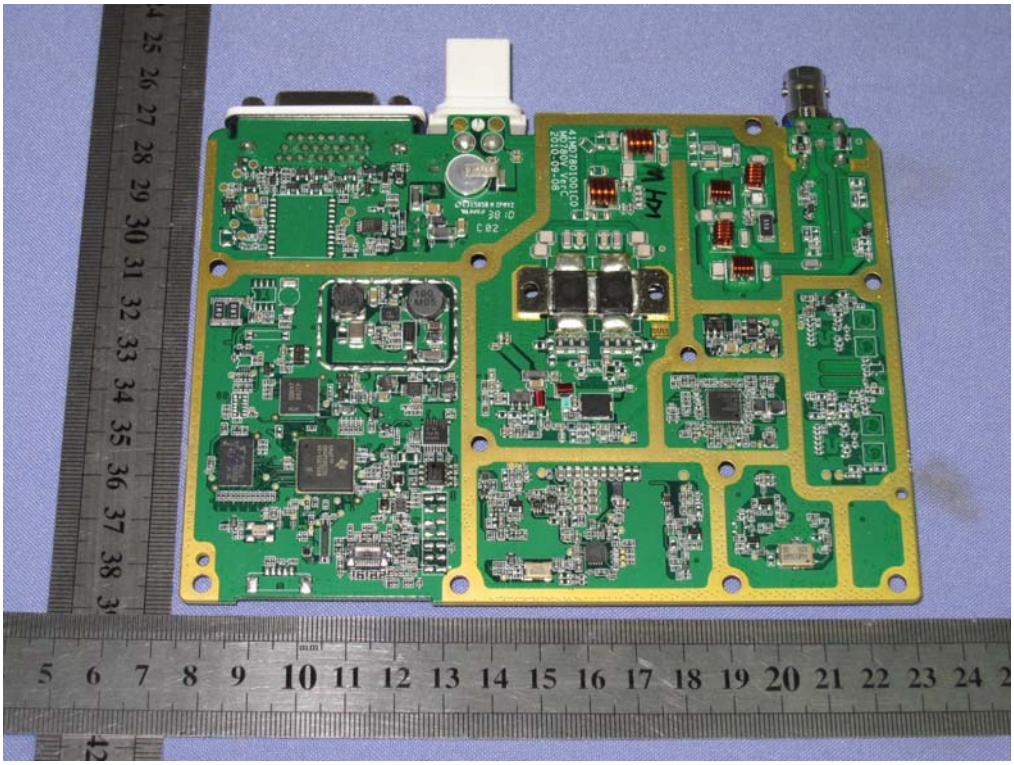
6. External and Internal Photos of the EUT

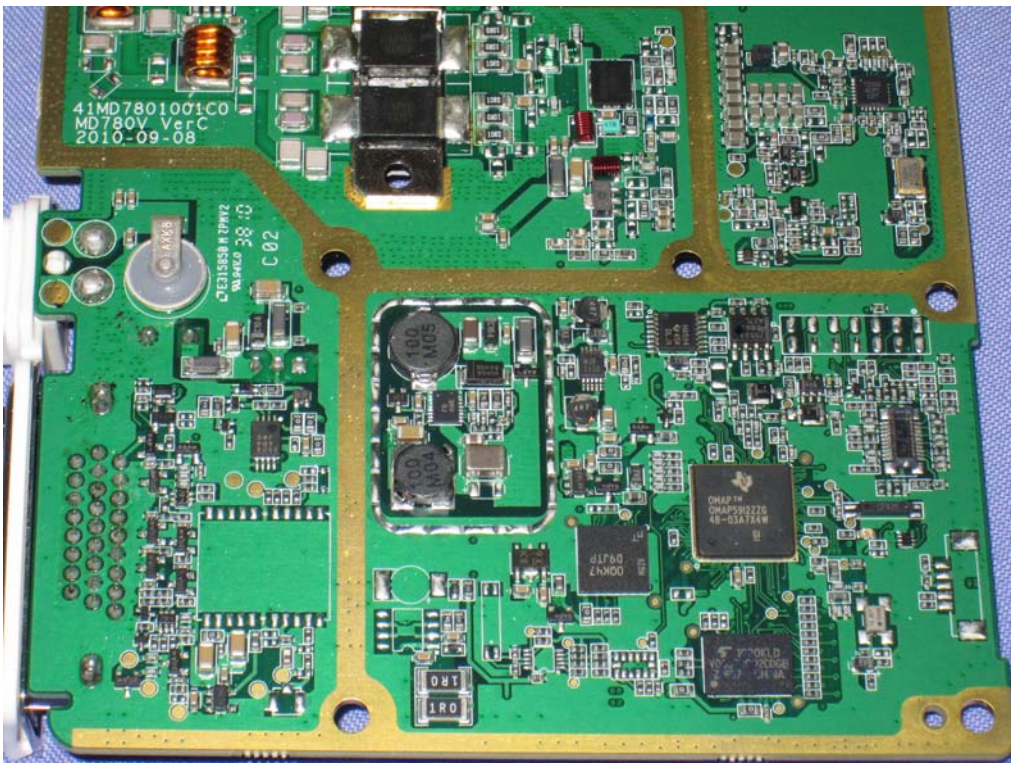
External Photos

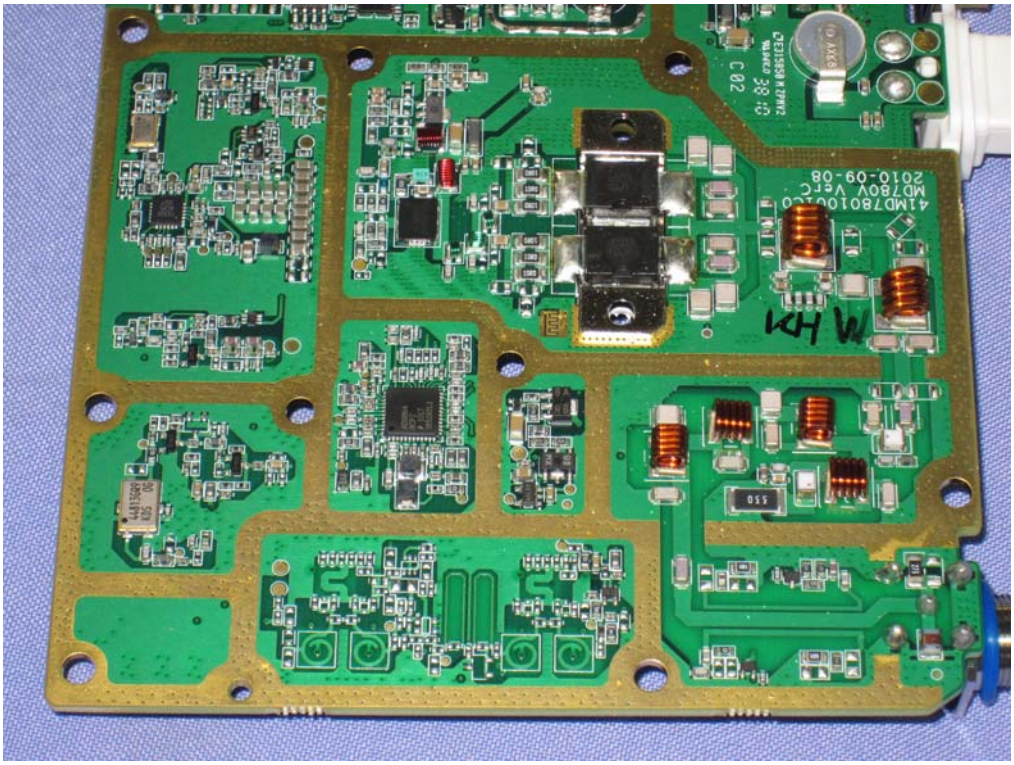
Internal Photos

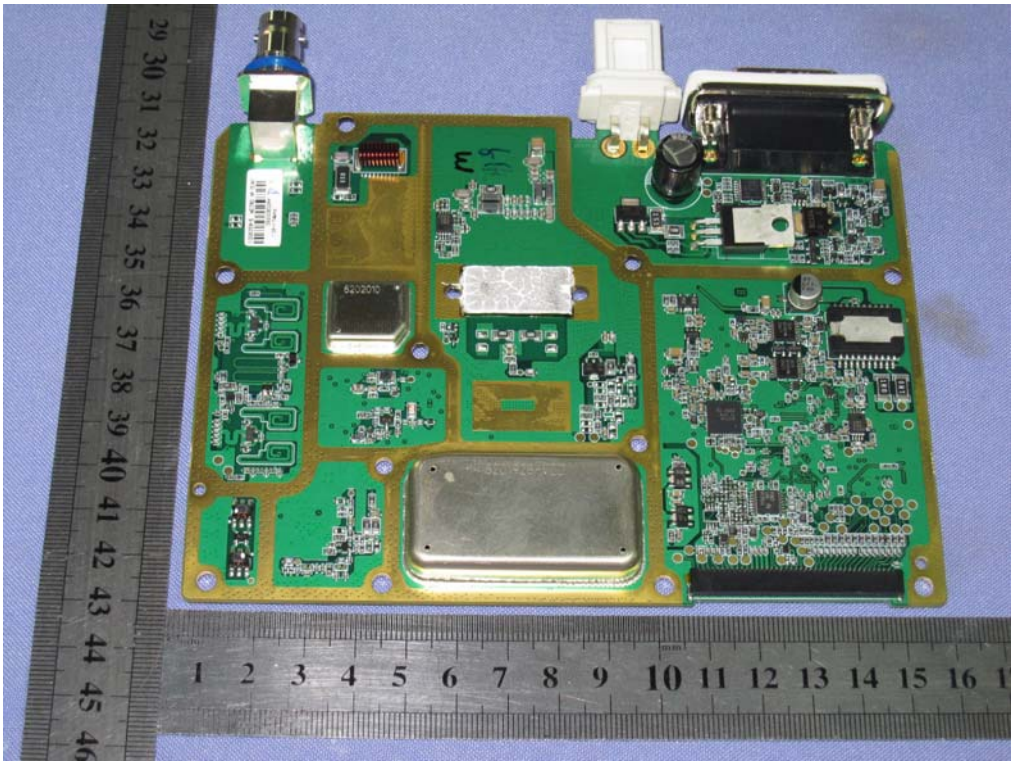


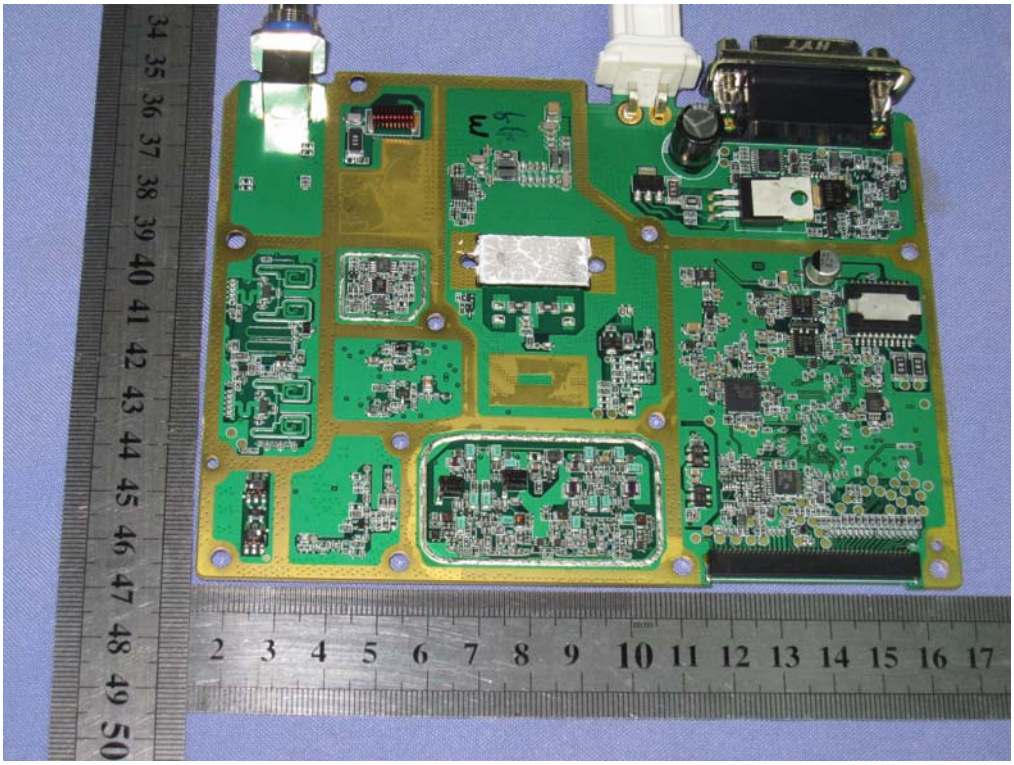


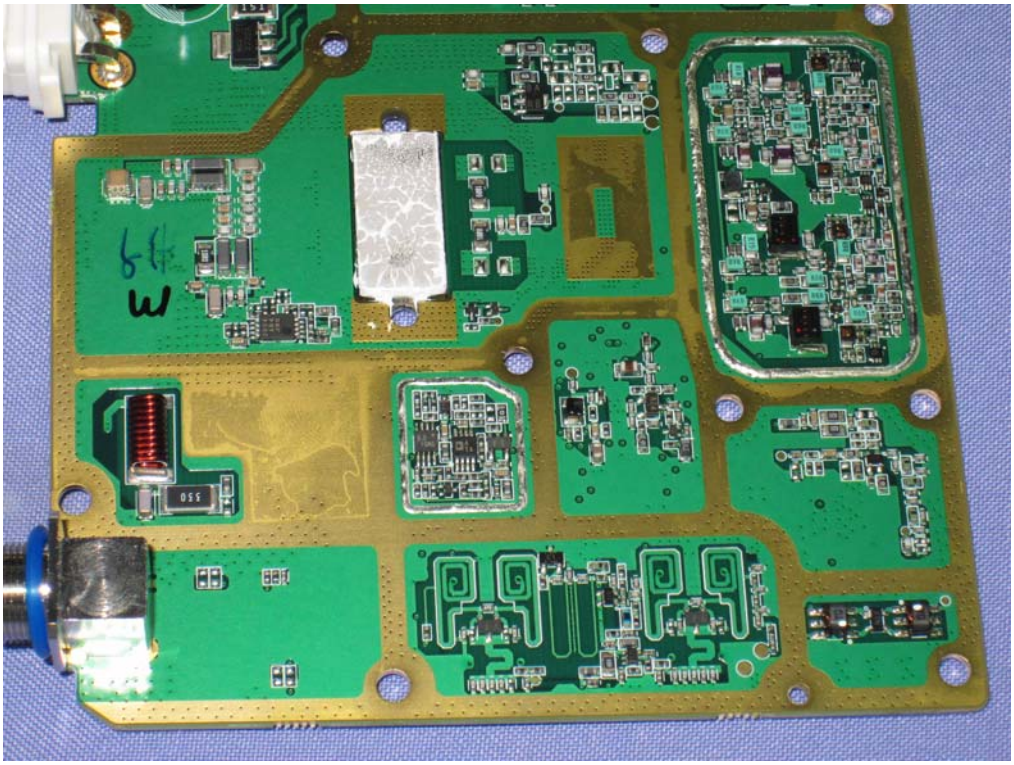


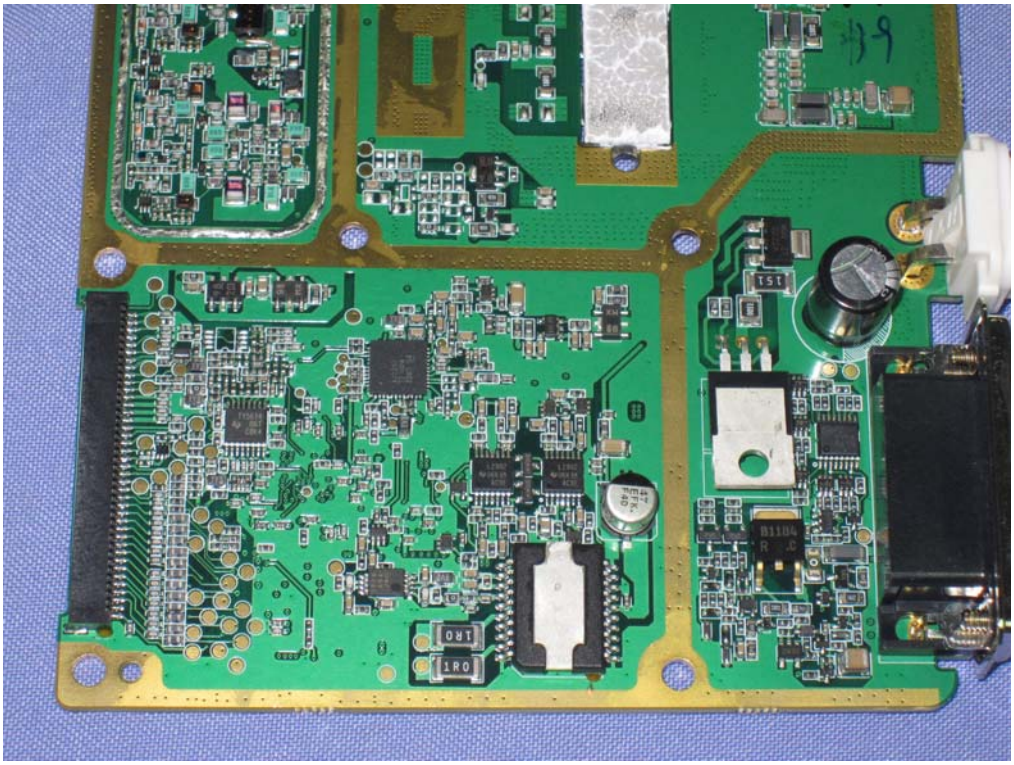

41MD7801001C0
MD780V VerC
2010-09-08

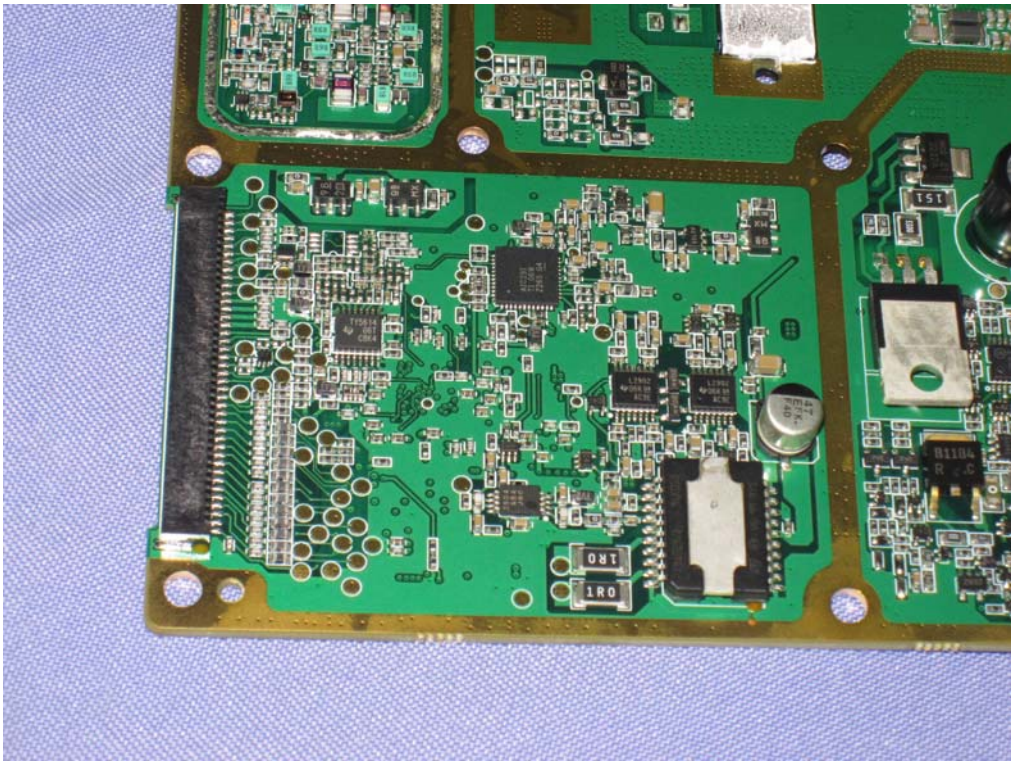


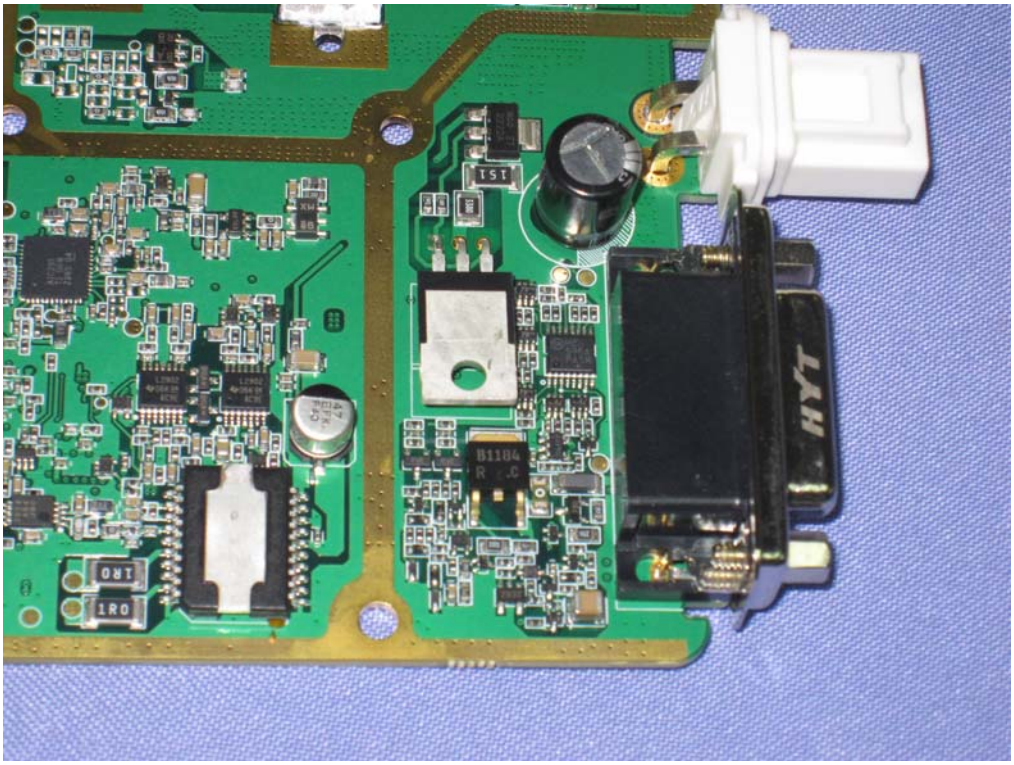


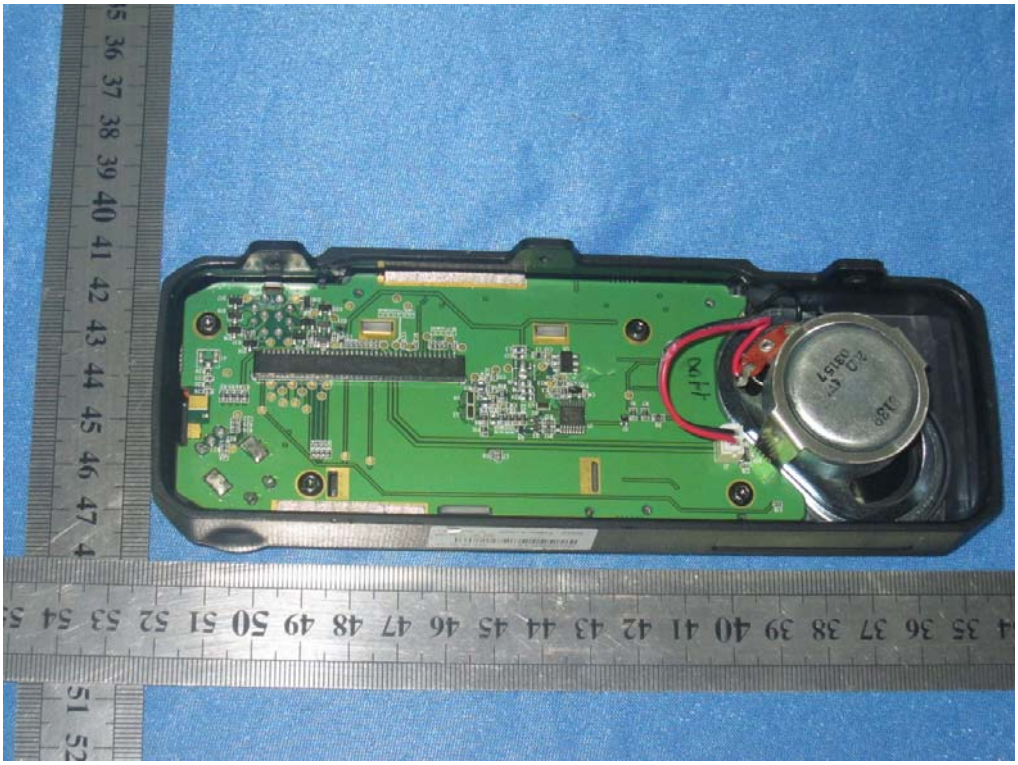


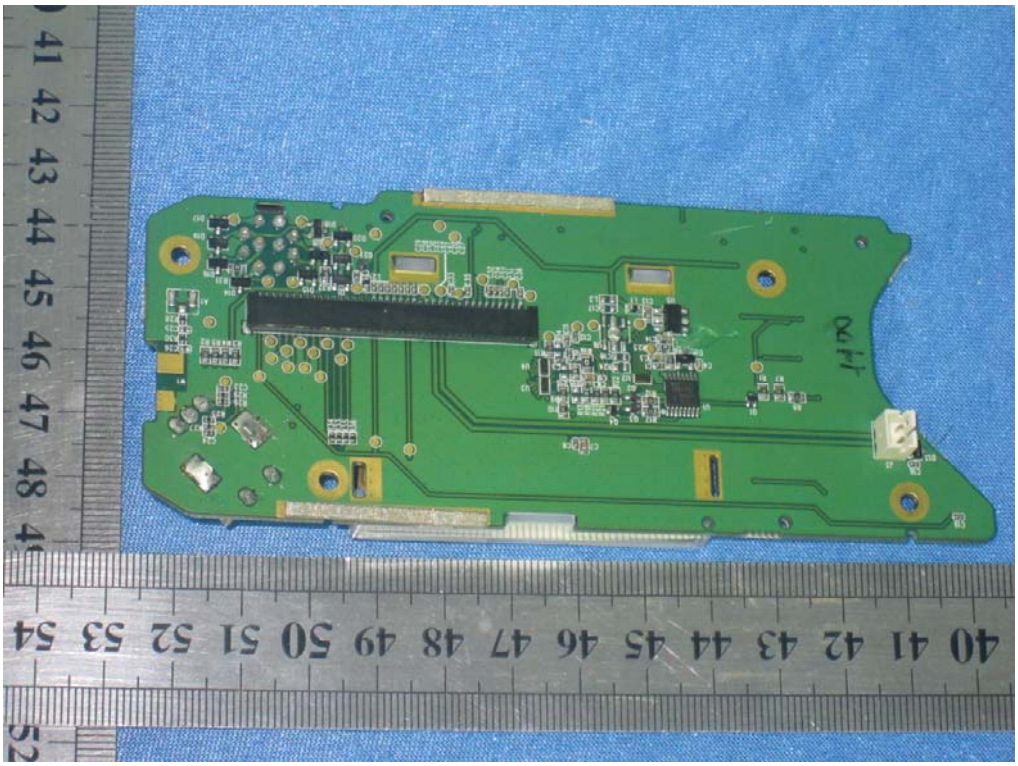


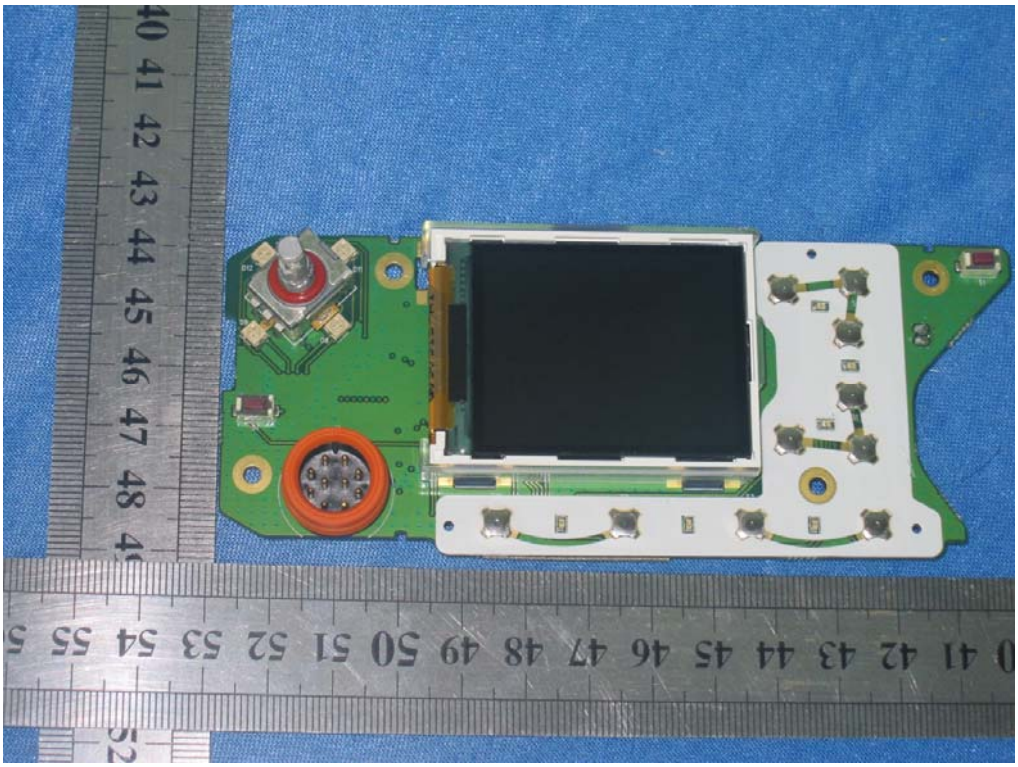


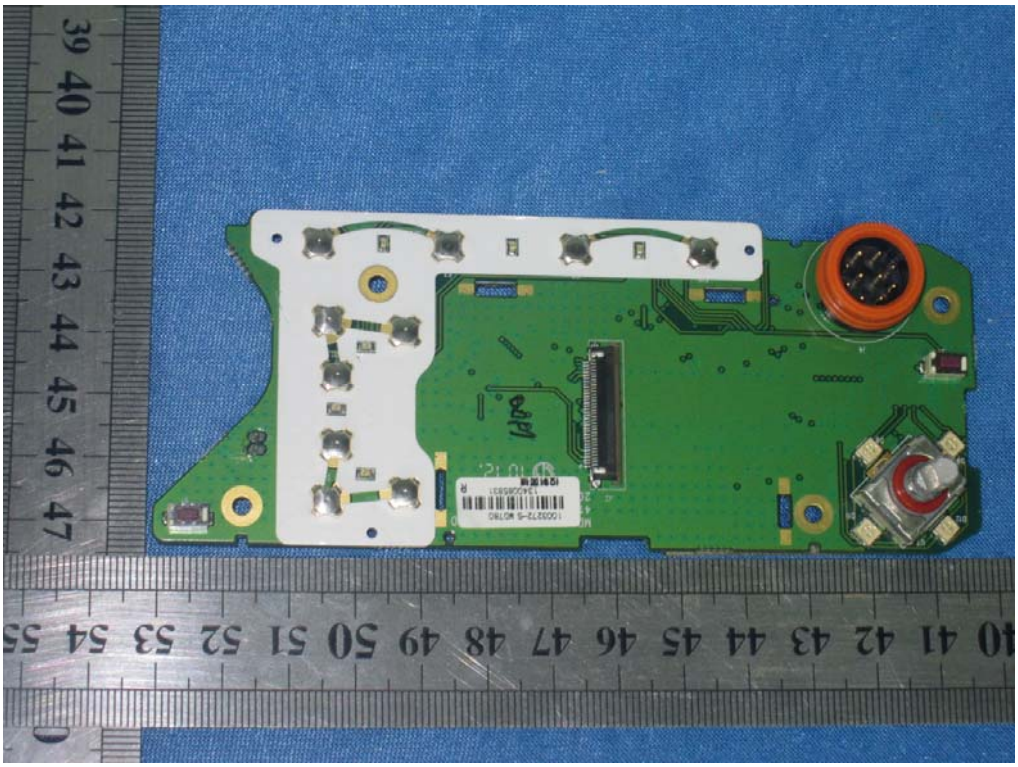


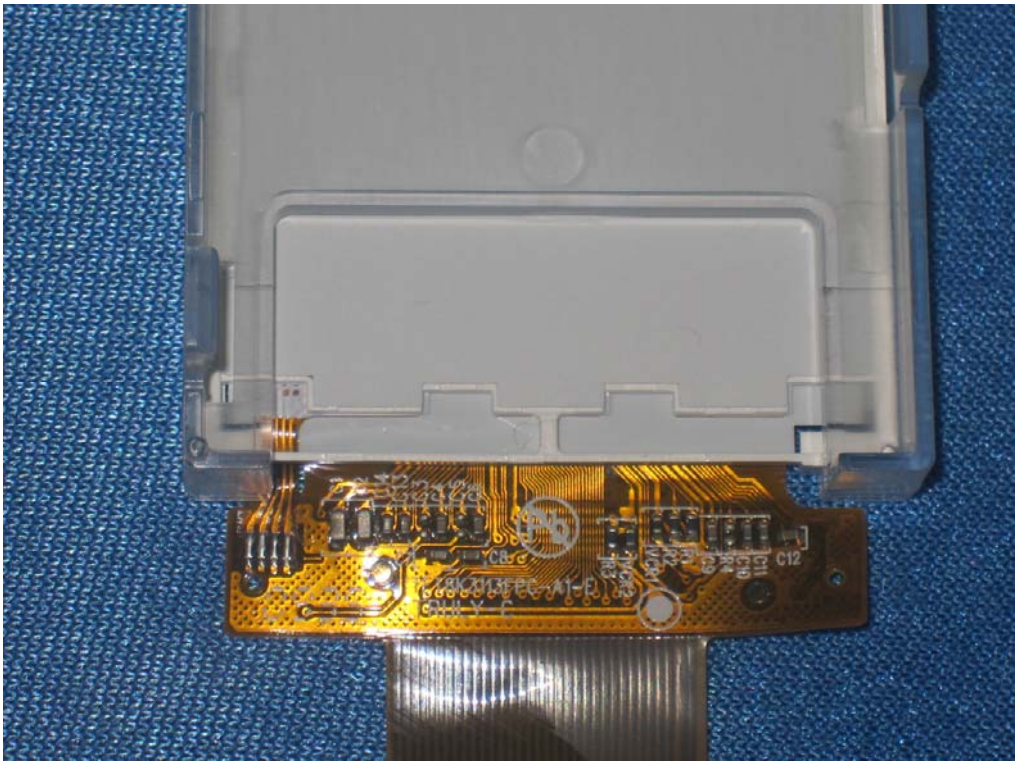

HYT











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