FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.225

Equipment	:	**Mobile Computer**
Brand Name	:	**CIPHERLAB**
Model No.	:	**8700**
Filing Type	:	**New Application**
Applicant	:	**CIPHERLAB Co., Ltd.** 12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106
FCC ID	:	**Q3N-8700**
Manufacturer	:	**CIPHERLAB Co., Ltd.** 12F, 333 Dunhua S. Rd., Sec. 2, Taipei, Taiwan 106
Received Date	:	Feb. 03, 2012
Final Test Date	:	Feb. 07, 2012

Statement

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

Table of Contents

History of This Test Report

Original Issue Date: Feb. 08, 2012
Report No.: FR211345
■ No additional attachment.
□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.225

Equipment : Mobile Computer
Brand Name : CIPHERLAB
Model No. : 8700
Applicant : CIPHERLAB Co., Ltd.
12F, 333 Dunhua S. Rd., Sec. 2,
Taipei, Taiwan 106

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Feb. 03, 2012 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu / Assistant Manager

SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

1. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
3.1	15.207	AC Power Line Conducted Emissions	Complies	15.82 dB
3.2	15.225(a)	Field Strength of Fundamental Emissions	Complies	39.41 dB
3.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
3.4	15.225(d)	Radiated Emissions	Complies	6.57 dB
3.5	15.225(e)	Frequency Stability	Complies	-
3.6	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Field Strength of Fundamental Emissions	±0.8dB	Confidence levels of 95%
20dB Spectrum Bandwidth / Frequency Stability	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated / Band Edge Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2. GENERAL INFORMATION

1.1 Product Details

Items	Description
Power Type	5Vdc from AC Adapter ; 3.7Vdc from Li-ion Battery
Modulation	ASK
Channel Number	1
Channel Band Width (99%)	2.24 kHz
Max. Field Strength	63.67 dBuV/m at 10m (QP)
Test Freq. Range	13.553 ~ 13.567MHz
Carrier Frequencies	13.56 MHz (Ch. 1)
Antenna	Integrate Antenna (Without any antenna connector)

1.2 Accessories

Accessories Information					
Accessories or 2nd Source or Key Part	AC Adapter	Brand Name	Adapter	Model Name	STD-05030V
		Power Rating	I/P: 100 -240Vac, 0.48mA, O/P: 5Vdc, 3A		
		Power Cord	1.5meter, non-shielded cable, with w/ ferrite core		
	Battery	Brand Name	HighCell	Model Name	CT-1S1PL
		Power Rating	3.7Vdc, 4000mAh	Type	Li-ion
	Power Cable	Brand Name	N/A	Model Name:	N/A
		Signal Line	1.0meter shielded cable without ferrite core		
	USB Cable	Brand Name	CABLE MAX	Model Name	MOLEX16PM& DC3.8*1.0F+USB4P A TYPE M
		Signal Line	1.2 meter, non-shielded cable, with w/ ferrite core		
	RFID Module	Brand Name	Microprogram	Model Name	CIPHERLAB930
	BT Module	Brand Name	Atech	Model Name	BM-1023

1.3 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Channel
AC Power Line Conducted Emissions Radiated Emissions 30MHz~1GHz	CTX	-
Field Strength of Fundamental Emissions	CTX	1
20dB Spectrum Bandwidth	CTX	1
Radiated Emissions 9kHz~30MHz	CTX	1
Band Edge Emissions	CTX	1
Frequency Stability	Un-modulation	1

Note: CTX=continuously transmitting.

1.4 Table for Testing Locations

Test Site No.	Site Category	Location
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
10CH02-HY	SAC	Hwa Ya
03CH03-HY	SAC	Hwa Ya

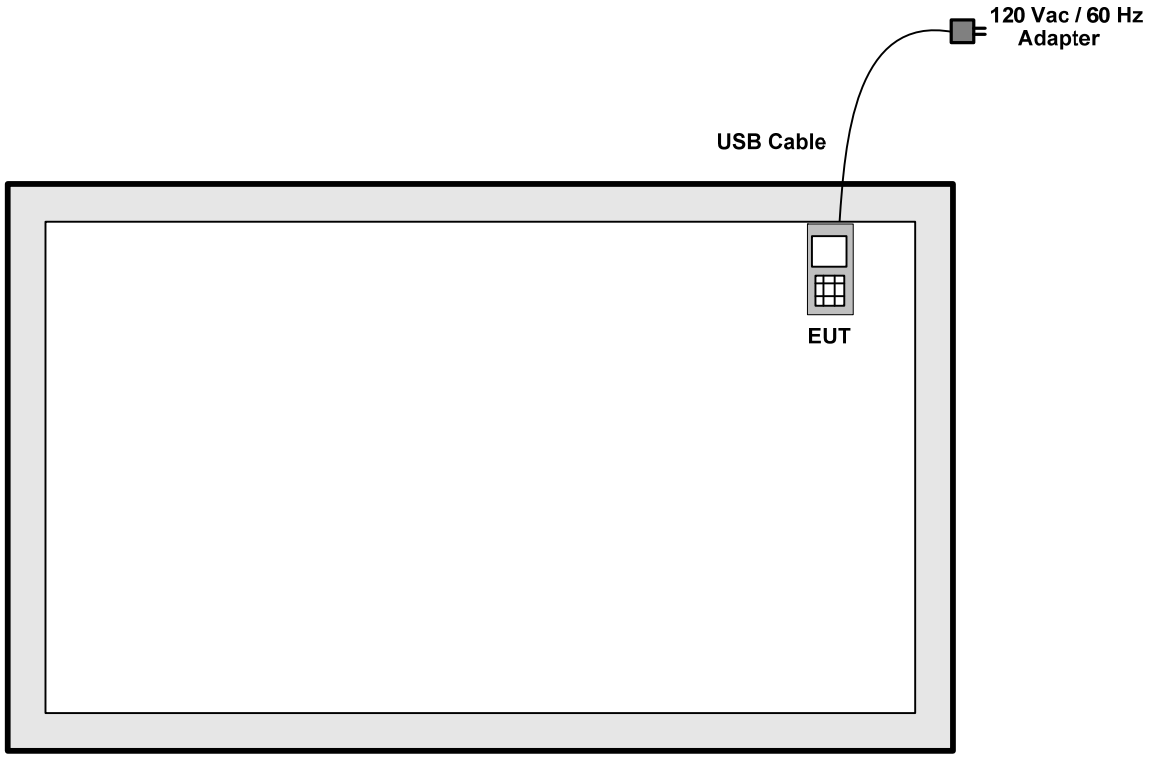
Semi Anechoic Chamber (SAC).

1.5 Table for Supporting Units

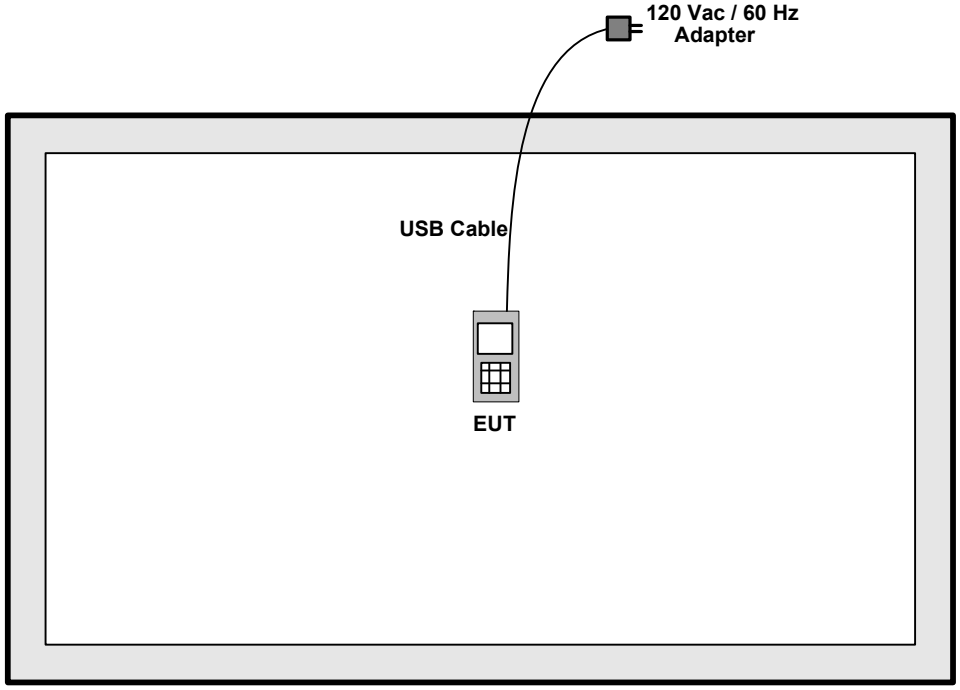
The EUT was tested alone.

1.6 Test Configurations

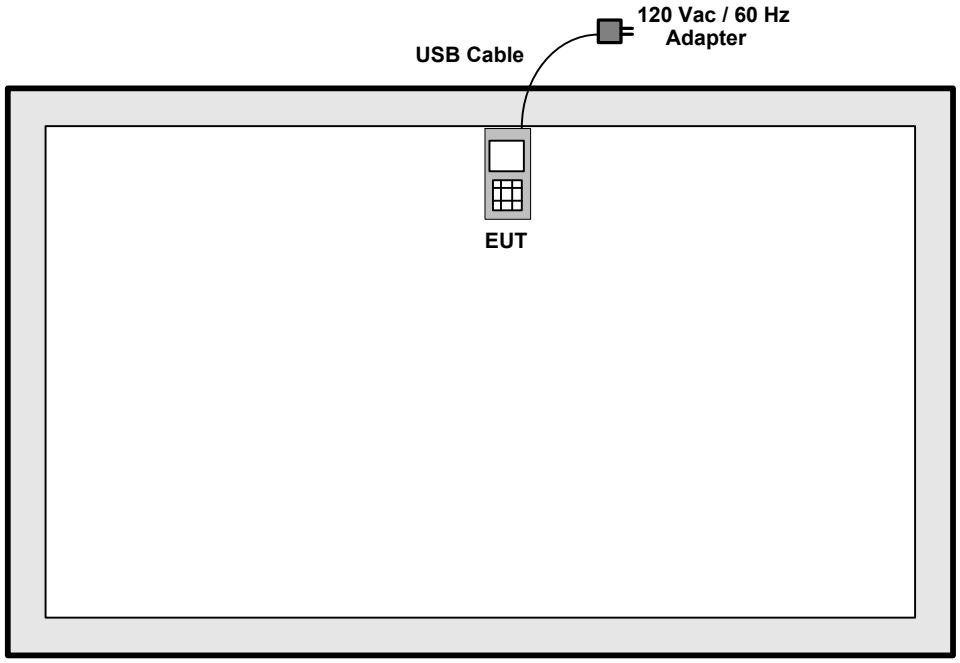
For conducted emissions



For radiated emissions 9kHz~30MHz



For radiated emissions 30MHz~1GHz



3. TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

1.6.1 Limit

For a Low-power Radio-frequency device which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

1.6.2 Measuring Instruments and Setting

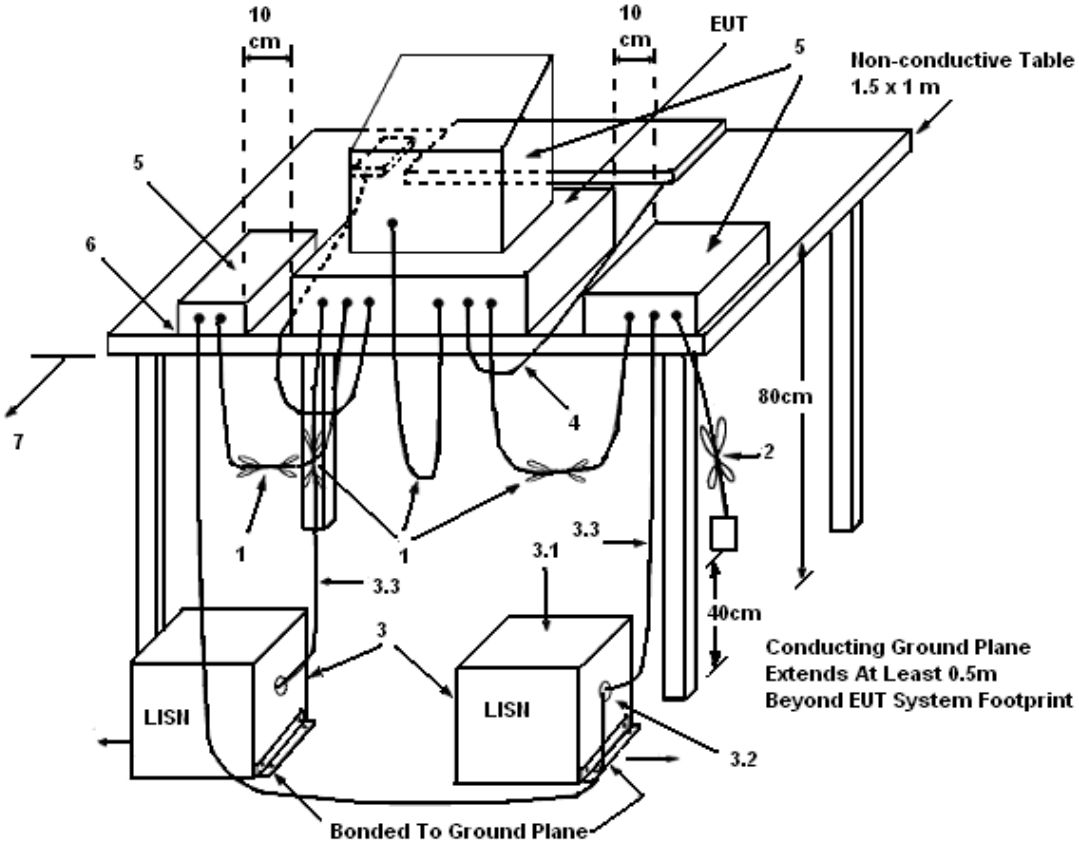
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

1.6.3 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

1.6.4 Test Setup Layout



LEGEND:
(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
(3.1) All other equipment powered from additional LISN(s).
(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
(3.3) LISN at least 80 cm from nearest part of EUT chassis.
(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
(5) Non-EUT components of EUT system being tested.
(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

1.6.5 Test Deviation

There is no deviation with the original standard.

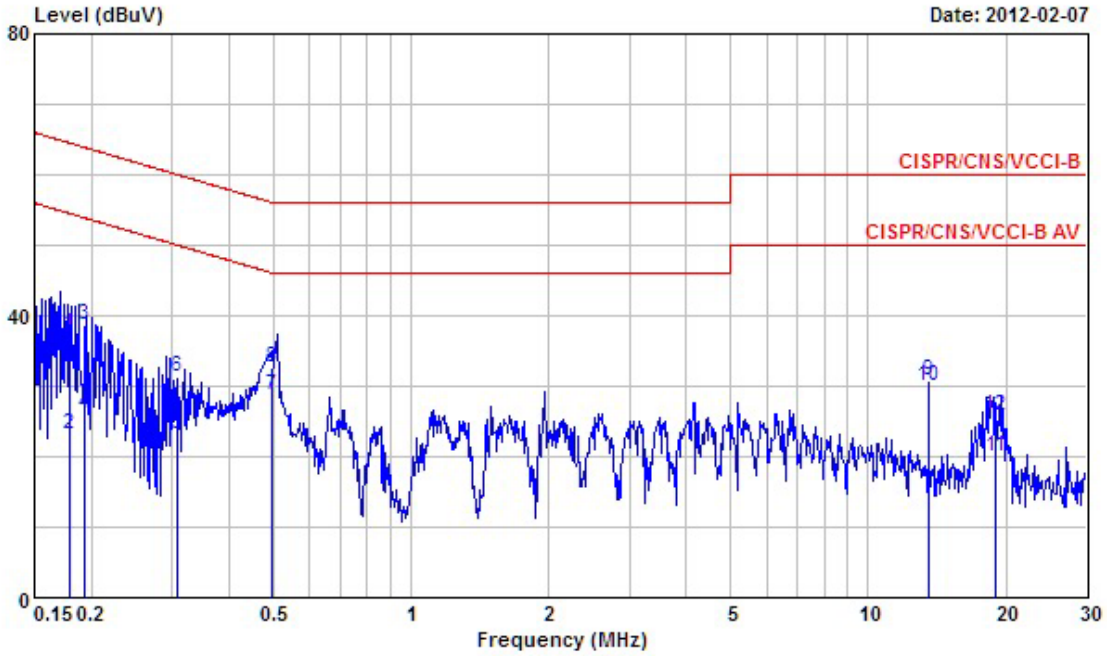
1.6.6 EUT Operation during Test

The EUT was placed on the test table and programmed in transmitting mode.

1.6.7 Results of AC Power Line Conducted Emissions Measurement

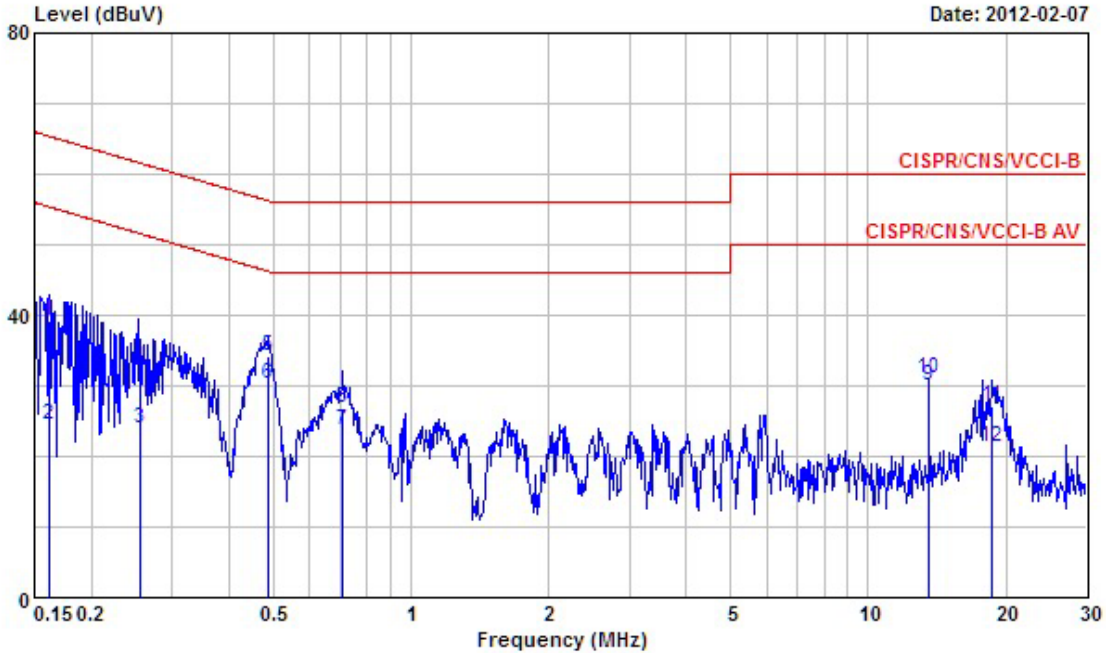
Final Test Date	Feb. 07, 2012	**Test Site No.**	CO04-HY
Temperature	24.5℃	**Humidity**	48%
Test Engineer	Assen	**Configuration**	Transmitting Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1788700	37.42	-27.12	64.54	37.04	0.30	0.08	QP
2	0.1788700	23.09	-31.45	54.54	22.71	0.30	0.08	Average
3	0.1927480	38.67	-25.25	63.92	38.27	0.30	0.10	QP
4	0.1927480	26.12	-27.80	53.92	25.72	0.30	0.10	Average
5	0.3094290	23.25	-26.74	49.99	22.85	0.30	0.10	Average
6	0.3094290	31.42	-28.57	59.99	31.02	0.30	0.10	QP
7	0.4954440	28.77	-17.31	46.08	28.38	0.29	0.10	Average
8	0.4954440	32.61	-23.47	56.08	32.22	0.29	0.10	QP
9	13.560	30.91	-29.09	60.00	29.80	0.51	0.60	QP
10	13.560	29.94	-20.06	50.00	28.83	0.51	0.60	Average
11	19.015	19.95	-30.05	50.00	18.93	0.57	0.45	Average
12	19.015	25.67	-34.33	60.00	24.65	0.57	0.45	QP

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1615500	39.30	-26.08	65.38	38.97	0.26	0.07	QP
2	0.1615500	24.59	-30.79	55.38	24.26	0.26	0.07	Average
3	0.2558610	23.98	-27.58	51.56	23.63	0.25	0.10	Average
4	0.2558610	32.51	-29.05	61.56	32.16	0.25	0.10	QP
5	0.4889010	34.08	-22.11	56.19	33.74	0.24	0.10	QP
6	0.4889010	30.37	-15.82	46.19	30.03	0.24	0.10	Average
7	0.7084240	23.61	-22.39	46.00	23.26	0.25	0.10	Average
8	0.7084240	26.82	-29.18	56.00	26.47	0.25	0.10	QP
9	13.560	30.02	-19.98	50.00	28.99	0.43	0.60	Average
10	13.560	30.99	-29.01	60.00	29.96	0.43	0.60	QP
11	18.705	26.98	-33.02	60.00	26.04	0.47	0.47	QP
12	18.705	21.29	-28.71	50.00	20.35	0.47	0.47	Average

Note:
Level = Read Level + LISN Factor + Cable Loss.

3.2 Field Strength of Fundamental Emissions and Mask Measurement

3.2.1 Limit

Field strength of fundamental emissions limit:
The field strength of fundamental emissions shall not exceed 15848 micorvolts/meter at 30 meters. The emissions limit in this paragraph is based on measurement instrumentation employing a QP detector.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
13.553 ~ 13.567MHz	15848 at 30m	103.08 (QP)	124 (QP)

Mask limit:

Rules and specifications	CFR 47 Part 15 section 15.225(a)-(d)				
Description	Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 1kHz for the band 13.553~13.567MHz				
Limit	Freq. of Emission (MHz)	Field Strength (uV/m) at 30m	Field Strength (dBuV/m) at 30m	Field Strength (dBuV/m) at 10m	Field Strength (dBuV/m) at 3m
	1.705~13.110	30	29.5	48.58	69.5
	13.110~13.410	106	40.5	59.58	80.5
	13.410~13.553	334	50.5	69.58	90.5
	13.553~13.567	15848	84.0	103.08	124.0
	13.567~13.710	334	50.5	69.58	90.5
	13.710~14.010	106	40.5	59.58	80.5
	14.010~30.000	30	29.5	48.58	69.5

3.2.2 Measuring Instruments and Setting

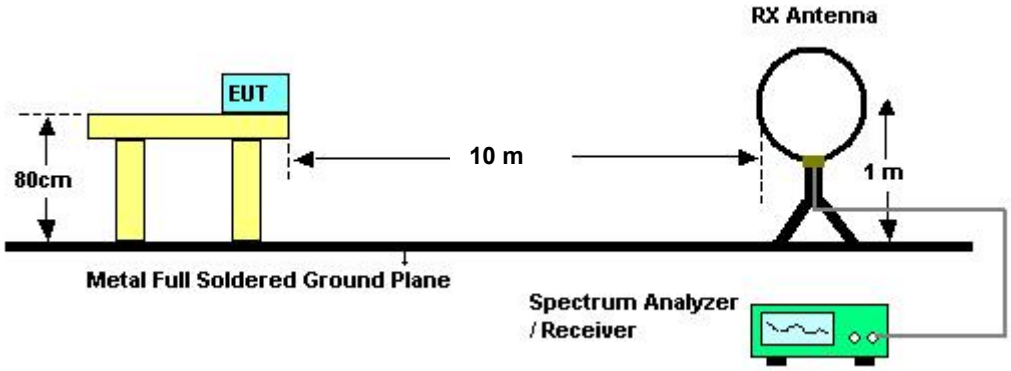
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RB	9 kHz
Detector	QP

3.2.3 Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
6. Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 1kHz for the band 13.553~13.567MHz.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

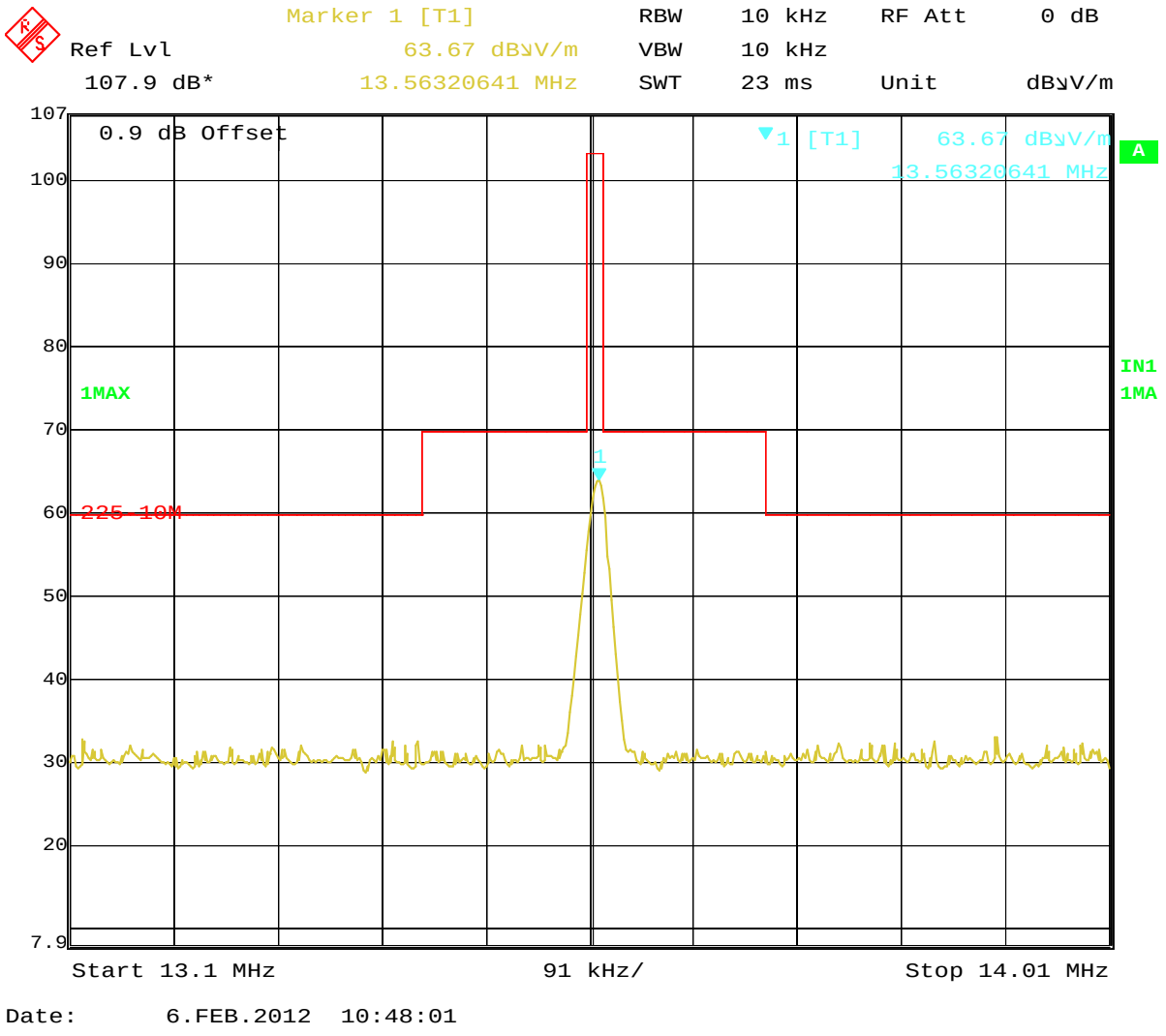
3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Test Result of Field Strength of Fundamental Emissions

Final Test Date	Feb. 06, 2012	**Test Site No.**	10CH02-HY
Temperature	22.4℃	**Humidity**	73%
Test Engineer	Streak	**Configurations**	Ch. 1

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m) at 10m	Remark
13.56 MHz	63.67	-39.41	103.08	QP



Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

3.3 20dB Spectrum Bandwidth Measurement

3.3.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 ~ 13.567MHz).

3.3.2 Measuring Instruments and Setting

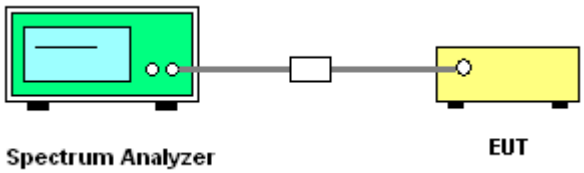
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	1 kHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. For 20dB Bandwidth the resolution bandwidth of 1 kHz and the video bandwidth of 1 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. For 99% Occupied Bandwidth the resolution Bandwidth of 1 kHz and the video bandwidth of 1 kHz was used.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

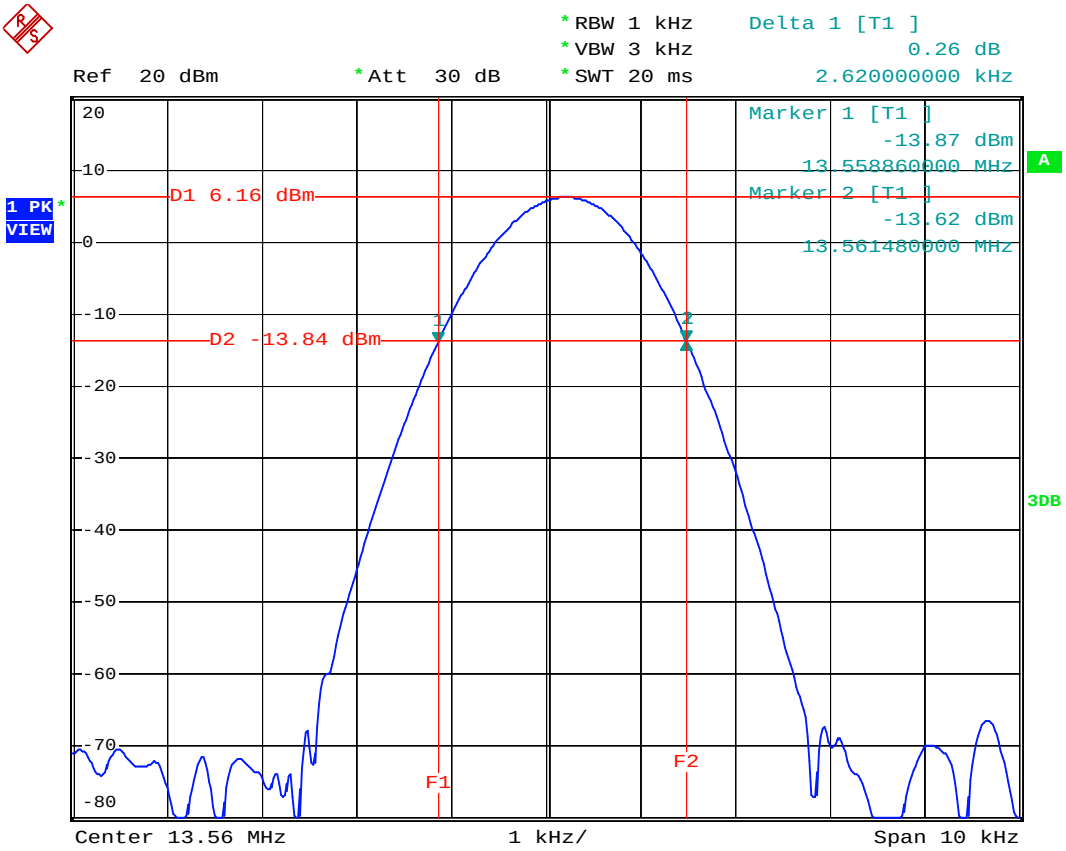
The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of 20dB Spectrum Bandwidth

Final Test Date	Feb. 06, 2012	**Test Site No.**	TH01-HY
Temperature	22.2℃	**Humidity**	38%
Test Engineer	Ian	**Configurations**	Ch. 1

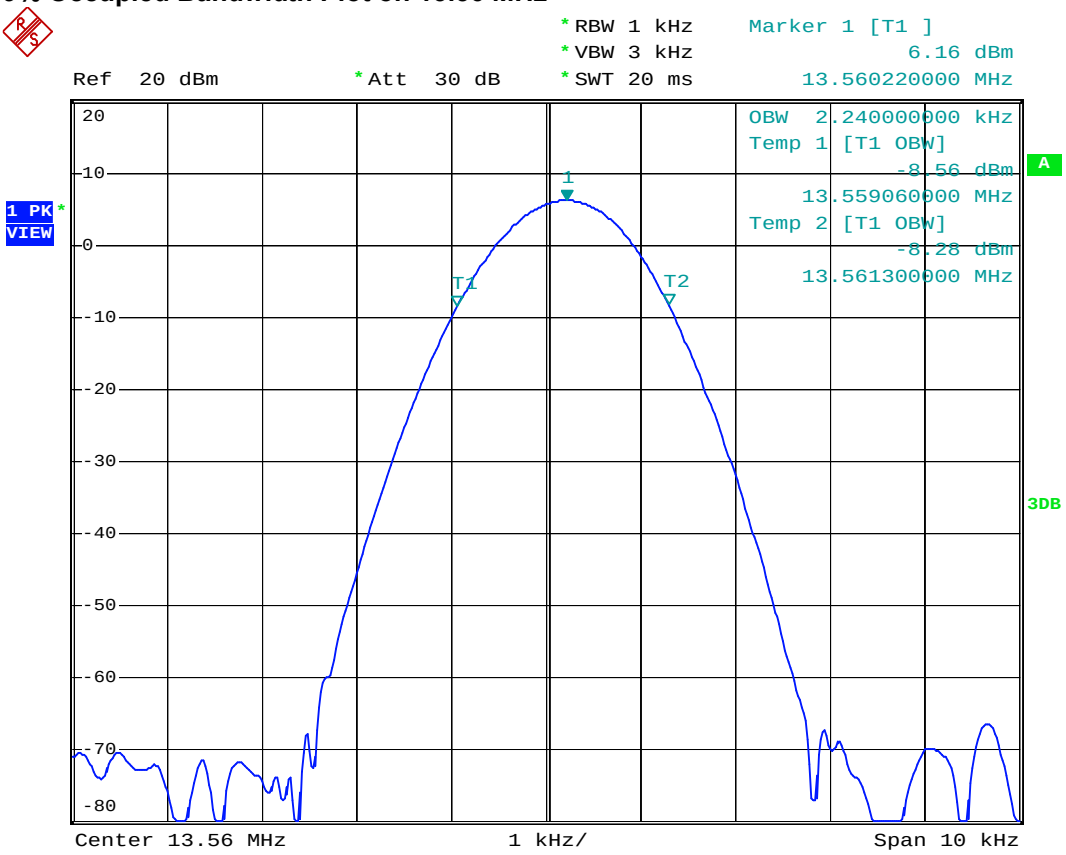
Frequency	**20dB BW (kHz)**	**99% OBW (kHz)**	**Frequency range (MHz) f_L > 13.553MHz**	**Frequency range (MHz) f_H < 13.567MHz**	**Test Result**
13.56 MHz	2.62	2.24	13.5589	13.5615	**Complies**

20 dB Bandwidth Plot on 13.56 MHz



Date: 7.FEB.2012 00:14:57

99% Occupied Bandwidth Plot on 13.56 MHz



Date: 7.FEB.2012 00:15:09

3.4 Radiated Emissions Measurement

3.4.1 Limit

The field strength of any emissions which appear outside of 13.553 ~ 13.567MHz band shall not exceed the general radiated emissions limits in Section 15.209(a)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.4.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of receiver.

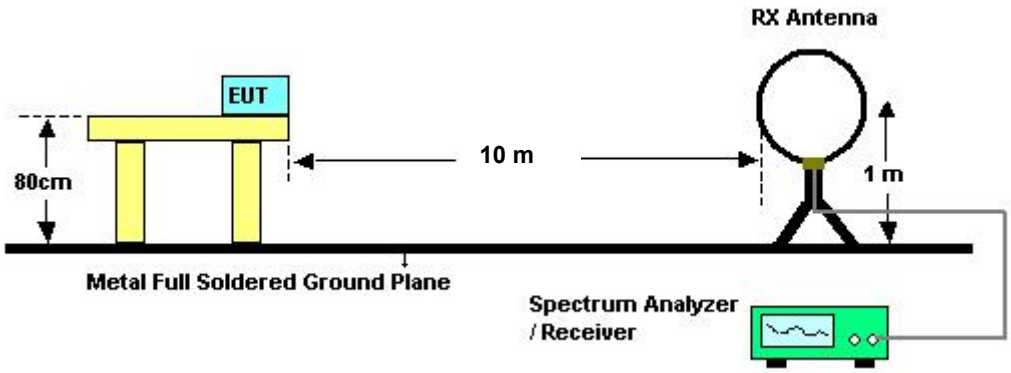
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.4.3 Test Procedures

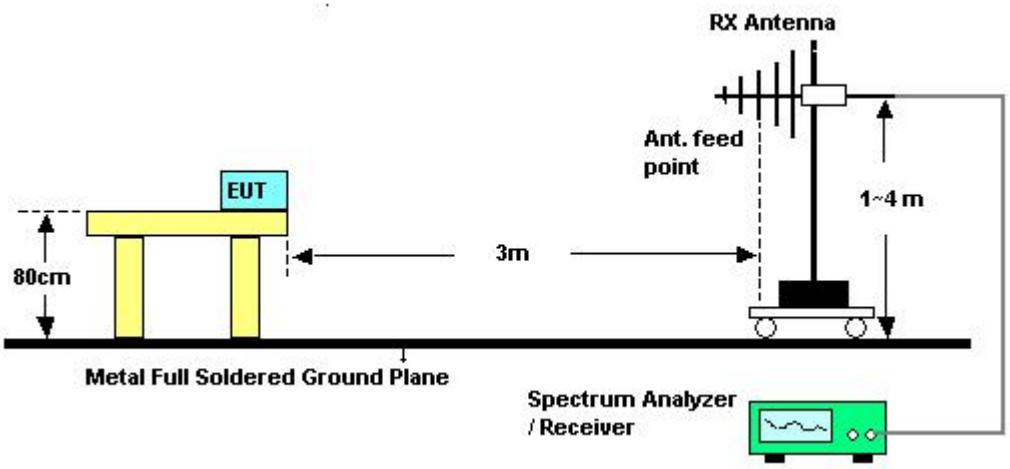
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.4.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.4.5 Test Deviation

There is no deviation with the original standard.

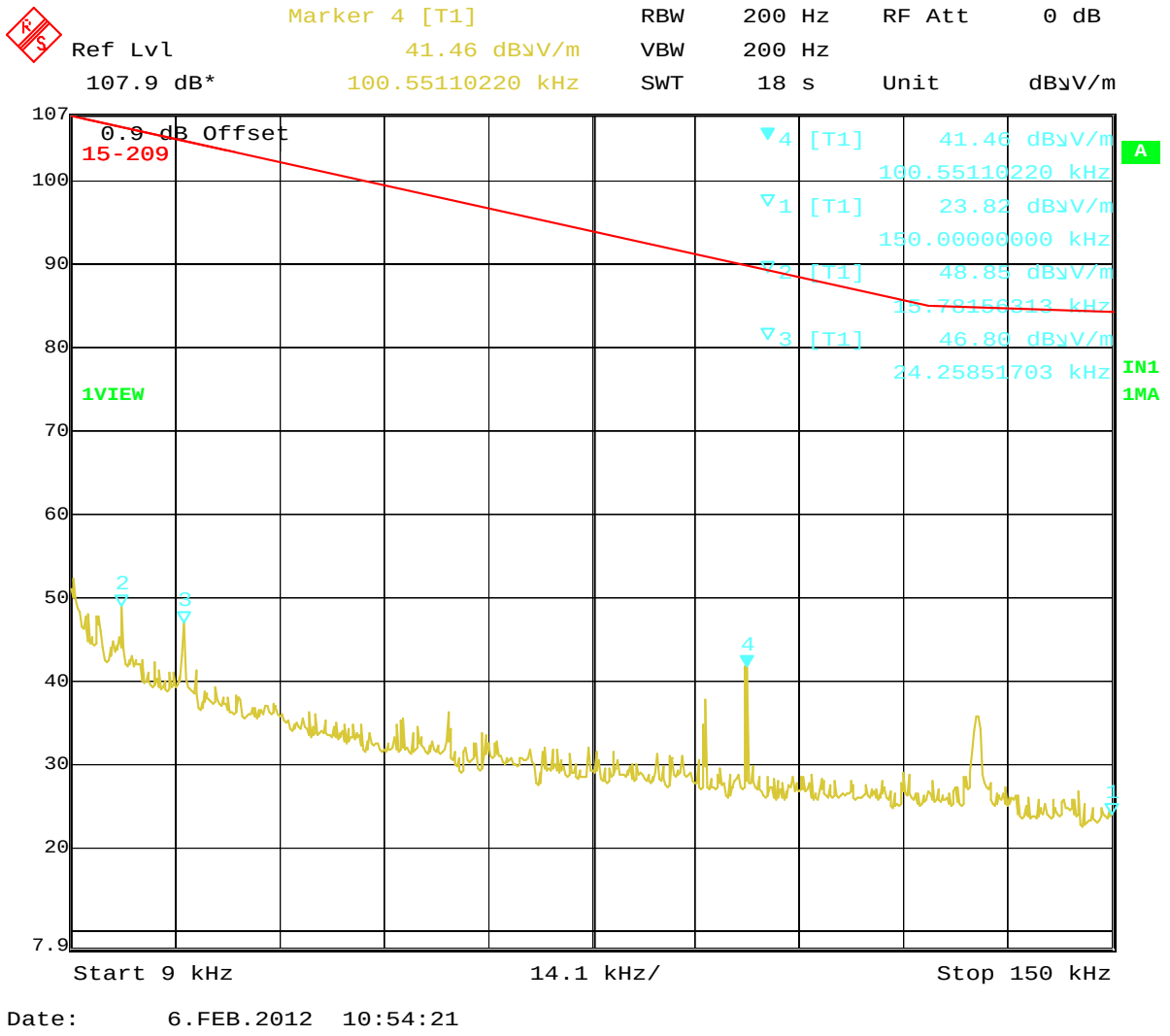
3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

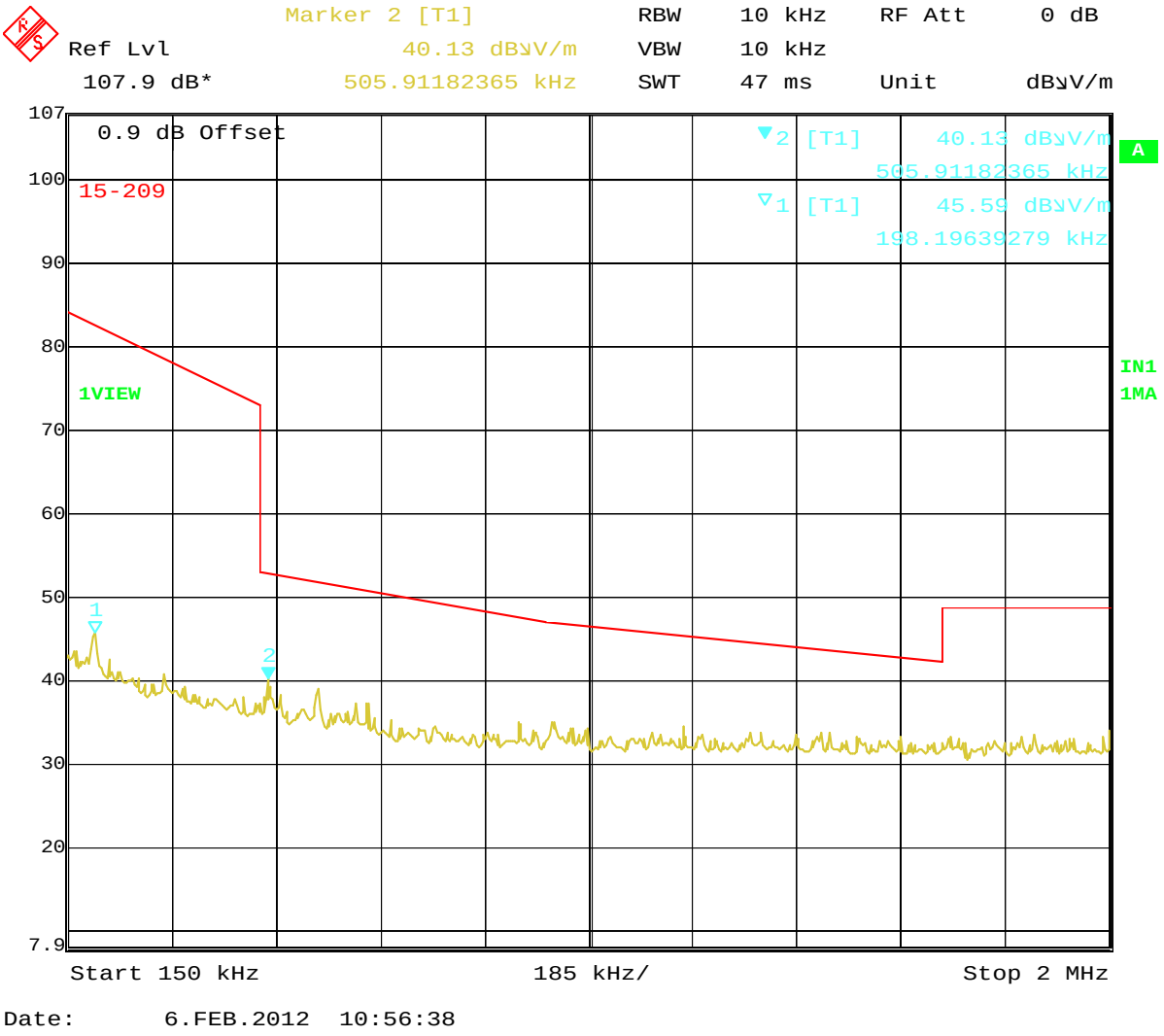
3.4.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Feb. 06, 2012	**Test Site No.**	10CH02-HY
Temperature	22.4℃	**Humidity**	73%
Test Engineer	Streak	**Configurations**	Ch. 1

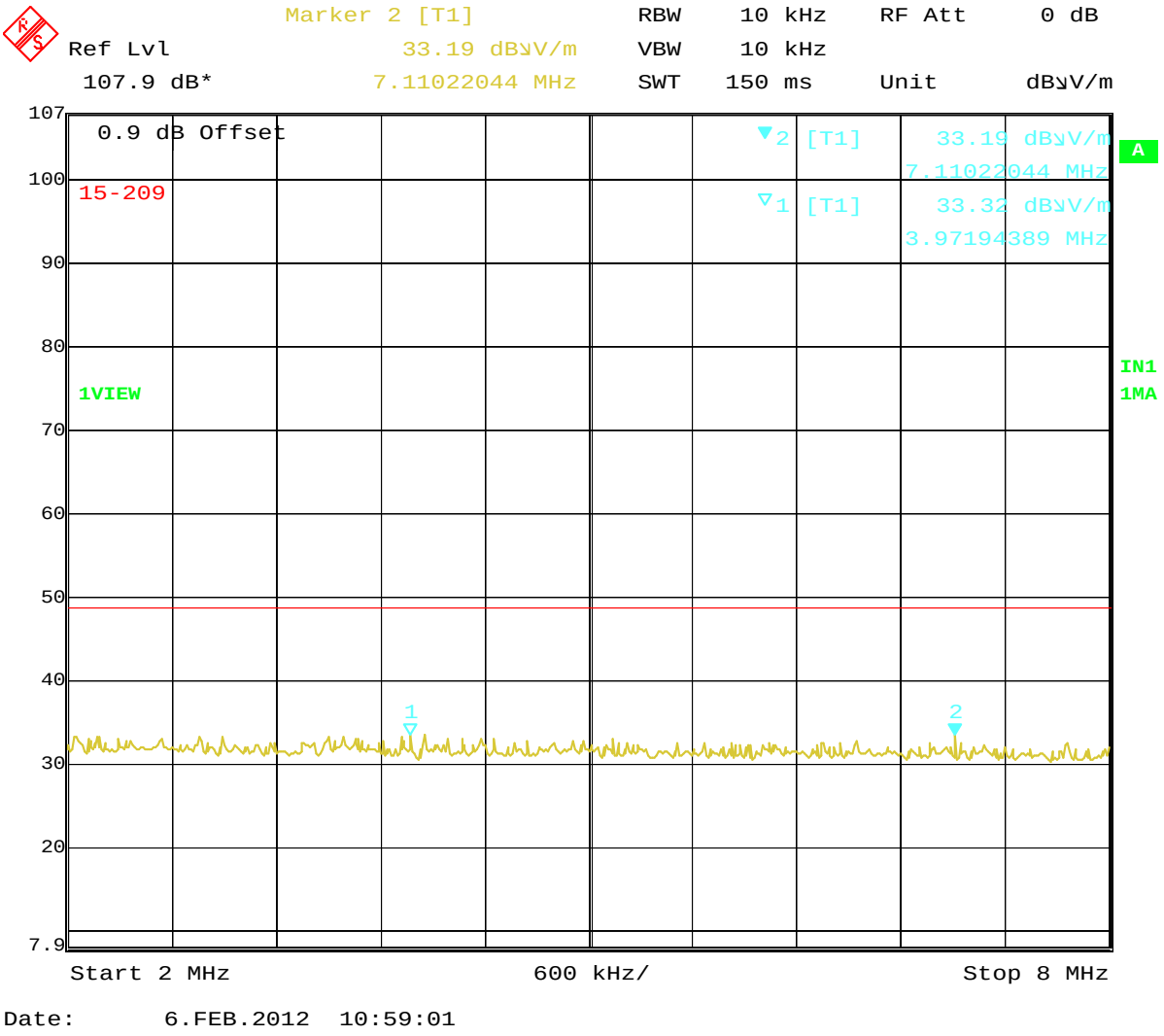
9KHz~150KHz



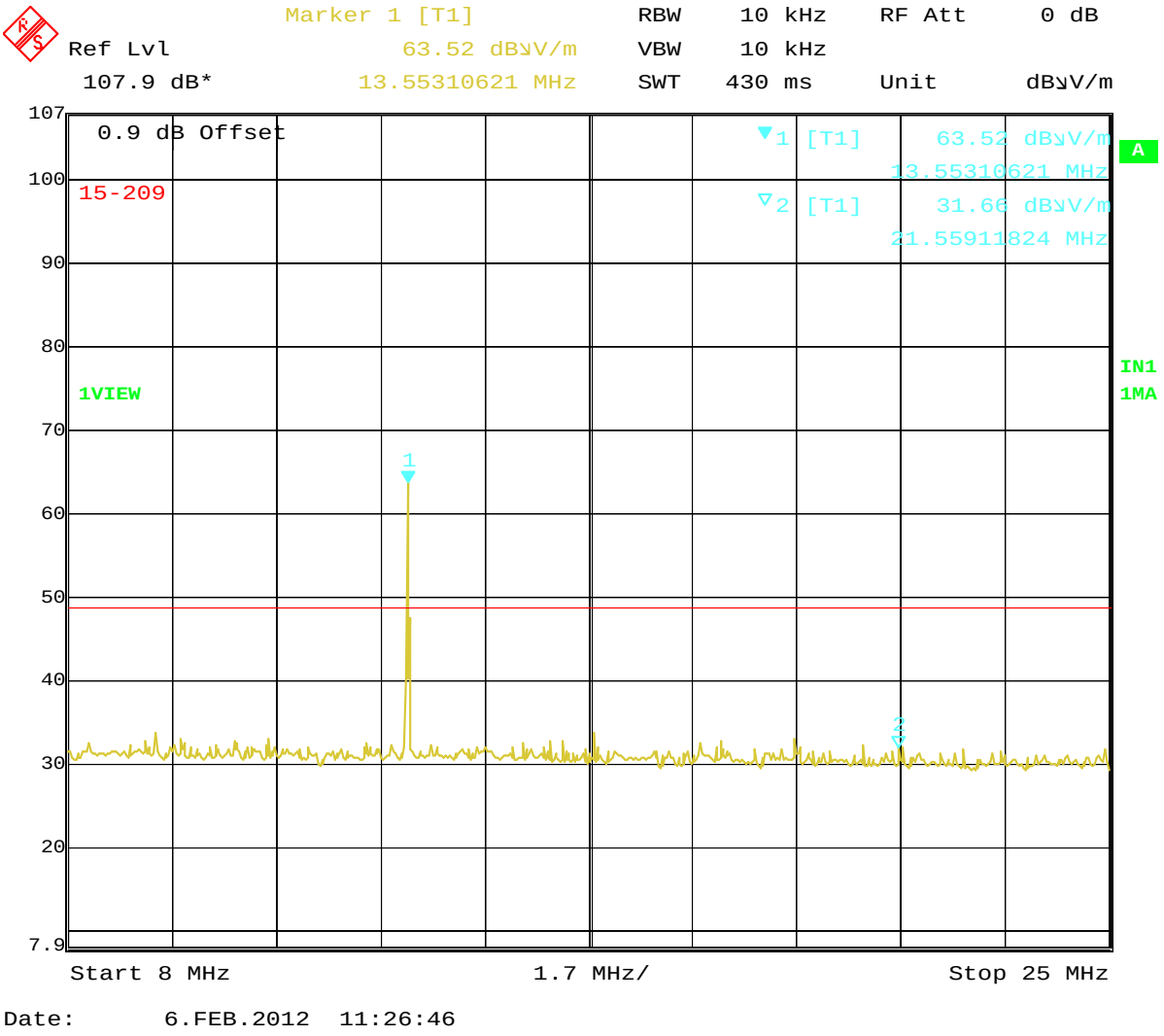
150KHz~2MHz


Marker 2 [T1]
RBW 10 kHz
RF Att 0 dB
Ref Lvl
40.13 dBµV/m
VBW 10 kHz
107.9 dB*
505.91182365 kHz
SWT 47 ms
Unit dBµV/m
0.9 dB Offset
2 [T1] 40.13 dBµV/m
505.91182365 kHz
1 [T1] 45.59 dBµV/m
198.19639279 kHz
15-209
1VIEW
A
IN1
1MA
107
100
90
80
70
60
50
40
30
20
7.9
Start 150 kHz
185 kHz/
Stop 2 MHz
Date: 6.FEB.2012 10:56:38

2MHz~8MHz

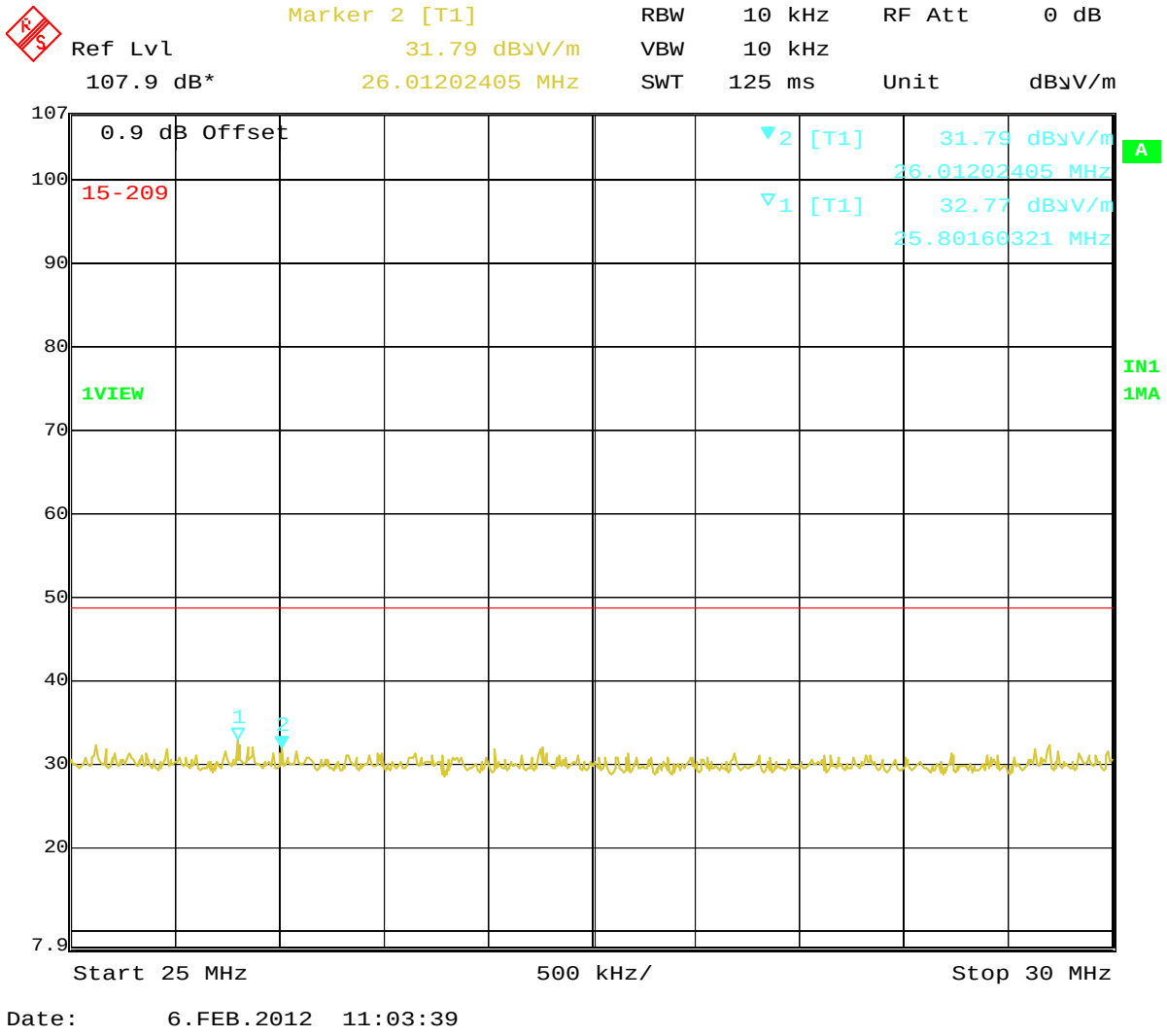

Marker 2 [T1]
RBW 10 kHz
RF Att 0 dB
Ref Lvl
33.19 dBµV/m
VBW 10 kHz
107.9 dB*
7.11022044 MHz
SWT 150 ms
Unit dBµV/m
0.9 dB Offset
2 [T1] 33.19 dBµV/m
7.11022044 MHz
15-209
1 [T1] 33.32 dBµV/m
3.97194389 MHz
A
IN1
1MA
1VIEW
107
100
90
80
70
60
50
40
30
20
7.9
Start 2 MHz
600 kHz/
Stop 8 MHz
Date: 6.FEB.2012 10:59:01

8MHz~25MHz



Marker 1 is the transmitter carrier frequency.

25MHz~30MHz

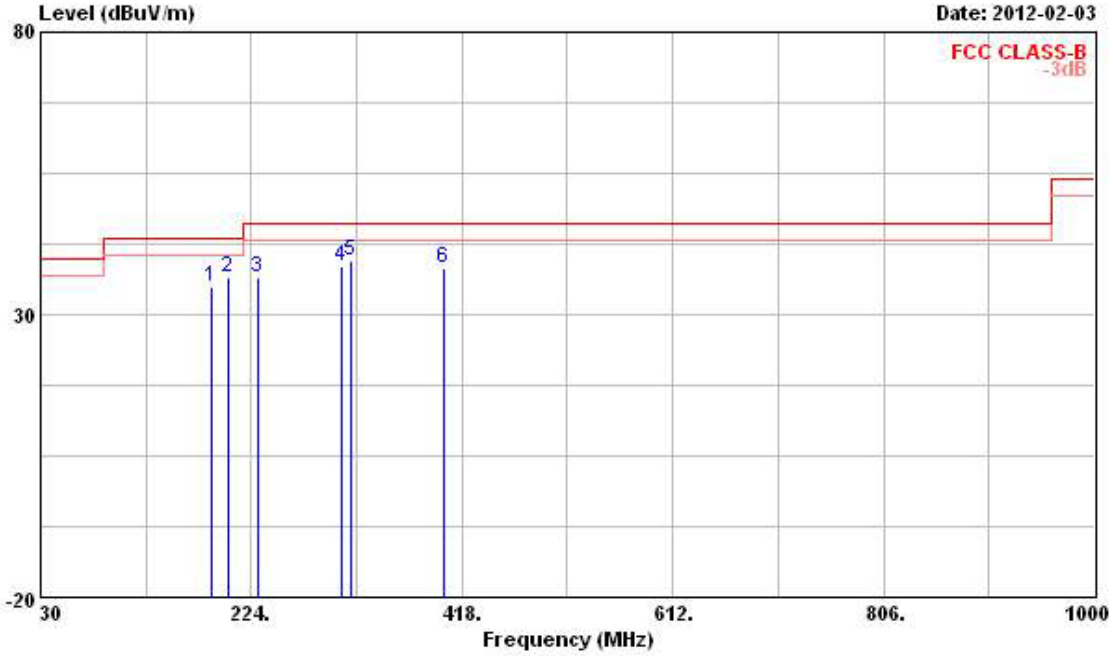


Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

3.4.8 Results for Radiated Emissions (30MHz~1GHz)

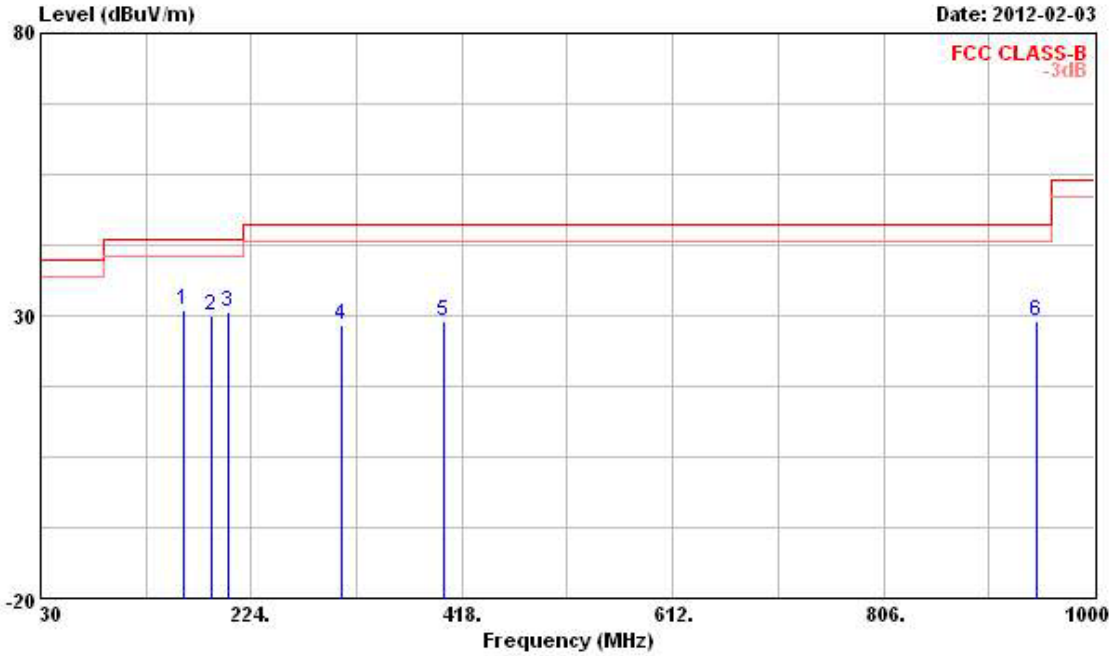
Final Test Date	Feb. 03, 2012	Test Site No.	03CH02-HY
Temperature	22.4℃	Humidity	73%
Test Engineer	Streak	Configurations	Ch. 1

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	188.110	34.95	-8.55	43.50	49.59	10.48	2.34	27.46	Peak	---	---
2 @	202.660	36.67	-6.83	43.50	50.18	11.45	2.44	27.40	Peak	---	---
3 @	229.820	36.54	-9.46	46.00	48.91	12.33	2.64	27.34	Peak	---	---
4 @	307.420	38.68	-7.32	46.00	49.08	13.82	3.00	27.22	Peak	---	---
5 @	316.150	39.43	-6.57	46.00	49.71	13.96	3.03	27.27	Peak	---	---
6 @	401.510	38.20	-7.80	46.00	47.39	15.29	3.40	27.88	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	160.950	30.93	-12.57	43.50	45.91	10.51	2.09	27.58	Peak	---	---
2	188.110	29.89	-13.61	43.50	44.53	10.48	2.34	27.46	Peak	---	---
3	202.660	30.58	-12.92	43.50	44.09	11.45	2.44	27.40	Peak	---	---
4	307.420	28.43	-17.57	46.00	38.83	13.82	3.00	27.22	Peak	---	---
5	401.510	28.87	-17.13	46.00	38.06	15.29	3.40	27.88	Peak	---	---
6	947.620	28.85	-17.15	46.00	29.54	21.21	5.52	27.42	Peak	---	---

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.5 Frequency Stability Measurement

3.5.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

3.5.2 Measuring Instruments and Setting

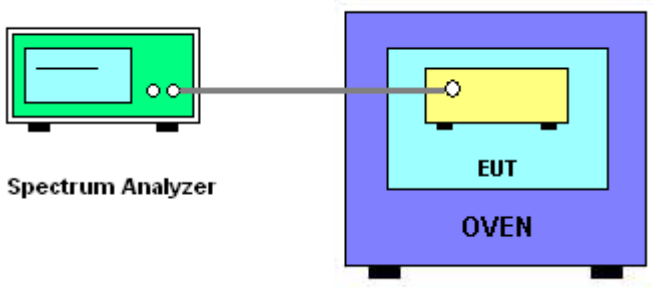
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	1 kHz
VB	1 kHz
Sweep Time	Auto

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 1 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±100ppm.
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -20°C~50°C.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

3.5.7 Test Result of Frequency Stability

Final Test Date	Feb. 06, 2012	**Test Site No.**	TH01-HY
Temperature	22.2℃	**Humidity**	38%
Test Engineer	Ian	**Configurations**	Ch. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	**13.56 MHz**
126.5	13.560160
110	13.560180
93.5	13.560220
Max. Deviation (MHz)	**0.000220**
Max. Deviation (ppm)	**16.2242**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(℃)	**13.56 MHz**
-20	13.560240
-10	13.560260
0	13.560220
10	13.560180
20	13.560160
30	13.560180
40	13.560060
50	13.560020
Max. Deviation (MHz)	**0.000260**
Max. Deviation (ppm)	**19.1740**

3.6 Antenna Requirements

3.6.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.6.2 Antenna Connector Construction

Please refer to section 2.1 in this test report; antenna connector complied with the requirements.

4. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 20, 2011	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	Mar. 10, 2011	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	May 04, 2011	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9kHz – 30MHz	Apr. 21, 2011	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 30	100023	9 KHz ~ 30 GHz	Mar. 15, 2011	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 03, 2011	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Nov. 17, 2011	Conducted (TH01-HY)
RF Cable-1m	Jye Bao	RG142	CB034-1m	20 MHz ~ 7 GHz	Dec. 01, 2011	Conducted (TH01-HY)
RF Cable-2m	Jye Bao	RG142	CB035-2m	20 MHz ~ 1 GHz	Dec. 01, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10 MHz ~ 40 GHz	Jun. 07, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300 MHz ~ 40 GHz	Jun. 16, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300 MHz ~ 40 GHz	Jun. 20, 2011	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 09, 2011*	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is two year.

For Radiated emissions 9kHz~30MHz

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	AGILENT	8447D	2944A10827	100 KHz ~ 1.3 GHz	May 20, 2011	Radiation (10CH02-HY)
Amplifier	AGILENT	8447D	2944A10828	100 KHz ~ 1.3 GHz	May 16, 2011	Radiation (10CH02-HY)
Receiver	R&S	ESI	838496/008	20 Hz ~ 7 GHz	Apr. 24, 2011	Radiation (10CH02-HY)
Spectrum Analyzer	R&S	FSP7	100645	9 KHz ~ 7 GHz	Jun. 01, 2011	Radiation (10CH02-HY)
Turn Table	HD	DS 430	430/360	0 -360 degree	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/664	1 m - 4 m	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/667	1 m - 4 m	N/A	Radiation (10CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

For Radiated emissions 30MHz~1GHz

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz ~ 40 GHz	Feb. 11, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz ~ 1 GHz 3m	May 11, 2011	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz ~ 1.3 GHz	Jul. 25, 2011	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz ~ 1 GHz	Mar. 07, 2011	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz ~ 2 GHz	Oct. 22, 2011	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 29, 2010*	Radiation (10CH02-HY) (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.

5. TEST LOCATION

SHIJR	ADD :	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL :	886-2-2696-2468
	FAX :	886-2-2696-2255
HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL :	886-3-327-3456
	FAX :	886-3-318-0055
LINKOU	ADD :	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL :	886-2-2601-1640
	FAX :	886-2-2601-1695
DUNGHU	ADD :	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL :	886-2-2631-4739
	FAX :	886-2-2631-9740
JUNGHE	ADD :	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL :	886-2-8227-2020
	FAX :	886-2-8227-2626
NEIHU	ADD :	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL :	886-2-2794-8886
	FAX :	886-2-2794-9777
JHUBEI	ADD :	No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL :	886-3-656-9065
	FAX :	886-3-656-9085

6. TAF CERTIFICATE OF ACCREDITATION

Certificate No.：L1190-110111

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date：January 11, 2011

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