FCC/IC Test Report

APPLICANT	:	Option nv
EQUIPMENT	:	GTM661W
BRAND NAME	:	Option
MODEL NAME	:	MO6612
FCC ID	:	NCMOMO6612
IC	:	2734A-MO6612
STANDARD	:	ICES-003 Issue 4 FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION	:	Certification

The product was received on Nov. 26, 2010 and completely tested on May 04, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Roy Wu / Manager

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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FD140819	Rev. 01	Initial issue of report	May 12, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.107	7.2.2	AC Conducted Emission	< 15.107 limits < RSS-Gen table 2 limits	PASS	Under limit 13.3 dB at 0.26 MHz
3.2	15.109	7.2.3.2	Radiated Emission	< 15.109 limits or < RSS-Gen table 1 limits (Section 6)	PASS	Under limit 8.59 dB at 312.60 MHz

1. General Description

1.1. Applicant

Option nv
Gaston Geenslaan 14, 3001 Leuven, Belgium

1.2. Manufacturer

Option nv
Gaston Geenslaan 14, 3001 Leuven, Belgium

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GTM661W
Brand Name	Option
Model Name	MO6612
FCC ID	NCMOMO6612
IC	2734A-MO6612
Tx Frequency Range	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz WCDMA Band II : 1850 MHz ~ 1910 MHz
Rx Frequency Range	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz WCDMA Band II : 1930 MHz ~ 1990 MHz GPS : 1.57542 GHz
Antenna Type	Fixed External Antenna
HW Version	3.1
SW Version	1.7.3.0
Type of Modulation	GSM / GPRS : GMSK EDGE : 8PSK WCDMA : QPSK HSDPA : QPSK / 16QAM HSUPA : BPSK GPS : BPSK
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Test Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		**FCC/IC Registration No.**
	CO05-HY	03CH07-HY	722060/4086B-1

1.5. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR FCC Part 15 Subpart B
- IC ICES-003 Issue 4
- ANSI C63.4-2003
- IC RSS-Gen Issue 3

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. The test results for FCC compliance, indicating that these results are deemed satisfactory evidence of compliance with **Industry Canada Interference-Causing Equipment Standard ICES-003**.

1.6. Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
3.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test modes as the worst cases and recorded in this report.

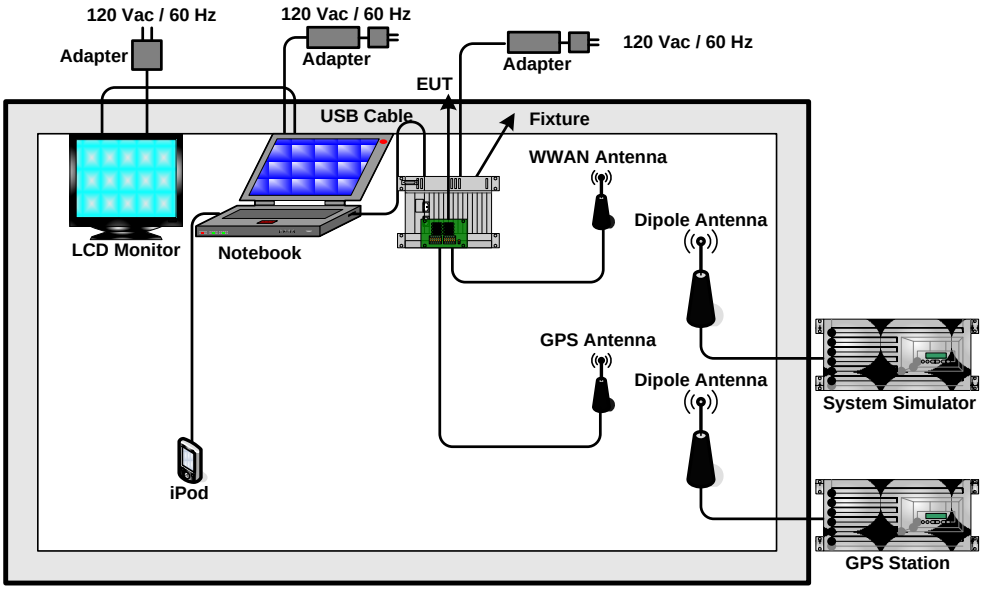
Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Charging Mode (EUT with adapter)	☒	☒	☒

Abbreviations:

- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1 : GSM850 Idle + GPS Rx + Adapter Mode 2 : WCDMA Band II Idle + GPS Rx + Adapter
Radiated Emissions < 1GHz	1	Mode 1 : GSM850 Idle + GPS Rx + Adapter Mode 2 : WCDMA Band II Idle + GPS Rx + Adapter
Radiated Emissions ≥ 1GHz	1	Mode 1 : GSM850 Idle + GPS Rx + Adapter
Remark: **1.** The worst case of AC is mode 1; only the test data of this mode was reported. **2.** The worst case of RE < 1G is mode 1; only the test data of this mode was reported.		

2.2. Connection Diagram of Test System



2.3. Test Software

The EUT was in GSM or WCDMA idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT execute "MinGPS Lite for PC.exe" to make the EUT receive signals from GPS station continuously.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (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 the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

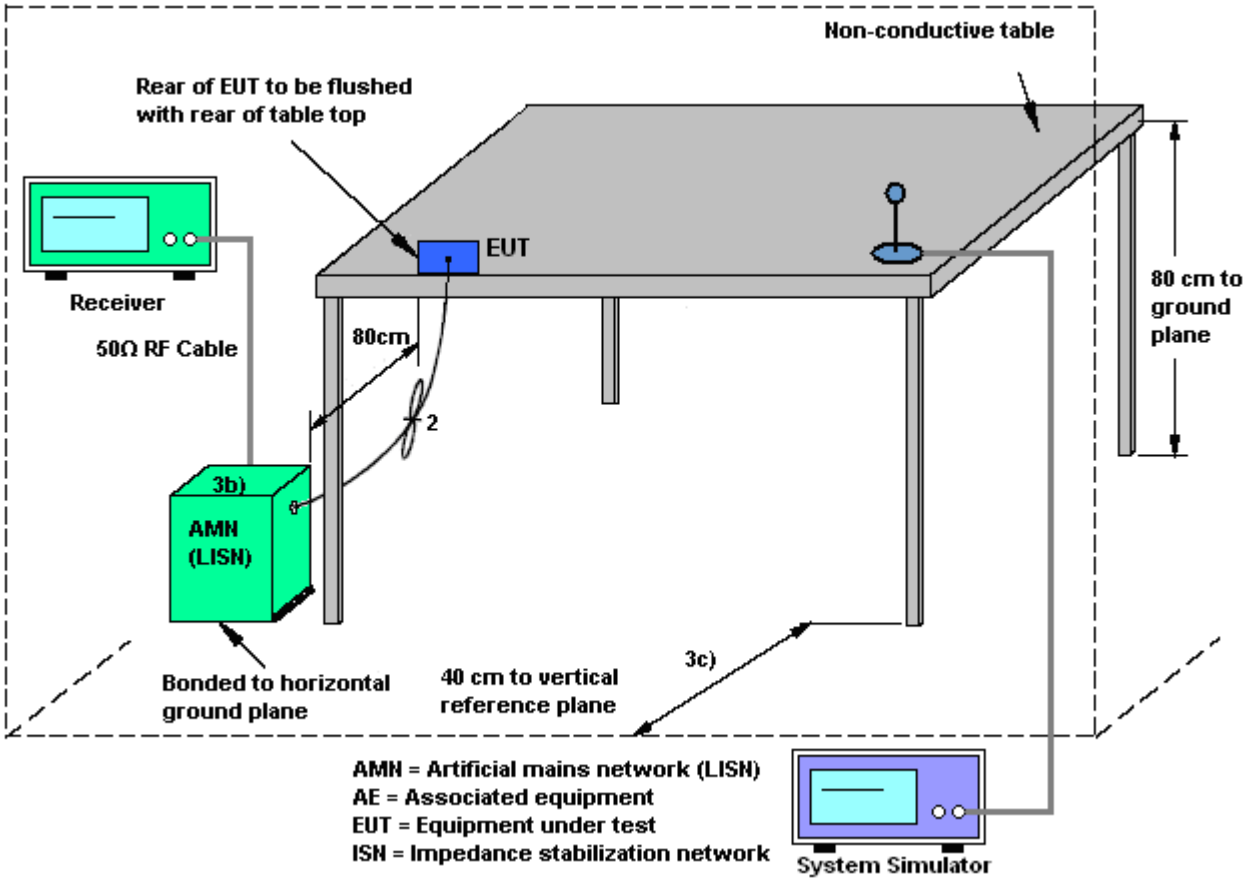
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

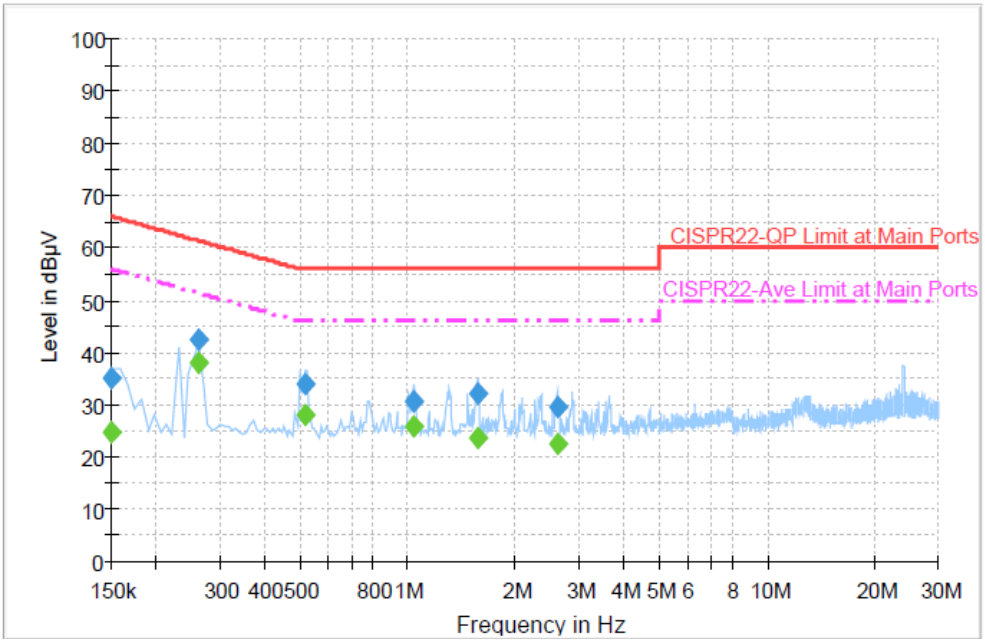
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + GPS Rx + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



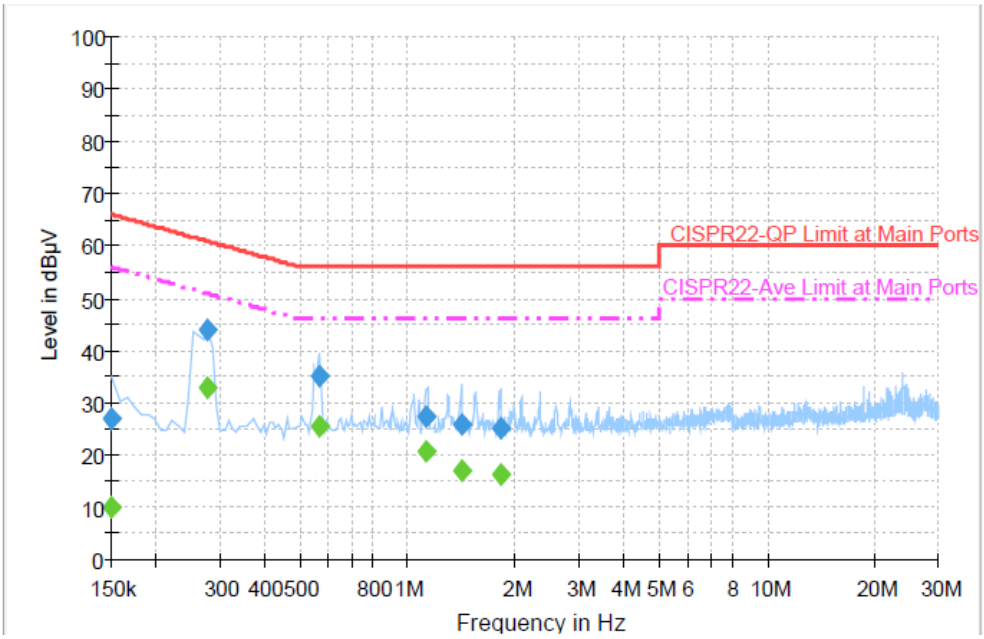
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	34.9	Off	L1	19.4	31.1	66.0
0.262000	42.4	Off	L1	19.4	19.0	61.4
0.518000	34.0	Off	L1	19.4	22.0	56.0
1.038000	30.8	Off	L1	19.4	25.2	56.0
1.566000	32.1	Off	L1	19.4	23.9	56.0
2.606000	29.7	Off	L1	19.4	26.3	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	24.6	Off	L1	19.4	31.4	56.0
0.262000	38.1	Off	L1	19.4	13.3	51.4
0.518000	28.0	Off	L1	19.4	18.0	46.0
1.038000	25.8	Off	L1	19.4	20.2	46.0
1.566000	23.8	Off	L1	19.4	22.2	46.0
2.606000	22.4	Off	L1	19.4	23.6	46.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + GPS Rx + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	26.8	Off	N	19.4	39.2	66.0
0.278000	43.8	Off	N	19.4	16.1	60.9
0.566000	35.0	Off	N	19.4	21.0	56.0
1.126000	27.2	Off	N	19.5	28.8	56.0
1.414000	25.9	Off	N	19.5	30.1	56.0
1.814000	25.0	Off	N	19.5	31.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	9.8	Off	N	19.4	46.2	56.0
0.278000	33.0	Off	N	19.4	17.9	50.9
0.566000	25.6	Off	N	19.4	20.4	46.0
1.126000	20.7	Off	N	19.5	25.3	46.0
1.414000	17.1	Off	N	19.5	28.9	46.0
1.814000	16.1	Off	N	19.5	39.9	46.0

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/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

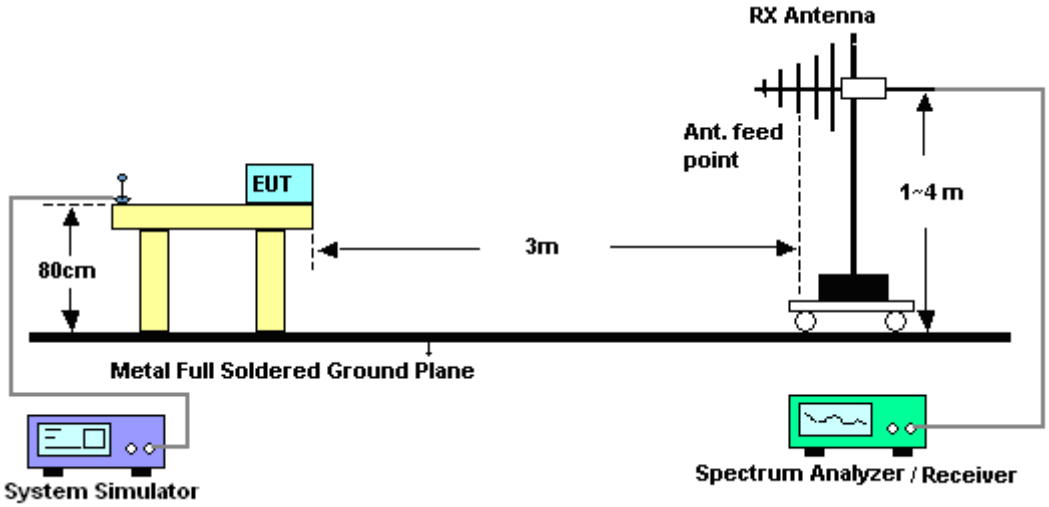
3.2.2. Measuring Instruments

See list of measuring instruments of this test report.

3.2.3. Test Procedures

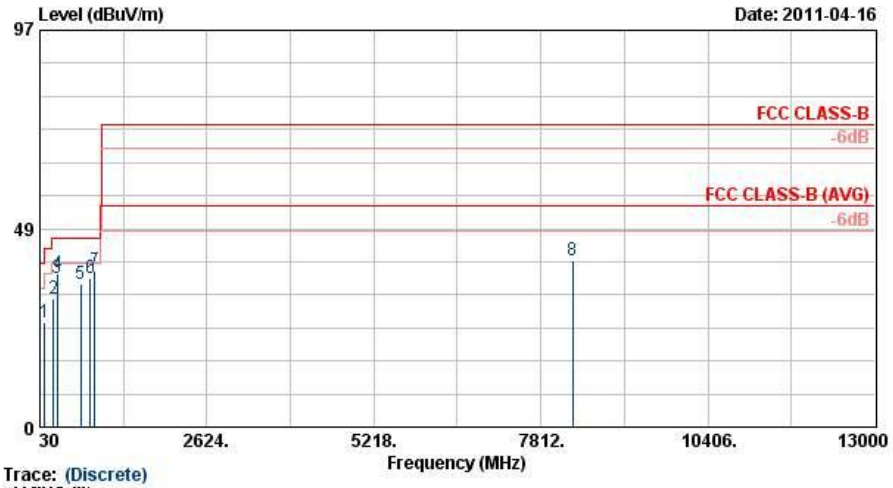
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported
8. Emission level (dBuV/m) = 20 log Emission level (uV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission



3.2.5. Test Result of Radiated Emission

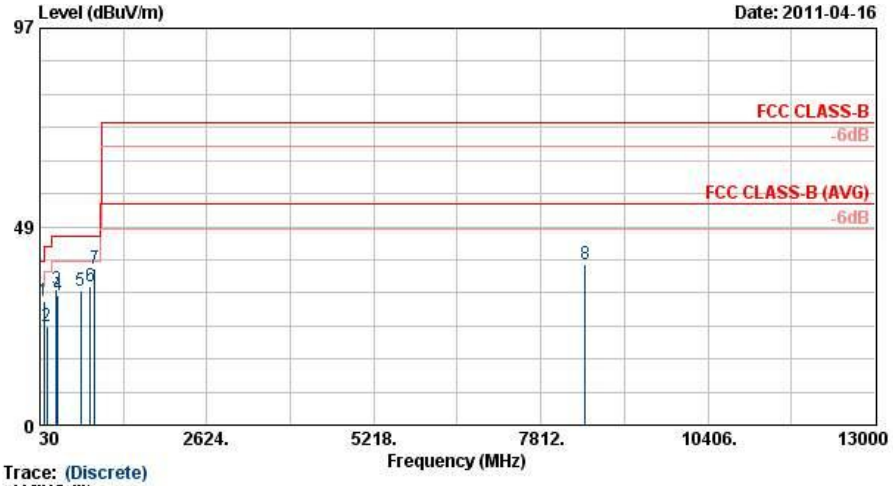
Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kay Wu	Relative Humidity :	48~51%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM850 Idle + GPS Rx + Adapter		
Remark :	#7 is System Simulator Signal which can be ignored.		



Site : 03CH07-HY
Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
Project : FD 140819
Mode : Mode 1
Power : 120Vac/60Hz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	103.98	25.69	-17.81	43.50	46.10	10.12	1.01	31.54	---	---	Peak
2	242.22	31.51	-14.49	46.00	49.28	12.12	1.53	31.42	---	---	Peak
3	296.22	36.49	-9.51	46.00	52.68	13.40	1.74	31.33	---	---	Peak
4	312.60	37.41	-8.59	46.00	53.09	13.85	1.79	31.32	120	227	Peak
5	663.30	35.11	-10.89	46.00	42.62	20.48	2.87	30.86	---	---	Peak
6	811.00	36.35	-9.65	46.00	41.28	22.59	3.17	30.69	---	---	Peak
7 @	881.70	38.29			42.27	23.42	3.31	30.71	---	---	Peak
8	8302.00	40.76	-33.24	74.00	52.39	35.56	10.93	58.12	100	0	Peak

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Kay Wu	Relative Humidity :	48~51%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GSM850 Idle + GPS Rx + Adapter		
Remark :	#7 is System Simulator Signal which can be ignored.		



Trace: (Discrete)

Site : 03CH07-HY
Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
Project : FD 140819
Mode : Mode 1
Power : 120Vac/60Hz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	89.13	30.29	-13.21	43.50	52.35	8.53	0.93	31.52	---	---	Peak
2	142.05	24.11	-19.39	43.50	42.99	11.46	1.20	31.55	---	---	Peak
3	287.85	33.21	-12.79	46.00	49.58	13.27	1.68	31.33	---	---	Peak
4	313.30	31.81	-14.19	46.00	47.46	13.88	1.80	31.32	---	---	Peak
5	663.30	32.64	-13.36	46.00	40.15	20.48	2.87	30.86	---	---	Peak
6	813.80	33.91	-12.09	46.00	38.80	22.63	3.18	30.69	130	115	Peak
7 @	881.70	38.17			42.15	23.42	3.31	30.71	---	---	Peak
8	8496.00	39.38	-34.62	74.00	50.90	35.60	11.00	58.12	100	0	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)

5. Uncertainty of Evaluation

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

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-Shape	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 (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	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. Photographs of EUT

Please refer to Sporton report number EP140819 as below.