



Test Report

Product Name	Tablet PC MC-C5 / MC-F5
Model No.	CFT-001, CFT-002
FCC ID	Q3QIHW4965AGN
Transmitter Module.	TRF7960

Applicant	Motion Computing Incorporated
Address	8601 Ranch Road 2222, Building #2 Austin, Texas 78730 USA

Date of Receipt	Apr. 17, 2007
Issued Date	Feb. 10, 2009
Report No.	08C321R-RFUSP09V01
Version	V1.0

The test results relate only to the samples tested.
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Test Report Certification

Issued Date: Feb. 10, 2009

Report No.: 08C321R-RFUSP09V01



Product Name	Tablet PC MC-C5 / MC-F5
Applicant	Motion Computing Incorporated
Address	8601 Ranch Road 2222, Building #2 Austin, Texas 78730 USA
Manufacturer	Pegatron Corporation
Model No.	CFT-001, CFT-002
FCC ID.	Q3QIHW4965AGN
Rated Voltage	AC 120V/60Hz
Working Voltage	DC 3.3V
Trade Name	Motion Computing Incorporated
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2007 ANSI C63.4: 2003
Test Result	Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Tablet PC MC-C5 / MC-F5
Trade Name	Motion Computing Incorporated
Model No.	CFT-001, CFT-002
FCC ID	Q3QIHW4965AGN
Frequency Range	13.56MHz
Channel Control	N/A
Antenna Type	Loop
Power Adapter	MFR: DELTA, M/N: ADP-50HH REV.B Input: 100-240V, 50-60Hz, 1.5A Output: 19V-2.64A Cable out: Non-Shielded, 1.75m with one ferrite core bonded. Power Cord: Non-Shielded, 0.75m

Frequency of Each Channel:

Channel	Frequency
Channel 1:	13.56 MHz

Note:

1. This device is a Tablet PC MC-C5 / MC-F5 with a built-in 13.56MHz transmitter.
2. The EUT is including two models for different marketing requirement.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225 for spread spectrum devices.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

EUT is a Tablet PC MC-C5 / MC-F5 with a built-in 13.56MHz transceiver with ASK modulation. The signal will be transmitted through 13.56 MHz ASK RF signal from the Connector antenna from EUT to receiver.

Test Mode	Mode 1: Transmit
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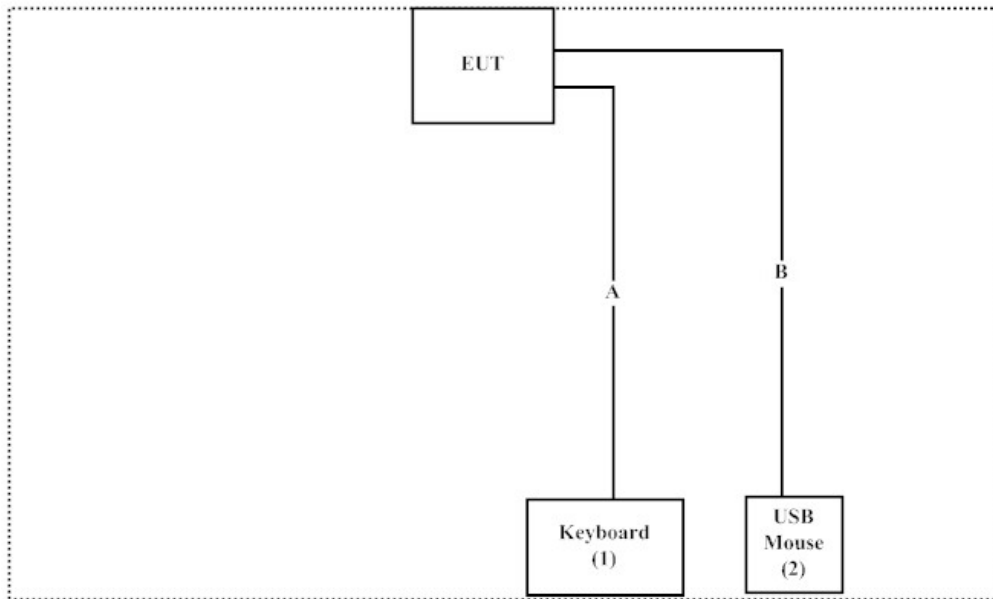
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Keyboard	BTC	5200U	N/A	N/A
(2)	USB Mouse	Logitech	M-BE58	HCA30102934	N/A

	Signal Cable Type	Signal cable Description
A.	Keyboard Cable	Shielded, 1.8m
B.	Mouse Cable	Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute TRF 7960 EVM Control V1.0.0.1 on the notebook.
- (3) Configure the test mode, EUT will continuous transmission the signal.
- (4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://tw.quietek.com/modules/myalbum/>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

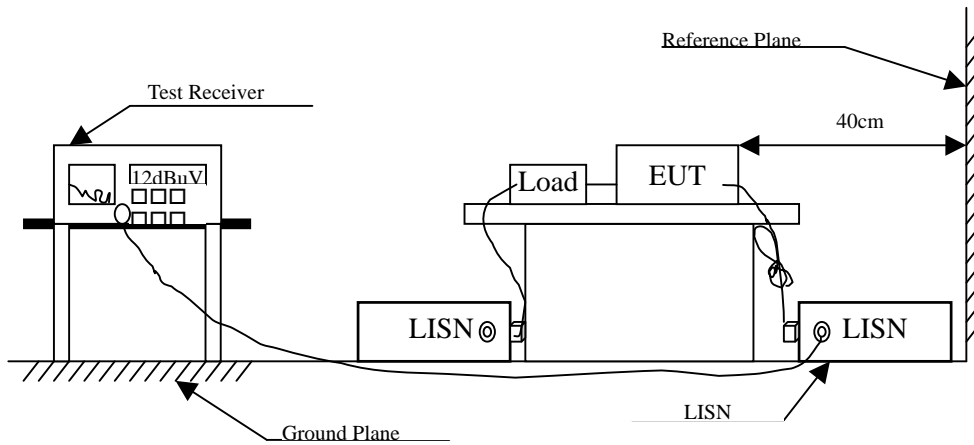
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2008	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2008	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2008	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2008	
5	No.1 Shielded Room			N/A	

Note: All equipments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Tablet PC MC-C5 / MC-F5
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.209	0.202	48.820	49.022	-15.292	64.314
0.269	0.210	39.480	39.690	-22.910	62.600
0.339	0.214	35.750	35.964	-24.636	60.600
0.409	0.215	38.100	38.315	-20.285	58.600
0.479	0.216	32.770	32.986	-23.614	56.600
0.549	0.217	36.200	36.417	-19.583	56.000
Average					
0.209	0.202	31.460	31.662	-22.652	54.314
0.269	0.210	23.840	24.050	-28.550	52.600
0.339	0.214	21.910	22.124	-28.476	50.600
0.409	0.215	24.010	24.225	-24.375	48.600
0.479	0.216	21.740	21.956	-24.644	46.600
0.549	0.217	23.300	23.517	-22.483	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Tablet PC MC-C5 / MC-F5
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmit

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV
	dB	dBuV	dBuV		
LINE 2					
Quasi-Peak					
0.205	0.202	51.880	52.082	-12.347	64.429
0.275	0.203	45.010	45.213	-17.216	62.429
0.345	0.214	37.230	37.444	-22.985	60.429
0.415	0.215	35.900	36.115	-22.314	58.429
0.485	0.216	29.020	29.236	-27.193	56.429
0.545	0.217	33.760	33.977	-22.023	56.000
Average					
0.205	0.202	33.840	34.042	-20.387	54.429
0.275	0.203	29.040	29.243	-23.186	52.429
0.345	0.214	23.130	23.344	-27.085	50.429
0.415	0.215	22.650	22.865	-25.564	48.429
0.485	0.216	18.980	19.196	-27.233	46.429
0.545	0.217	20.620	20.837	-25.163	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

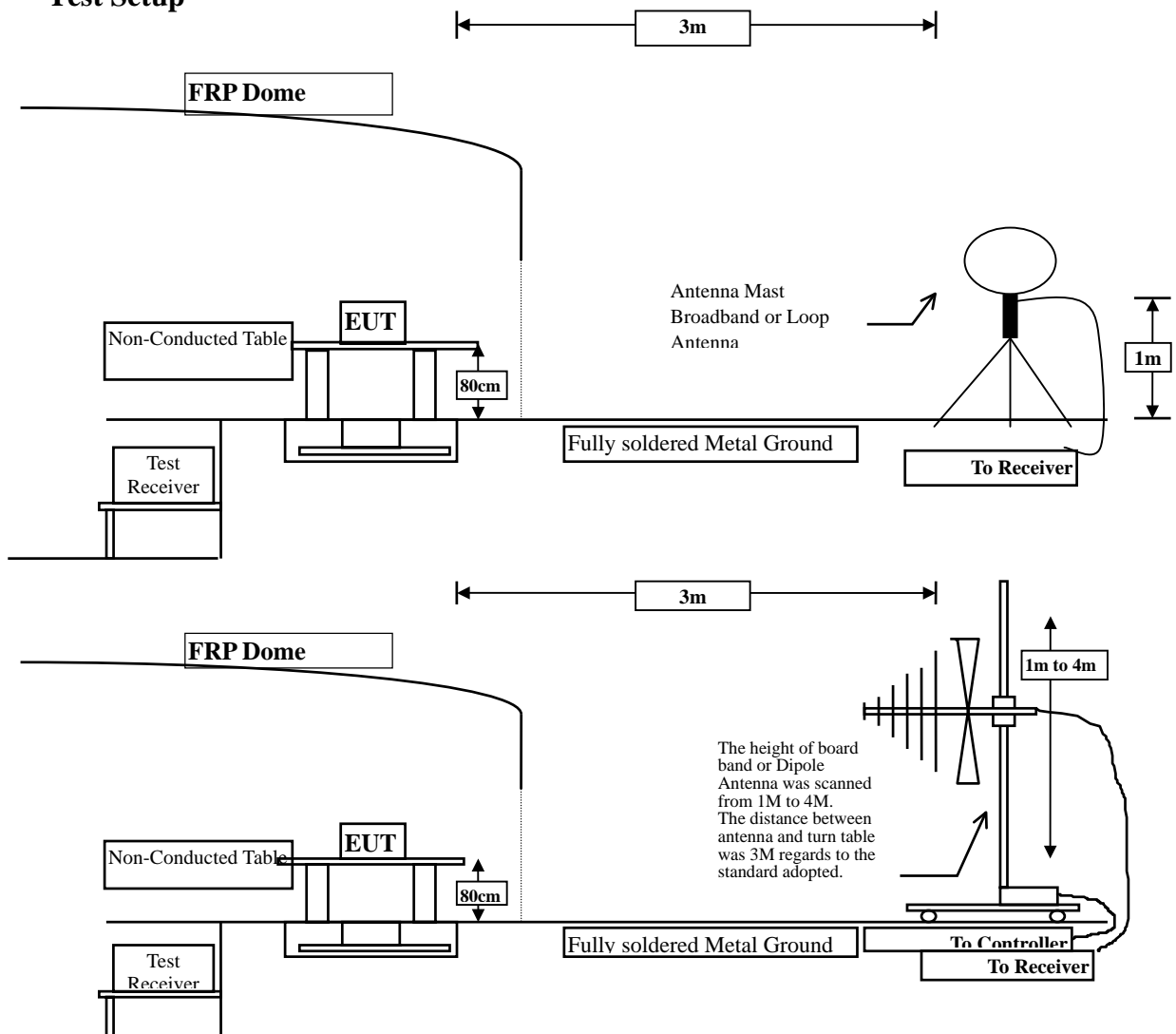
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
	X Horn Antenna	ETS	3115 / 0005-6160	July, 2008
	X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
	X Loop Antenna	R & S	HFH2-Z2/833799/004	July, 2008

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

3.2. Test Setup



3.3. Limits

➤ Fundamental electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Fundamental Frequency MHz	Field strength of fundamental			
	uV/m	Distance (meter)	dBuV/m	Distance (meter)
13.553 – 13.567	15848	30	124	3

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

Fundamental electric field strength:

The EUT and its simulators are placed on a turn table which is 1 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum electric field strength.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna which is 1 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

Spurious electric field strength:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

3.5. Uncertainty

± 2.6 dB below 30MHz

± 3.8 dB above 30MHz

3.6. Test Result of Radiated Emission

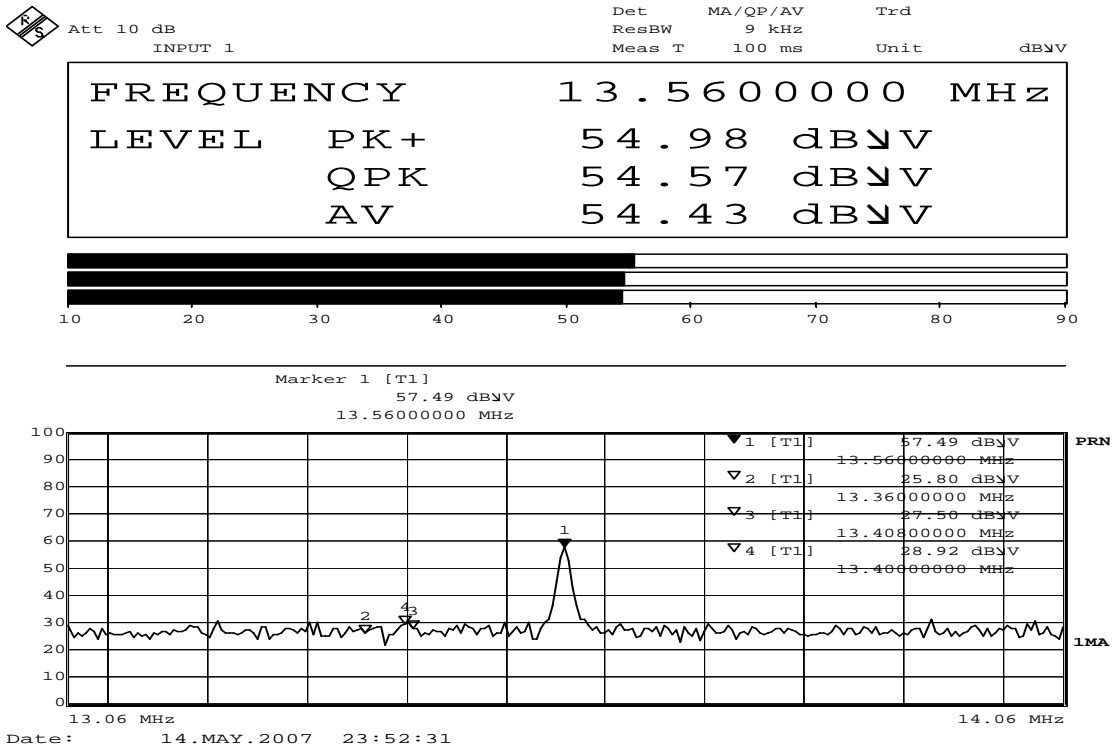
Product : Tablet PC MC-C5 / MC-F5
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
QP Detector					
13.560	0.710	54.570	55.280	-68.720	124.000

Note:

1. The Measurement is distance at 3 meters, Limit=84dBuV+40dB (40dB/decade)=124dBuV
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

CH 1



Product : Tablet PC MC-C5 / MC-F5
 Test Item : General Radiated Emission Data (below 30MHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
QP Detector					
3.014	0.520	31.900	32.420	-37.120	69.540
5.297	0.530	31.760	32.290	-37.250	69.540
6.199	0.580	31.960	32.540	-37.000	69.540
9.985	0.540	33.210	33.750	-35.790	69.540
16.116	0.740	32.270	33.010	-36.530	69.540
16.597	0.730	32.840	33.570	-35.970	69.540

Note:

1. The Measurement is distance at 3 meters, Limit=29.54dBuV+40dB
(40dB/decade)=69.54dBuV
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. "■" means the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.

Product : Tablet PC MC-C5 / MC-F5
 Test Item : General Radiated Emission Data (above 30MHz)
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
QP Detector					
95.475	12.009	23.827	35.836	-7.664	43.500
240.975	12.077	28.118	40.195	-5.805	46.000
432.550	17.666	18.823	36.489	-9.511	46.000
456.800	18.477	21.850	40.327	-5.673	46.000
527.125	18.485	21.643	40.128	-5.872	46.000
599.875	19.999	18.695	38.694	-7.306	46.000
Vertical					
QP Detector					
228.850	11.151	29.136	40.287	-5.713	46.000
240.975	12.463	28.883	41.346	-4.654	46.000
265.225	14.417	22.566	36.983	-9.017	46.000
335.550	14.360	27.227	41.587	-4.413	46.000
432.550	19.299	20.029	39.328	-6.672	46.000
527.125	18.888	21.746	40.634	-5.366	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

4. Band Edge

4.1. Test Equipment

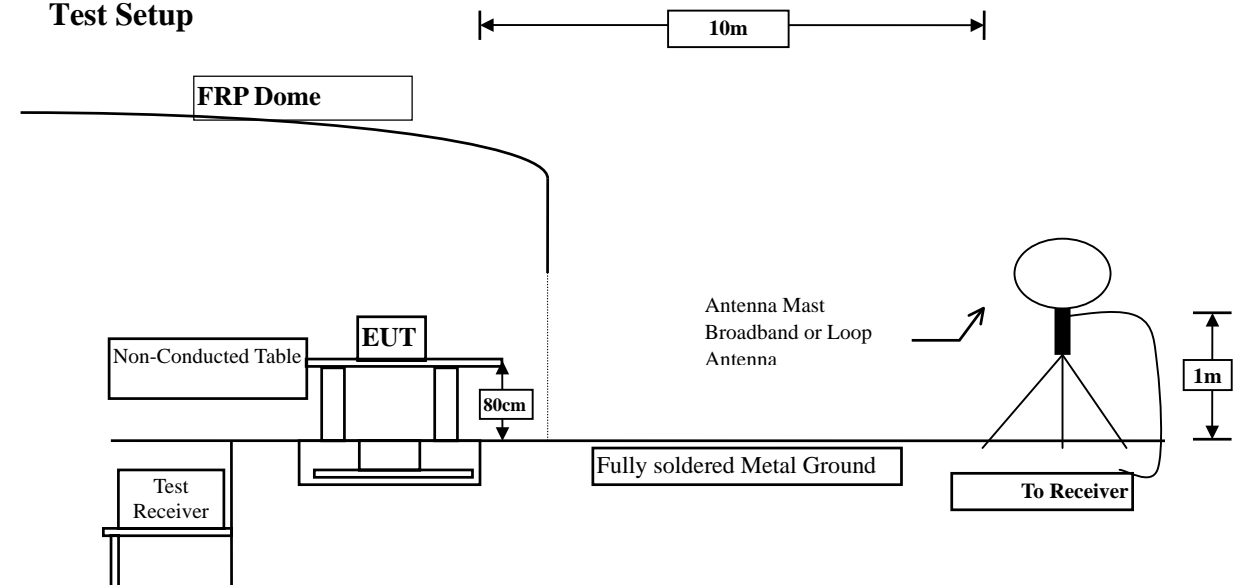
The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
X Horn Antenna	ETS	3115 / 0005-6160	July, 2008
X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
X Loop Antenna	R & S	HFH2-Z2/833799/004	July, 2006

Test Site: Site 3

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup



4.3. Limits

In any 9 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 9 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 on radiated measurement.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

4.5. Uncertainty

Radiated is ± 2.6 dB

4.6. Test Result of Band Edge

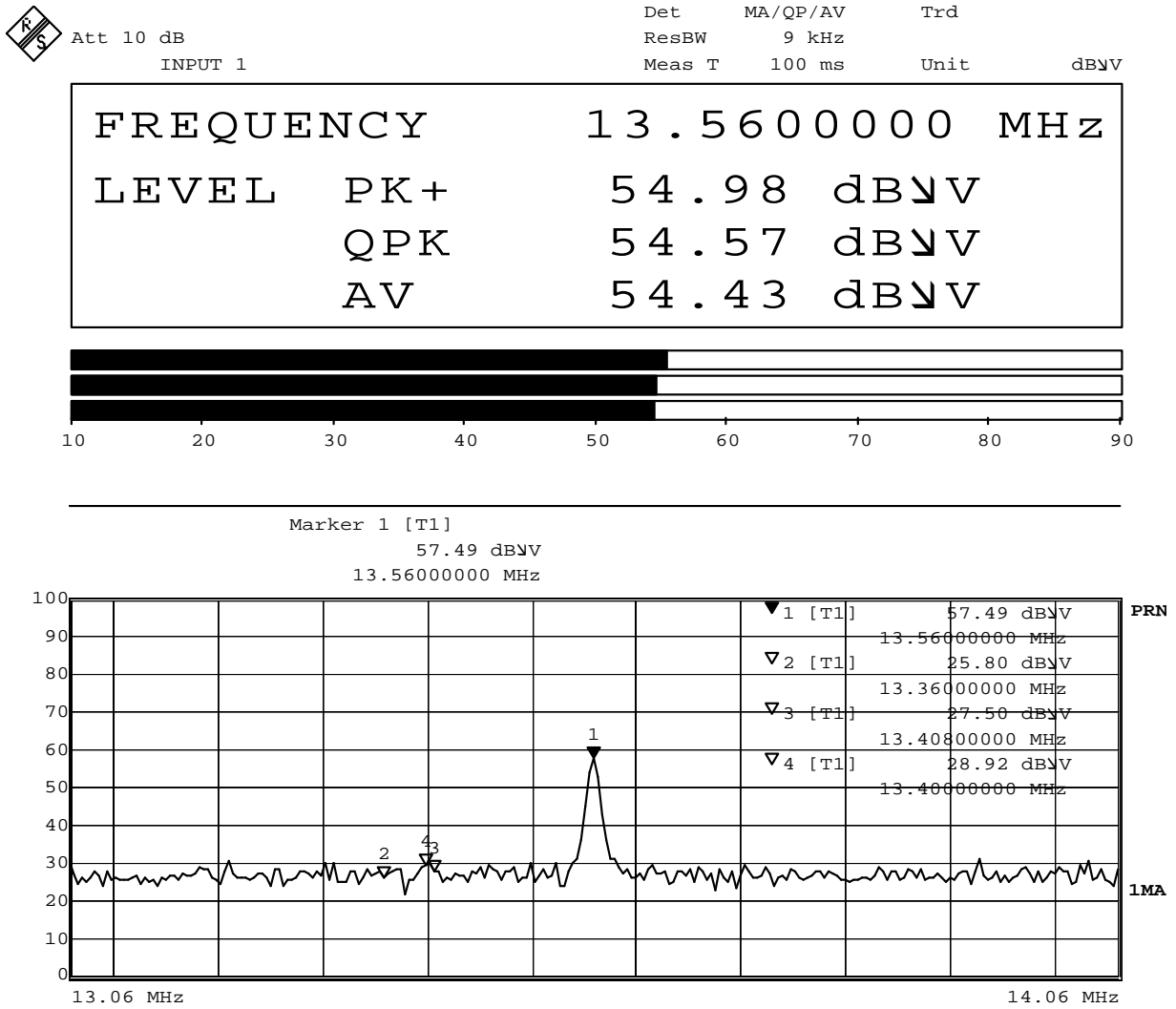
Product : Tablet PC MC-C5 / MC-F5
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

RF Radiated Measurement :

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Quasi-Peak)	13.400	0.720	28.92	29.64	69.540	Pass

Note: The Measurement is distance at 3 meters, Limit=29.54dBuV+40dB (40dB/decade)=69.54dBuV

Figure Channel 1: (Band Edge Data see mark 4)



Date: 14.MAY.2007 23:52:31

5. Occupied Bandwidth

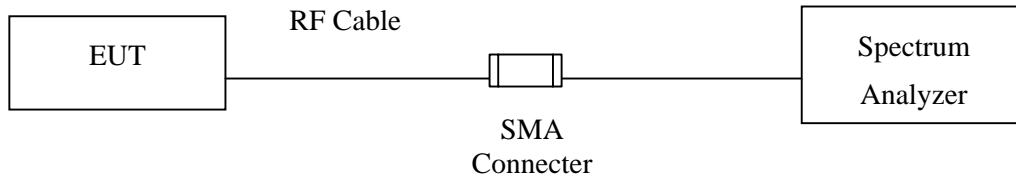
5.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
X Spectrum Analyzer	R & S	FSP40 / 100339	Apr, 2008
Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008

Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

5.2. Test Setup



5.3. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.

The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.4. Uncertainty

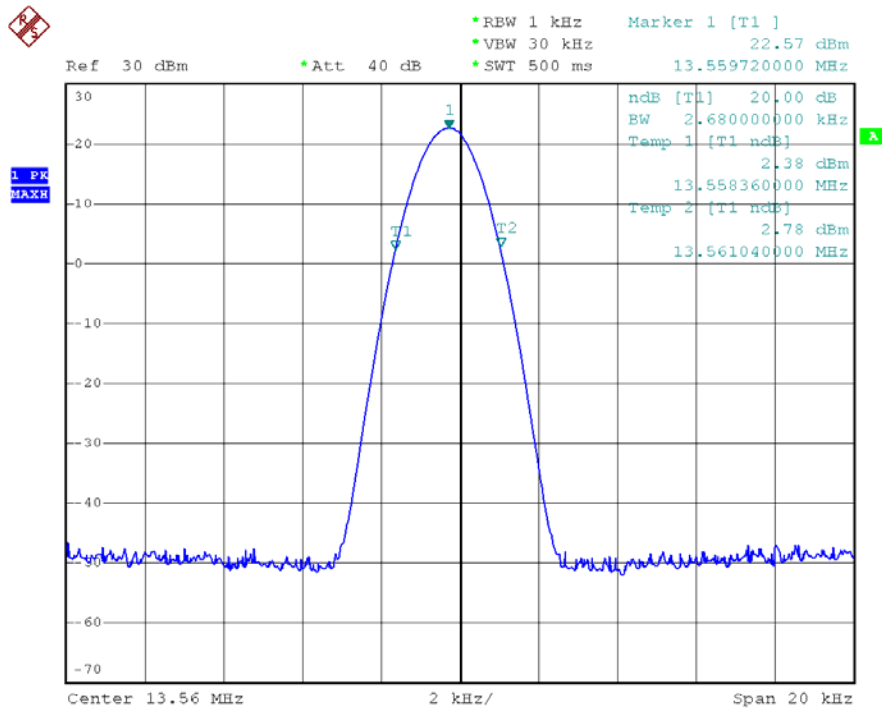
± 150Hz

5.5. Test Result of Occupied Bandwidth

Product : Tablet PC MC-C5 / MC-F5
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	13.56	2.68	--	Pass

Figure Channel 1:



PN1

Date: 15.MAY.2007 08:30:57

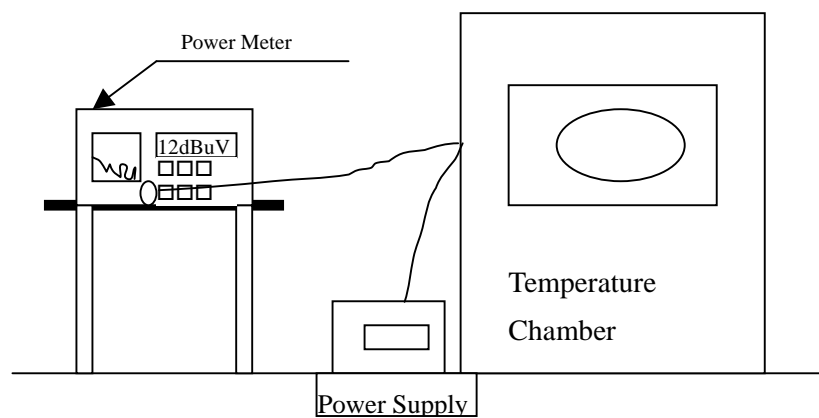
6. Frequency Tolerance

6.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.	Remark
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008	
Temperature Chamber	WIT GROUP	TH-1S-B / WIT-02121901	June, 2008	

Note: All equipments are calibrated every one year.

6.2. Test Setup



6.3. Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

6.4. Test Procedure

The over 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.

6.5. Uncertainty

± 150 Hz

6.6. Test Result of Frequency Stability

Product : Tablet PC MC-C5 / MC-F5
 Test Item : Frequency Tolerance
 Test Site : Temperature Chamber
 Test Mode : Mode 1: Transmit

Test Conditions		Channel	Frequency (MHz)	Reading Frequency (MHz)	Limit
Tnom (20) °C	Vnom (120)V	01	13.56	13.5605	13.5586~13.5613MHz
Tmax (50) °C	Vmax (136.5)V	01	13.56	13.5605	13.5586~13.5613MHz
Tmax (50) °C	Vmin (103.5)V	01	13.56	13.5605	13.5586~13.5613MHz
Tmin (-20) °C	Vmax (136.5)V	01	13.56	13.5605	13.5586~13.5613MHz
Tmin (-20) °C	Vmin (103.5)V	01	13.56	13.5605	13.5586~13.5613MHz

Note: Limit=13.56MHz * (±) 0.01% = 13.5586~13.5613MHz

7. EMI Reduction Method During Compliance Testing

No modification was made during testing.