FCC Test Report

EQUIPMENT	:	**Bluetooth Handsfree Car kit**
BRAND NAME	:	**Mantis Wireless Products**
MODEL NAME	:	**Mantis C1000 / C1050**
FCC ID	:	**WZHC10XX**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**Digital Spread Spectrum (DSS)**
APPLICANT	:	**Mantis Products LLC**
		4544 Valleyview Drive West Bloomfield MI 48323 USA

The product sample received on Dec. 24, 2008 and completely tested on Dec. 25, 2008. We, SPORTON INTERNATIONAL (KUNSHAN) 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 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Testing Laboratory 1190

Reviewed by: Roy Wu / Manager

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(b)(1)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(a)(1)	A8.1(b)	Peak Output Power	≤ 0.125W	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.91 dB at 4806.00 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR8D2432	Rev. 01	Initial issue of report	Jan. 17, 2009

1 General Description

1.1 Applicant

Mantis Products LLC
4544 Valleyview Drive West Bloomfield MI 48323 USA

1.2 Manufacturer

Flaircomm Technologies Inc
No. 5, Bibo Road, Keyuan Building, 4F, Zhanggiang Hi-Tech Park, Shanghai, 201203 P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Bluetooth Handsfree Car kit
Brand Name	Mantis Wireless Products
Model Name	Mantis C1000/C1050
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	-1.42 dBm
Antenna Type	PCB Antenna with gain 0.54 dBi
Antenna Connector Type	N/A
Type of Modulation	GFSK
EUT Stage	Identical Prototype

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: 86-0512-5790-0158 / FAX: 86-0512-5790-0958	
Test Site No.	**Sporton Site No.**	
	TH01-KS	03CH01-KS

1.5 Applied Standards

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

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 7

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	Chroma	61601	N/A	N/A	Unshielded, 1.8 m
2.	Phone	Nokia	8600d	QMNRM-164	N/A	N/A
3.	Earphone	Sampo	EK-Y652CS	FCC DoC	Unshielded, 1.2 m	N/A

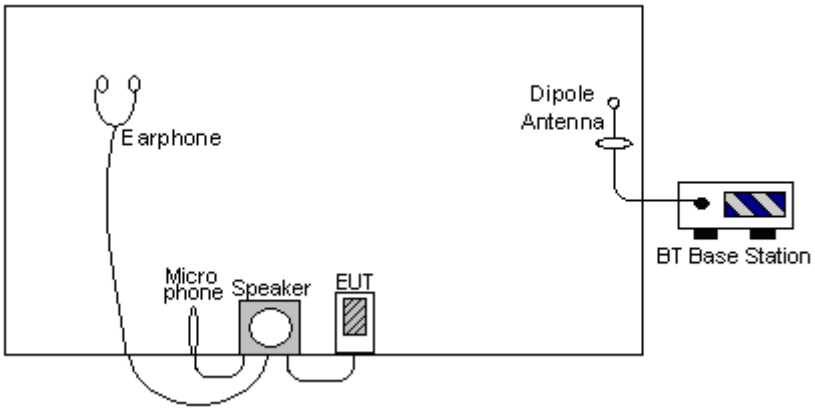
2 Test Configuration of Equipment Under Test

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 (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).Test mode list as follow:

Test Cases		
Test Item	**Modulation**	
	Bluetooth 1Mbps GFSK	
Conducted TCs	■ Mode 1: CH00_2402 MHz ■ Mode 2: CH39_2441 MHz ■ Mode 3: CH78_2480 MHz	
Radiated TCs	■ Mode 1: CH00_2402 MHz ■ Mode 2: CH39_2441 MHz ■ Mode 3: CH78_2480 MHz	

2.2 Connection Diagram of Test System



2.3 RF Utility

The RF Utility, “CSR BlueSuite” was programmed in order to make the EUT into the engineering modes to contact with BT base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

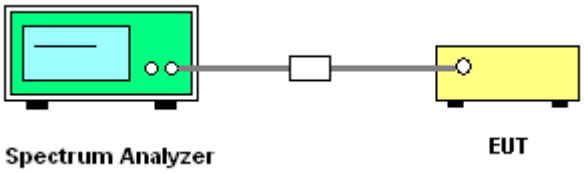
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.1.4 Test Setup

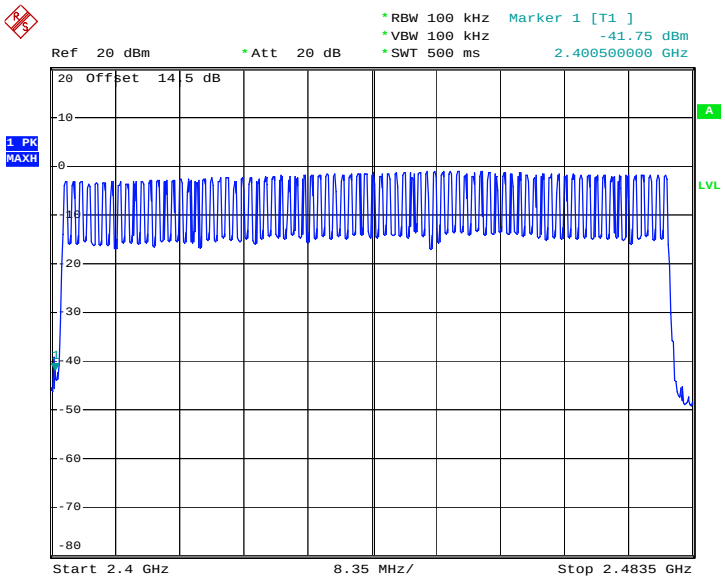


3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	17~18℃
Test Engineer :	Peter Chou	Relative Humidity :	38~40%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



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3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

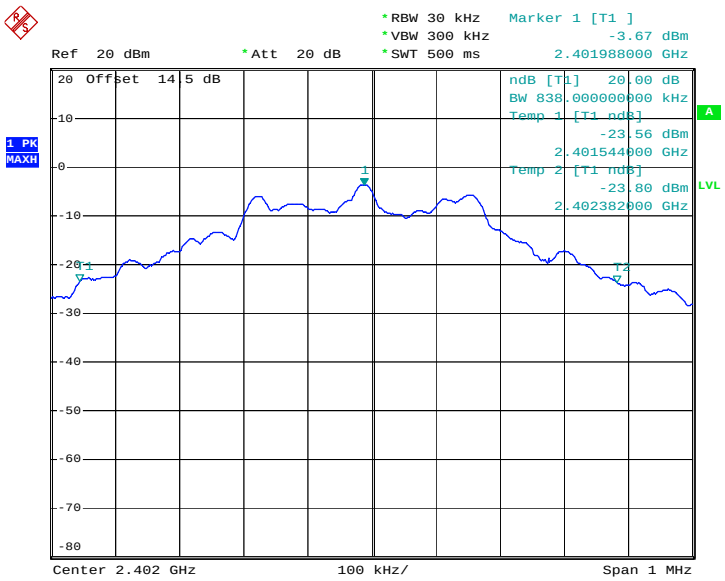
3.2.4 Test Setup

3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	17~18℃
Test Engineer :	Peter Chou	Relative Humidity :	38~40%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.839
39	2441	0.836
78	2480	0.836

20 dB Bandwidth Plot on Channel 00



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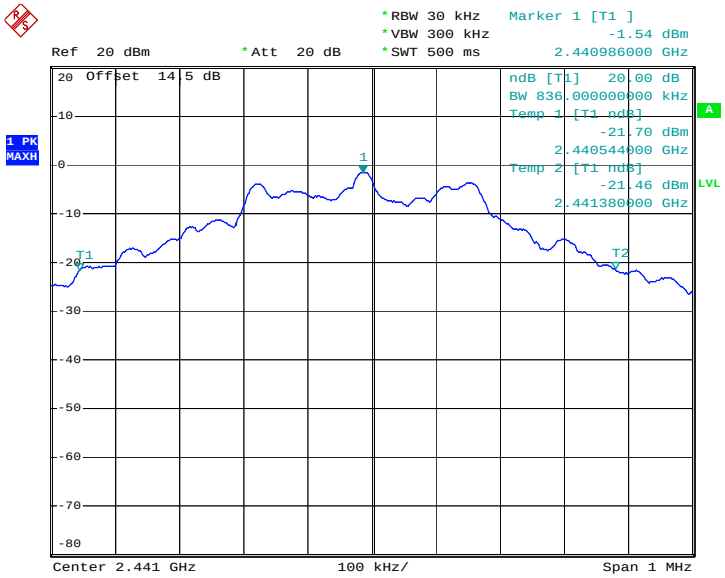
20 dB Bandwidth Plot on Channel 39



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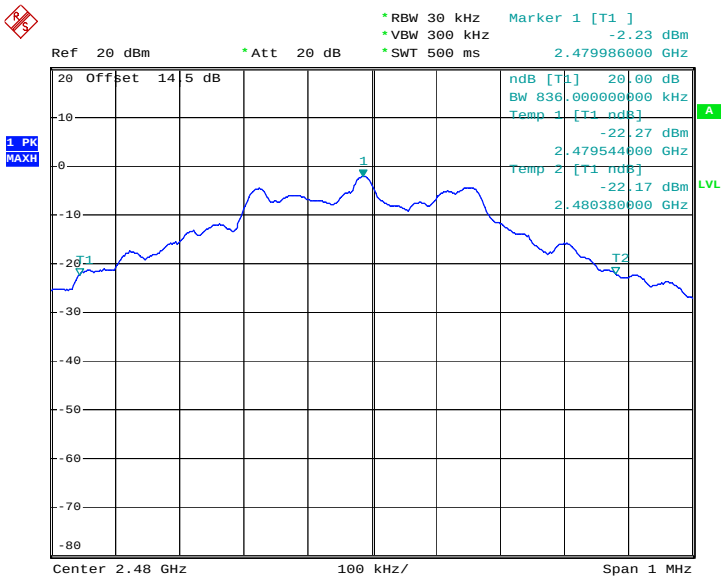
20 dB Bandwidth Plot on Channel 78



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3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

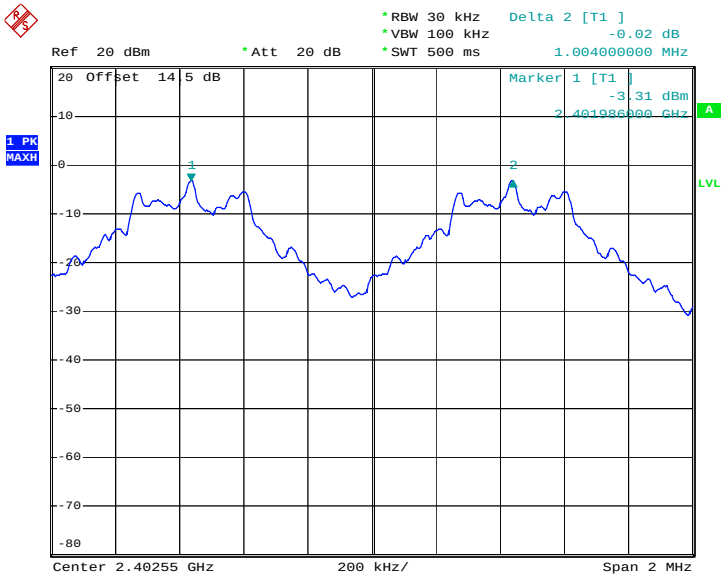
3.3.4 Test Setup

3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	17~18℃
Test Engineer :	Peter Chou	Relative Humidity :	38~40%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.004	0.559	Pass
39	2441	1.004	0.557	Pass
78	2480	1.004	0.557	Pass

Channel Separation Plot on Channel 00 - 01



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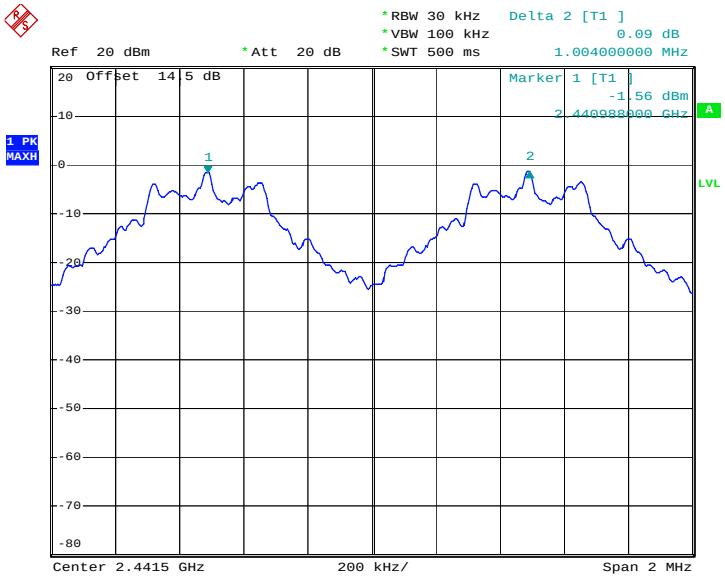
Channel Separation Plot on Channel 39 - 40



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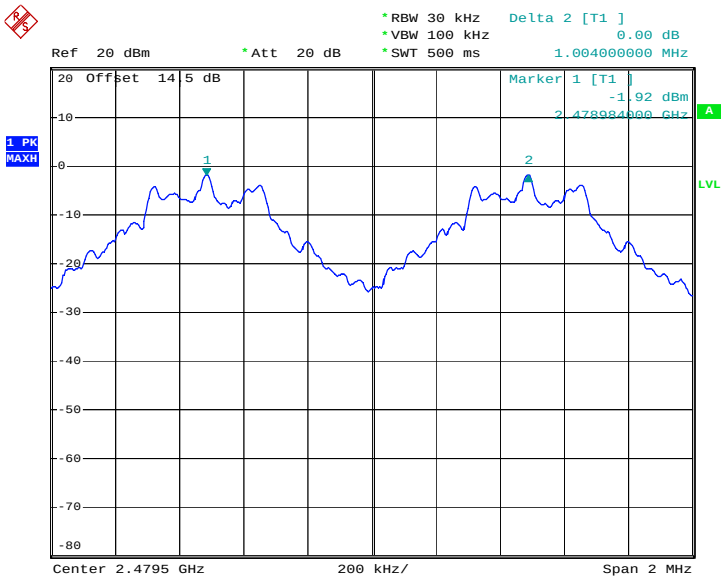
Channel Separation Plot on Channel 77 - 78



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3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

3.4.4 Test Setup

3.4.5 Test Result of Dwell Time

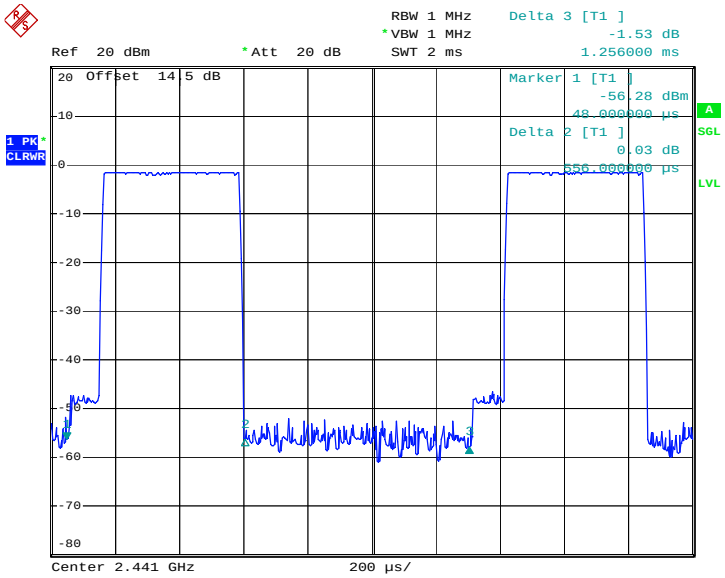
Test Mode :	Mode 2	Temperature :	17~18℃
Test Engineer :	Peter Chou	Relative Humidity :	38~40%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.50	3120.00	0.345	0.4	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

DH5 Dwell Time (One Pulse) Plot on Channel 39



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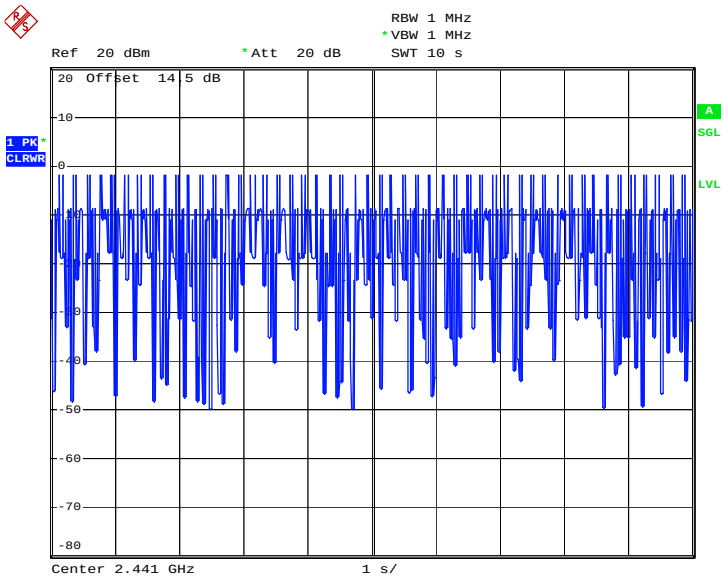
DH5 Dwell Time (Count Pulses) Plot on Channel 39



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3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

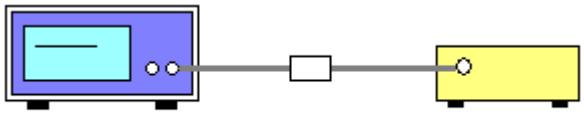
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the peak power meter by a low loss cable.

3.5.4 Test Setup

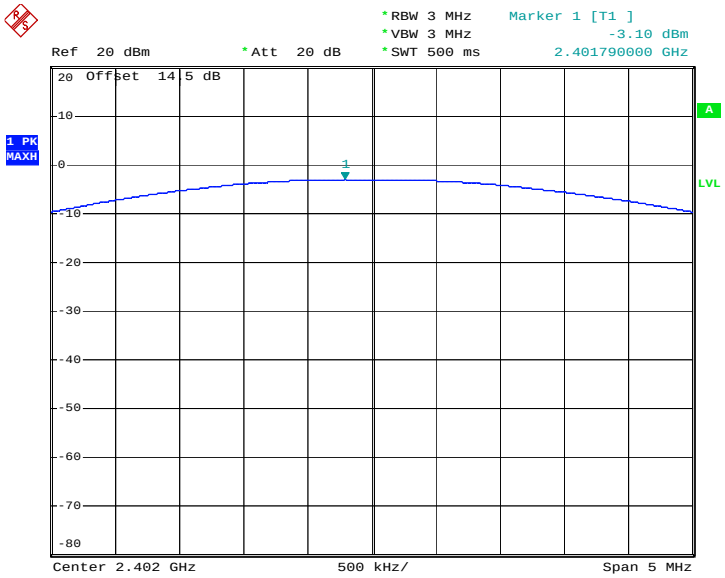


3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	17~18℃
Test Engineer :	Peter Chou	Relative Humidity :	38~40%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	-3.10	30	Pass
39	2441	-1.42	30	Pass
78	2480	-1.79	30	Pass

Peak Output Power Plot on Channel 00



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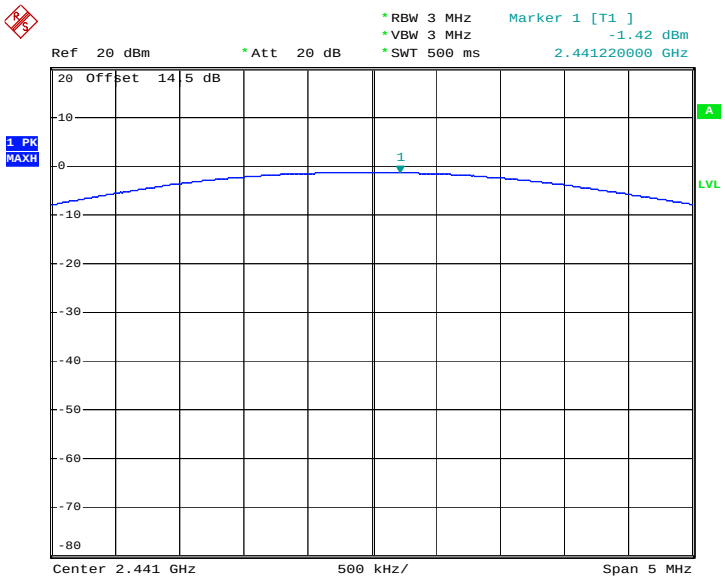
Peak Output Power Plot on Channel 39



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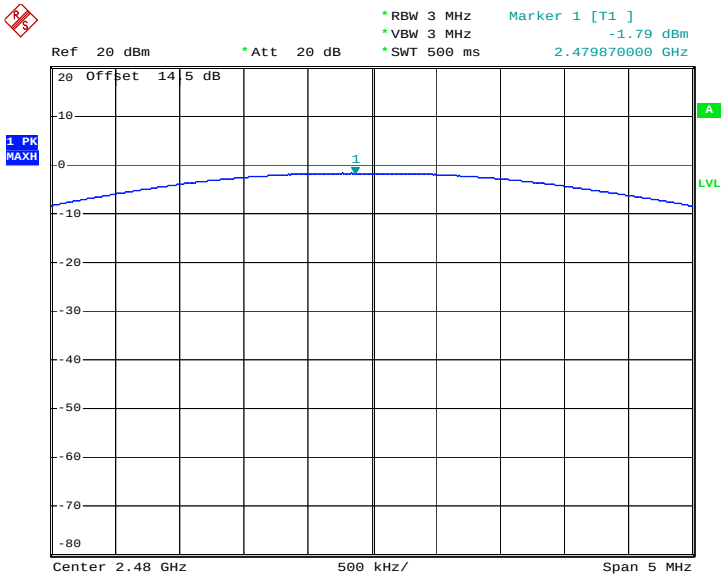
Peak Output Power Plot on Channel 78



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3.6 Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

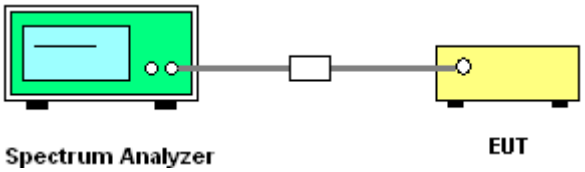
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).

3.6.4 Test Setup



3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	17~18°C
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390.00	45.24	-28.76	74.00	43.23	32.02	3.25	33.26	-	-	Peak
2390.00	32.97	-21.03	54.00	30.96	32.02	3.25	33.26	147	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390.00	44.55	-29.45	74.00	45.54	32.02	3.25	33.26			Peak
2390.00	33.17	-20.83	54.00	31.16	32.02	3.25	33.26	135	360	Average

Test Mode :	Mode 3	Temperature :	17~18°C
Test Channel :	78	Relative Humidity :	38~40%
Test Engineer :	Peter Chou		

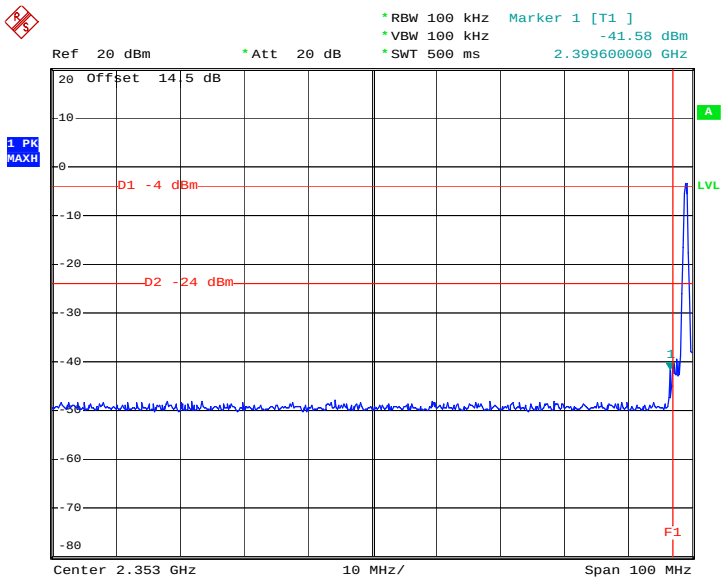
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	59.19	-14.81	74.00	56.85	32.34	3.29	33.29	-	-	Peak
2483.50	46.46	-7.54	54.00	44.12	32.34	3.29	33.29	120	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	55.61	-18.39	74.00	53.27	32.34	3.29	33.29	-	-	Peak
2483.50	46.92	-7.08	54.00	44.58	32.34	3.29	33.29	135	360	Average

3.6.6 Test Result of Conducted Band Edges

Test Mode :	Mode 1 and 3	Temperature :	17~18℃
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou		

Low Band Edge Plot on Channel 00



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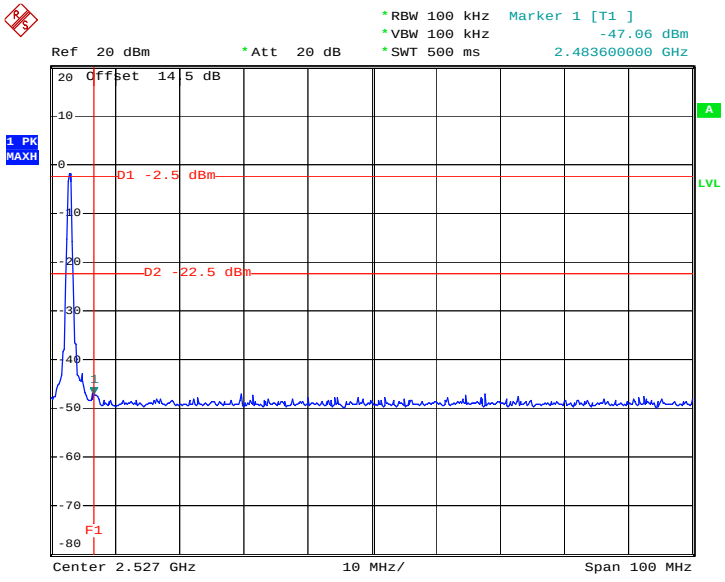
High Band Edge Plot on Channel 78



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3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

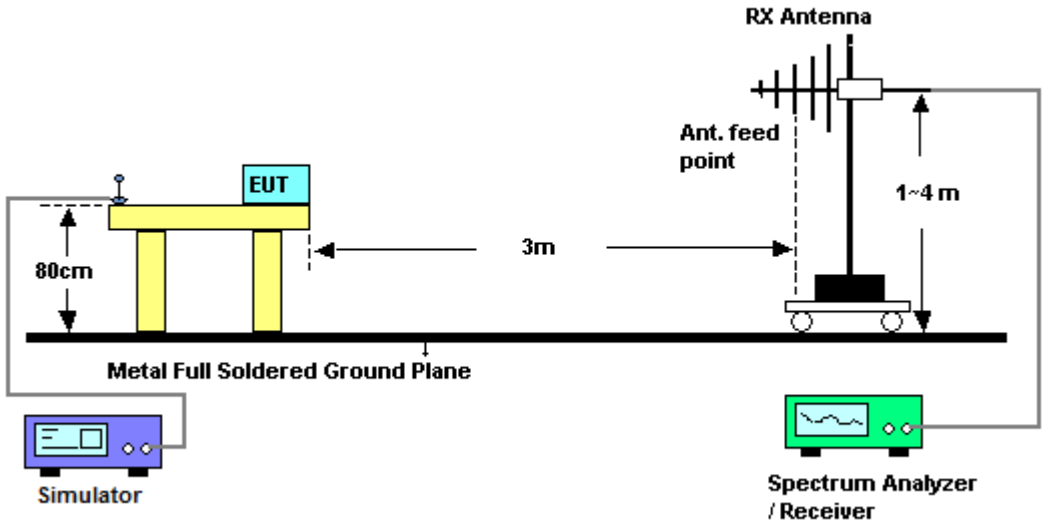
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

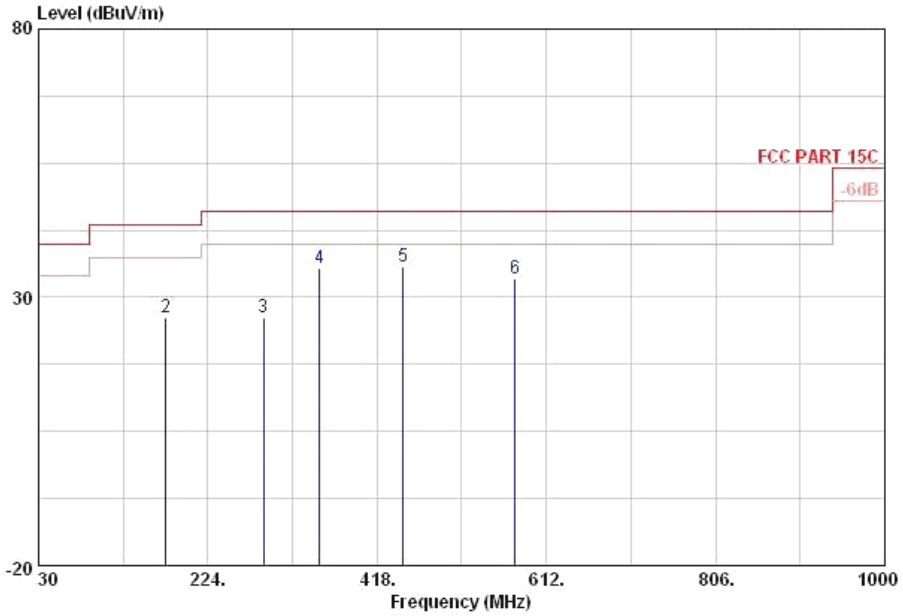
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 Test Setup



3.7.5 Test Result of Radiated Emission < 1GHz

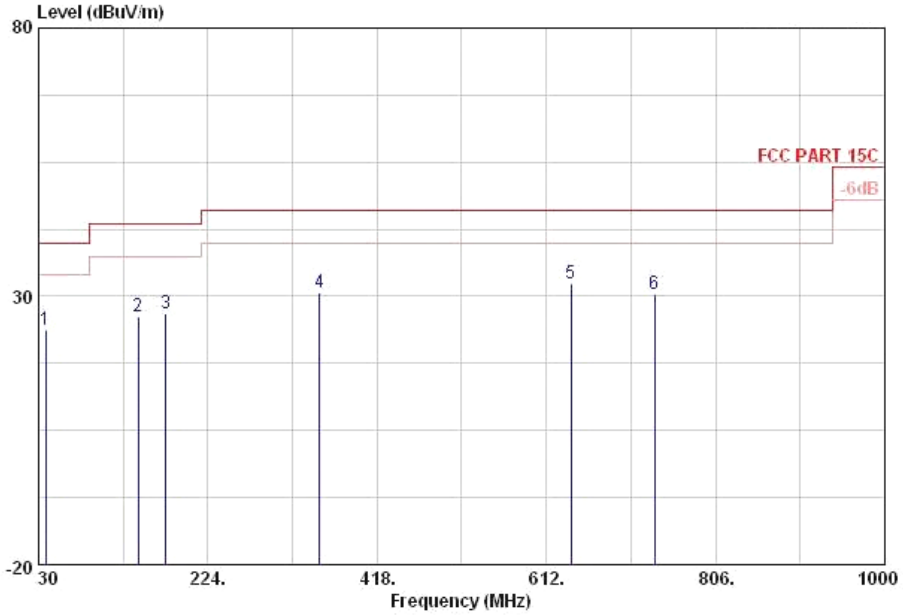
Test Mode :	Mode 1	Temperature :	17~18°C
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :			



Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 1

	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	30.27	20.35	-19.65	40.00	30.66	17.90	0.22	28.43	---	---	Peak
2	176.07	26.22	-17.28	43.50	45.48	8.67	0.62	28.55	---	---	Peak
3	288.12	26.30	-19.70	46.00	41.62	12.58	0.80	28.70	---	---	Peak
4	351.80	35.37	-10.63	46.00	48.88	14.43	0.88	28.82	100	60	Peak
5	447.70	35.85	-10.15	46.00	47.45	16.29	0.99	28.88	---	---	Peak
6	575.80	33.50	-12.50	46.00	43.18	18.40	1.14	29.22	---	---	Peak

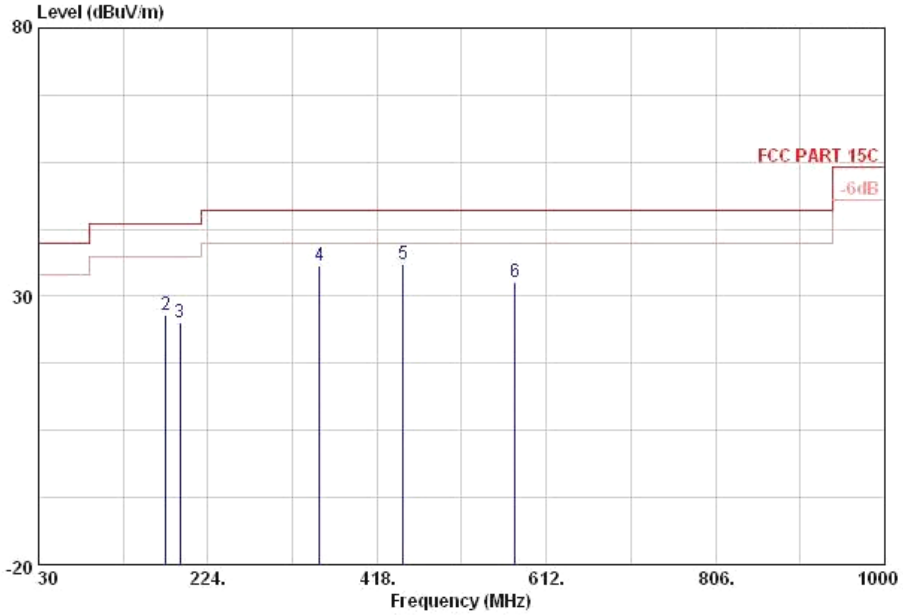
Test Mode :	Mode 1	Temperature :	17~18°C
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :			



Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 1

	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	37.83	23.66	-16.34	40.00	38.60	13.20	0.28	28.42	---	---	Peak
2	143.94	26.37	-17.13	43.50	43.90	10.41	0.56	28.50	---	---	Peak
3	176.07	26.72	-16.78	43.50	45.98	8.67	0.62	28.55	---	---	Peak
4	351.80	30.58	-15.42	46.00	44.09	14.43	0.88	28.82	---	---	Peak
5	640.20	32.41	-13.59	46.00	40.37	19.98	1.21	29.15	137	72	Peak
6	736.10	30.51	-15.49	46.00	37.89	19.95	1.31	28.64	---	---	Peak

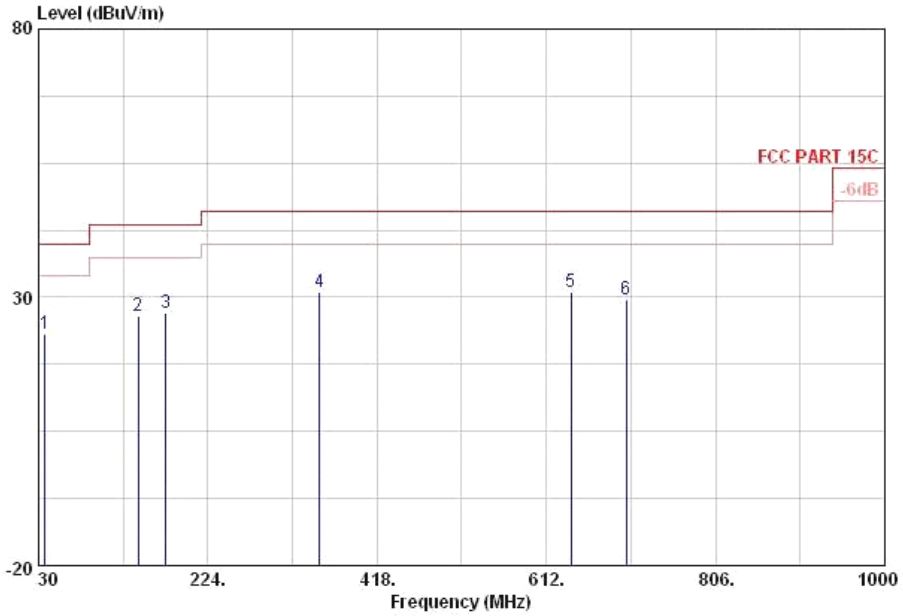
Test Mode :	Mode 2	Temperature :	17~18°C
Test Channel :	39	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :			



Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 2

	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	30.27	20.49	-19.51	40.00	30.80	17.90	0.22	28.43	---	---	Peak
2	176.07	26.44	-17.06	43.50	45.70	8.67	0.62	28.55	---	---	Peak
3	192.00	25.11	-18.39	43.50	44.35	8.68	0.65	28.57	---	---	Peak
4	351.80	35.71	-10.29	46.00	49.22	14.43	0.88	28.82	---	---	Peak
5	447.70	36.07	-9.93	46.00	47.67	16.29	0.99	28.88	200	350	Peak
6	575.80	32.72	-13.28	46.00	42.40	18.40	1.14	29.22	---	---	Peak

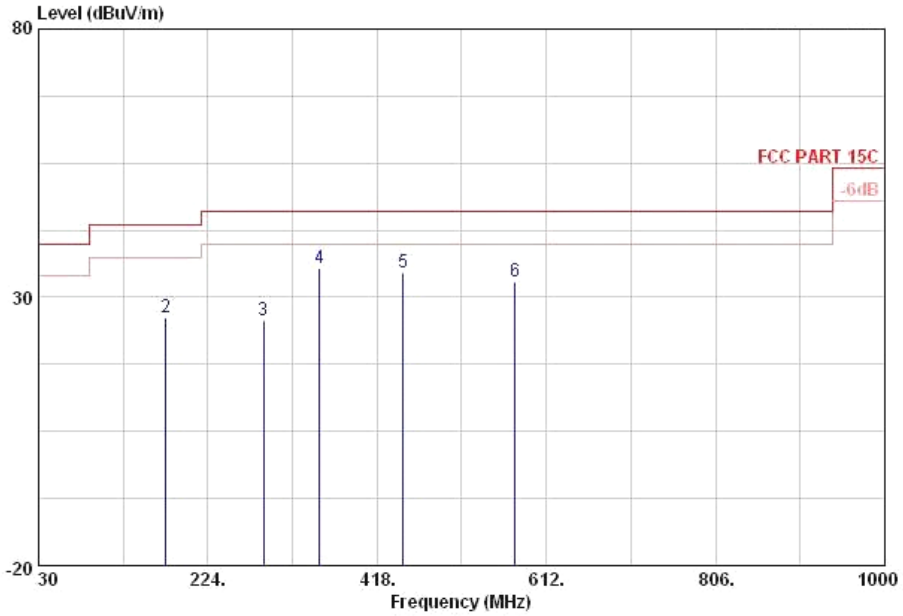
Test Mode :	Mode 2	Temperature :	17~18°C
Test Channel :	39	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :			



Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 2

	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	37.56	23.16	-16.84	40.00	38.10	13.20	0.28	28.42	---	---	Peak
2	143.94	26.46	-17.04	43.50	43.99	10.41	0.56	28.50	---	---	Peak
3	176.07	26.98	-16.52	43.50	46.24	8.67	0.62	28.55	---	---	Peak
4	351.80	30.91	-15.09	46.00	44.42	14.43	0.88	28.82	---	---	Peak
5	640.20	31.06	-14.94	46.00	39.02	19.98	1.21	29.15	135	70	Peak
6	703.90	29.63	-16.37	46.00	37.96	19.26	1.26	28.85	---	---	Peak

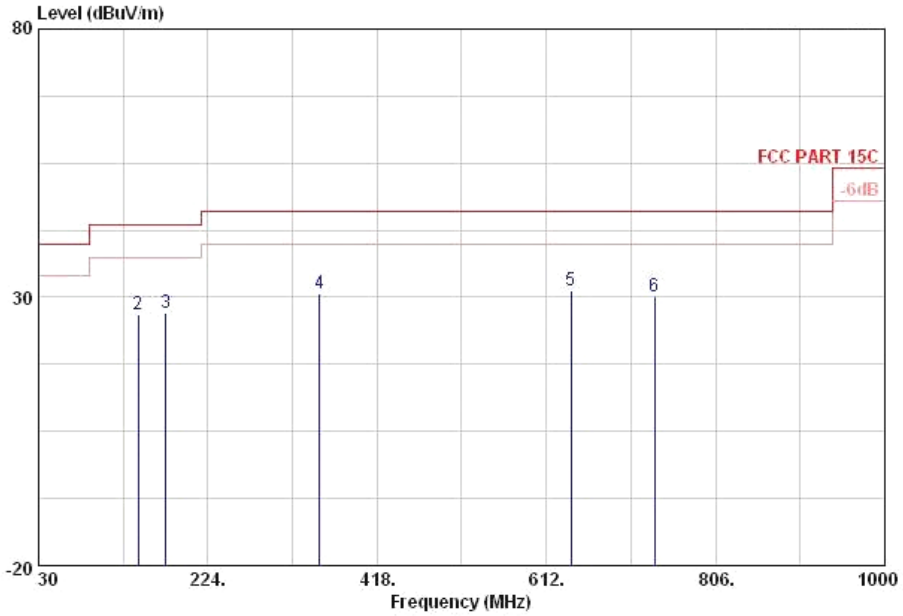
Test Mode :	Mode 3	Temperature :	17~18°C
Test Channel :	78	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :			



Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 3

	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	30.00	20.93	-19.07	40.00	31.24	17.90	0.22	28.43	---	---	Peak
2	176.07	26.36	-17.14	43.50	45.62	8.67	0.62	28.55	---	---	Peak
3	288.12	25.77	-20.23	46.00	41.09	12.58	0.80	28.70	---	---	Peak
4	351.80	35.51	-10.49	46.00	49.02	14.43	0.88	28.82	166	0	Peak
5	447.70	34.61	-11.39	46.00	46.21	16.29	0.99	28.88	---	---	Peak
6	575.80	32.90	-13.10	46.00	42.58	18.40	1.14	29.22	---	---	Peak

Test Mode :	Mode 3	Temperature :	17~18°C
Test Channel :	78	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :			

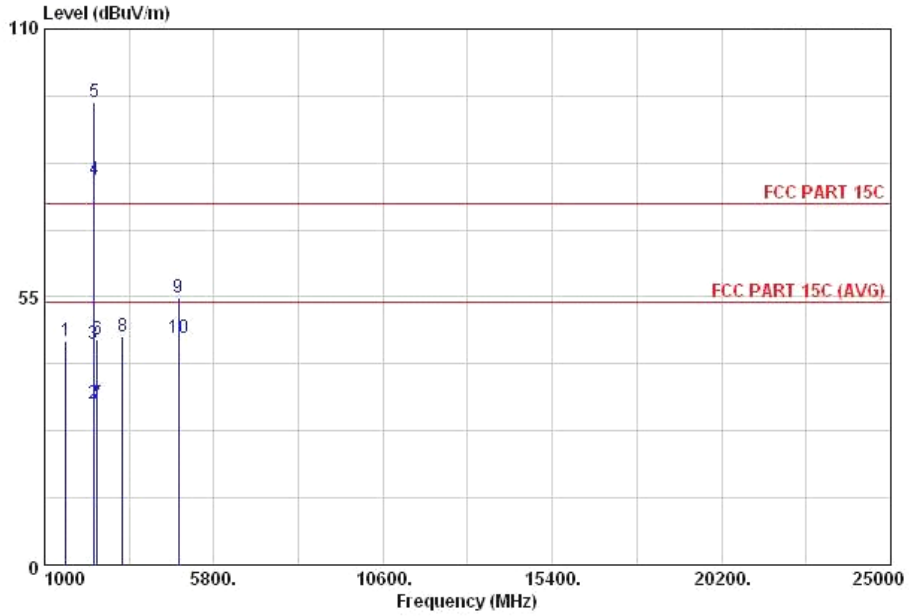


Site : 03CH01-KS
Condition: FCC PART 15C 3m LF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 3

	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	30.00	22.40	-17.60	40.00	32.71	17.90	0.22	28.43	---	---	Peak
2	143.94	26.77	-16.73	43.50	44.30	10.41	0.56	28.50	---	---	Peak
3	176.07	27.10	-16.40	43.50	46.36	8.67	0.62	28.55	---	---	Peak
4	351.80	30.65	-15.35	46.00	44.16	14.43	0.88	28.82	---	---	Peak
5	640.20	31.18	-14.82	46.00	39.14	19.98	1.21	29.15	135	70	Peak
6	736.10	30.25	-15.75	46.00	37.63	19.95	1.31	28.64	---	---	Peak

3.7.6 Test Result of Radiated Emission ≥ 1GHz

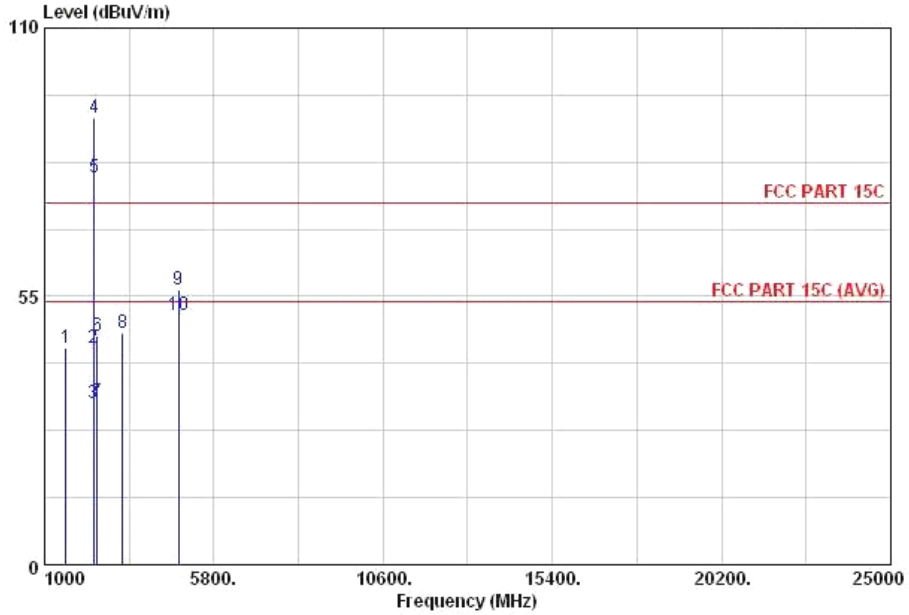
Test Mode :	Mode 1	Temperature :	17~18°C
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 1

	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	1602.00	45.94	-28.06	74.00	47.73	28.14	3.17	33.10	---	---	Peak
2	2390.00	32.97	-21.03	54.00	30.96	32.02	3.25	33.26	147	360	Average
3	2390.00	45.24	-28.76	74.00	43.23	32.02	3.25	33.26	---	---	Peak
4 X	2402.00	79.18			77.17	32.02	3.25	33.26	147	360	Average
5 X	2402.00	94.89			92.88	32.02	3.25	33.26	---	---	Peak
6	2500.00	46.34	-27.66	74.00	43.94	32.40	3.30	33.30	---	---	Peak
7	2500.00	33.23	-20.77	54.00	30.83	32.40	3.30	33.30	147	360	Average
8	3202.00	47.01	-26.99	74.00	44.49	32.44	3.72	33.64	---	---	Peak
9	4804.00	54.94	-19.06	74.00	49.88	34.27	4.59	33.80	---	---	Peak
10	4804.00	46.68	-7.32	54.00	41.62	34.27	4.59	33.80	160	334	Average

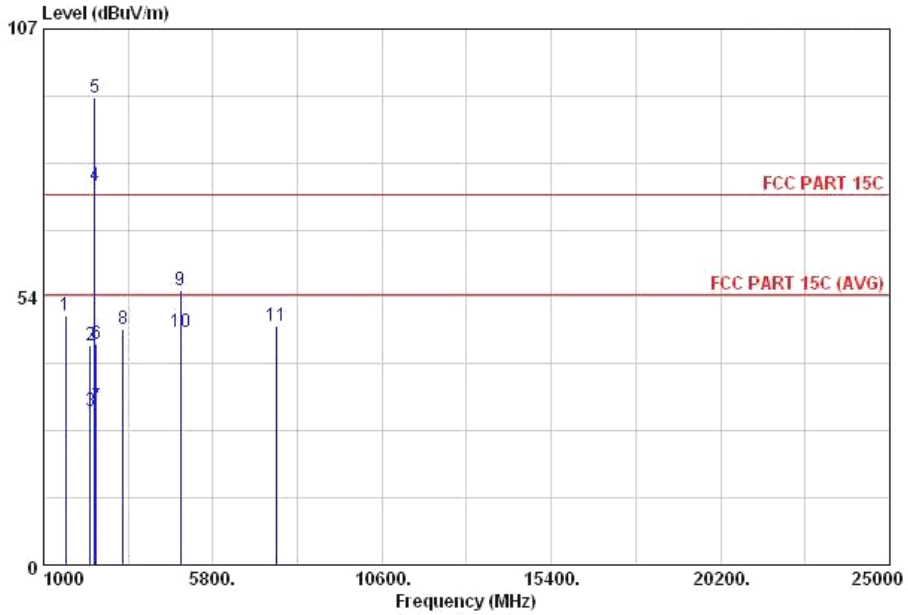
Test Mode :	Mode 1	Temperature :	17~18°C
Test Channel :	00	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 1

		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		1602.00	44.58	-29.42	74.00	46.37	28.14	3.17	33.10	---	---	Peak
2		2390.00	44.55	-29.45	74.00	42.54	32.02	3.25	33.26	---	---	Peak
3		2390.00	33.17	-20.83	54.00	31.16	32.02	3.25	33.26	135	360	Average
4	X	2402.00	91.58			89.57	32.02	3.25	33.26	---	---	Peak
5	X	2402.00	79.38			77.37	32.02	3.25	33.26	135	360	Average
6		2484.00	46.84	-27.16	74.00	44.50	32.34	3.29	33.29	---	---	Peak
7		2484.00	33.55	-20.45	54.00	31.21	32.34	3.29	33.29	135	360	Average
8		3202.00	47.44	-26.56	74.00	44.92	32.44	3.72	33.64	---	---	Peak
9		4806.00	56.45	-17.55	74.00	51.39	34.27	4.59	33.80	---	---	Peak
10		4806.00	51.09	-2.91	54.00	46.03	34.27	4.59	33.80	117	20	Average

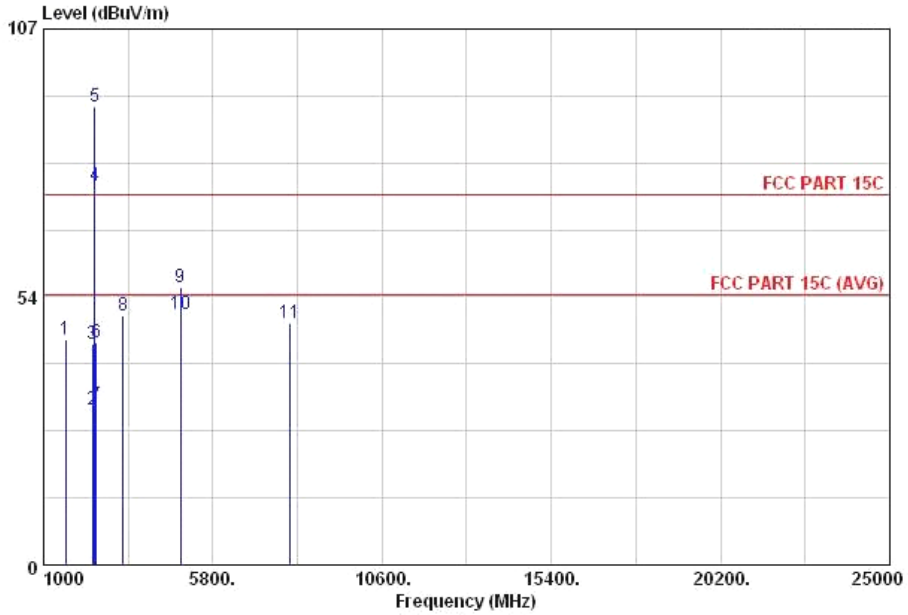
Test Mode :	Mode 2	Temperature :	17~18°C
Test Channel :	39	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 2

	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	1628.00	49.68	-24.32	74.00	51.33	28.30	3.15	33.10	---	---	Peak
2	2316.00	43.87	-30.13	74.00	42.28	31.63	3.19	33.23	---	---	Peak
3	2316.00	30.70	-23.30	54.00	29.11	31.63	3.19	33.23	132	0	Average
4 X	2442.00	75.78			73.57	32.22	3.27	33.28	132	0	Average
5 X	2442.00	93.32			91.11	32.22	3.27	33.28	---	---	Peak
6	2486.00	44.13	-29.87	74.00	41.79	32.34	3.29	33.29	---	---	Peak
7	2486.00	31.58	-22.42	54.00	29.24	32.34	3.29	33.29	132	0	Average
8	3254.00	47.23	-26.77	74.00	44.43	32.68	3.77	33.65	---	---	Peak
9	4884.00	54.69	-19.31	74.00	49.55	34.32	4.62	33.80	---	---	Peak
10	4884.00	46.55	-7.45	54.00	41.41	34.32	4.62	33.80	108	32	Average
11	7598.00	47.77	-26.23	74.00	40.13	35.68	6.21	34.25	---	---	Peak

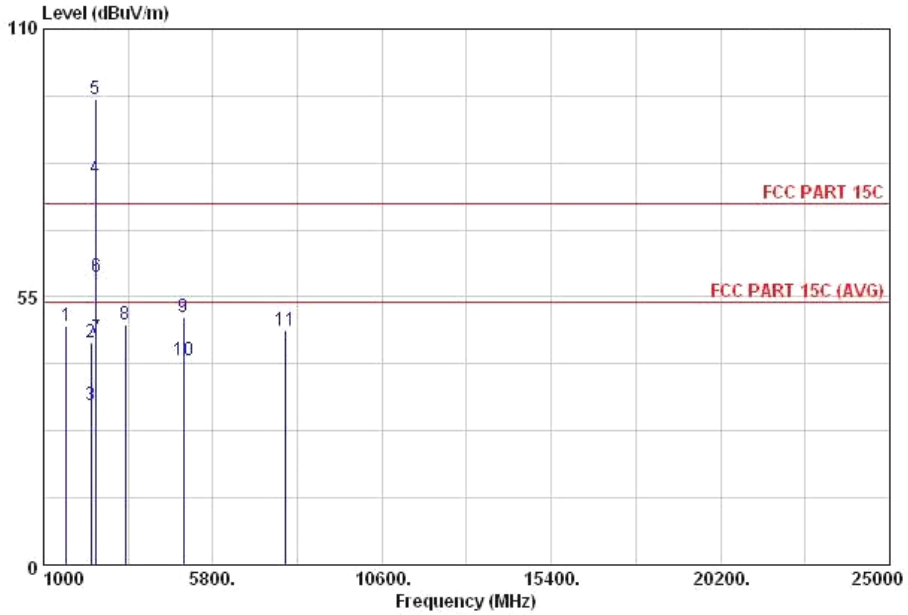
Test Mode :	Mode 2	Temperature :	17~18°C
Test Channel :	39	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 2

	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	1628.00	45.11	-28.89	74.00	46.76	28.30	3.15	33.10	---	---	Peak
2	2376.00	31.08	-22.92	54.00	29.17	31.94	3.23	33.26	117	0	Average
3	2376.00	44.06	-29.94	74.00	42.15	31.94	3.23	33.26	---	---	Peak
4 X	2442.00	75.79			73.58	32.22	3.27	33.28	117	0	Average
5 X	2442.00	91.44			89.23	32.22	3.27	33.28	---	---	Peak
6	2488.00	44.35	-29.65	74.00	41.94	32.40	3.30	33.29	---	---	Peak
7	2488.00	31.82	-22.18	54.00	29.41	32.40	3.30	33.29	117	0	Average
8	3256.00	49.69	-24.31	74.00	46.89	32.68	3.77	33.65	---	---	Peak
9	4884.00	55.44	-18.56	74.00	50.30	34.32	4.62	33.80	---	---	Peak
10	4884.00	50.10	-3.90	54.00	44.96	34.32	4.62	33.80	100	24	Average
11	8000.00	48.20	-25.80	74.00	40.03	36.10	6.57	34.50	---	---	Peak

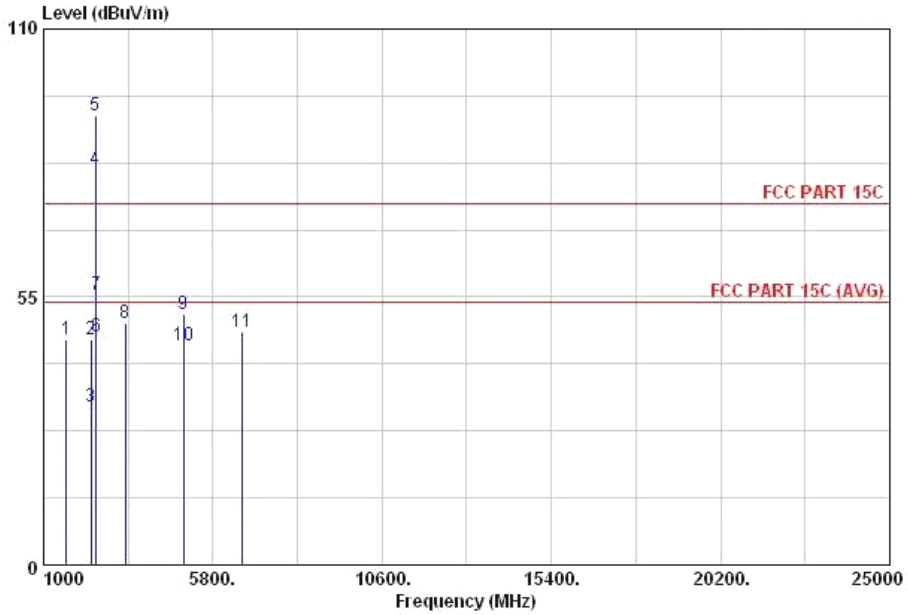
Test Mode :	Mode 3	Temperature :	17~18°C
Test Channel :	78	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Horizontal
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 HORIZONTAL
Model : FR 8D1701
Memo : Mode 3

		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		1652.00	49.07	-24.93	74.00	50.63	28.39	3.15	33.10	---	---	Peak
2		2346.00	45.71	-28.29	74.00	43.95	31.79	3.21	33.24	---	---	Peak
3		2346.00	32.65	-21.35	54.00	30.89	31.79	3.21	33.24	120	360	Average
4	X	2480.00	79.30			76.96	32.34	3.29	33.29	120	360	Average
5	X	2480.00	95.46			93.12	32.34	3.29	33.29	---	---	Peak
6		2483.50	59.19	-14.81	74.00	56.85	32.34	3.29	33.29	---	---	Peak
7		2483.50	46.46	-7.54	54.00	44.12	32.34	3.29	33.29	120	360	Average
8		3308.00	49.24	-24.76	74.00	46.20	32.89	3.82	33.67	---	---	Peak
9		4962.00	50.96	-23.04	74.00	45.72	34.38	4.66	33.80	---	---	Peak
10		4962.00	41.93	-12.07	54.00	36.69	34.38	4.66	33.80	143	53	Average
11		7877.00	48.12	-25.88	74.00	40.07	36.00	6.48	34.43	---	---	Peak

Test Mode :	Mode 3	Temperature :	17~18°C
Test Channel :	78	Relative Humidity :	38~40%
Test Engineer :	Peter Chou	Polarization :	Vertical
Remark :	#4 and #5 are Fundamental Signals		



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-081217 VERTICAL
Model : FR 8D1701
Memo : Mode 3

	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	1654.00	46.36	-27.64	74.00	47.92	28.39	3.15	33.10	---	---	Peak
2	2348.00	46.17	-27.83	74.00	44.41	31.79	3.21	33.24	---	---	Peak
3	2348.00	32.56	-21.44	54.00	30.80	31.79	3.21	33.24	135	360	Average
4 X	2480.00	81.08			78.74	32.34	3.29	33.29	135	360	Average
5 X	2480.00	92.31			89.97	32.34	3.29	33.29	---	---	Peak
6	2483.50	46.92	-7.08	54.00	44.58	32.34	3.29	33.29	135	360	Average
7	2483.50	55.61	-18.39	74.00	53.27	32.34	3.29	33.29	---	---	Peak
8	3308.00	49.60	-24.40	74.00	46.56	32.89	3.82	33.67	---	---	Peak
9	4962.00	51.36	-22.64	74.00	46.12	34.38	4.66	33.80	---	---	Peak
10	4962.00	44.97	-9.03	54.00	39.73	34.38	4.66	33.80	111	13	Average
11	6626.00	47.82	-26.18	74.00	40.88	35.42	5.44	33.92	---	---	Peak

3.8 Antenna Requirements

3.8.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

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 FCC rule.

3.8.2 Antenna Connected Construction

The antennas type used in this product is PCB Antenna without connector and it is considered to meet antenna requirement.

3.8.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Power Meter	Agilent	E4416A	MY45101555	N/A	Jun. 18, 2007	Jun. 17, 2009	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	50MHz~18GHz	Jun. 12, 2007	Jun. 11, 2009	Conducted (TH01-KS)
Thermal Chamber	Rten Billion	TTC-B3S	TBN-960502	-40~150C	Jun. 27, 2007	Jun. 26, 2009	Conducted (TH01-KS)
POWER DIVIDER	ARRA	A3200-2	N/A	DC~18GHz	Sep. 01, 2007	Aug. 31, 2009	Conducted (TH01-KS)
DC Power Supply	Topward	3306D	N/A	30V6A	N/A	N/A	Conducted (TH01-KS)
DC Block	Mini-Circuits	BLK-18-S+	N/A	DC-18GHz	N/A	N/A	Conducted (TH01-KS)
Terminator	Mini-Circuits	ANNE-50+	N/A	DC~18000MHz	N/A	N/A	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9K~40GHz	Mar. 13, 2008	Mar. 12, 2009	Radiation (03CH01-KS)
EMI Test Receiver	R&S	ESCI	100724	9KHz~2.75GHz	Feb. 06, 2008	Feb. 05, 2009	Radiation (03CH01-KS)
Bilog Antenna	Schaffner	CBL6112D	23182	25MHz~2000MHz	May 21, 2008	May 20, 2009	Radiation (03CH01-KS)
Controller	MF	MF7802	N/A	N/A	N/A	N/A	Radiation (03CH01-KS)
AC Power Source	APC	AFC-11001G	N/A	N/A	N/A	N/A	Radiation (03CH01-KS)
Preamplifier	Agilent	8449B	3008A02370	1G~26.5GHz	Jun. 03, 2008	Jun. 02, 2009	Radiation (03CH01-KS)
Preamplifier	Wireless	FPA6592G	60006	30M~2000MHz	Jul. 23, 2008	Jul. 22, 2009	Radiation (03CH01-KS)
High Pass filter (3GHz)	Microwave Circuits	H3G018G	N/A	N/A	N/A	N/A	Radiation (03CH01-KS)
High Pass filter (7GHz)	Microwave Circuits	H07G18G3	N/A	N/A	N/A	N/A	Radiation (03CH01-KS)
High Pass filter	N/A	WHKX1.5/15G-10SS	23	N/A	N/A	N/A	Radiation (03CH01-KS)
High Pass filter	N/A	WHKX2.2-18G-10SS	8	N/A	N/A	N/A	Radiation (03CH01-KS)
Band Reject Filter	WI	WRCG2400/2483-2390/2493-35/10SS	14	N/A	N/A	N/A	Radiation (03CH01-KS)
Band Reject Filter	WI	WRCG 1850/1910-1835/1925-40/8SS	15	N/A	N/A	N/A	Radiation (03CH01-KS)
Band Reject Filter	WI	WRCG 824/849-814/859-40/8SS	34	N/A	N/A	N/A	Radiation (03CH01-KS)
DRG Horn(Medium)	EMCO	3117	75959	1GHz~18GHz	Apr. 17, 2007	Apr. 16, 2009	Radiation (03CH01-KS)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	**1.13**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.26**		

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

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-shaped	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 (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	Ci	$Ci*u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	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-shaped	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**				

6 Certification of TAF Accreditation

Certificate No. : L1190-070110

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, 2007 to January 09, 2010
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

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

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The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.

Appendix A. Photographs of EUT

Please refer to Sporton report number EP8D2432 as below.