

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : 5.8GHz Digital Wireless Transceiver

Model No. : 15-1974 / TL9010 / TL907

FCC ID : RFATL901X

Filing Type : Certification

Applicant : **ATLM TAIWAN INC.**
13Fl, No. 99, Sec. 1, Nankan Road, Luchu Shiang,
Taoyuan Hsien 338, Taiwan, R.O.C.

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

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History of this test report

Original Report Issue Date: Nov. 18, 2003

- ☒ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : 5.8GHz Digital Wireless Transceiver
Model No. : 15-1974 / TL9010 / TL907
FCC ID : RFATL901X
Filing Type : Certification
Applicant : **ATLM TAIWAN INC.**
13Fl, No. 99, Sec. 1, Nankan Road, Luchu Shiang,
Taoyuan Hsien 338, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2001** and the energy emitted by this equipment was **passed** both radiated and conducted emission limits. Testing was carried out on Nov. 11, 2003 at **SPORTON International Inc. LAB.**



Alex Chen
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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TEL : 886-2-2696-2468

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FCC ID : RFATL901X

Page No. : 1 of 33

Issued Date : Nov. 18, 2003

1. General Description of Equipment under Test

1.1. Applicant

ATLM TAIWAN INC.
13FI, No. 99, Sec. 1, Nankan Road, Luchu Shiang,
Taoyuan Hsien 338, Taiwan, R.O.C.

1.2. Manufacturer

Eastway Electronics Co., Ltd.
Don Fong District, Xinxu, Hui-Yang,
Guangdong, P.R.China

1.3. Basic Description of Equipment under Test

Equipment	: 5.8GHz Digital Wireless Transceiver
Model No.	: 15-1974 / TL9010 / TL907
FCC ID	: RFATL901X
Trade Name	: RadioShack
Audio Cable ×2	: Non-Shielded, 2.2m
Power Supply Type	: Linear
AC Power Input	: Wall-mount, 2pin
DC Power Cord	: Non-Shielded, 1.8m, 2pin

1.4. Feature of Equipment under Test**1. 5.8GHz wireless**

- . Built in Antenna
- . Multi Channel selection: 8 channels
- . 6 channels 5.725 ~ 5.875 GHz radio frequency

2. Audio

- . Volume control
- . Power on/off
- . Freq. Response : 20Hz ~ 20KHz
- . S/N Ratio better than 70dB/A-Weighted
- . THD less than 0.1% at 1 KHz/1W

3. Transmitter

- . Modulation Method : BPSK (Binary Phase Shift Keying) Modulation
- . Output power : 0dBm (US)
- . Range up to 10 (US) meters at clear line of sight
- . Audio Input Low Level (RCA) :1 V
- . Audio Input High Level (Terminal) : 4 V
- . Audio Input Impedance: >20 Kohms
- . Operating Current : 500mA

4. Receiver

- . AC Power Supply : 120V
- . Audio Output Level : 25W X 2 @10%THD

5. Stuffing Q'ty

- . 20ft: TBA
- . 40ft: TBA

2. Test Configuration of Equipment under Test

2.1. Test Manner

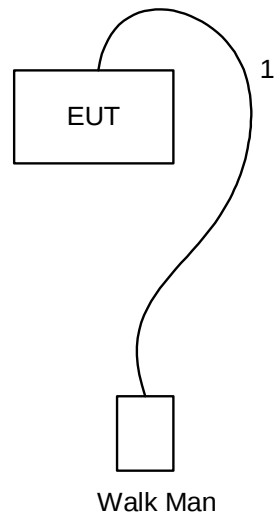
- a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The complete test system included SANYO Walk Man and EUT for EMI test.
- c. The following test modes were performed:
 - Mode 1: CH00 (5735MHz)
 - Mode 2: CH02 (5775MHz)
 - Mode 3: CH05 (5835MHz)
- d. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 40000MHz.

2.2. Description of Test System

Support Unit 1. – Walk Man (SANYO)

FCC ID	: N/A
Model No.	: MGR-925
Serial No.	: SP0038
Data Cable	: Non-Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3. Connection Diagram of Test System



1. The Audio cable is connected from EUT to the support unit 1.

3. Test Software

No test software was used during testing.

4. General Information of Test

4.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055
Test Site No. : CO01-HY, 03CH03-HY

4.2. Test Voltage

110V/60Hz

4.3. Standard for Methods of Measurement

ANSI C63.4-2001

4.4. Test in Compliance with

FCC Part 15, Subpart C 15.249

4.5. Frequency Range Investigated

- a. Conduction: from 150 KHz to 30 MHz
- b. Radiation: from 30 MHz to 40000 MHz

4.6. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5. Test of Conducted Powerline

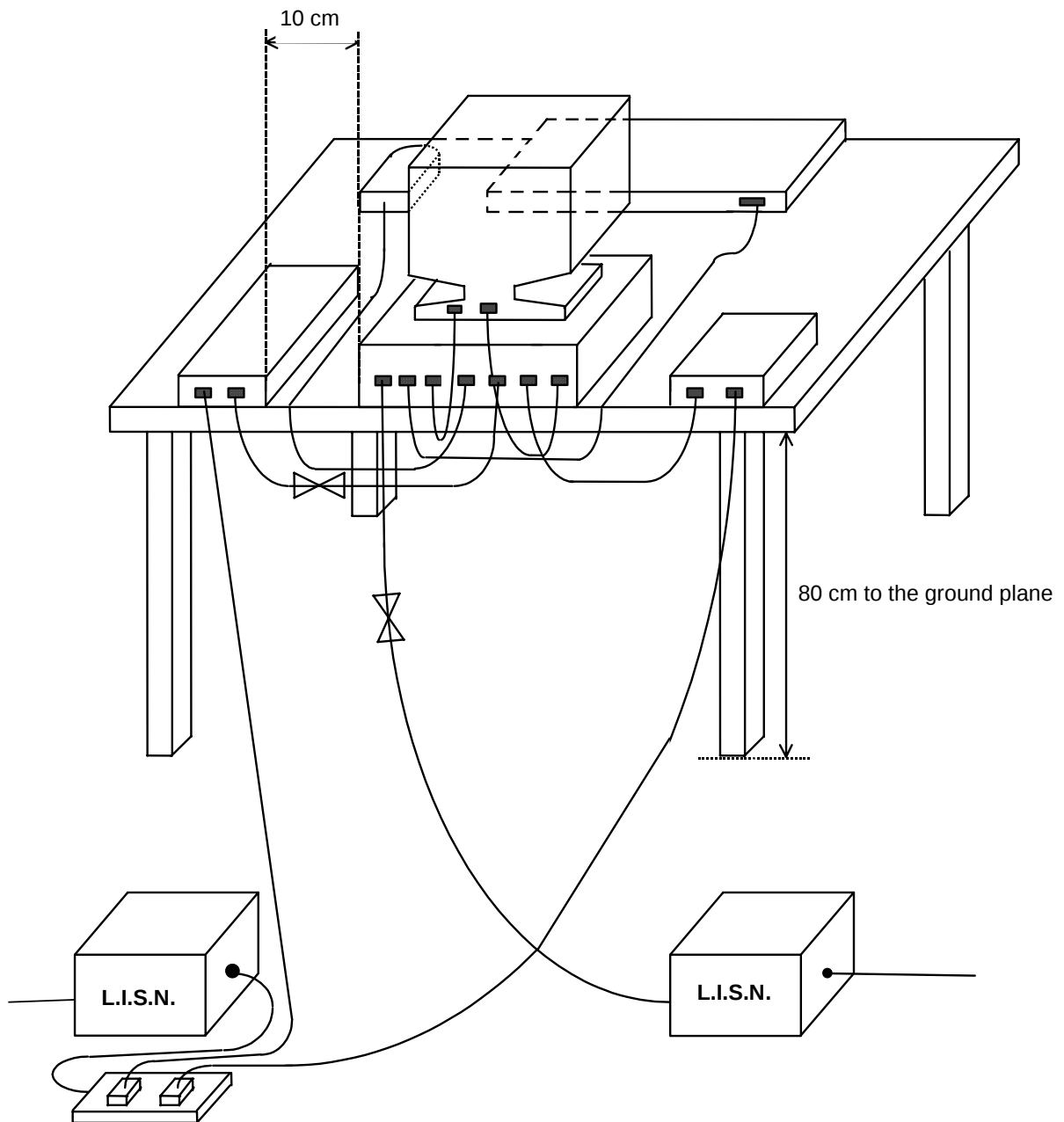
Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-2001 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.1. Major Measuring Instruments

- Test Receiver (R&S ESCS 30)
 - Attenuation 10 dB
 - Start Frequency 0.15 MHz
 - Stop Frequency 30 MHz
 - IF Bandwidth 9 KHz

5.2. Test Procedures

- a. 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.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

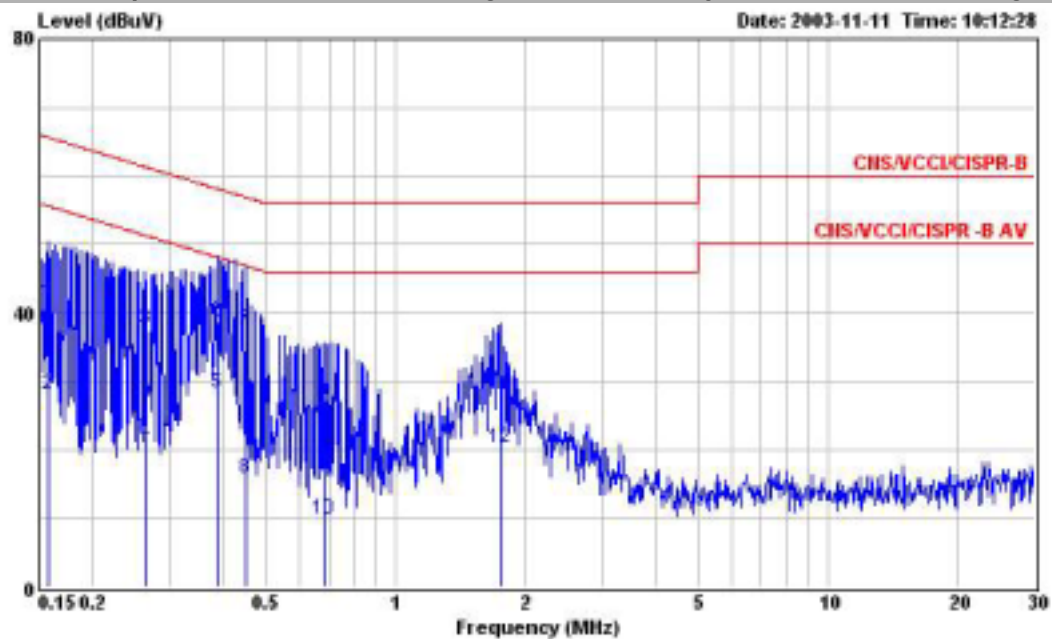


5.4. Test Result of AC Powerline Conducted Emission

5.4.1. Test Mode: Mode 1

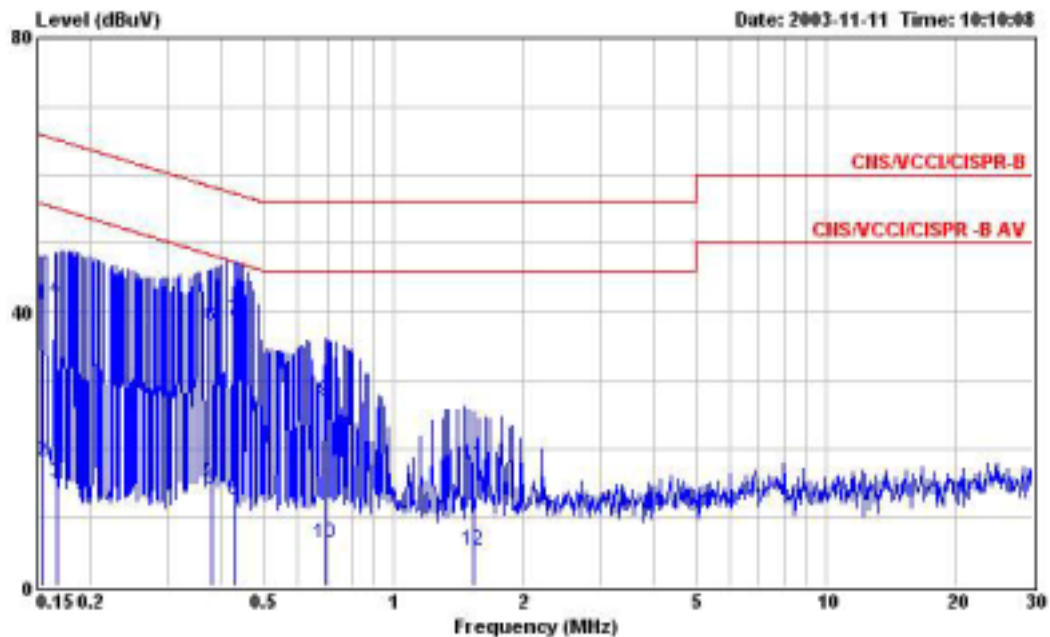
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 27°C
- Relative Humidity: 46%
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HV
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch00

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.157	41.47	-24.15	65.62	41.21	0.10	0.16	QP
2	0.157	27.98	-27.64	55.62	27.72	0.10	0.16	Average
3	0.265	37.75	-23.52	61.27	37.50	0.10	0.15	QP
4	0.265	21.17	-30.10	51.27	20.92	0.10	0.15	Average
5	0.387	28.20	-19.93	48.13	28.00	0.10	0.10	Average
6	0.387	38.59	-19.54	58.13	38.39	0.10	0.10	QP
7	0.452	37.50	-19.26	56.84	37.39	0.10	0.09	QP
8	0.452	15.84	-31.00	46.84	15.65	0.10	0.09	Average
9	0.683	27.12	-28.88	56.00	26.97	0.10	0.05	QP
10	0.683	9.74	-36.26	46.00	9.59	0.10	0.05	Average
11	1.750	27.94	-28.06	56.00	27.76	0.10	0.08	QP
12	1.750	20.36	-25.64	46.00	20.18	0.10	0.08	Average



Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch00

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.155	41.10	-24.63	65.73	40.04	0.10	0.16	QP
2	0.155	18.07	-37.66	55.73	17.81	0.10	0.16	Average
3	0.167	15.19	-39.92	55.11	14.93	0.10	0.16	Average
4	0.167	41.72	-23.39	65.11	41.46	0.10	0.16	QP
5	0.379	13.90	-34.40	48.30	13.69	0.10	0.11	Average
6	0.379	37.94	-20.36	58.30	37.73	0.10	0.11	QP
7	0.431	38.74	-18.49	57.23	38.55	0.10	0.09	QP
8	0.431	12.48	-34.75	47.23	12.29	0.10	0.09	Average
9	0.694	27.08	-28.92	56.00	26.93	0.10	0.05	QP
10	0.694	6.26	-39.74	46.00	6.11	0.10	0.05	Average
11	1.530	17.71	-38.29	56.00	17.54	0.10	0.07	QP
12	1.530	5.15	-40.85	46.00	4.98	0.10	0.07	Average

Test Engineer:

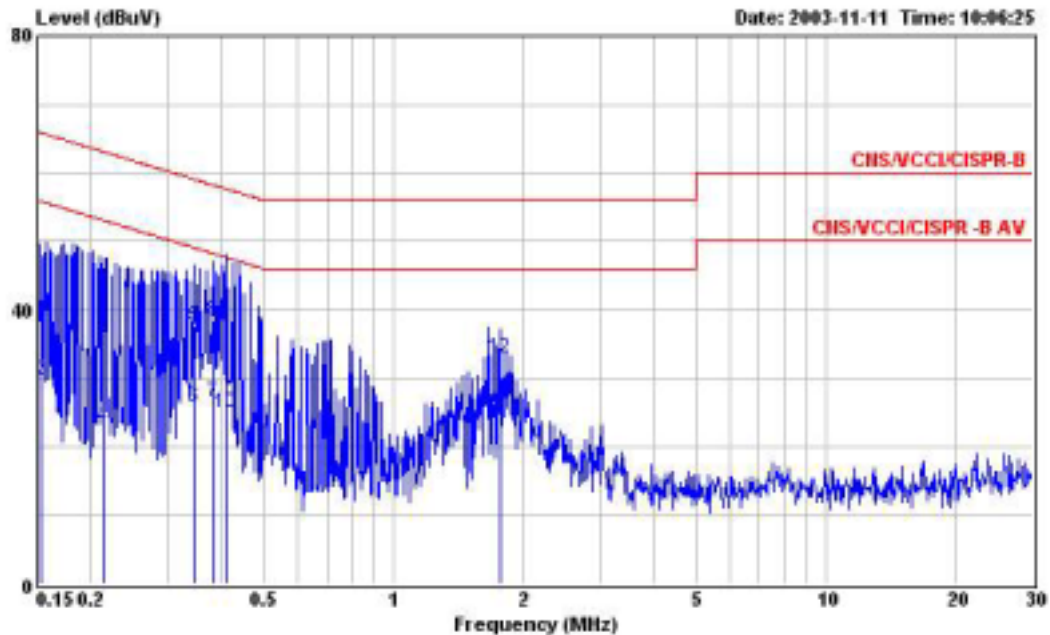
John

John Huang

5.4.2. Test Mode: Mode 2

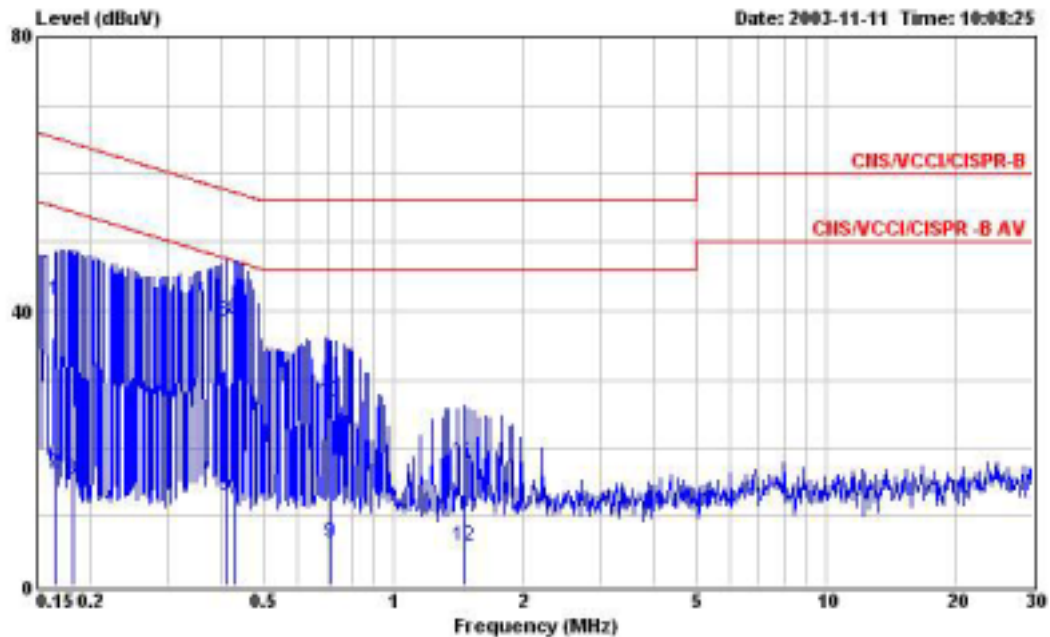
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 27 °C
- Relative Humidity: 46 %
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HY
 Condition : CIS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch02

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	41.48	-24.35	65.83	41.22	0.10	0.16	QP
2	0.153	29.58	-26.25	55.83	29.32	0.10	0.16	Average
3	0.214	39.63	-23.43	63.06	39.36	0.10	0.17	QP
4	0.214	22.95	-30.11	53.06	22.68	0.10	0.17	Average
5	0.345	37.61	-21.47	59.08	37.39	0.10	0.12	QP
6	0.345	25.81	-23.27	49.08	25.59	0.10	0.12	Average
7	0.383	26.44	-21.77	48.21	26.23	0.10	0.11	Average
8	0.383	38.44	-19.77	58.21	38.23	0.10	0.11	QP
9	0.408	38.48	-19.21	57.69	38.28	0.10	0.10	QP
10	0.408	24.94	-22.75	47.69	24.74	0.10	0.10	Average
11	1.770	23.43	-22.57	46.00	23.24	0.10	0.09	Average
12	1.770	33.00	-23.00	56.00	32.81	0.10	0.09	QP



Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch02

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.165	41.62	-23.60	65.22	41.36	0.10	0.16	QP
2	0.165	16.31	-38.91	55.22	16.05	0.10	0.16	Average
3	0.182	15.33	-39.06	54.39	15.06	0.10	0.17	Average
4	0.182	41.60	-22.79	64.39	41.33	0.10	0.17	QP
5	0.408	13.07	-34.62	47.69	12.87	0.10	0.10	Average
6	0.408	38.50	-19.19	57.69	38.30	0.10	0.10	QP
7	0.431	12.41	-34.82	47.23	12.22	0.10	0.09	Average
8	0.431	38.72	-18.51	57.23	38.53	0.10	0.09	QP
9	0.720	6.26	-39.74	46.00	6.11	0.10	0.05	Average
10	0.720	26.87	-29.13	56.00	26.72	0.10	0.05	QP
11	1.460	18.05	-37.95	56.00	17.89	0.10	0.06	QP
12	1.460	5.65	-40.35	46.00	5.49	0.10	0.06	Average

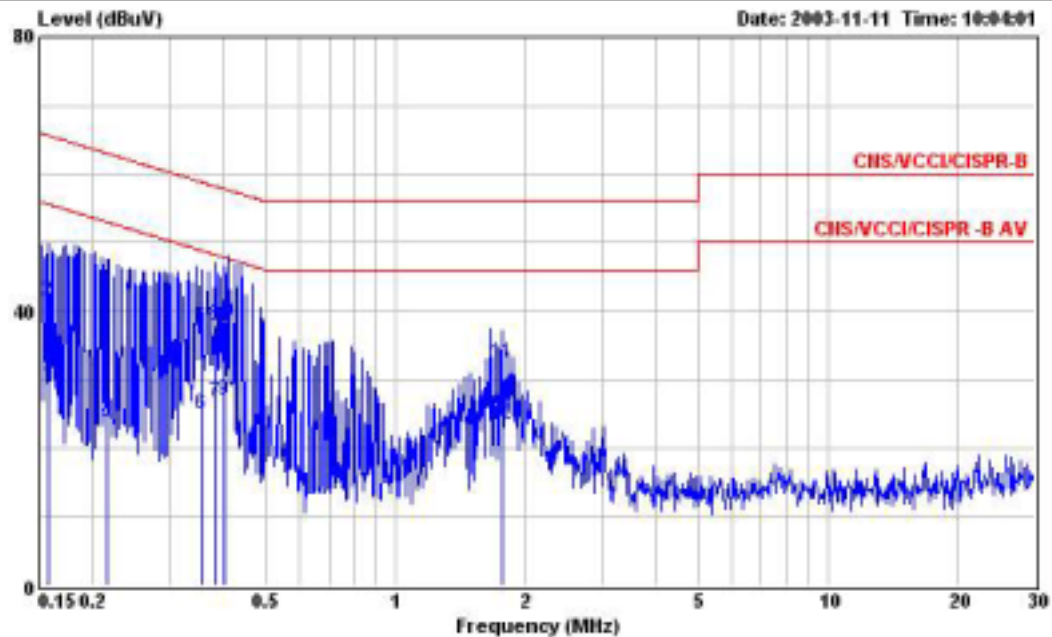
Test Engineer:

John
 John Huang

5.4.3. Test Mode: Mode 3

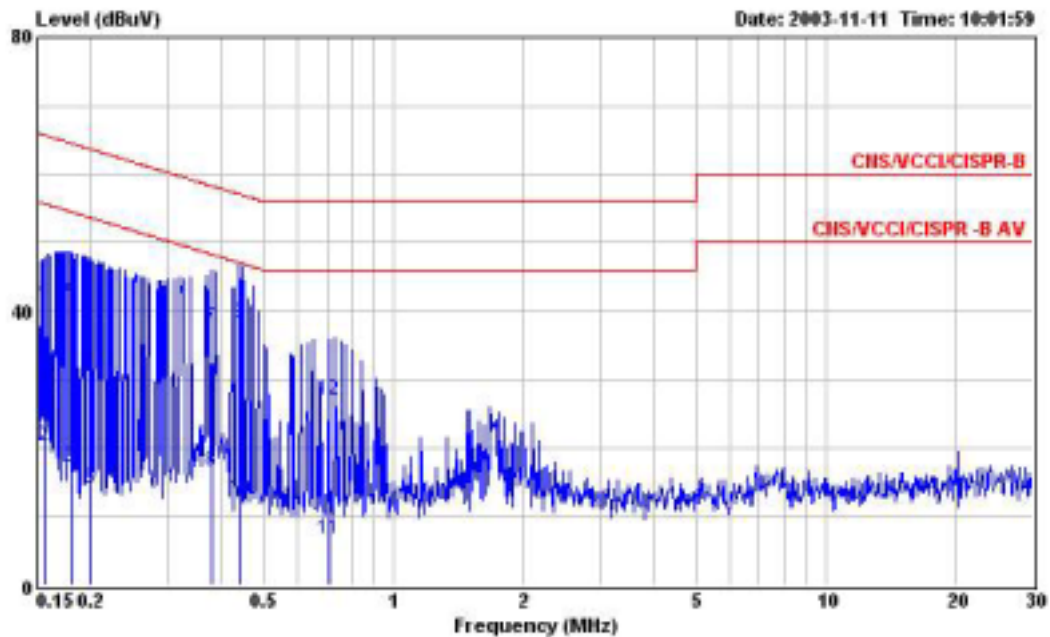
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 27 °C
- Relative Humidity: 46 %
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch05

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.157	29.01	-26.61	55.62	28.75	0.10	0.16	Average
2	0.157	41.49	-24.13	65.62	41.23	0.10	0.16	QP
3	0.215	39.55	-23.46	63.01	39.28	0.10	0.17	QP
4	0.215	23.28	-29.73	53.01	23.01	0.10	0.17	Average
5	0.354	37.59	-21.28	58.87	37.38	0.10	0.11	QP
6	0.354	24.90	-23.97	48.87	24.69	0.10	0.11	Average
7	0.383	26.66	-21.55	48.21	26.45	0.10	0.11	Average
8	0.383	37.96	-20.25	58.21	37.75	0.10	0.11	QP
9	0.400	27.11	-20.74	47.85	26.91	0.10	0.10	Average
10	0.400	38.37	-19.48	57.85	38.17	0.10	0.10	QP
11	1.770	32.47	-23.53	56.00	32.28	0.10	0.09	QP
12	1.770	23.28	-22.72	46.00	23.09	0.10	0.09	Average



Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : wireless 5.8G speaker
 Power : 110V/60Hz
 Model :
 Memo : TX ch05

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.156	41.05	-24.62	65.67	40.79	0.10	0.16	QP
2	0.156	20.39	-35.28	55.67	20.13	0.10	0.16	Average
3	0.179	17.12	-37.40	54.52	16.85	0.10	0.17	Average
4	0.179	41.52	-23.00	64.52	41.25	0.10	0.17	QP
5	0.200	40.37	-23.24	63.61	40.09	0.10	0.18	QP
6	0.200	14.02	-39.59	53.61	13.74	0.10	0.18	Average
7	0.381	37.67	-20.59	58.26	37.46	0.10	0.11	QP
8	0.381	16.66	-31.60	48.26	16.45	0.10	0.11	Average
9	0.440	38.28	-18.78	57.06	38.09	0.10	0.09	QP
10	0.440	12.53	-34.53	47.06	12.34	0.10	0.09	Average
11	0.708	6.63	-39.37	46.00	6.48	0.10	0.05	Average
12	0.708	27.12	-28.88	56.00	26.97	0.10	0.05	QP

Test Engineer:

John
 John Huang

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 40000 MHz were measured with a bandwidth of 120 kHz for 30MHz to 1 GHz and 1MHz for above 1GHz according to the methods defines in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Major Measuring Instruments

- Amplifier (HP 8447D)
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz

- Amplifier (MITEQ AFS44)
 - RF Gain 40 dB
 - Signal Input 100 MHz to 26.5 GHz

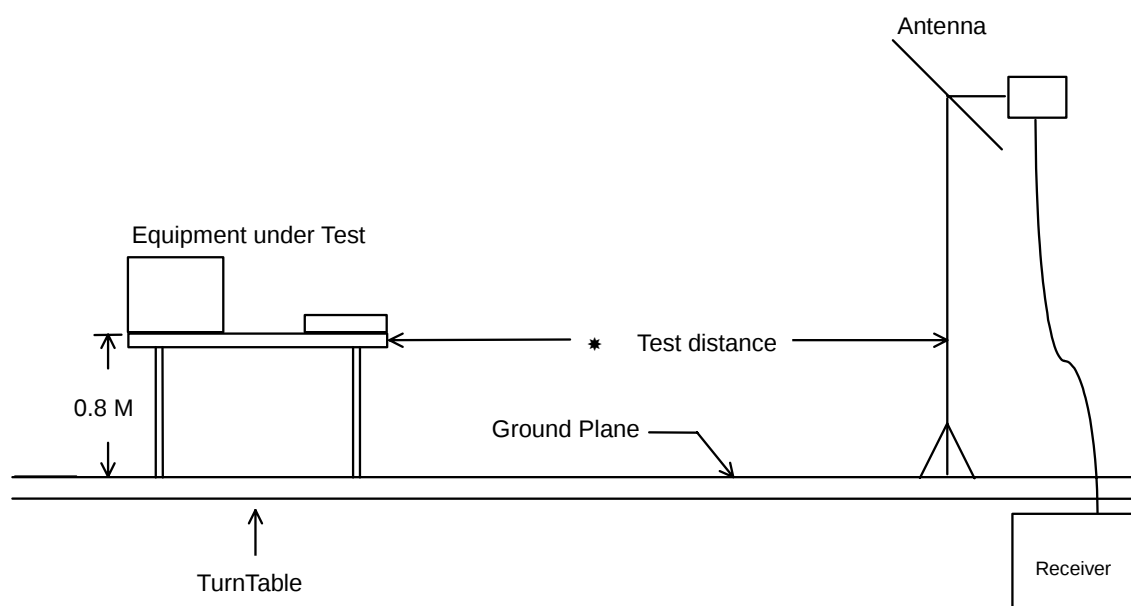
- Spectrum analyzer (R&S FSP40)
 - Attenuation 10 dB
 - Start Frequency 1 GHz
 - Stop Frequency 40 GHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 40 GHz

- Test Receiver (SCHAFFNER SCR3501)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 K – 1 GHz
 - Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode

6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. 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 turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. 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 which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was more 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

6.4.1. Test Mode: Mode 1

- Test Distance: 3 M
- Temperature: 27 °C
- Relative Humidity: 62 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following table

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH00 5735MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	86.970	28.08	-11.92	40.00	45.59	8.10	1.42	27.03	Peak	100	105
2	122.610	24.32	-19.18	43.50	38.90	10.13	2.20	26.91	Peak	---	---
3	147.180	30.09	-12.61	43.50	45.04	9.65	2.21	26.01	Peak	---	---
1	318.900	28.29	-17.71	46.00	39.97	12.00	3.03	26.71	Peak	---	---
2	330.100	32.05	-13.95	46.00	43.37	12.36	3.10	26.78	Peak	---	---
3	676.600	28.42	-17.58	46.00	33.92	17.84	4.66	28.00	Peak	---	---
1	3822.000	45.20	-28.80	74.00	50.94	32.14	3.55	41.43	Peak	---	---
2	3822.000	32.80	-21.20	54.00	38.54	32.14	3.55	41.43	Average	---	---

Site : 03CH03-NY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH00 5735MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	96.420	24.37	-19.13	43.50	40.54	9.15	1.69	27.01	Peak	---	---
2	122.610	26.55	-16.95	43.50	41.13	10.13	2.20	26.91	Peak	---	---
3	147.180	28.68	-14.82	43.50	43.63	9.65	2.21	26.81	Peak	---	---
1	330.100	27.39	-18.61	46.00	38.71	12.36	3.10	26.78	Peak	---	---
2	466.600	30.16	-15.84	46.00	38.35	15.56	3.78	27.53	Peak	---	---
3	676.600	28.40	-17.60	46.00	33.90	17.84	4.66	28.00	Peak	---	---
1	3822.000	49.39	-24.61	74.00	55.13	32.14	3.55	41.43	Peak	---	---
2	3822.000	36.58	-17.42	54.00	42.32	32.14	3.55	41.43	Average	---	---
3	3921.000	45.92	-28.08	74.00	50.99	32.42	3.98	41.47	Peak	---	---
4	3921.000	36.07	-17.93	54.00	41.14	32.42	3.98	41.47	Average	---	---

➤ For 5GHz ~ 40GHz

Remark: Frequency from 5000MHz to 40000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin	Detect	
Polarity	Factor	Loss							
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
5733.000	H	34.10	4.74	29.19	-	-	68.03	2520.58	A.V.
5733.000	H	34.10	4.74	39.47	-	-	78.31	8231.90	Peak
5733.000	V	34.10	4.74	37.95	-	-	76.79	6910.35	A.V.
5733.000	V	34.10	4.74	48.98	-	-	87.82	24603.68	Peak
11470.000	V/H					-			Peak, A.V.
17205.000	V/H					-			Peak, A.V.
22940.000	V/H					-			Peak, A.V.
28675.000	V/H					-			Peak, A.V.
34410.000	V/H					-			Peak, A.V.
40145.000	V/H					-			Peak, A.V.
45880.000	V/H					-			Peak, A.V.
51615.000	V/H					-			Peak, A.V.
57350.000	V/H					-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Steve Chen

6.4.2. Test Mode: Mode 2

- Test Distance: 3 M
- Temperature: 27 °C
- Relative Humidity: 62 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following table

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH02 5775MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	110.460	25.52	-17.98	43.50	41.31	9.67	1.80	27.26	Peak	---	---
2	122.610	24.16	-19.34	43.50	39.04	10.13	2.20	27.21	Peak	---	---
3	220.890	22.42	-23.58	46.00	37.45	9.23	2.58	26.84	Peak	---	---
1	330.100	32.31	-13.69	46.00	43.72	12.36	3.10	26.87	Peak	100	105
2	430.200	28.33	-17.67	46.00	37.28	15.06	3.67	27.68	Peak	---	---
3	528.200	28.69	-17.31	46.00	36.42	16.33	4.07	28.13	Peak	---	---
1	3849.000	47.12	-26.88	74.00	52.47	32.21	3.88	41.44	Peak	---	---
2	3849.000	36.96	-17.04	54.00	42.31	32.21	3.88	41.44	Average	---	---

Site : 03CH03-NY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH02 5775MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	63.210	21.60	-18.40	40.00	42.73	4.92	1.32	27.37	Peak	---	---
2	100.740	26.17	-17.93	43.50	42.36	9.38	1.73	27.30	Peak	---	---
3	122.610	26.23	-17.27	43.50	41.11	10.13	2.20	27.21	Peak	---	---
1	330.100	26.29	-19.71	46.00	37.70	12.36	3.10	26.87	Peak	---	---
2	676.600	29.29	-16.71	46.00	34.99	17.84	4.66	28.20	Peak	---	---
3	774.600	27.85	-18.15	46.00	32.33	18.59	4.98	28.05	Peak	---	---
1	3750.000	44.40	-29.60	74.00	50.15	31.93	3.72	41.40	Peak	---	---
2	3750.000	34.40	-19.60	54.00	40.15	31.93	3.72	41.40	Average	---	---
3	3846.000	48.94	-25.06	74.00	54.28	32.21	3.89	41.44	Peak	---	---
4	3846.000	36.96	-17.04	54.00	42.30	32.21	3.89	41.44	Average	---	---

➤ For 5GHz ~ 40GHz

Remark: Frequency from 5000MHz to 40000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor	Loss	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
5778.000	H	34.11	4.46	38.71	-	-	77.28	7311.39		Peak
5778.000	H	34.11	4.46	27.64	-	-	66.21	2044.09		A.V.
5778.000	V	34.11	4.46	47.42	-	-	85.99	19929.67		Peak
5778.000	V	34.11	4.46	37.05	-	-	75.62	6039.49		A.V.
11550.000	V/H						-			Peak, A.V.
17325.000	V/H						-			Peak, A.V.
23100.000	V/H						-			Peak, A.V.
28875.000	V/H						-			Peak, A.V.
34650.000	V/H						-			Peak, A.V.
40425.000	V/H						-			Peak, A.V.
46200.000	V/H						-			Peak, A.V.
51975.000	V/H						-			Peak, A.V.
57750.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Steve Chen
Steve Chen

6.4.3. Test Mode: Mode 3

- Test Distance: 3 M
- Temperature: 27 °C
- Relative Humidity: 62 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following table

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH05 5835MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	122.610	23.87	-19.63	43.50	38.75	10.13	2.20	27.21	Peak	---	---
2	149.610	26.86	-16.64	43.50	42.34	9.45	2.17	27.10	Peak	---	---
3	220.890	22.10	-23.90	46.00	37.13	9.23	2.58	26.84	Peak	---	---
1	330.100	32.38	-13.62	46.00	43.79	12.36	3.10	26.87	Peak	100	102
2	430.200	28.40	-17.60	46.00	37.35	15.06	3.67	27.68	Peak	---	---
3	528.200	27.74	-18.26	46.00	35.47	16.33	4.07	28.13	Peak	---	---
1	3885.000	47.48	-26.52	74.00	52.87	32.32	3.75	41.46	Peak	---	---
2	3885.000	37.26	-16.74	54.00	42.65	32.32	3.75	41.46	Average	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : Wireless 5.8G Speaker
 Power : 110V/60Hz
 MODEL :
 MEMO : TX CH05 5835MHz
 : F3N1003

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	63.210	23.31	-16.69	40.00	44.44	4.92	1.32	27.37	Peak	---	---
2	97.770	21.02	-22.48	43.50	37.39	9.23	1.70	27.30	Peak	---	---
3	122.610	25.75	-17.75	43.50	40.63	10.13	2.20	27.21	Peak	---	---
1	330.100	26.13	-19.87	46.00	37.54	12.36	3.10	26.87	Peak	---	---
2	676.600	28.59	-17.41	46.00	34.29	17.84	4.66	28.20	Peak	---	---
3	822.900	27.34	-18.66	46.00	31.22	18.93	5.14	27.95	Peak	---	---
1	3885.000	49.65	-24.35	74.00	55.04	32.32	3.75	41.46	Peak	---	---
2	3885.000	40.23	-13.77	54.00	45.62	32.32	3.75	41.46	Average	---	---

➤ For 5GHz ~ 40GHz

Remark: Frequency from 5000MHz to 40000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor	Cable Loss	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	(dBuV/m)	Level (uV/m)	Margin (dB)	Detect Mode
5838.000	H	34.14	4.74	44.08	-	-	82.96	14060.48		Peak
5838.000	H	34.14	4.74	34.22	-	-	73.10	4518.56		A.V.
5838.000	V	34.14	4.74	49.60	-	-	88.48	26546.06		Peak
5838.000	V	34.14	4.74	38.02	-	-	76.90	6998.42		A.V.
11670.000	V/H						-			Peak, A.V.
17505.000	V/H						-			Peak, A.V.
23340.000	V/H						-			Peak, A.V.
29175.000	V/H						-			Peak, A.V.
35010.000	V/H						-			Peak, A.V.
40845.000	V/H						-			Peak, A.V.
46680.000	V/H						-			Peak, A.V.
52515.000	V/H						-			Peak, A.V.
58350.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Steve
Steve Chen

7. EMI Suppression Component List

1. Added a ferrite core on power cable.
(As the External photo No. 4)

8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	0.92
35	13.63	1.05
40	11.11	1.08
45	10.59	1.15
50	6.47	1.29
55	5.83	1.63
60	5.18	1.30
65	4.81	1.36
70	4.43	1.43
75	5.10	1.48
80	5.91	1.53
85	7.33	1.61
90	8.74	1.69
95	9.05	1.67
100	9.36	1.76
110	9.65	1.80
120	9.97	1.90
130	10.51	1.61
140	10.32	2.14
150	9.42	2.16
160	8.09	2.16
170	7.43	1.99
180	7.60	2.39
190	7.43	2.38
200	7.26	2.46
220	9.11	2.59
240	10.88	2.68
260	11.75	2.91
280	11.55	2.92
300	11.36	2.99
320	12.03	3.03
340	12.69	3.22
360	13.33	3.28
380	14.00	3.80
400	14.63	3.80
450	15.33	3.69
500	16.03	3.93
550	16.65	3.56
600	17.29	4.15
650	17.64	4.58
700	18.00	4.73
750	18.39	4.71
800	18.79	4.99
850	19.10	5.24
900	19.42	5.38
950	19.58	5.57
1000	19.75	5.62

< 1G ~ 40G >

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
1000	24.10	1.92
2000	27.40	2.65
3000	30.00	2.85
4000	32.60	4.07
5000	33.40	4.20
6000	34.20	4.70
7000	35.30	5.22
8000	36.90	5.72
9000	38.10	6.07
10000	39.00	6.72
11000	38.60	6.84
12000	39.50	7.08
13000	39.30	7.61
14000	41.60	7.75
15000	40.60	7.58
16000	37.20	8.05
17000	40.20	8.28
18000	36.70	8.26
19000	37.60	8.70
20000	37.30	9.15
21000	37.00	9.50
22000	38.00	10.02
23000	38.70	10.18
24000	38.60	10.02
25000	38.90	10.27
26000	38.80	8.30
27000	39.10	8.33
28000	39.40	8.38
29000	39.10	8.41
30000	38.80	8.44
31000	39.90	8.46
32000	41.00	8.47
33000	41.15	8.50
34000	41.30	8.52
35000	41.80	8.50
36000	41.30	8.54
37000	42.05	8.59
38000	42.80	8.65
39000	43.95	8.68
40000	45.10	8.70

9. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 12, 2003	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 30, 2003	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 30, 2003	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	Conduction (CO01-HY)
50 ohm BNC type Terminal	NOBLE	50ohm	TM013	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHz~40GHz	Aug. 07, 2003	Radiation (03CH03-HY)
Receiver	SCHAFFNER	SCR 3501	417	9 KHz –1GHz	Feb. 20, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)

Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	±0.54
combined standard uncertainty $U_e(y)$	normal	±2.7
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±5.4

$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.2$ for 10m test distance

$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	0.2
combined standard uncertainty $U_e(y)$	normal	±1.66
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±3.32

$U = \sqrt{\{(0.3/2)^2 + (2^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.66$