





**SK TECH CO., LTD.**

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## Certificate of Compliance

<b>Test Report No.:</b>	<b>SKTOS-02029</b>		
<b>NVLAP CODE :</b>	<b>200220-0</b>		
<b>Applicant:</b>	<b>SEJIN ELECTRON INC.</b>		
<b>Applicant Address:</b>	60-19, KASAN-DONG, KEUMCHON-KU, SEOUL, KOREA		
<b>Product:</b>	<b>MP3 Internet Music Player</b>		
<b>FCC ID:</b>	GJJSMP-3020	<b>Model No.:</b>	SMP-3020
<b>Receipt No.:</b>	SKE20020313-167	<b>Date of receipt:</b>	Mar. 13, 2002
<b>Date of Issue:</b>	Mar. 25, 2002		
<b>Testing location:</b>	<b>SK TECH CO., LTD.</b> 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
<b>Test Standards:</b>	<b>ANSI C63.4 / 2000</b>		
<b>Rule Parts:</b>	<b>FCC part 15 Subpart B</b>		
<b>Equipment Class :</b>	<b>Class B Digital Device Peripheral</b>		
<b>Test Result:</b>	The above mentioned product has been tested and passed.		
<div style="display: flex; justify-content: space-between;"> <div> <b>Prepared by:</b> Y.H.Kang    <hr style="width: 100%;"/> <div style="display: flex; justify-content: space-between;"><i>Signature</i><i>Date</i></div> </div> <div> <b>Tested by:</b> K.W.Song/Engineer    <hr style="width: 100%;"/> <div style="display: flex; justify-content: space-between;"><i>Signature</i><i>Date</i></div> </div> <div> <b>Approved by:</b> K.S.Kim/Manager &amp; Chief Engineer    <hr style="width: 100%;"/> <div style="display: flex; justify-content: space-between;"><i>Signature</i><i>Date</i></div> </div> </div>			
<b>Other Aspects :</b>			
<b>Abbreviations :</b>	· OK, Pass = passed · Fail = failed · N/A = not applicable		
<ul style="list-style-type: none"> <li>This test report is not permitted to copy partly without our permission.</li> <li>This test result is dependent on only equipment to be used.</li> <li>This test result is based on a single evaluation of one sample of the above mentioned.</li> <li>This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.</li> <li>We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.</li> </ul>			
 <b>NVLAP Lab. Code: 200220-0</b>			



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## **1. General**

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by SK Tech Co., Ltd. and were made under Chief Engineer' s supervision.  
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

## **2. Test Site**

SK TECH Co., Ltd.

### **2.1 Location**

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200220-0  
and DATech for DAR-Registration No.:TTI-P-G155/97-10



## 2.2 List of Test and Measurement Instruments

**Table 1 : List of Test and Measurement Equipment**

- **Conducted Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	02.2003
Artificial Mains Network	ESH3-Z5	834549/001	10.2002
EMI Receiver	ESHS10	835871/002	10.2002
Artificial Mains Network	ESH3-Z5	836679/018	10.2002
Conducted Cable	N/A	N/A	N/A

- **Radiated Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS 10	825120/013	02.2003
EMI Receiver	ESVS 10	834468/008	11.2002
Spectrum Analyzer	R3361A	11730187	06.2002
Amplifier	8447F	3113A05153	05.2002
Log Periodic Antenna	UHALP9107	1819	02.2003
Biconical Antenna	BBA9106	91031626	02.2003
Antenna Mast	5907	N/A	N/A
Antenna & Turntable controller	5906	N/A	N/A
Amp & Receiver connection cables	N/A	N/A	N/A
50 Switcher	MP59B	6100214538	N/A

## 2.3 Test Date

Date of Application : Mar. 15, 2002 ~ Mar. 22, 2002

Date of Test : Mar. 25, 2002

## 2.4 Test Environment

See each test item' s description.



### **3. Description of the tested samples**

The EUT is the MP3 Internet Music Player.

#### **3.1 Rating and Physical Characteristics**

- System Requirement
  - Pentium 90MHz or higher
  - Windows 95/98/ME/2000/XP
  - 40MB of hard disk or more
  - CD-ROM driver
- Memory Size : Built-in Memory 32MB/64MB/128MB
- Liquid Crystal Display : LCD Segment type
- Case : Plastic
- PC Interface : USB
- Bit Rate : 4Mbps
- 3D Sound : SRS (Sound Retrieval System)
- Equalizer : 3 sound effects (Classic, Pop, and Rock)
- Noise Rate : 90dB
- Earphone Output : 7mW + 7mW
- Output Frequency Range : 20Hz - 20kHz
- Channel Separation : 40dB
- Size (    x D ) / Weight : 73 x 23mm / 57g (without battery)

#### **3.2 Submitted Documents**

N/A



## 4. Measurement Conditions

The operating voltage of EUT DC 3V by batteries.

### 4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

The EUT was connected with the PC with USB cable.

The test was made on the mode of uploading, downloading and playing MP3 files.

### 4.2 List of Peripherals

Description	Manufacturer	Model Name	Serial No.	FCC ID
Personal Computer	LG IBM	W8S	202KI11027	DoC
Monitor	Comtec	CT-150	N/A	DoC
Keyboard	Jing Mold	LKB-0107	10209670	N/A
Mouse	Logitech	M-S48a	LZE94504062	N/A
Printer	H.P.	2225C	3245512493	DSI6XU2225
Adapter 1 (for Monitor)	L.S.E	LSE0107A1240	A10142103041	N/A
Adapter 2 (for Printer)	Dream Electronics	DR-05600U	N/A	N/A



### 4.3 Type of Used Cables

Description	Length	Type of shield	Manufacturer	Remark
PC Power cable	1.6m	Non-Shield	None	
AC/DC Adapter cable	1.8m	Non-Shield	None	For Monitor
AC/DC Adapter cable	1.9m	Non-Shield	None	For Printer
VGA cable	1.8m	Shield	None	
Printer Interface cable	1.7m	Shield	None	
USB cable	1.2m	Shield	None	For EUT
Keyboard Interface cable	1.2m	Shield	None	
Mouse Interface cable	1.5m	Shield	None	
Earphone cable	1.0m	Non-Shield	None	For EUT

### 4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.

### 4.5 Uncertainty

#### 1) Radiated disturbance

$U_c$  (Combined standard Uncertainty) =  $\pm 1.9\text{dB}$

Expanded uncertainty  $U = KU_c$

$K = 2$

$U = \pm 3.8\text{dB}$

#### 2) Conducted disturbance

$U_c = \pm 0.88\text{dB}$

$U = KU_c = 2 \times U_c = \pm 1.8\text{dB}$



## 5. EMISSION Test

### 5.1 Conducted Emissions

**Result:****Pass**

The line-conducted facility is located inside a 2.0M x 3.6M x 7.2M shielded enclosure.

The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05.

A 1m x 1.5m wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room. ROHDE & SCHWARZ Model ESH3-Z5 (10kHz-30MHz) 50ohm/50 uH Line-Impedance Stabilization Networks(LISNs) are bonded to the shielded room.

The EUT is powered from the ROHDE & SCHWARZ LISN and the support equipment is powered from the ROHDE & SCHWARZ LISN. Power to the LISNs are filtered by a high-current high-insertion loss Lindgren enclosures power line filters (100dB 14kHz-10GHz).

The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.

All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".

If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the ROHDE & SCHWARZ LISN.

All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 450kHz to 30MHz with 100msec. sweep time.

The frequency producing the maximum level was reexamined using EMI/field Intensity Meter (ESHS 10) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode.

The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.

Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of conducted test.

Each EME reported was calibrated using self-calibrating mode.



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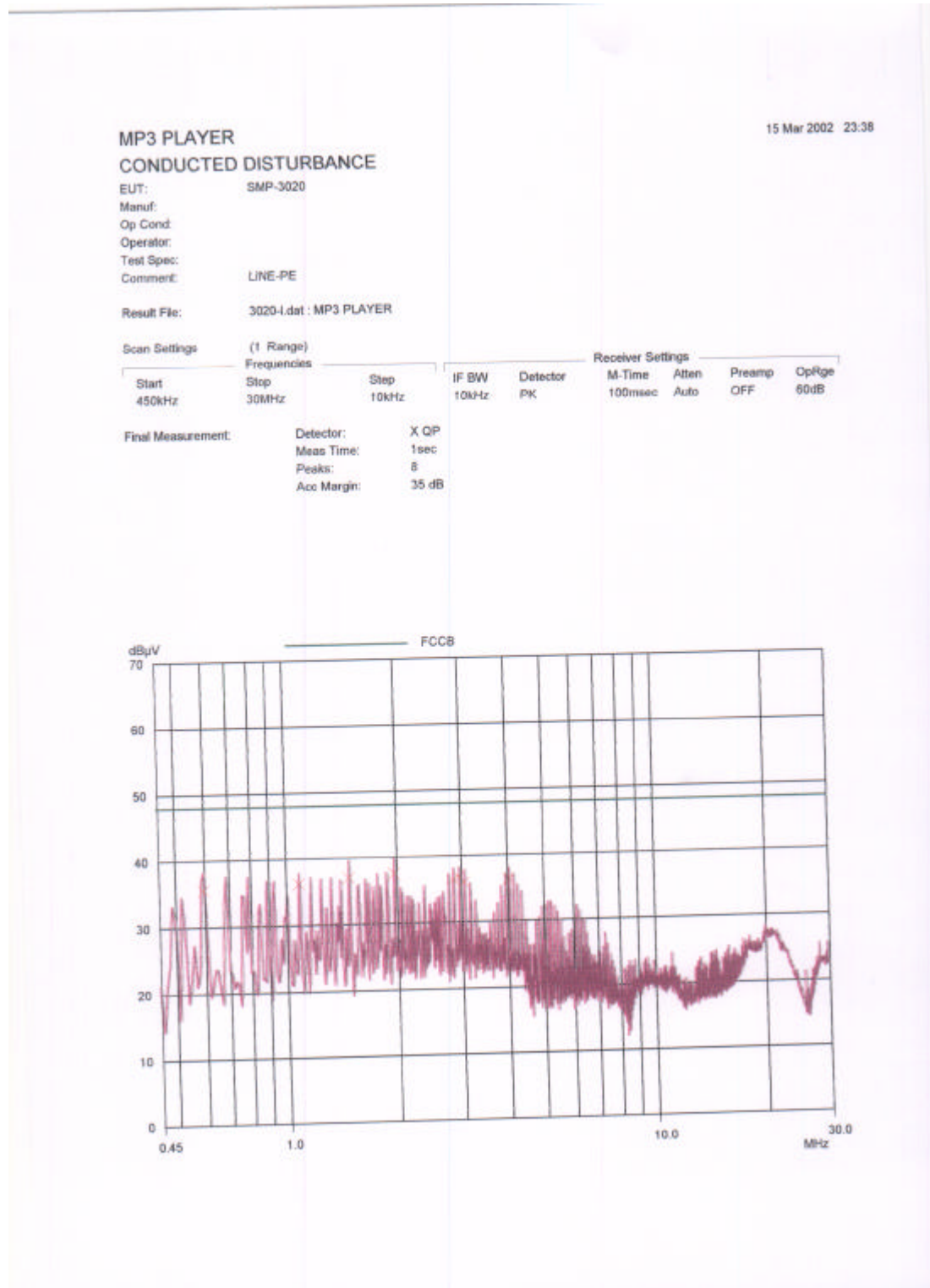
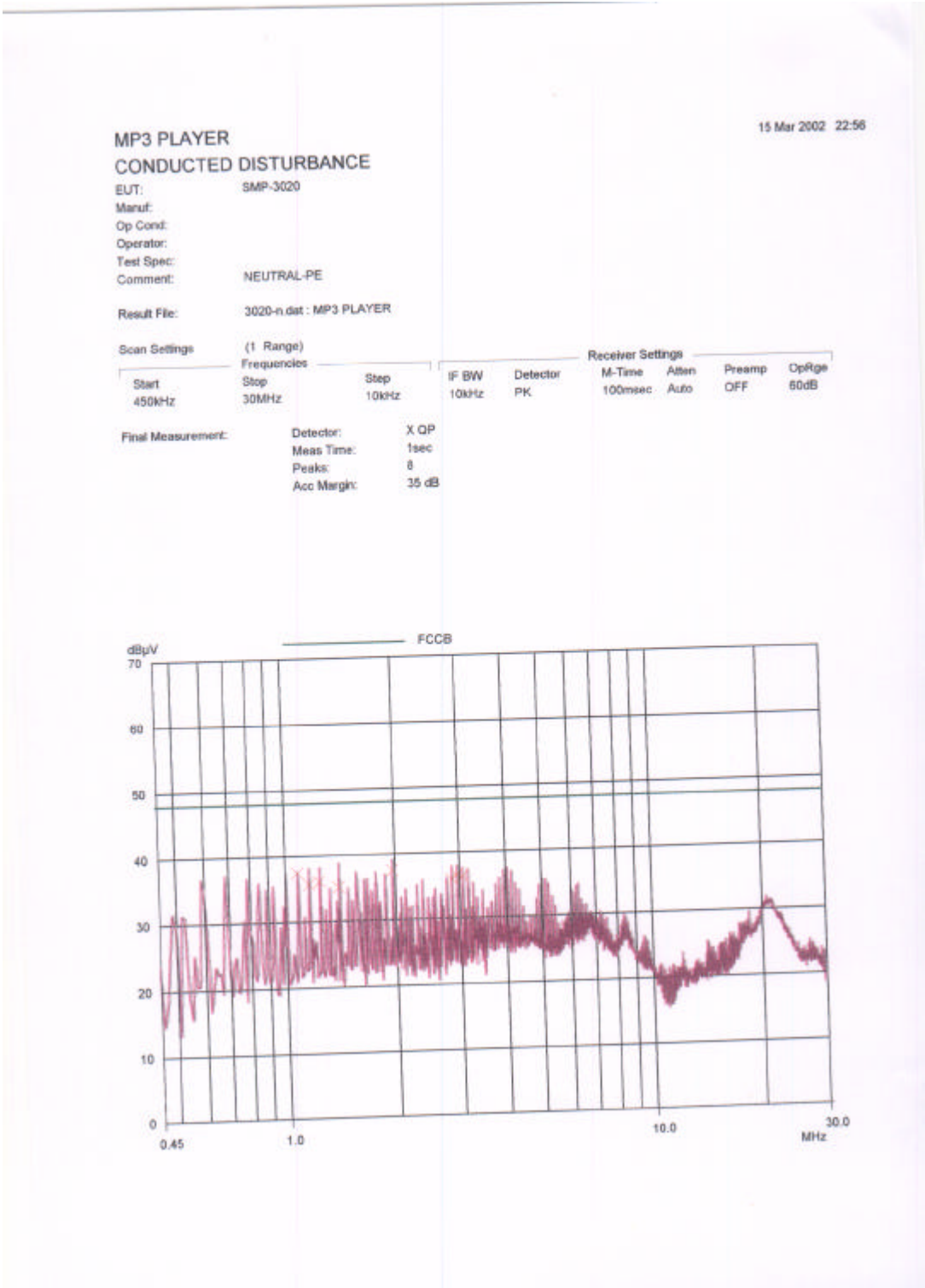
**Figure 1 : Spectral Diagram, LINE - PE**



Figure 2 : Spectral Diagram, NEUTRAL – PE



**Table 2: Test Data, Conducted Emissions**

Frequency (MHz)	(1)Reading (dBmV)	Line	(2)C/F (dB)	(3)C/L (dB)	(4)Actual (dBmV)	(5)Limit (dBmV)	(6)Margin (dB)
1.090	36.31	A	0.1	0.1	36.51	48.0	11.49
1.410	35.25	B	0.1	0.1	35.45	48.0	12.55
1.980	37.50	A	0.1	0.3	37.90	48.0	10.10
2.870	36.03	B	0.3	0.3	36.63	48.0	11.37
3.070	35.97	A	0.1	0.3	36.37	48.0	11.63
4.060	36.35	A	0.2	0.4	36.95	48.0	11.05

**NOTES:**

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. Line A = LINE-PE, Line B = NEUTRAL-PE
6. C/F = Correction Factor
7. C/L = Cable Loss

**Margin Calculation**

$$(6)\text{Margin} = (5)\text{Limit} - (4)\text{Actual}$$

$$[(4)\text{Actual} = (1)\text{Reading} + (2)\text{C/F} + (3)\text{C/L}]$$



## 5.2 Radiated Emissions

**Result :****Pass**

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.

Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.

The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using SCHWARZBECK dipole antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with FRP.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter(ESVS 10) and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table.

The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of radiated emission test.

Each EME reported was calibrated using self-calibrating mode.

**Table 3 : Test Data, Radiated Emissions**

Frequency (MHz)	Pol.	Height [m]	Angle [ ° ]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
48.01	V	1.0	65	23.1	12.6	35.7	40.0	4.3
96.31	V	1.0	40	27.0	10.9	37.9	43.5	5.6
144.01	V	1.0	251	21.9	16.8	38.7	43.5	4.8
192.01	V	1.0	295	20.0	18.3	38.3	43.5	5.2
240.01	V	1.0	336	18.4	20.2	38.6	46.0	7.4
384.10	V	1.0	280	14.1	21.6	35.7	46.0	10.3
480.03	V	1.0	165	15.0	22.6	37.6	46.0	8.4

Table. Radiated Measurements at 3-meters

**NOTES:**

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. AFCL = Antenna factor and cable loss
6. H = Horizontal, V = Vertical Polarization

**Margin Calculation**

$$(5)\text{Margin} = (4)\text{Limit} - (3)\text{Actual}$$

$$[(3)\text{Actual} = (1)\text{Reading} + (2)\text{AFCL}]$$