CTK Co., Ltd.
386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
Tel: +82-31-339-9970 Fax: +82-31-339-9855
www.e-ctk.com

TEST REPORT For FCC

Test Report No.	:	2009040039
Date of Issue	:	April 20, 2009
Model/Type No.	:	SHS-7020XMS/EN
FCC ID	:	WQRSHS-7020XMSEN
Kind of Product	:	DIGITAL DOORLOCK
Applicant	:	SEOUL COMMTECH Co., Ltd.
Applicant Address	:	448-11, Seongnae 3-dong, Gangdong-gu, Seoul, Korea
Manufacturer 1	:	ORIENTAL INTERGRATED ELECTRONICS Co., Ltd.
Manufacturer Address 1	:	281-34, Dodang-dong, Wonmi-gu, Buchun-si, Gyeonggi-do, Korea
Manufacturer 2	:	JE TECHNOLOGY Co., Ltd.
Manufacturer Address 2	:	Dasong B/D 5F 694-29, Gumjung-dong, Kunpo-si, Gyeonggi-do, Korea
Contact Person	:	Dong Yeol Kim / Engineer
Telephone	:	+82-2-2225-6804
Received Date	:	March 20, 2009
Test Period	:	Start : March 20, 2009 End : April 20, 2009
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

The test results presented in this report relate only to the object tested.

Tested by

Eun-Won, Lee
Test Engineer
Date: April 20, 2009

Reviewed by

Young-Joon, Park
Technical Manager
Date: April 20, 2009

REPORT REVISION HISTORY

Date	Revision	Page No
April 20, 2009	Issued (2009040039)	All

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1.0 General Product Description

1.0.1 Tested Equipment

☒ Unless otherwise indicated, all tests were conducted on Model SHS-7020XMS/EN.

☐ Tests performed on Model _____ were considered to be representative of Model(s) _____.

1.0.2 Equipment Size, Mobility and Identification

Dimensions:	86(W) by 222(H) by 69(D)	☒ mm (Outdoor Unit)
	86(W) by 222(H) by 69(D)	☒ mm (Indoor Unit)
Mobility:	☐ Hand-held ☐ Table-top	☒ Built-in
	☐ Traveling ☐ Floor-standing	
Serial No.:	Prototype	

1.0.3 Electrical Ratings

Input 1:	7.5 Vdc (5 AA Alkaline 1.5 V Batteries (LR6))	
Output 1:	-	
Input 2:	12 Vdc (AC ADAPTOR	Input: 100-230 Vac, 50/60 Hz, 1.0 A Output: 12 Vdc, 2.5 A)
Output 2:	-	

1.0.4 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage 1:	7.5 Vdc (Battery)
Frequency 1:	-
Voltage 2:	120 Vac (AC ADAPTOR)
Frequency 2:	60 Hz

1.0.5 Clock & Other Frequencies Utilized

7.3728 MHz, 13.56 MHz

1.1 Model Differences

Not applicable

1.2 Device Modifications

Not applicable

1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
AC ADAPTOR	Sin Sung Electronics Co., Ltd.	SHT-PS1250X	-	-

☒ Cable Description

#	Description	Ferrite Core	Length (m)	Other Details
1	AC Power Cable, Unshielded	No	1.8	Connect to AC Power
2	DC IN Cable, Unshielded	Yes	1.6	Between the EUT and an AC ADAPTOR

1.4 Test Software

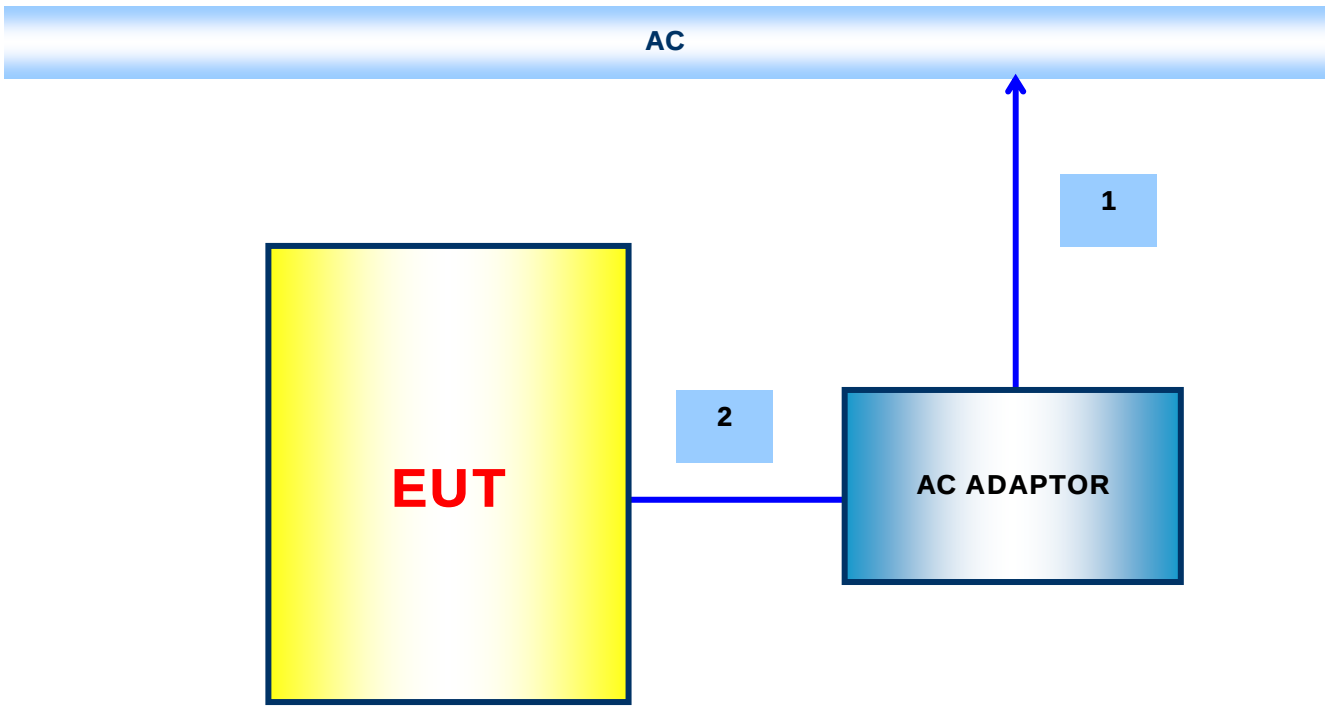
☐ EMC Test V 1.0
☐ Display Test Patterns – V1.5
☐ Ping.exe
☒ Not applicable

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

☐ Standby
☐ Display circles pattern
☒ Practice operation – EUT transmitting at 13.56 MHz continuously
☐ Scrolling 'H'
☐ Read / Write

1.6 Configuration



1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.8 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested.
Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)
Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Open Area Test Site. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-2003 7.2.3, 7.2.4, 8.3.1.1, 8.3.1.2

1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	93250
JAPAN	**VCCI**	10 meter Open Area Test Site and one conducted site.	R-948, C-986
KOREA	**KCC**	EMI (10 meter Open Area Test Site and two conducted sites) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	No. 51, KR0025
International	**KOLAS**	EMC	

2.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

☐ EN 61000-6-3:2007		
☐ EN 61000-6-4:2007		
☐ EN 55011:2007 +A2:2007	☐ Group 1 ☐ Class A	☐ Group 2 ☐ Class B
☐ EN 55013:2001 +A1:2003 +A2:2006		
☐ EN 55014-1:2006		
☐ EN 55015:2006		
☐ EN 61204-3:2000	☐ Class A	☐ Class B
☐ EN 61131-2:2003		
☐ EN 61326-1:2006	☐ Class A	☐ Class B
☐ EN 55022:2006	☐ Class A	☐ Class B
☐ EN 61000-3-2:2006		
☐ EN 61000-3-3:1995 +A1:2001 +A2:2005		
☐ VCCI V-3/2008.04	☐ Class A	☐ Class B
☐ AS/NZS CISPR22:2006	☐ Class A	☐ Class B
☒ FCC Part 15 Subpart C		
☐ CISPR 22:2006	☐ Class A	☐ Class B

2.1 Radiated Electric Field Emissions - 15.225(a)

Reference Standard
FCC Part 15.225(a)

Test Date
April 6, 2009

Test Location
☒ EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
☒	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2010-02-27
☒	Loop Antenna	EMCO	6502	9107-2652	2010-10-13

Frequency Range of Measurement
13.553 MHz to 13.567 MHz

Instrument Settings
IF Band Width: 10 kHz

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (30 m)	Field Strength of Fundamental dBuV/m (3 m)
13.553-13.567	15,848	84	104

Test Results
The requirements are:

☒ MET
☐ NOT MET
☐ NOT APPLICABLE

Remarks
See Appendix A for test data

2.2 Radiated Electric Field Emissions - 15.225(b)(c)

Reference Standard
FCC Part 15.225(b)(c)

Test Date
April 6, 2009

Test Location
☒ EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
☒	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2010-02-27
☒	Loop Antenna	EMCO	6502	9107-2652	2010-10-13

Frequency Range of Measurement
13.410 MHz to 13.553 MHz, 13.567 MHz to 13.710 MHz
13.110 MHz to 13.410 MHz, 13.710 MHz to 14.010 MHz

Instrument Settings
IF Band Width: 10 kHz

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (30 m)	Field Strength of Fundamental dBuV/m (3 m)
13.410-13.553	334	50.4	70.4
13.567-13.710	334	50.4	70.4
13.110-13.410	106	40.5	60.5
13.710-14.010	106	40.5	60.5

Test Results
The requirements are:

☒ MET
☐ NOT MET
☐ NOT APPLICABLE

Remarks
Emissions 20dB's below the limit were not necessarily recorded.

2.3 Radiated Electric Field Emissions - 15.225(d)

Reference Standard
FCC Part 15.225(d), 15.209

Test Date
April 6, 2009

Test Location
☒ EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
☒	Field Strength Meter	Rohde & Schwarz	ESVS30	826638/008	2009-06-10
☒	ULTRA Broadband Antenna	Rohde & Schwarz	HL562	361324/014	2010-06-20
☒	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2010-02-27
☒	Loop Antenna	EMCO	6502	9107-2652	2010-10-13

Frequency Range of Measurement
9 kHz to 1000 MHz

Instrument Settings
IF Band Width: 10 kHz (9 kHz to 30 MHz)
IF Band Width: 120 kHz (30 MHz to 1000 MHz)

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (3 m)
1.705-30.0	30	49.5
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	600	54

Test Results
The requirements are:

☒ MET
☐ NOT MET
☐ NOT APPLICABLE

Remarks
See Appendix A for test data

2.4 Frequency Stability – 15.225(e)

Reference Standard
FCC Part 15.225(e)

Test Date
April 9, 2009

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
☒	Spectrum Analyzer	HP	E4403B	US39440619	2009-10-31
☒	Temp & Humi Chamber	Kunpoong Engineering	KP-1000	2002KP050041	2010-01-29

Test Results
The requirements are:

☒ MET
☐ NOT MET
☐ NOT APPLICABLE

Test Data

Timing	-20˚C	-10˚C	0˚C	10˚C	20˚C	30˚C	40˚C	50˚C
Start-up	13.56069	13.56075	13.56078	13.56078	13.56078	13.56079	13.56078	13.56080
10 min	13.56069	13.56074	13.56078	13.56078	13.56078	13.56080	13.56078	13.56081
30 min	13.56070	13.56075	13.56078	13.56078	13.56078	13.56079	13.56079	13.56081

Timing	Power 85%	Power 115%
Start-up	13.56078	13.56078
10 min	13.56078	13.56078
30 min	13.56078	13.56078

2.5 Conducted Voltage Emissions – 15.207

Reference Standard
FCC Part 15.207

Test Date
April 9, 2009

Test Location
Shielded Room

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
☐	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2010-02-27
☐	LISN	EMCO	3825/2	9607-2575	2009-08-19
☐	LISN	EMCO	3825/2	9409-2246	2009-08-19
☒	Field Strength Meter	Rohde & Schwarz	ESHS30	862024/001	2010-03-04
☒	LISN	Rohde & Schwarz	ESH3-Z5	100207	2009-12-12
☒	LISN	EMCO	3825/2	9206-1971	2009-12-12

Frequency Range of Measurement
150 kHz to 30 MHz

Instrument Settings
IF Band Width: 9 kHz

Conducted Emission limits

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

Test Results
The requirements are:

☒ MET

Frequency (MHz)	Measured Data (dBuV)	Margin (dB)	Remark
13.56	43.7	6.3	Average

☐ NOT MET
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

APPENDIX A – TEST DATA

Radiated Electric Field Emissions (Quasi-Peak reading)

#1 Battery Mode

1) Fundamental Frequency Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
13.56	46.9	H	1.0	9.1	0.1	104.0	56.1	47.9
13.56	43.1	V	1.0	9.1	0.1	104.0	52.3	51.7

2) Frequency Range from 9 kHz to 30 MHz Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
8.38	25.9	H	1.0	9.4	0.1	49.5	35.4	14.1
8.37	26.9	V	1.0	9.4	0.1	49.5	36.4	13.1

3) Frequency Range from 30 MHz to 1000 MHz Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
97.50	16.8	V	1.0	9.4	0.8	43.5	27.0	16.5
270.94	18.5	H	4.0	10.1	2.1	46.0	30.7	15.3
284.47	18.0	H	4.0	10.5	2.2	46.0	30.7	15.3
879.25	17.7	V	1.2	20.7	4.6	46.0	43.0	3.0
949.25	14.6	H	3.0	21.5	4.5	46.0	40.6	5.4
963.25	13.3	H	2.5	21.6	4.6	54.0	39.5	14.5

#2 AC ADAPTOR Mode

1) Fundamental Frequency Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
13.56	47.3	H	1.0	9.1	0.1	104.0	56.5	47.5
13.56	43.1	V	1.0	9.1	0.1	104.0	52.3	51.7

2) Frequency Range from 9 kHz to 30 MHz Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
8.39	27.1	H	1.0	9.4	0.1	49.5	36.6	12.9
8.39	27.8	V	1.0	9.4	0.1	49.5	37.3	12.2

3) Frequency Range from 30 MHz to 1000 MHz Test Data

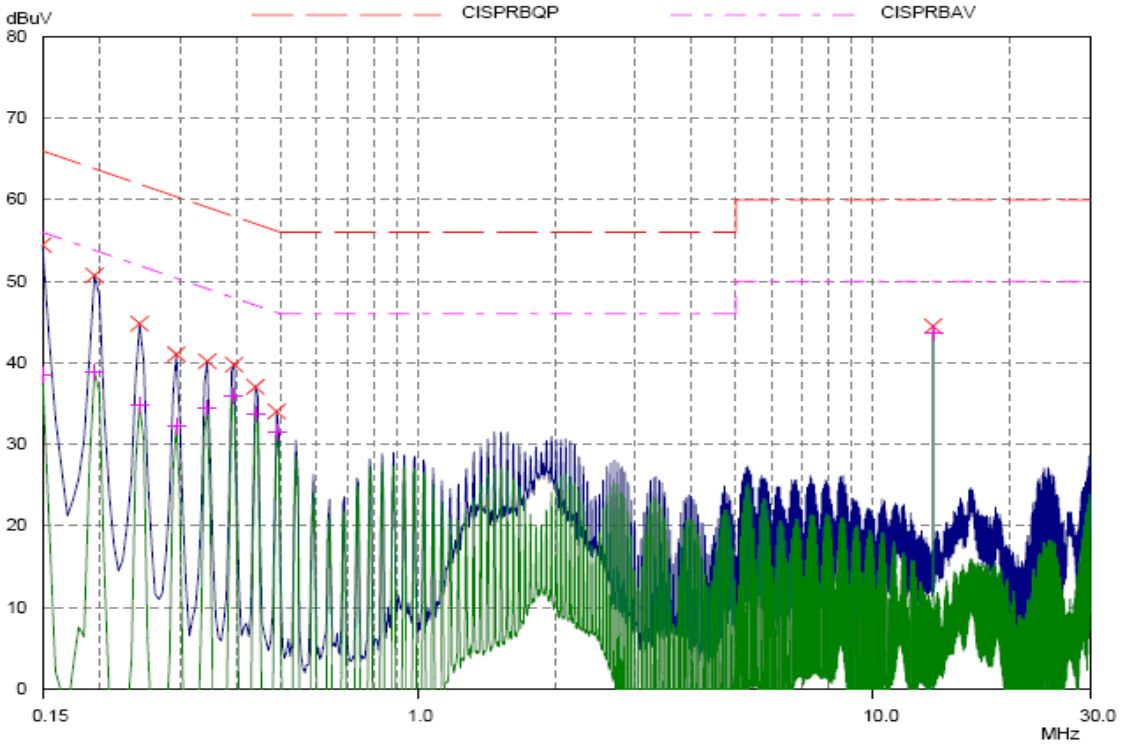
Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
40.80	22.3	V	1.0	14.4	0.2	40.0	36.9	3.1
102.22	25.9	V	1.0	9.6	0.9	43.5	36.4	7.1
108.97	25.9	V	1.0	9.8	0.9	43.5	36.6	6.9
879.25	17.7	V	1.2	20.7	4.6	46.0	43.0	3.0
949.25	15.5	H	3.0	21.5	4.5	46.0	41.5	4.5
963.25	13.8	H	2.5	21.6	4.6	54.0	40.0	14.0

Conducted Voltage Emissions (AC ADAPTOR Mode)

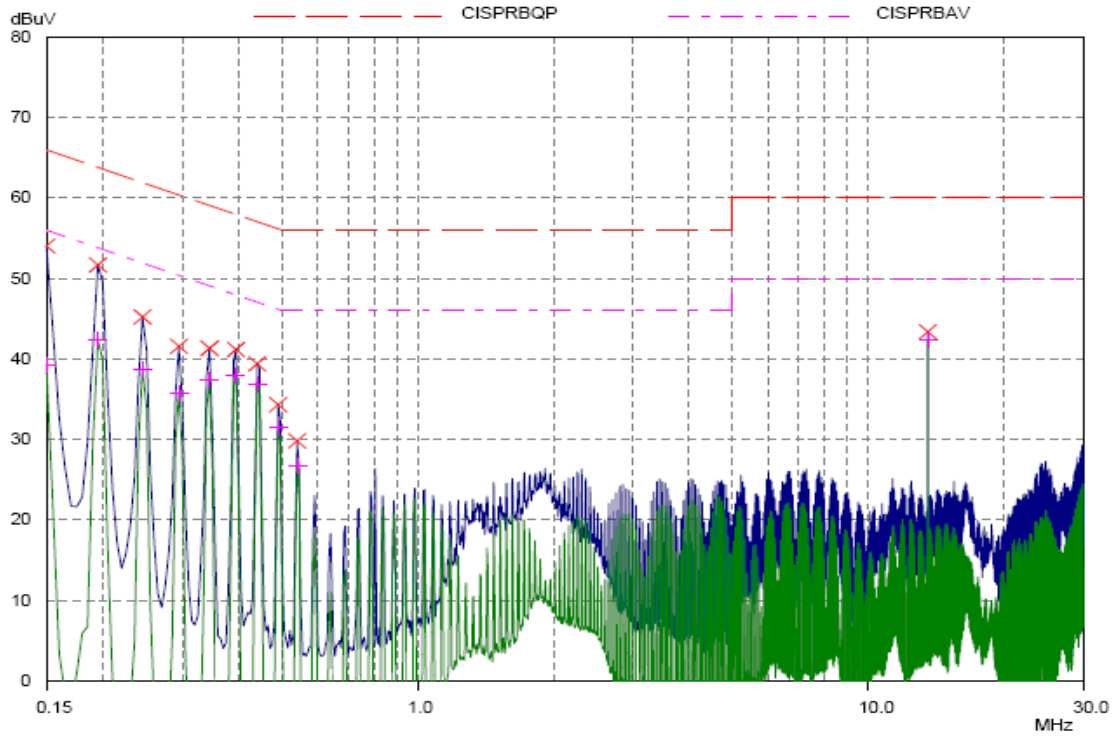
Frequency	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
[MHz]	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dB]
0.19	0.1	0.2	N	64.0	51.3	51.6	12.4	54.0	42.0	42.3	11.7
0.24	0.1	0.2	N	62.1	44.9	45.2	16.9	52.1	38.4	38.7	13.4
0.34	0.1	0.2	N	59.2	41.0	41.3	17.9	49.2	37.1	37.4	11.8
0.39	0.1	0.2	N	58.1	40.8	41.1	17.0	48.1	37.7	38.0	10.1
0.44	0.1	0.3	N	57.1	38.9	39.3	17.8	47.1	36.3	36.7	10.4
13.56	0.6	0.6	H	60.0	43.2	44.4	15.6	50.0	42.5	43.7	6.3

H : Hot, N : Neutral

[HOT]



[NEUTRAL]



Bandwidth of the Operating Frequency