



243 Jubug-Ri, Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 449-822

Tel: +82-31-323-6008 Fax: +82-31-323-6010

<http://www.ltalab.com>

Dates of Tests: June 23~July 2, 2010

Test Report S/N: LR500191006F

Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

RQKSMARTNL-RF2000

APPLICANT

Sammi Information Systems Co., Ltd.

FCC Classification	:	FHSS Sequence Spread Spectrum (FHSS)
Manufacturing Description	:	UHF-RFID Reader
Manufacturer	:	Sammi Information Systems Co., Ltd.
Model name	:	SmartNL-RF2000
Test Device Serial No.:	:	-
Rule Part(s)	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2003
Frequency Range	:	902.75 ~ 927.25MHz
RF power	:	0.85 W - Conducted
Data of issue	:	July 2, 2010

This test report is issued under the authority of:

The test was supervised by:

Kyung-Taek LEE, Technical Manager

Hyun-Chae You, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. GENERAL INFORMATION'S	3
2. INFORMATION'S ABOUT TEST ITEM	4
3. TEST REPORT	6
3.1 SUMMARY OF TESTS	6
3.2 TECHNICAL CHARACTERISTICS TEST	7
3.2.1 CARRIER FREQUENCY SEPARATION	7
3.2.2 NUMBER OF HOPPING FREQUENCIES	9
3.2.3 20 dB BANDWIDTH	11
3.2.4 TIME OF OCCUPANCY (Dwell Time)	14
3.2.5 TRANSMITTER OUTPUT POWER	16
3.2.6 BAND – EDGE (Conducted)	19
3.2.7 FIELD STRENGTH OF HARMONICS	24
3.2.8 AC CONDUCTED EMISSIONS	32
 APPENDIX	
APPENDIX TEST EQUIPMENT USED FOR TESTS	53

1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2010-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-09-01	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Applicant

Company name : Sammi Information Systems Co., Ltd.
 Address : 11F Kolon Aston Bldg, 505-14, Gasan-dong,
 Guemcheon-Gu, Seoul, 153-803 KOREA
 Tel / Fax : +82 2 790-5505/ +82 2 797-9206

2-2 Manufacturer

Company name : NESSLAB Co., Ltd.
 Address : 5F 23-14 Jang-dong Yuseong-gu Daejeon 305-345 Korea
 Tel / Fax : +82-420-867-1081 / +82-42-867-1083

2-2 Equipment Under Test (EUT)

Trade name : UHF-RFID Reader
 FCC ID : RQKSMARTNL-RF2000
 Model name : SmartNL-RF2000
 Serial number : Identification
 Date of receipt : June 23, 2010
 EUT condition : Pre-production, not damaged
 Antenna type : Patch Antenna/Model name:MACRO260-919(180K) Max Gain 5.45dBi
 Patch Antenna/Model name:MACRO200-915(RHCP)Max Gain 5.33dBi
 Frequency Range : 902.75 ~ 927.25MHz
 RF output power : 0.85 W- Conducted
 Number of channels : 50
 Channel spacing : 500KHz
 Channel Access Protocol : Frequency Hopping
 Power Source : 5.0VDC by Adapter

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	902.75	914.75	927.25

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400 Microtower	CNG8330J9R	HP
Monitor	HPL1710	CNC816QH92	HP
KEYBOARD	SK-8115	68A-04Q6	DELL
MOUSE	MO56UO	LNB33130022	DELL
PRINTER	Deskjet 600K	SG7631B1XX	HP

2-5 Adapter Description

Adatper Type	Model Name	Input	Output	Manufacturer	Note
AC_DC Adapter	STD-0505P	100 ~ 240 Vac / 47 ~ 63 Hz	+5Vdc / 5A	Adapter Technology Co., Ltd.	Tested
DC_DC Adapter	PA-3550B	9V TO 30V	+5Vdc / 3A	PULSETECH CO., LTD.	Tested
CAR Adapter	PC-050400C	12Vdc / 24Vdc	+5Vdc / 4A	PERFECT POWER CO., LTD.	Tested

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	Number of Hopping Frequencies	≥ 50 hops		C
15.247(a)	20 dB Bandwidth	-		C
15.247	Dwell Time	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 1Watt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.249 / 15.209	Field Strength of Harmonics	< 54 dBuV (at 3m)	Radiated	C
15.207 /15.107	AC Conducted Emissions	EN 55022	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003

→ Antenna Requirement

The **Sammi Information Systems Co., Ltd. SmartNL-RF2000** unit complies with the requirement of §15.203.

The Antenna type is TNC Reversed Type ; Refer to the External photo

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation

Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = 1 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 10 kHz (1% of the span or more) Sweep = auto

VBW = 10 kHz Detector function = peak

Trace = max hold

Measurement Data:

Test Results	
Carrier Frequency Separation (KHz)	Result
499.3	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Measurement Setup

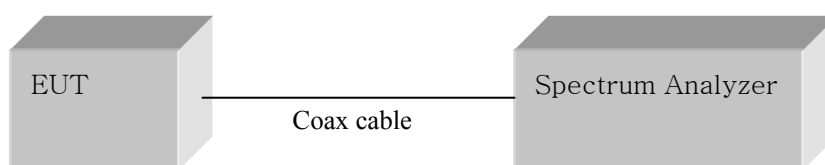
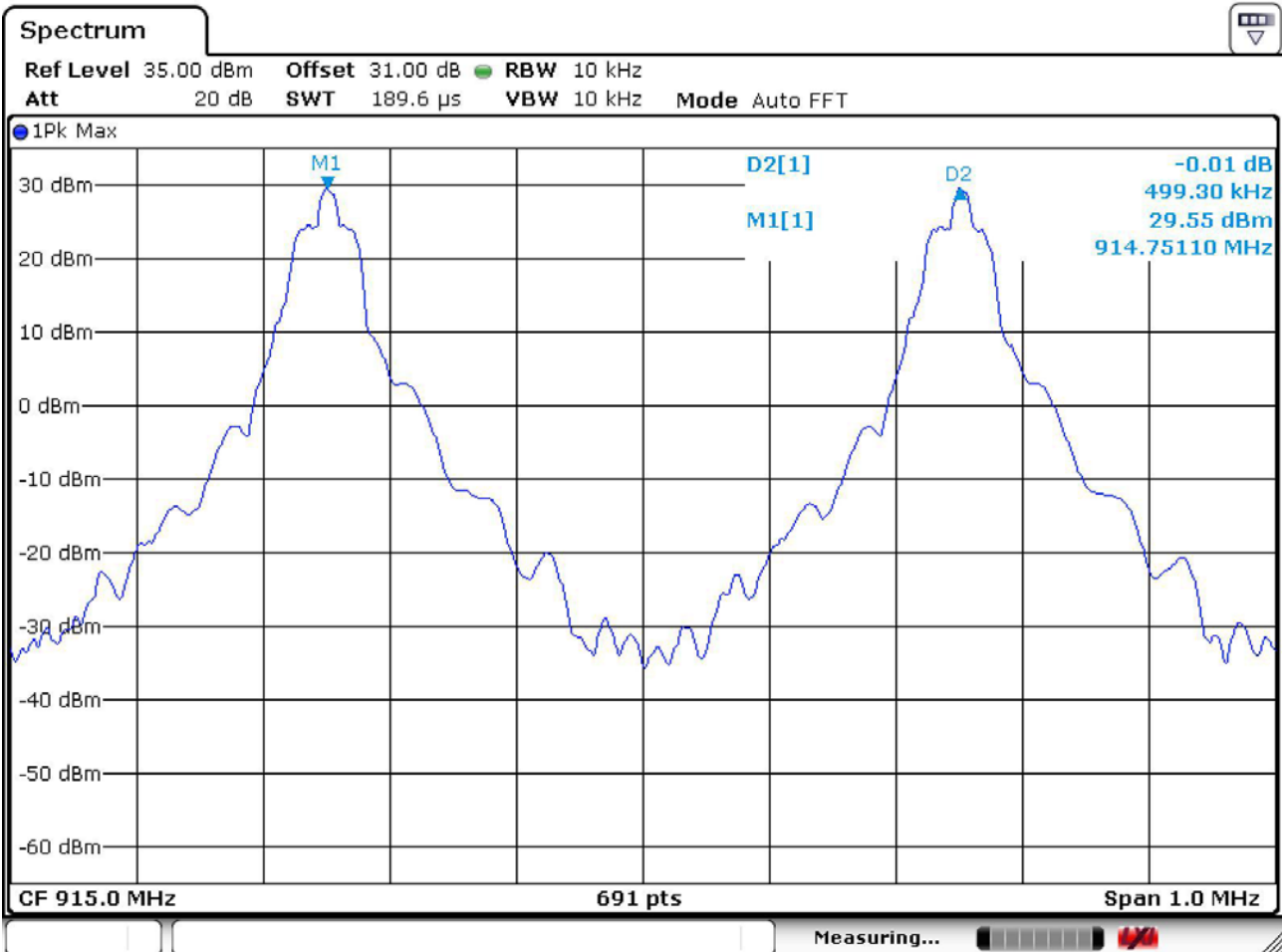


Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation



3.2.2 Number of Hopping Frequencies

Procedure:

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

To get higher resolution, four frequency ranges within the 902 ~ 928 MHz FH band were examined.

The spectrum analyzer is set to:

Frequency range 1: Start = 900 MHz, Stop = 930 MHz
RBW = 100 kHz (1% of the span or more) Sweep = auto
VBW = 100 kHz (VBW ≥ RBW) Detector function = peak
Trace = max hold Span = 30MHz

Measurement Data: Complies

Total number of Hopping Channels	50
----------------------------------	----

- See next pages for actual measured spectrum plots.

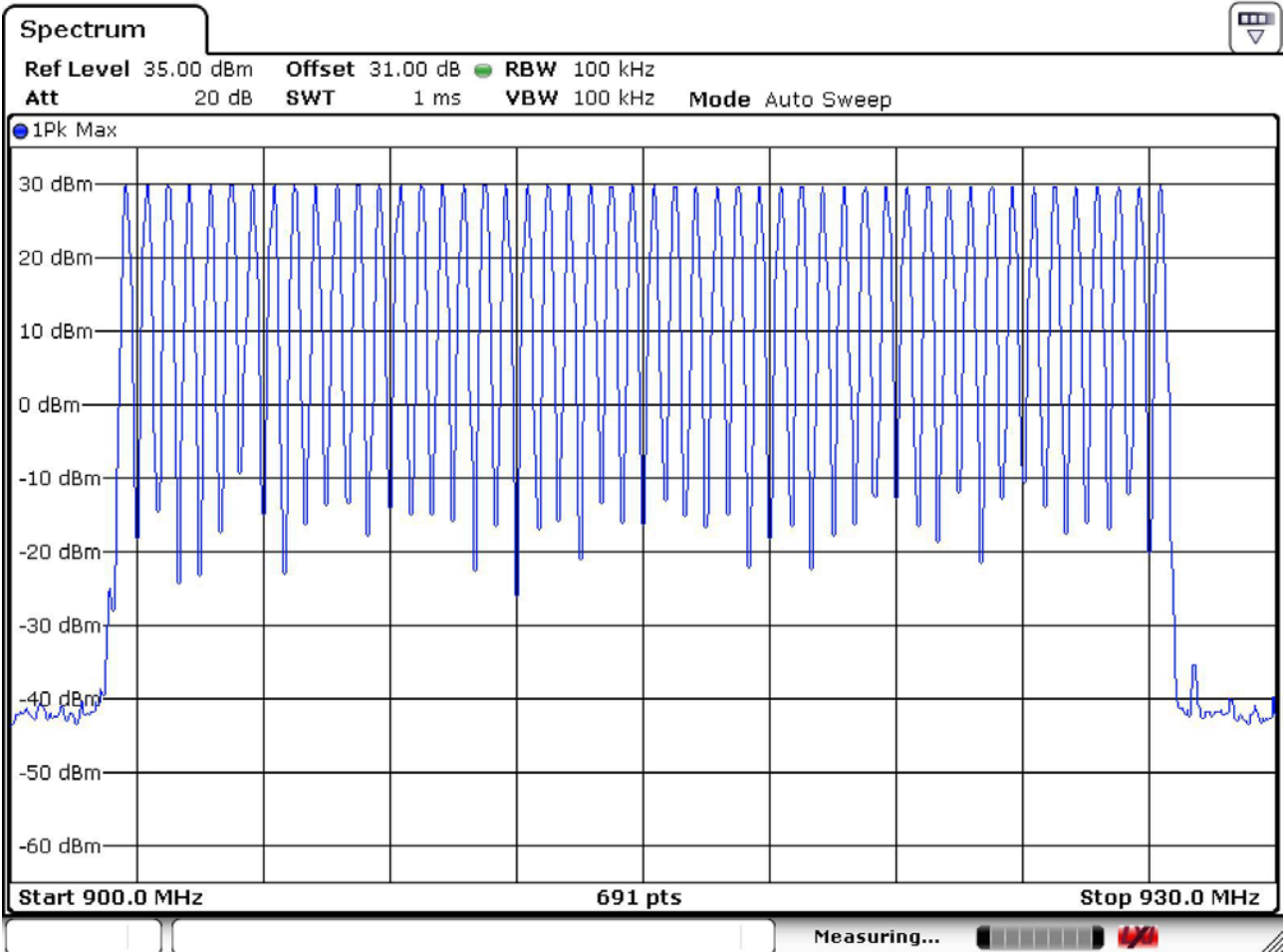
Minimum Standard:

At least 50 hopes

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Number of Hopping Frequencies



3.2.3 20 dB Bandwidth

Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 1 MHz (approximately 2 or 3 times of the 20 dB bandwidth)

RBW = 10 kHz

Sweep = auto

VBW = 10 kHz (VBW $\geq$ RBW)

Detector function = peak

Trace = max hold

Measurement Data:

Frequency (MHz)	Test Results	
	Measured Bandwidth (kHz)	Result
902.75	57.60	Complies
914.75	58.18	Complies
927.25	58.47	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

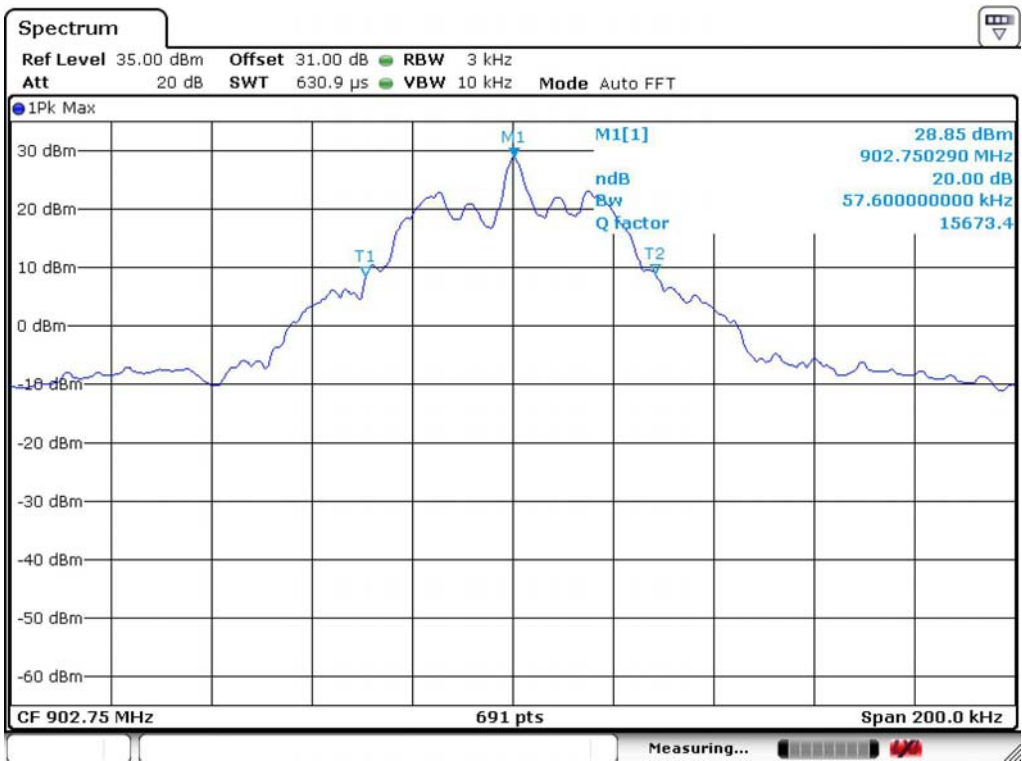
-

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

20 dB Bandwidth

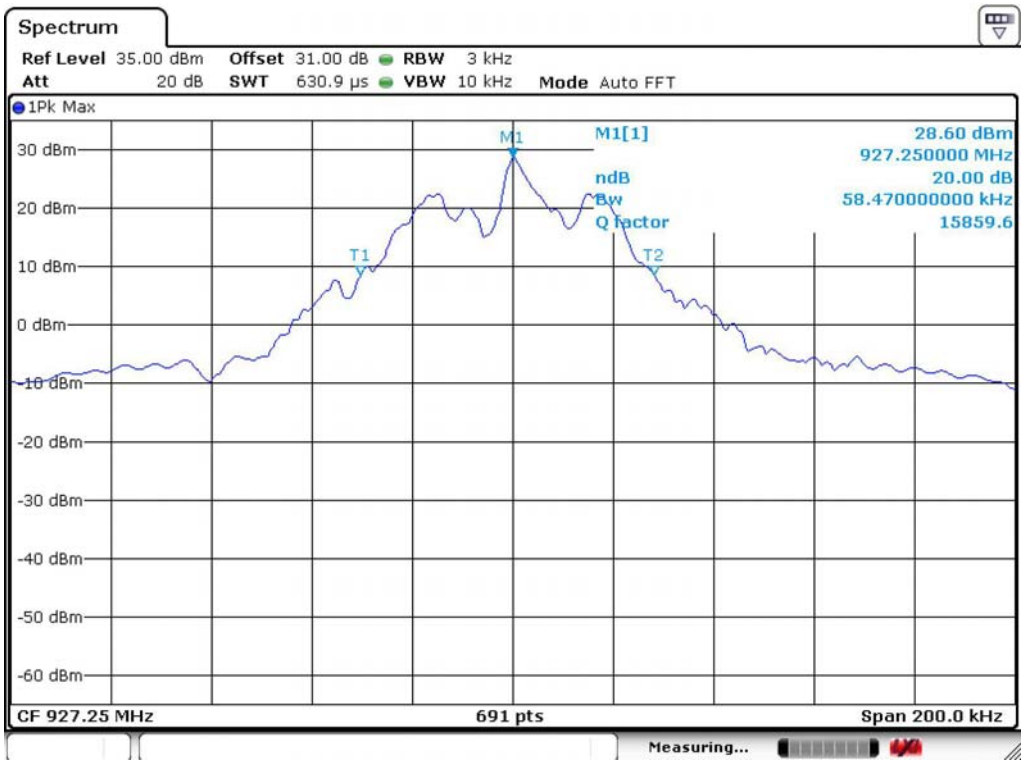
Low Channel



Mid Channel



High Channel



3.2.4 Time of Occupancy (Dwell Time)

Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 914.9 MHz

Span = zero

RBW = 10 MHz

VBW = 30 MHz (VBW $\geq$ RBW)

Trace = max hold

Detector function = peak

Measurement Data:

Channel Frequency (MHz)	Test Results			
	Length (ms)	number	Dwell Time (ms)	Result
914.75	99.42	3	298.26	Complies

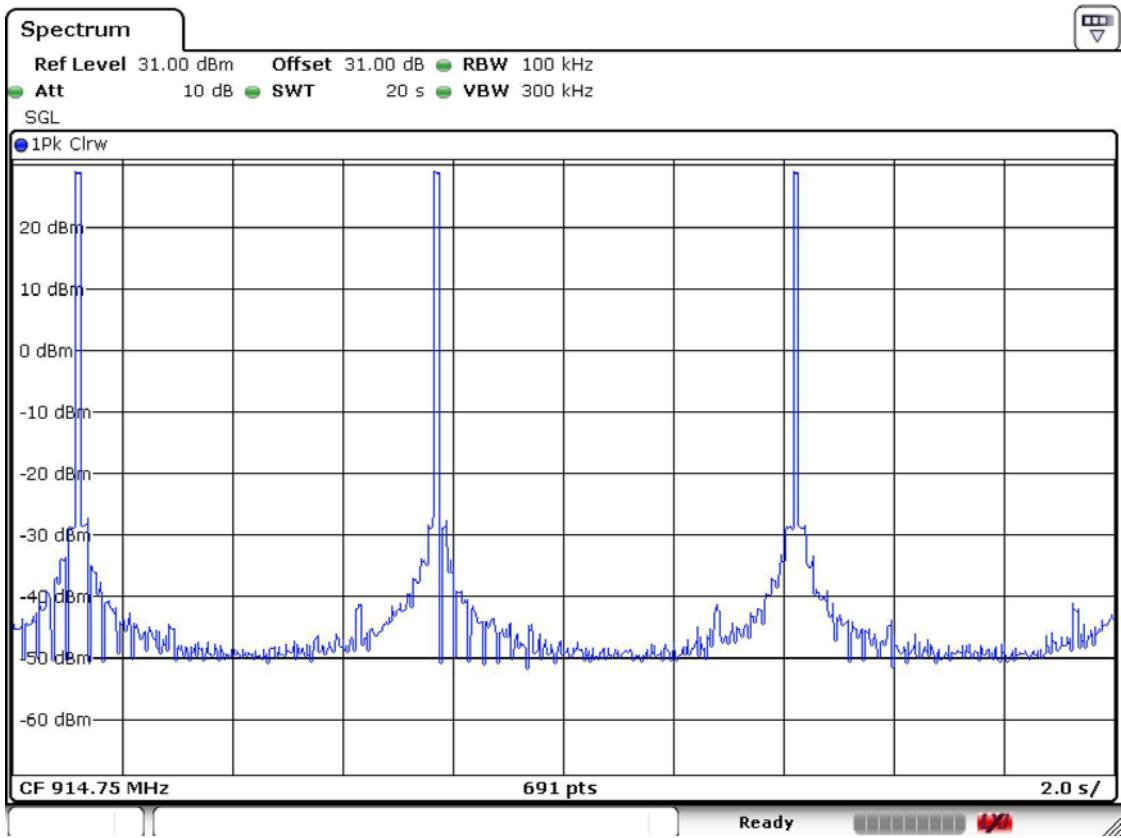
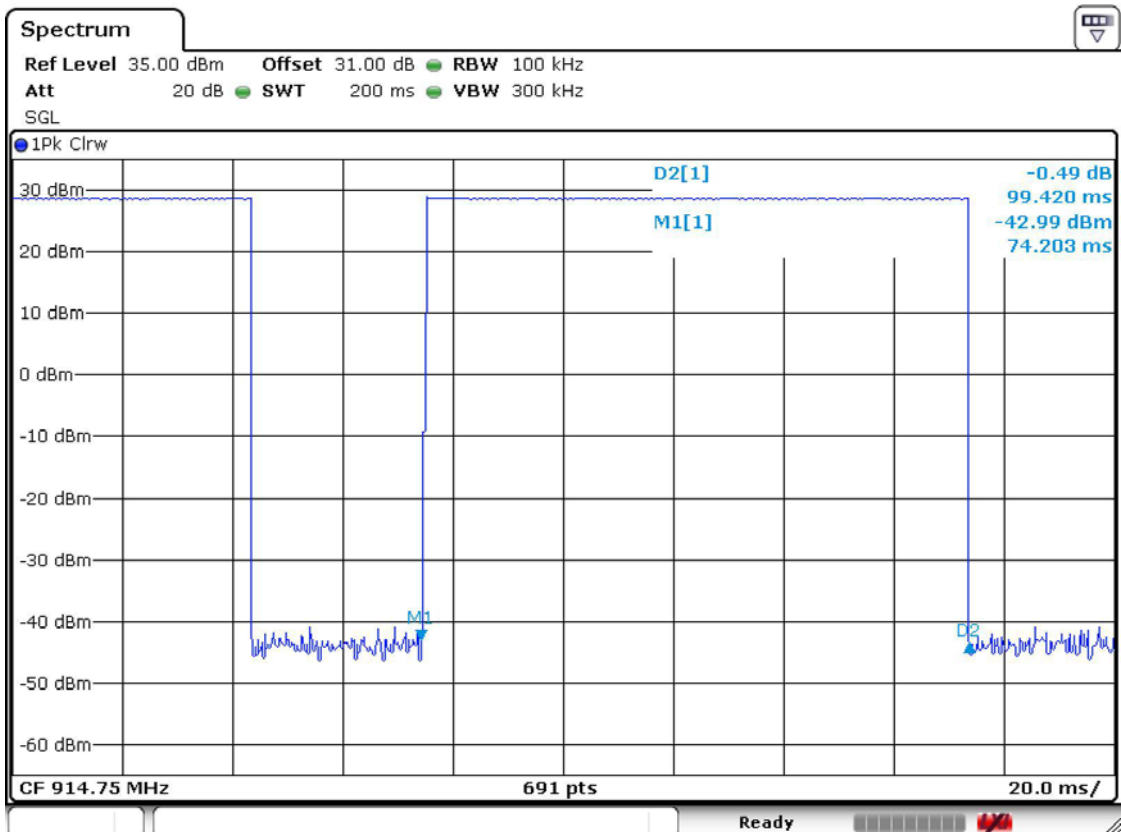
- See next pages for actual measured spectrum plots.

Minimum Standard:

0.4 seconds within a 20 second period per any frequency

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)



3.2.5 Transmitter Output Power

Procedure:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 5 MHz (approximately 5 times of the 20 dB bandwidth)

RBW = 1 MHz (greater than the 20dB bandwidth of the emission being measured)

VBW = 1 MHz ($VBW \geq RBW$)

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data:

Frequency (MHz)	Test Results		
	dBm	W	Result
902.75	29.30	0.85	Complies
914.75	28.91	0.78	Complies
927.25	28.79	0.76	Complies

- See next pages for actual measured spectrum plots.

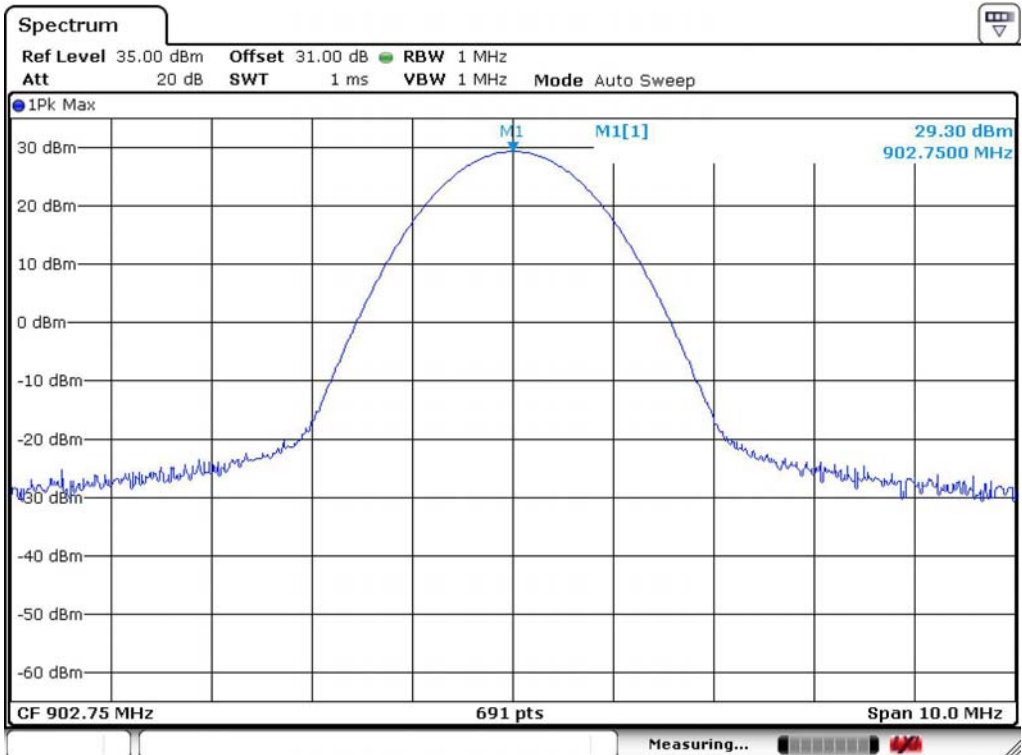
Minimum Standard:	< 1W
-------------------	------

Measurement Setup

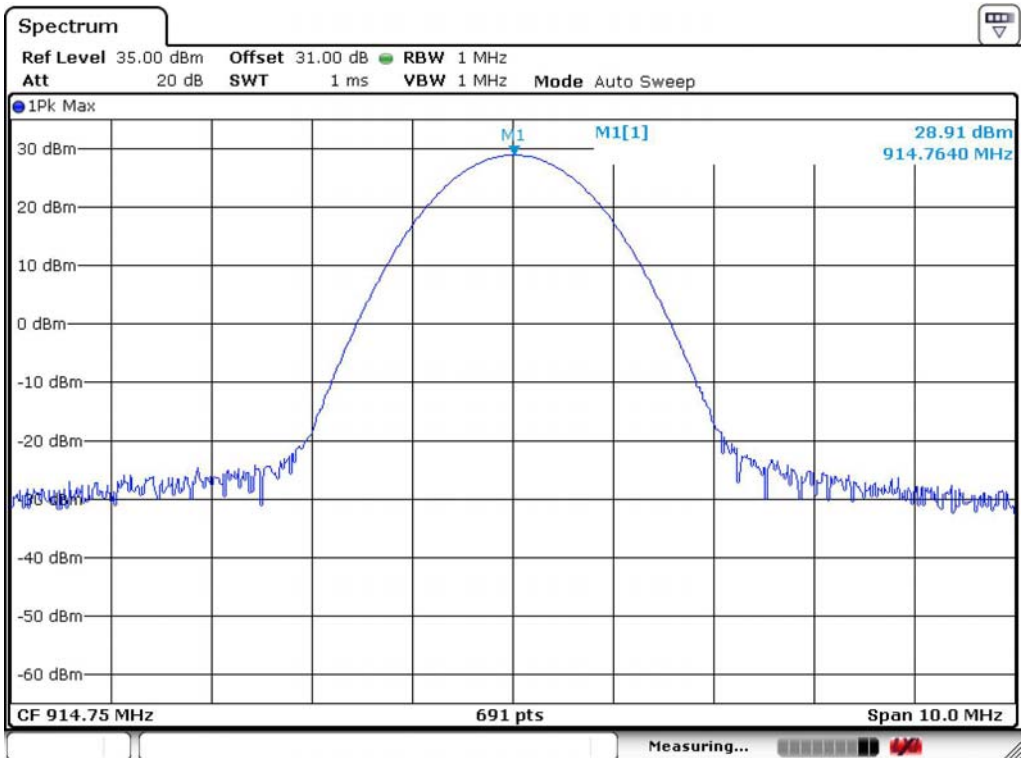
Same as the Chapter 3.2.1 (Figure 1)

Peak Output Power

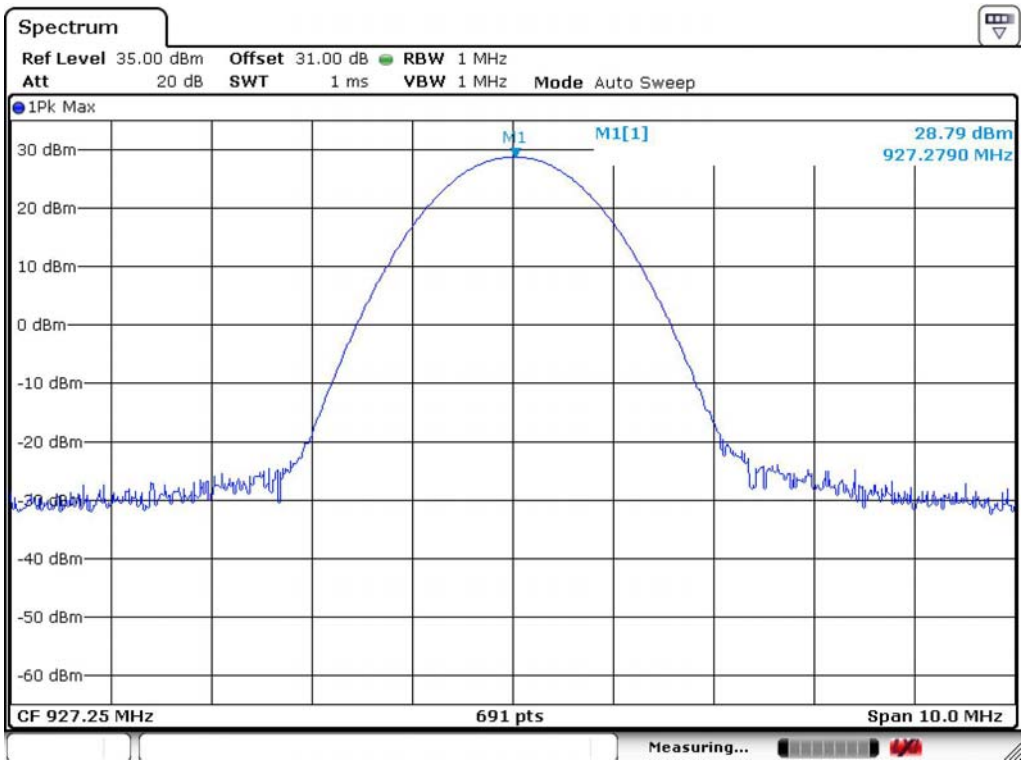
Low Channel



Mid Channel



High Channel



3.2.6 Band Edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 10 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

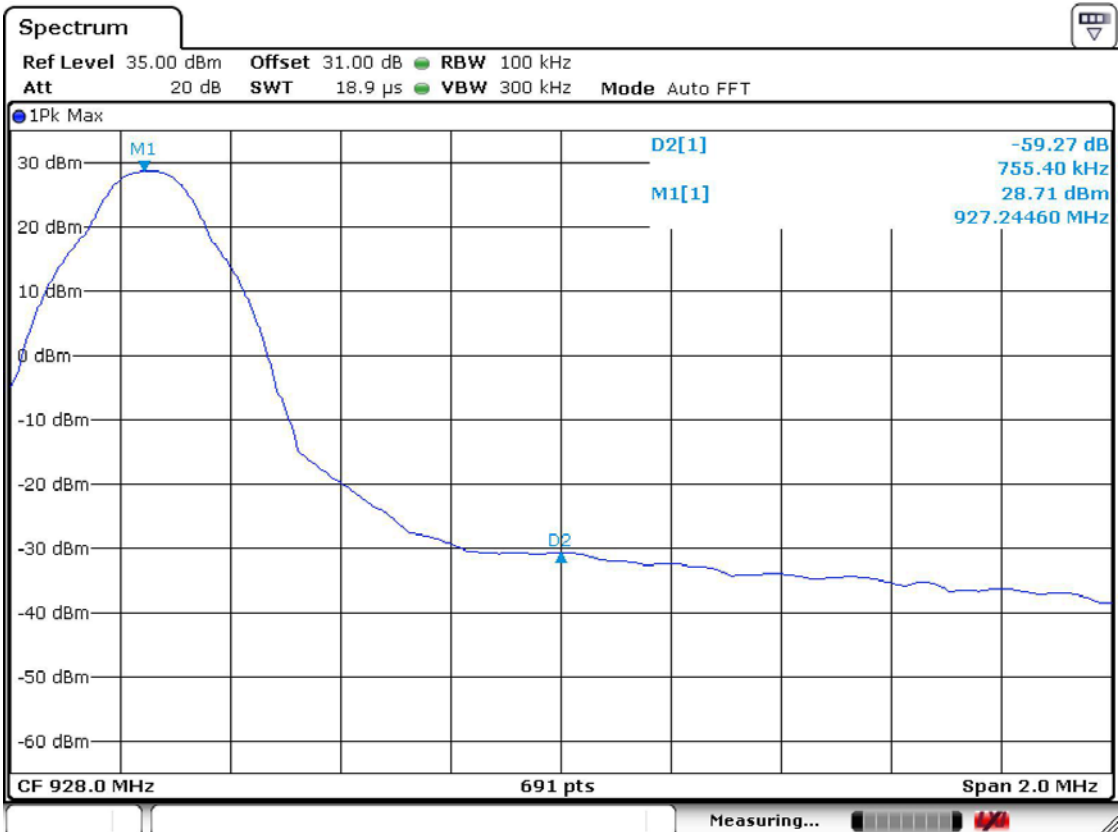
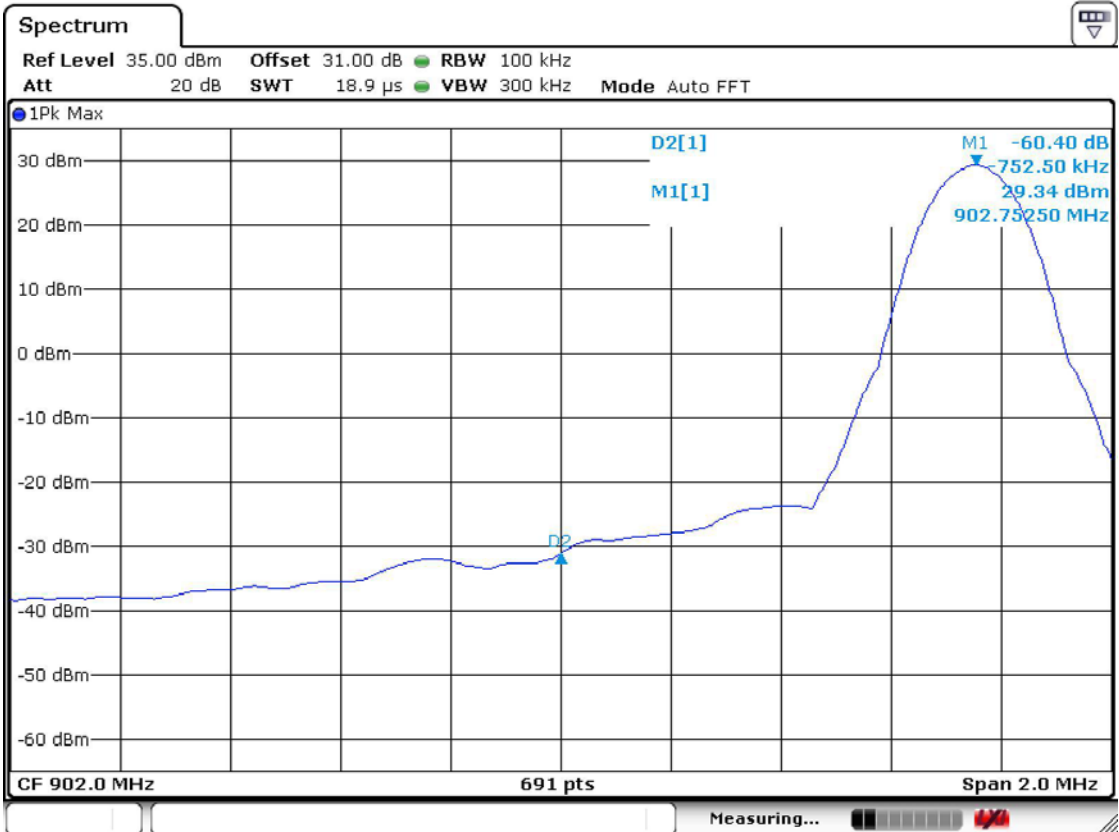
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
--------------------------	----------

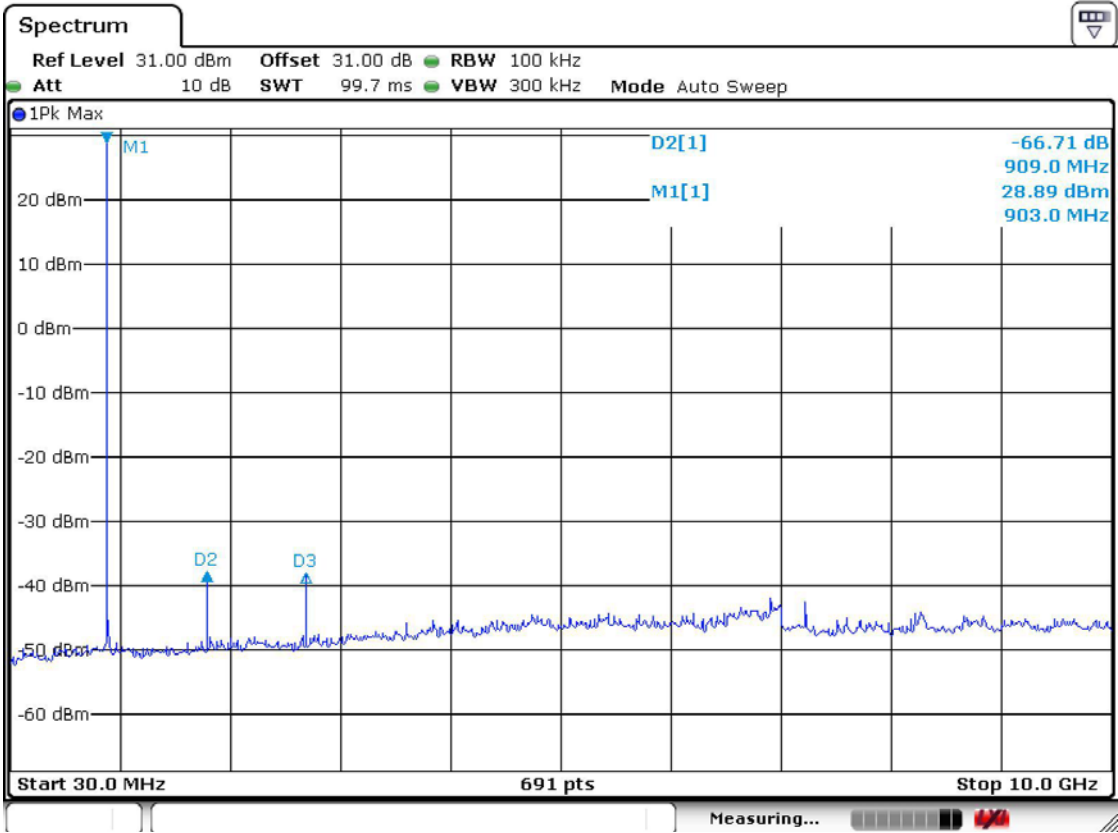
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

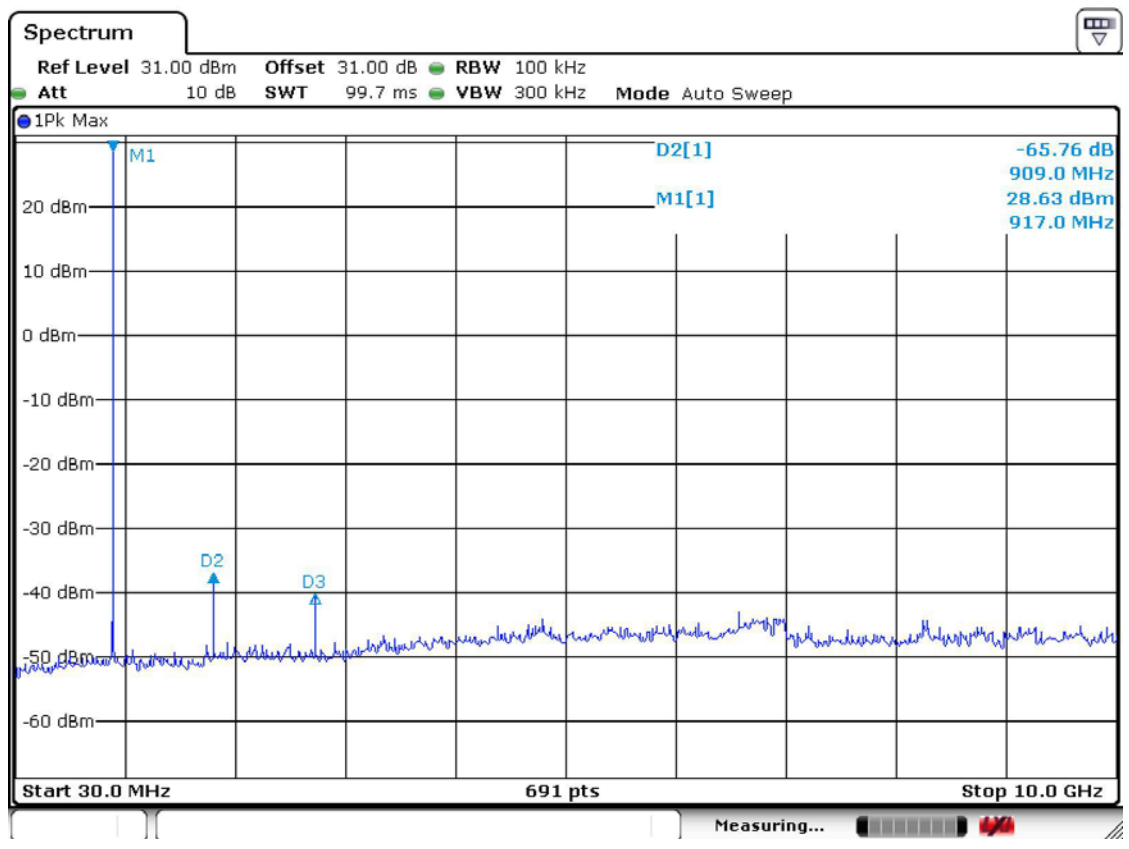
Band - edge



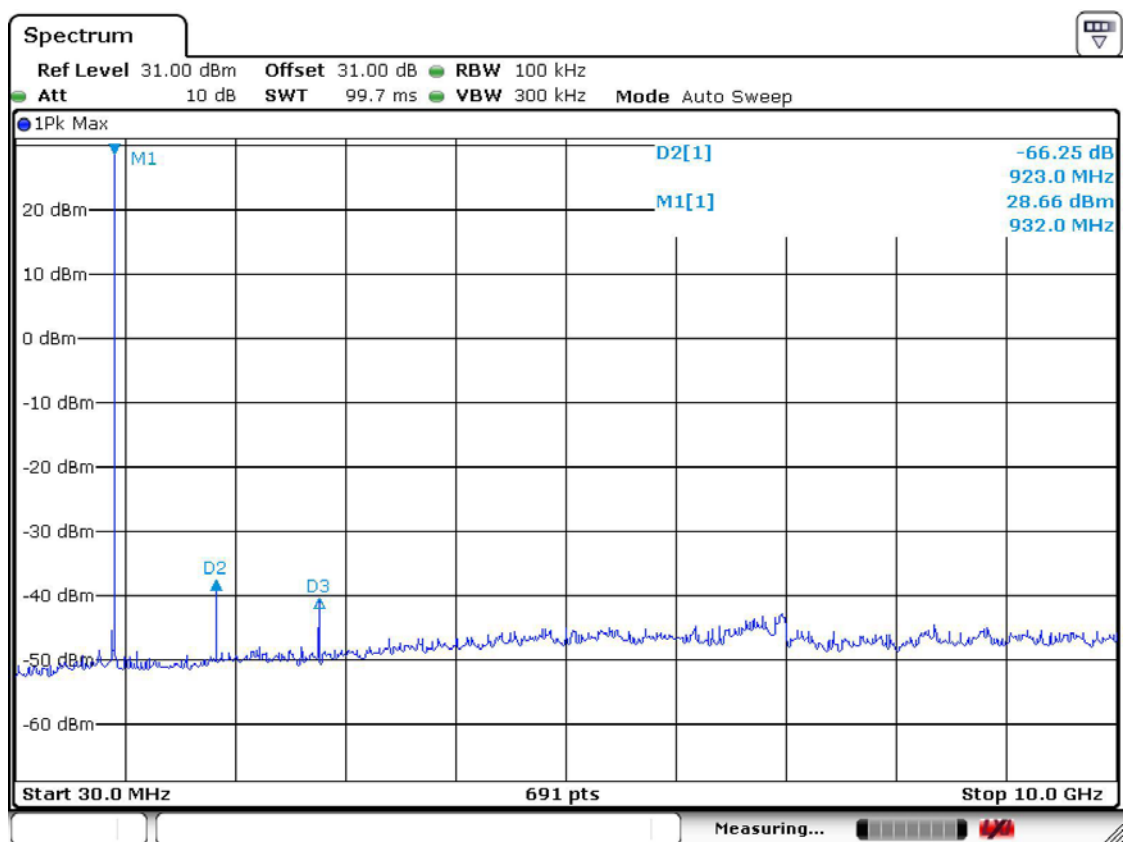
Band - edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic.



Band - edge (at 20 dB blow) – Mid channel
Frequency Range = 30 MHz ~ 10th harmonic.



Band - edge (at 20 dB blow) – High channel
Frequency Range = 30 MHz ~ 10th harmonic.



3.2.7 Field Strength of Harmonics

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Trace = max hold

Peak mode: VBW = 1 MHz

Average mode: VBW = 10Hz

Detector function = Peak & average

Sweep = auto

Measurement Data:

- See next pages for actual measured data.
- The used antenna is “MACRO260-919(180K)” and it gave the worse case emissions.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Minimum Standard: FCC Part 15.109

Frequency (MHz)	Limit (uV/m) @ 10m
30 ~ 88	90
88 ~ 216	150
216 ~ 960	210
Above 960	300

Measurement Data : MACRO260-919(180K)

Frequency		Reading		Pol.	Correction			Limits		Result		Margin	
		[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]		AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
1804.40		52.4	56.5	H	26.0	38.2	3.5	54.0	74.0	43.7	47.8	10.3	26.2
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-
Frequency		Reading		Pol.	Correction			Limits		Result		Margin	
		[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]		AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
1829.5		52.5	56.8	H	26.0	38.2	3.5	54.0	74.0	43.8	48.1	10.2	25.9
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-
Frequency		Reading		Pol.	Correction			Limits		Result		Margin	
		[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]		AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
185400		52.4	56.4	H	26.0	38.2	3.5	54.0	74.0	43.7	47.7	10.3	26.3
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-

No other emissions were detected at a level greater than 20dB below limit.

Radiated Emissions – AC/DC Adapter RJ-45 mode

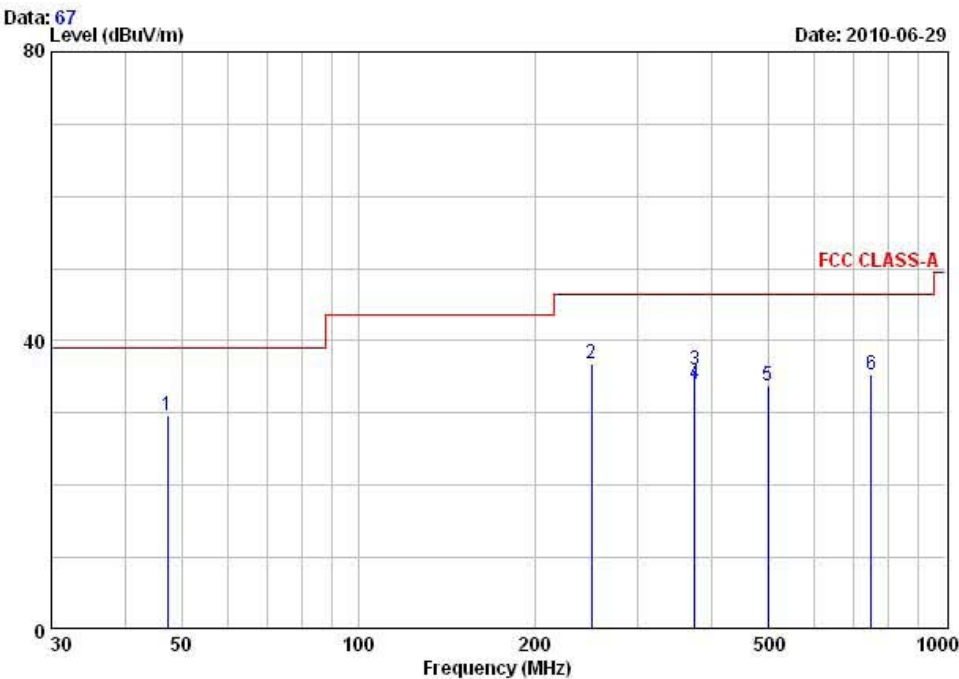


243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000 (AC/DC Adapter) TEST MODE: RJ-45 mode

Temp Humi : 25 / 49

Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	47.27	-13.45	29.55	39.00	9.45	100	300	VERTICAL
2	250.03	-10.27	36.93	46.40	9.47	379	266	HORIZONTAL
3	375.00	-7.13	35.87	46.40	10.53	371	63	HORIZONTAL
4	375.00	-7.13	34.07	46.40	12.33	132	167	VERTICAL
5	500.03	-5.28	33.82	46.40	12.58	345	229	HORIZONTAL
6	750.02	-0.08	35.22	46.40	11.18	142	167	VERTICAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions – AC/DC Adapter RS-232 mode

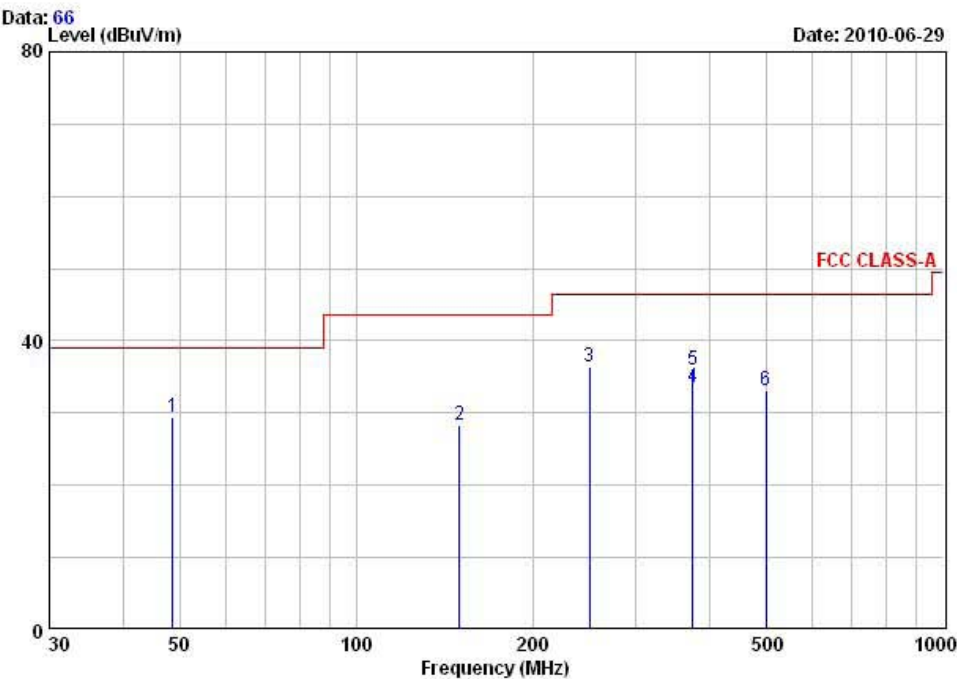


243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000 (AC/DC Adapter) TEST MODE: RS-232 mode

Temp Humi : 25 / 49

Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	48.63	-13.26	29.34	39.00	9.66	100	304	VERTICAL
2	150.01	-11.52	28.28	43.50	15.22	100	149	VERTICAL
3	250.01	-10.27	36.43	46.40	9.97	386	257	HORIZONTAL
4	375.02	-7.13	33.67	46.40	12.73	126	157	VERTICAL
5	375.02	-7.13	36.07	46.40	10.33	369	58	HORIZONTAL
6	500.02	-5.28	33.22	46.40	13.18	349	238	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions – DC/DC Adapter RJ-45 mode

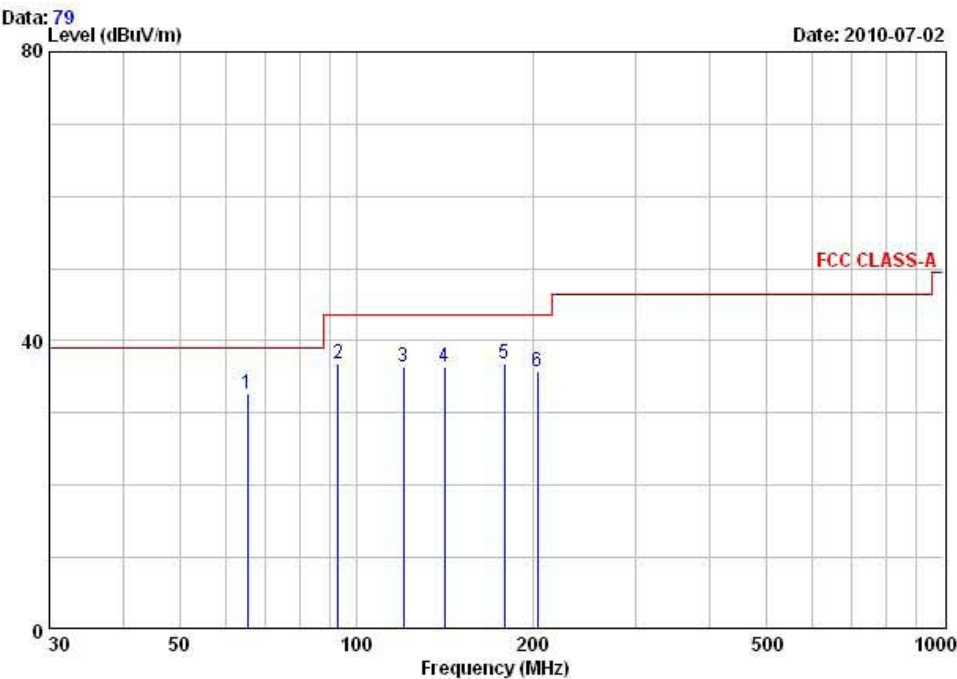


243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000(DC/DC Adapter) TEST MODE: RJ-45 mode

Temp Humi : 27 / 53

Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	65.29	-15.22	32.80	39.00	6.20	100	253	VERTICAL
2	93.27	-16.87	36.83	43.50	6.67	400	164	HORIZONTAL
3	120.58	-13.97	36.33	43.50	7.17	400	149	HORIZONTAL
4	141.32	-12.10	36.40	43.50	7.10	400	87	HORIZONTAL
5	178.65	-11.82	36.78	43.50	6.72	400	308	HORIZONTAL
6	203.47	-12.32	35.78	43.50	7.72	400	197	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions –DC/DC Adapter RS-232 mode

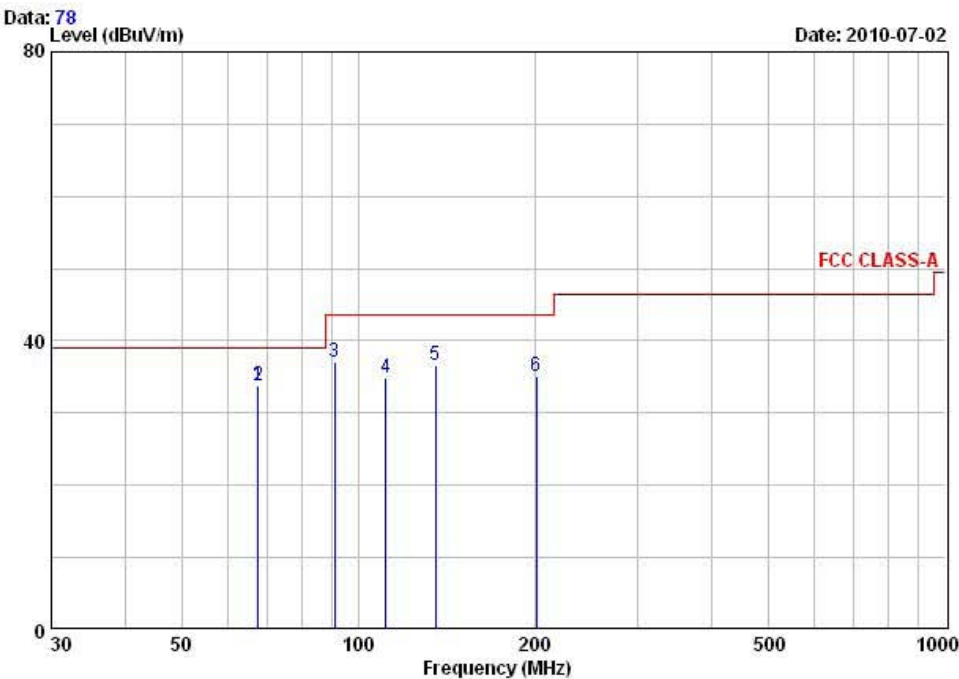


243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000(DC/DC Adapter) TEST MODE: RS-232 mode

Temp Humi : 27 / 53

Tested by: PARK.H.W



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	QP	dB	cm	deg	
1	67.50	49.40	-15.54	33.86	39.00	5.14	100	247	VERTICAL
2	67.57	49.30	-15.55	33.75	39.00	5.25	400	126	HORIZONTAL
3	91.24	54.30	-17.19	37.11	43.50	6.39	400	237	HORIZONTAL
4	111.38	49.60	-14.77	34.83	43.50	8.67	400	169	HORIZONTAL
5	135.51	49.30	-12.57	36.73	43.50	6.77	400	76	HORIZONTAL
6	201.30	47.50	-12.43	35.07	43.50	8.43	400	229	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions – CAR Adapter RJ-45 mode

243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000 (Car Adapter) TEST MODE: RJ-45 mode

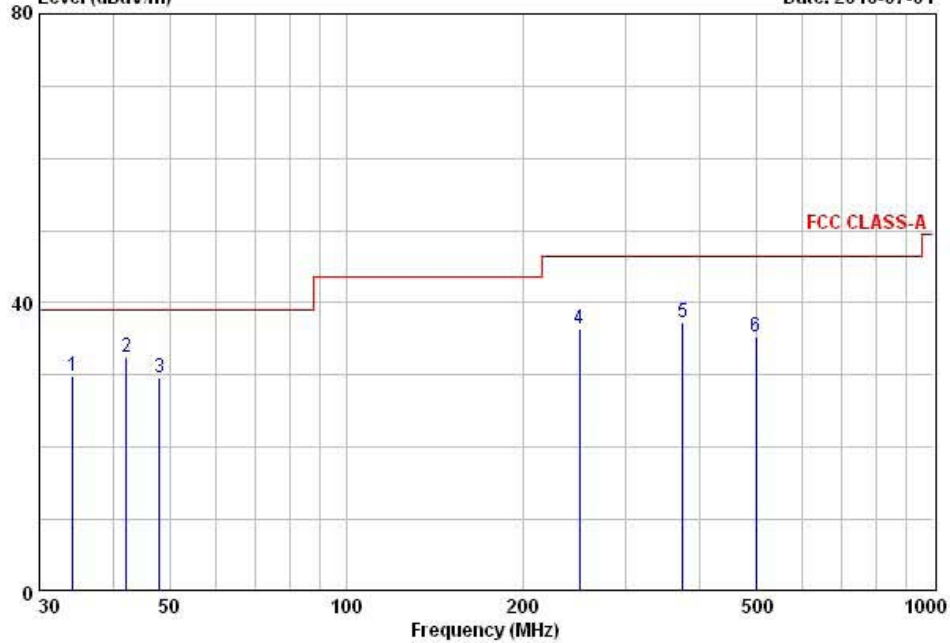
Temp Humi : 25 / 49

Tested by: PARK.H.W

Data: 76

Level (dBuV/m)

Date: 2010-07-01



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	34.27	45.10	-15.33	29.77	39.00	9.23	100	46 VERTICAL
2	42.16	46.90	-14.32	32.58	39.00	6.42	100	77 VERTICAL
3	48.03	42.90	-13.34	29.56	39.00	9.44	100	76 VERTICAL
4	250.01	46.70	-10.27	36.43	46.40	9.97	379	178 HORIZONTAL
5	375.02	44.50	-7.13	37.37	46.40	9.03	342	247 HORIZONTAL
6	500.01	40.60	-5.28	35.32	46.40	11.08	258	167 HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

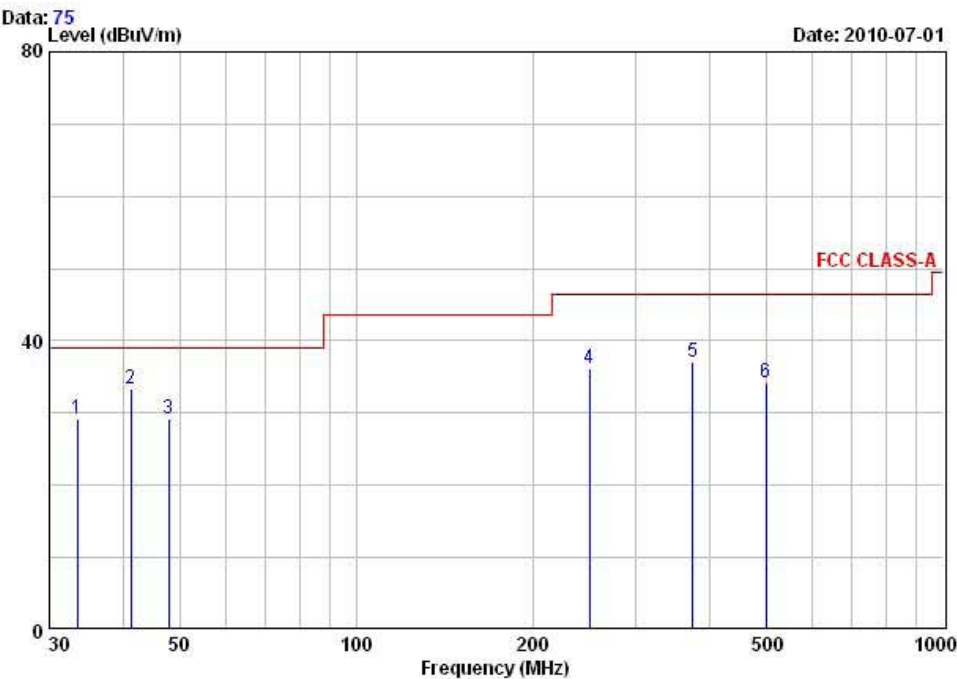
Radiated Emissions – CAR Adapter RS-232 mode



243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SmartNL-RF2000 (Car Adapter) TEST MODE: RS-232 mode

Temp Humi : 25 / 49 Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	33.44	44.70	-15.42	29.28	39.00	9.72	100	37 VERTICAL
2	41.28	47.80	-14.50	33.30	39.00	5.70	100	49 VERTICAL
3	48.00	42.60	-13.35	29.25	39.00	9.75	100	58 VERTICAL
4	250.00	46.40	-10.27	36.13	46.40	10.27	387	165 HORIZONTAL
5	375.01	44.10	-7.13	36.97	46.40	9.43	342	247 HORIZONTAL
6	500.00	39.50	-5.28	34.22	46.40	12.18	269	257 HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.8 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.

Minimum Standard: FCC Part 15.107/EN 55022**Class A**

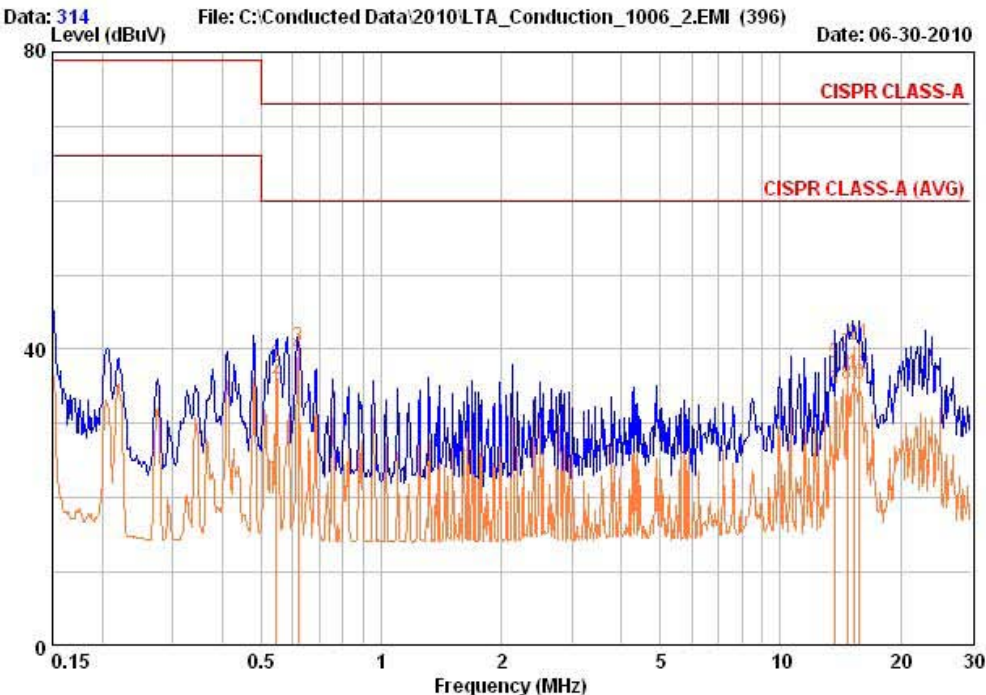
Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	66 dBuV
0.5 ~ 30 MHz	73 dBuV	60 dBuV

AC Conducted Emissions – AC/DC Adapter RJ-45 – Line



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (AC/DC adapter)	Phase	: LINE
Test Mode	: RJ-45 mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.547	28.45	26.35	9.70	38.15	36.05	73.00	60.00	34.85	23.95
0.619	30.66	29.56	9.73	40.39	39.29	73.00	60.00	32.61	20.71
13.684	27.90	24.20	10.35	38.25	34.55	73.00	60.00	34.75	25.45
14.745	29.01	24.91	10.39	39.40	35.30	73.00	60.00	33.60	24.70
15.246	30.21	24.91	10.42	40.63	35.33	73.00	60.00	32.37	24.67
15.801	30.41	26.11	10.44	40.85	36.55	73.00	60.00	32.15	23.45

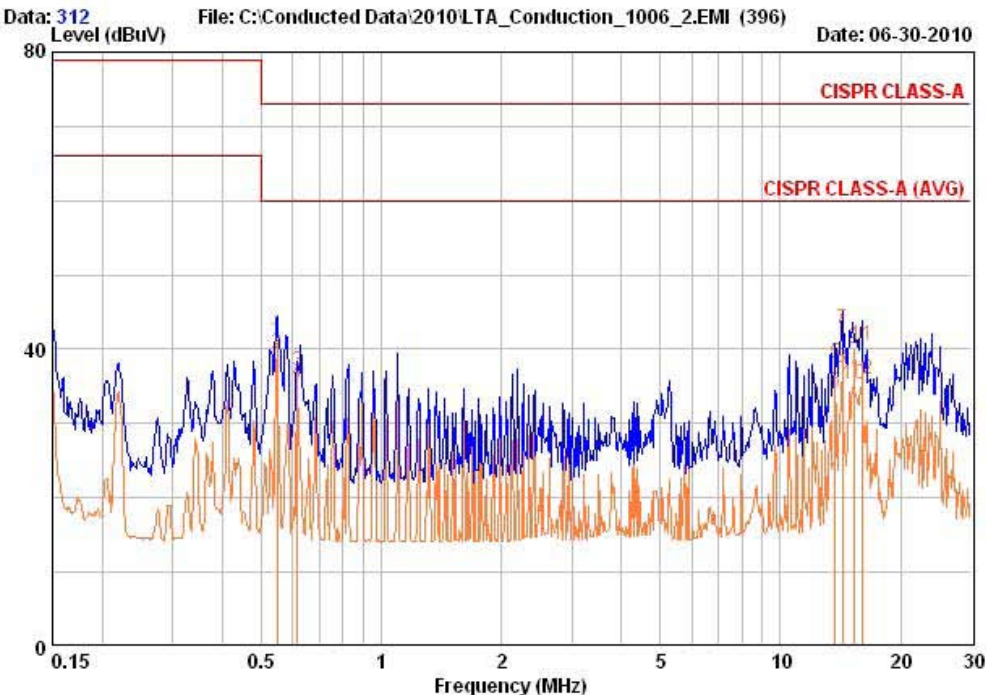
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – AC/DC Adapter RJ-45 – Neutral



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (AC/DC adapter)	Phase	: NEUTRAL
Test Mode	: RJ-45 mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.548	31.45	29.75	9.69	41.14	39.44	73.00	60.00	31.86	20.56
0.617	27.26	25.76	9.73	36.98	35.48	73.00	60.00	36.02	24.52
13.685	27.80	23.90	10.35	38.15	34.25	73.00	60.00	34.85	25.75
14.308	32.41	27.21	10.38	42.78	37.58	73.00	60.00	30.22	22.42
15.245	29.71	24.91	10.42	40.13	35.33	73.00	60.00	32.87	24.67
15.998	30.11	25.41	10.45	40.56	35.86	73.00	60.00	32.44	24.14

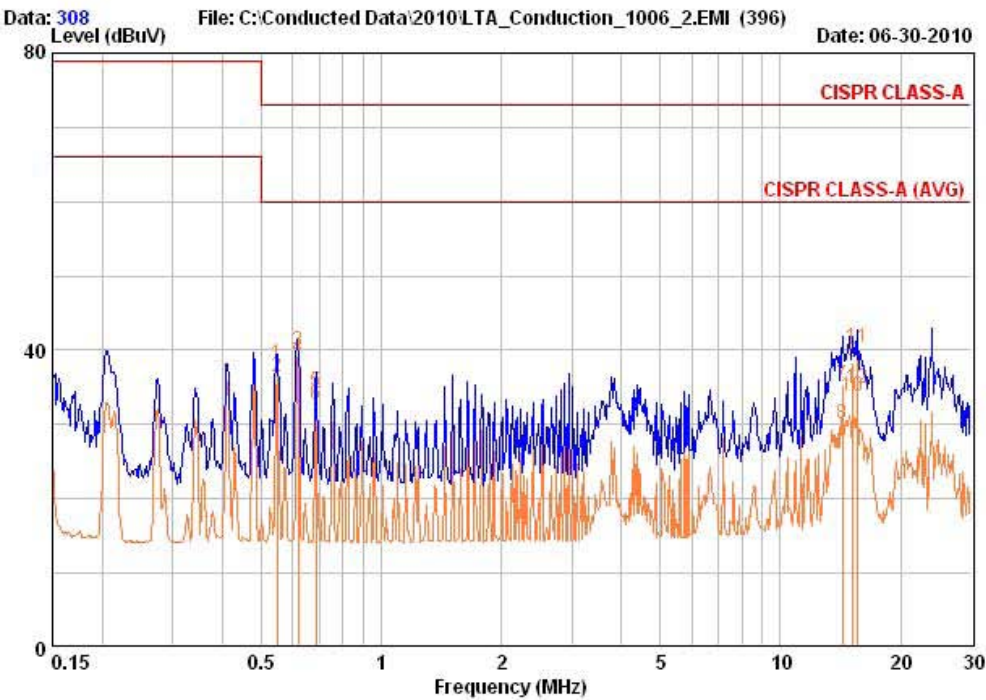
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – AC/DC Adapter RS-232 – Line



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (AC/DC adapter)	Phase	: LINE
Test Mode	: RS-232 mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.549	28.35	26.65	9.70	38.05	36.35	73.00	60.00	34.95	23.65
0.619	30.26	29.36	9.73	39.99	39.09	73.00	60.00	33.01	20.91
0.687	24.76	22.86	9.76	34.52	32.62	73.00	60.00	38.48	27.38
14.295	24.91	19.71	10.37	35.28	30.08	73.00	60.00	37.72	29.92
15.231	28.01	23.41	10.42	38.43	33.83	73.00	60.00	34.57	26.17
15.558	29.81	24.51	10.43	40.24	34.94	73.00	60.00	32.76	25.06

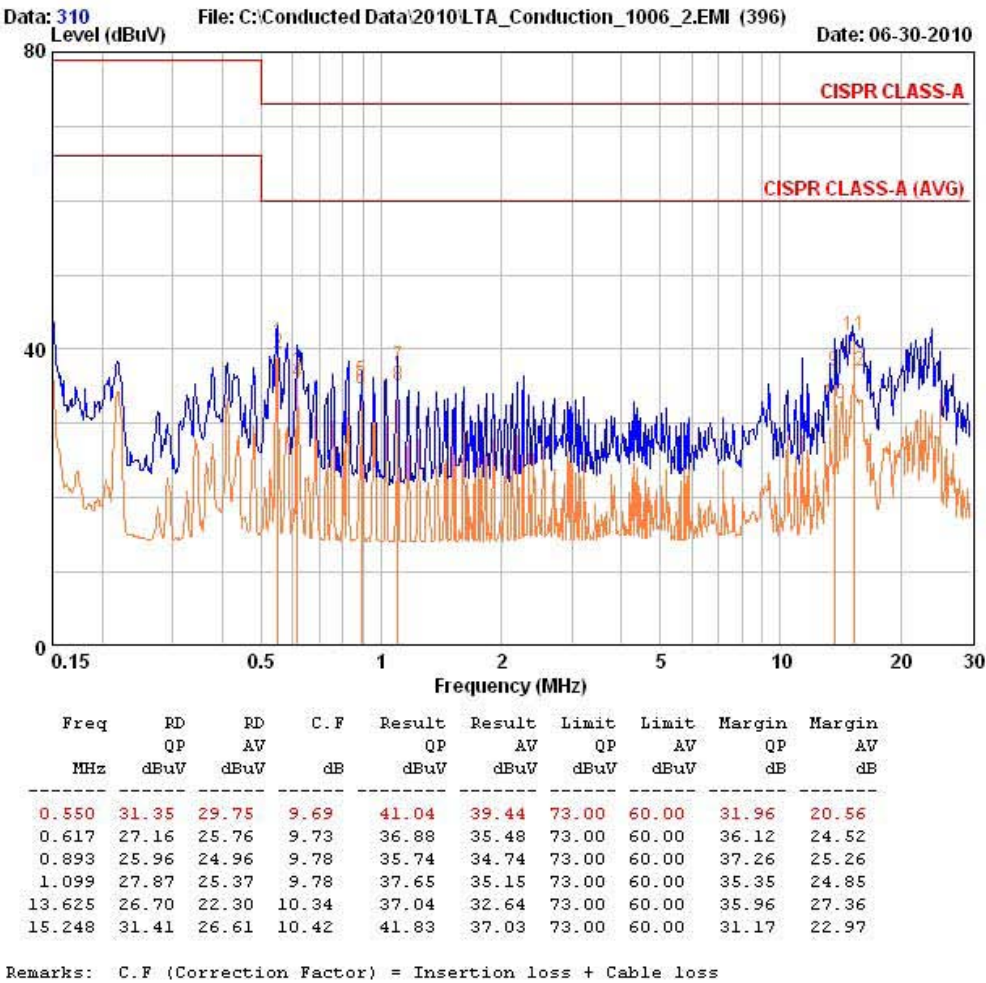
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – AC/DC Adapter RS-232 – Neutral



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (AC/DC adapter)	Phase	: NEUTRAL
Test Mode	: RS-232 mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W



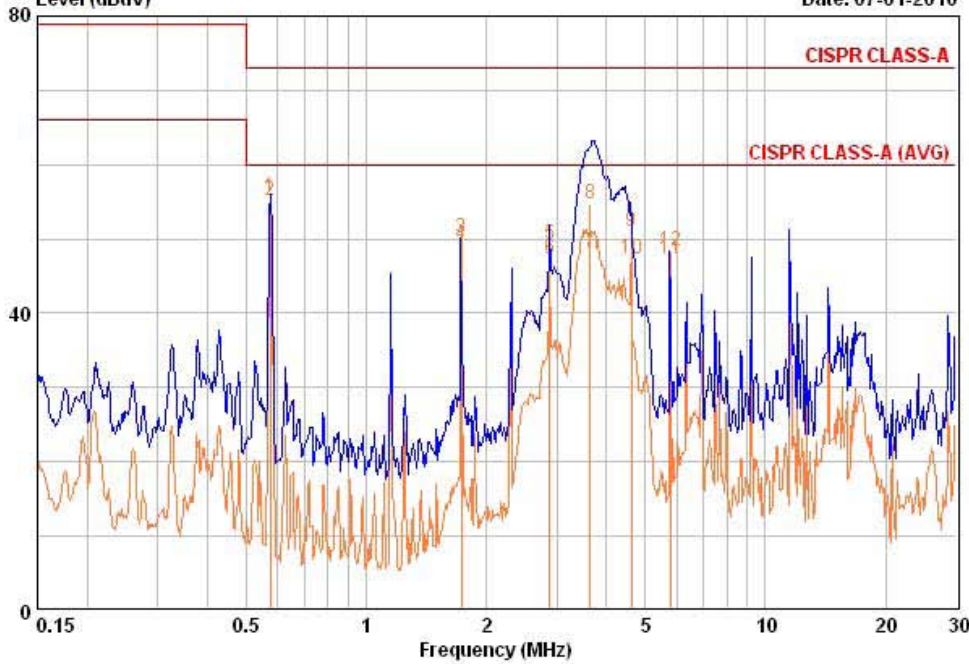
AC Conducted Emissions – DC/DC Adapter RJ-45 – Negative_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC adapter)	Phase	: NEGATIVE
Test Mode	: RJ-45 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 68	Test Engineer	: PARK.H.W

Data: 374 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (396) Date: 07-01-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.575	55.35	54.85	0.31	55.67	55.17	73.00	60.00	17.33	4.83
1.729	49.91	48.91	0.33	50.24	49.24	73.00	60.00	22.76	10.76
2.882	48.85	46.85	0.37	49.22	47.22	73.00	60.00	23.78	12.78
3.645	54.33	47.83	0.38	54.71	48.21	73.00	60.00	18.29	11.79
4.613	50.54	46.84	0.43	50.97	47.27	73.00	60.00	22.03	12.73
5.767	47.86	46.86	0.45	48.31	47.31	73.00	60.00	24.69	12.69

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

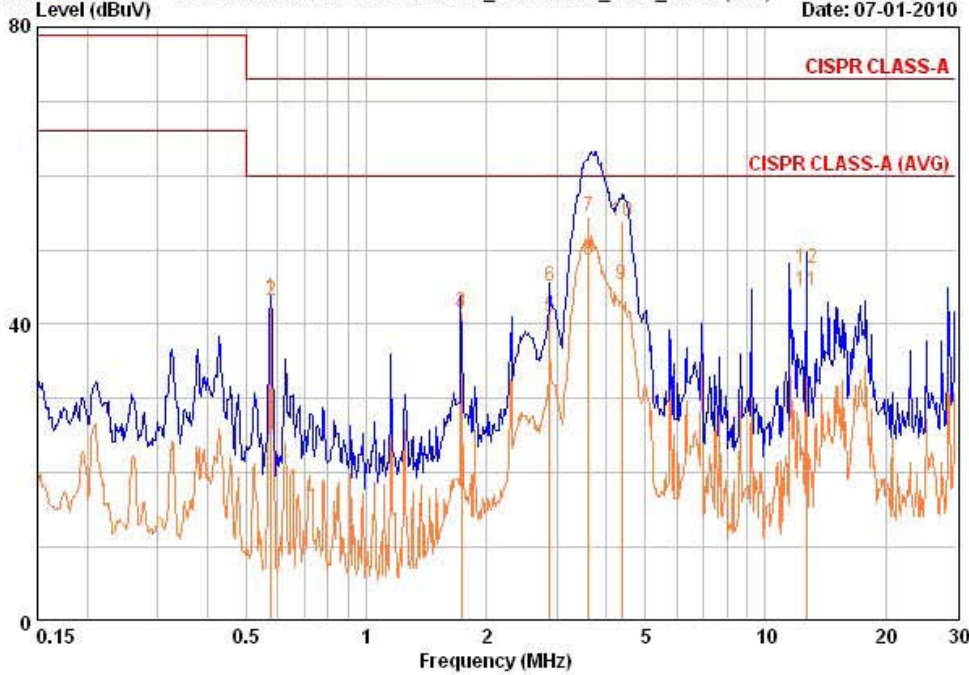
AC Conducted Emissions – DC/DC Adapter RJ-45 – Positive_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC adapter)	Phase	: POSITIVE
Test Mode	: RJ-45 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 68	Test Engineer	: PARK.H.W

Data: 372 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (396) Date: 07-01-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.578	43.35	42.95	0.31	43.67	43.27	73.00	60.00	29.33	16.73
1.729	41.21	41.11	0.33	41.54	41.44	73.00	60.00	31.46	18.56
2.884	44.85	40.55	0.37	45.22	40.92	73.00	60.00	27.78	19.08
3.602	54.03	48.33	0.38	54.41	48.71	73.00	60.00	18.59	11.29
4.361	53.44	44.84	0.42	53.86	45.26	73.00	60.00	19.14	14.74
12.689	46.90	43.90	0.64	47.54	44.54	73.00	60.00	25.46	15.46

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

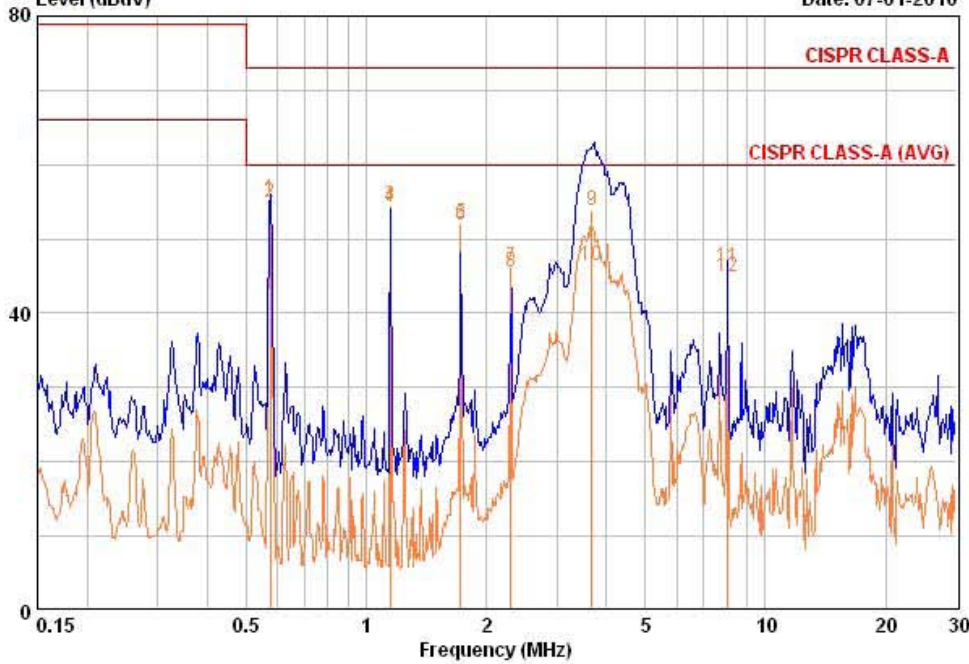
AC Conducted Emissions – DC/DC Adapter RS-232 – Negative_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (DC/DC Adapter)	Phase	: NEGATIVE
Test Mode	: RS-232 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 68	Test Engineer	: PARK.H.W

Data: 376 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (386) Date: 07-01-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.576	54.95	54.65	0.31	55.27	54.97	73.00	60.00	17.73	5.03
1.150	54.27	53.87	0.33	54.60	54.20	73.00	60.00	18.40	5.80
1.725	51.71	51.51	0.33	52.04	51.84	73.00	60.00	20.96	8.16
2.302	45.90	45.10	0.36	46.26	45.46	73.00	60.00	26.74	14.54
3.673	53.43	46.13	0.38	53.81	46.51	73.00	60.00	19.19	13.49
8.057	45.67	44.47	0.51	46.18	44.98	73.00	60.00	26.82	15.02

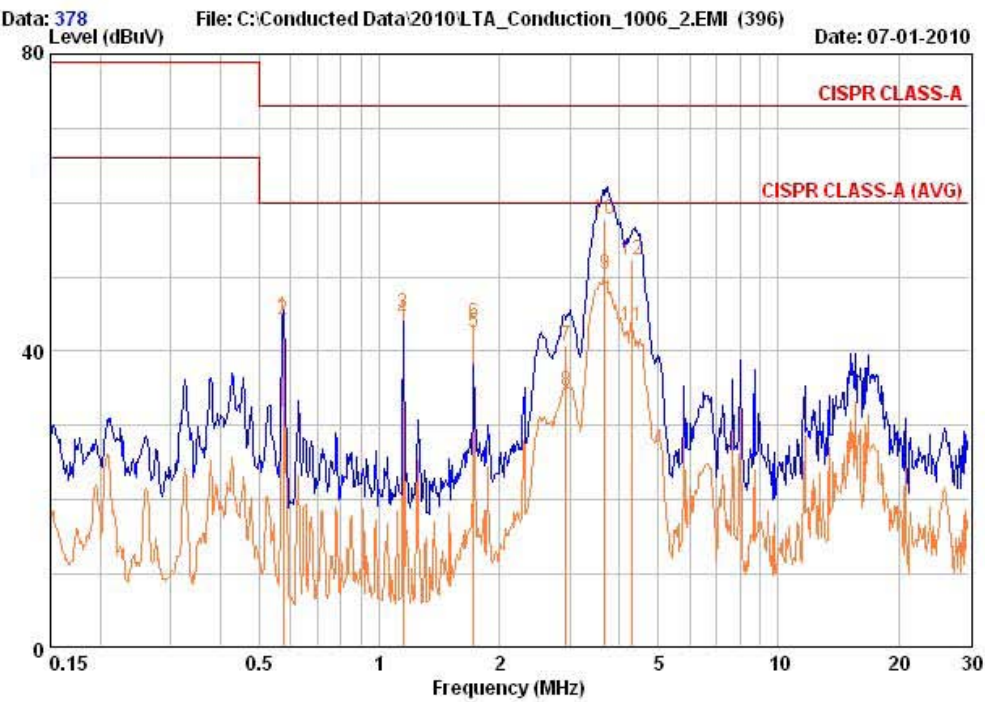
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – DC/DC Adapter RS-232 – Positive_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC Adapter)	Phase	: POSITIVE
Test Mode	: RS-232 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 68	Test Engineer	: PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.574	44.35	43.85	0.31	44.67	44.17	73.00	60.00	28.33	15.83
1.149	44.87	43.87	0.33	45.20	44.20	73.00	60.00	27.80	15.80
1.724	43.41	42.11	0.33	43.74	42.44	73.00	60.00	29.26	17.56
2.939	40.44	34.34	0.37	40.82	34.72	73.00	60.00	32.18	25.28
3.667	57.33	50.03	0.38	57.71	50.41	73.00	60.00	15.29	9.59
4.304	51.84	43.04	0.41	52.25	43.45	73.00	60.00	20.75	16.55

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

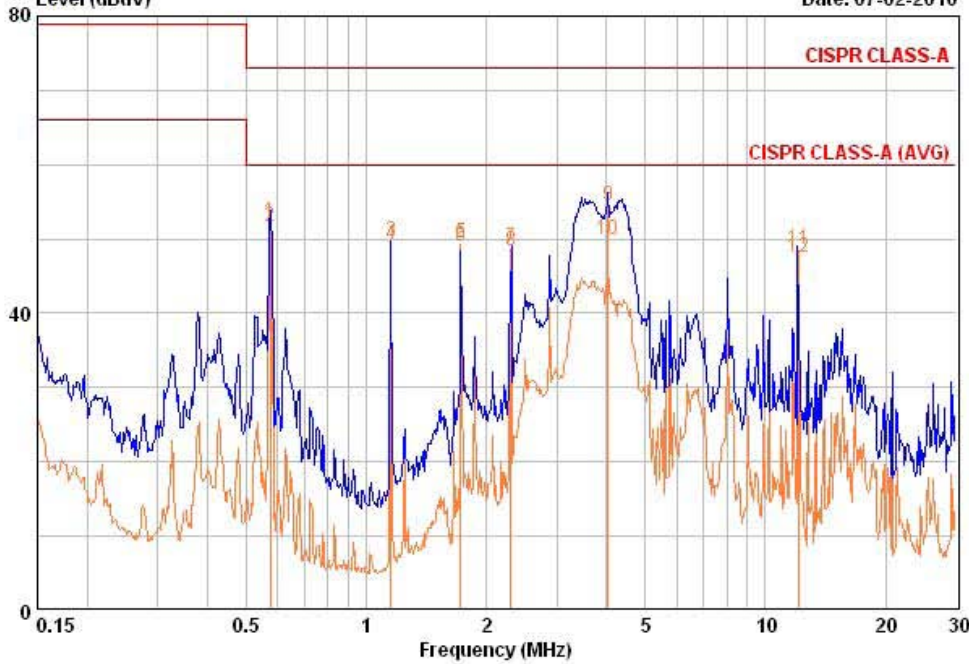
AC Conducted Emissions – DC/DC Adapter RJ-45 – Negative_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC Adapter)	Phase	: NEGATIVE
Test Mode	: RJ-45 mode	Test Power	: DC 24V
Temp./Humi.	: 25 / 69	Test Engineer	: PARK.H.W

Data: 408 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (408) Date: 07-02-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.576	51.95	51.35	0.31	52.27	51.67	73.00	60.00	20.73	8.33
1.151	49.47	48.87	0.33	49.80	49.20	73.00	60.00	23.20	10.80
1.727	49.11	48.71	0.33	49.44	49.04	73.00	60.00	23.56	10.96
2.304	48.50	48.10	0.36	48.86	48.46	73.00	60.00	24.14	11.54
4.033	54.13	49.43	0.39	54.52	49.82	73.00	60.00	18.48	10.18
12.096	47.89	46.89	0.61	48.51	47.51	73.00	60.00	24.49	12.49

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

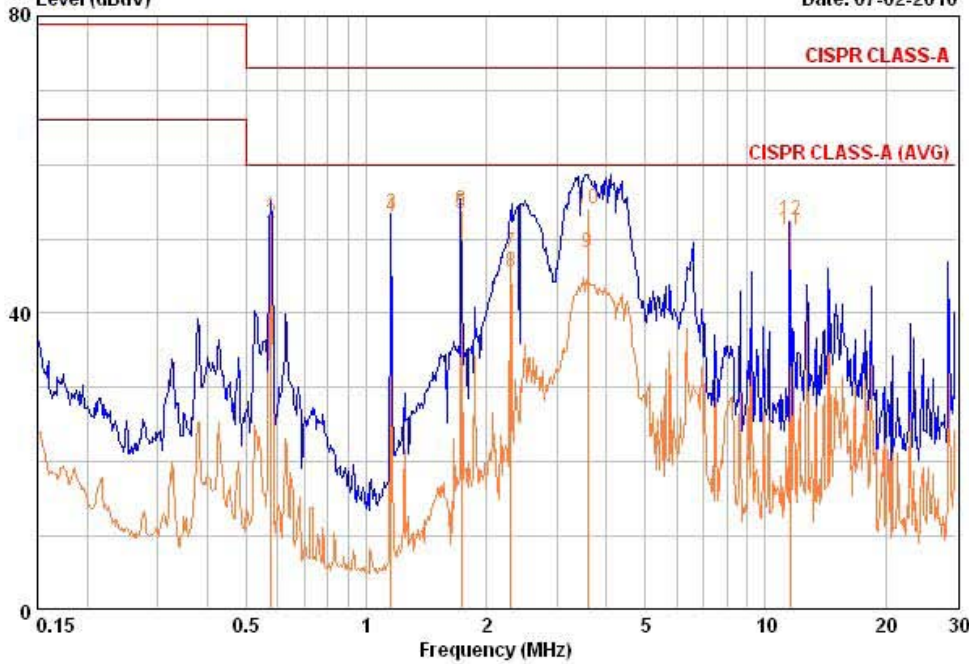
AC Conducted Emissions – DC/DC Adapter RJ-45 – Positive_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC Adapter)	Phase	: POSITIVE
Test Mode	: RJ-45 mode	Test Power	: DC 24V
Temp./Humi.	: 25 / 69	Test Engineer	: PARK.H.W

Data: 406 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (406) Date: 07-02-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.578	52.75	51.85	0.31	53.07	52.17	73.00	60.00	19.93	7.83
1.151	53.07	52.67	0.33	53.40	53.00	73.00	60.00	19.60	7.00
1.731	53.61	53.11	0.33	53.94	53.44	73.00	60.00	19.06	6.56
2.307	47.90	45.10	0.36	48.26	45.46	73.00	60.00	24.74	14.54
3.580	53.63	47.83	0.38	54.02	48.22	73.00	60.00	18.98	11.78
11.534	51.89	50.69	0.58	52.47	51.27	73.00	60.00	20.53	8.73

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

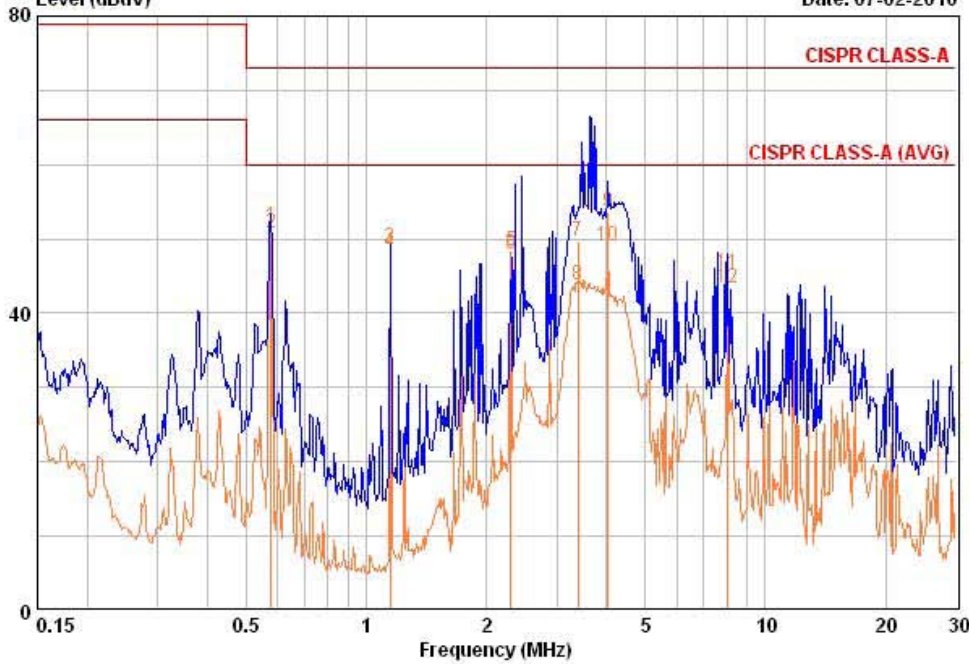
AC Conducted Emissions – DC/DC Adapter RS-232 – Negative_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC Adapter)	Phase	: NEGATIVE
Test Mode	: RS-232 mode	Test Power	: DC 24V
Temp./Humi.	: 25 / 69	Test Engineer	: PARK.H.W

Data: 410 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (410) Date: 07-02-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.577	51.45	50.45	0.31	51.77	50.77	73.00	60.00	21.23	9.23
1.149	48.47	47.87	0.33	48.80	48.20	73.00	60.00	24.20	11.80
2.300	48.10	47.70	0.36	48.46	48.06	73.00	60.00	24.54	11.94
3.393	49.34	43.34	0.39	49.73	43.73	73.00	60.00	23.27	16.27
4.028	53.23	48.73	0.39	53.62	49.12	73.00	60.00	19.38	10.88
8.059	44.77	42.87	0.51	45.28	43.38	73.00	60.00	27.72	16.62

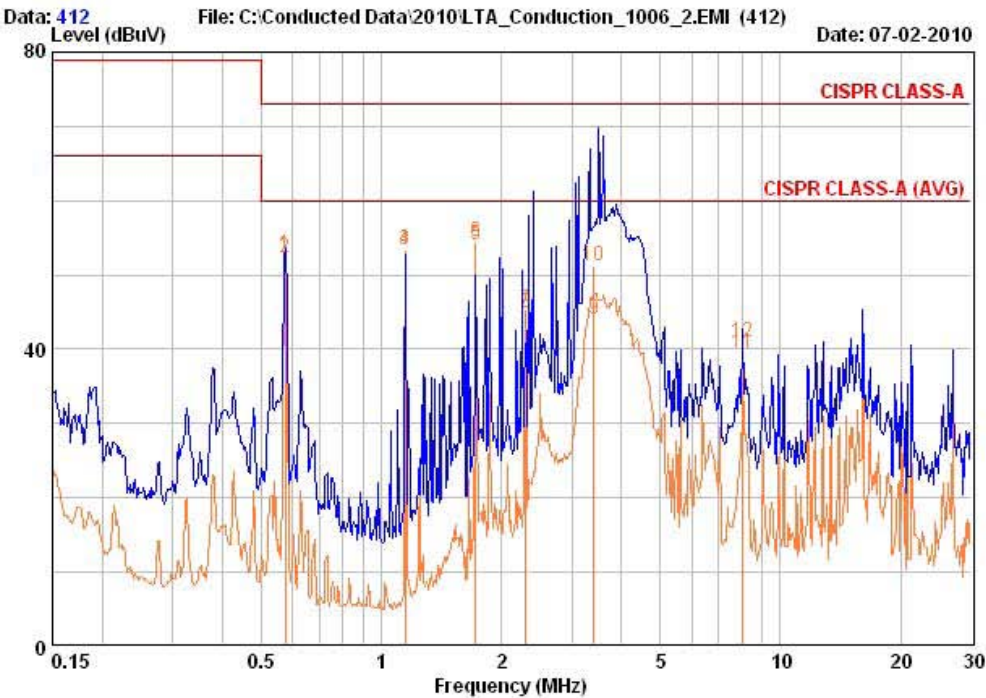
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – DC/DC Adapter RS-232 – Positive_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(DC/DC Adapter)	Phase	: POSITIVE
Test Mode	: RS-232 mode	Test Power	: DC 24V
Temp./Humi.	: 25 / 69	Test Engineer	: PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.576	52.45	51.95	0.31	52.77	52.27	73.00	60.00	20.23	7.73
1.150	53.07	52.97	0.33	53.40	53.30	73.00	60.00	19.60	6.70
1.726	54.21	53.71	0.33	54.54	54.04	73.00	60.00	18.46	5.96
2.301	45.00	44.50	0.36	45.36	44.86	73.00	60.00	27.64	15.14
3.415	50.74	43.74	0.39	51.12	44.12	73.00	60.00	21.88	15.88
8.059	40.37	38.87	0.51	40.88	39.38	73.00	60.00	32.12	20.62

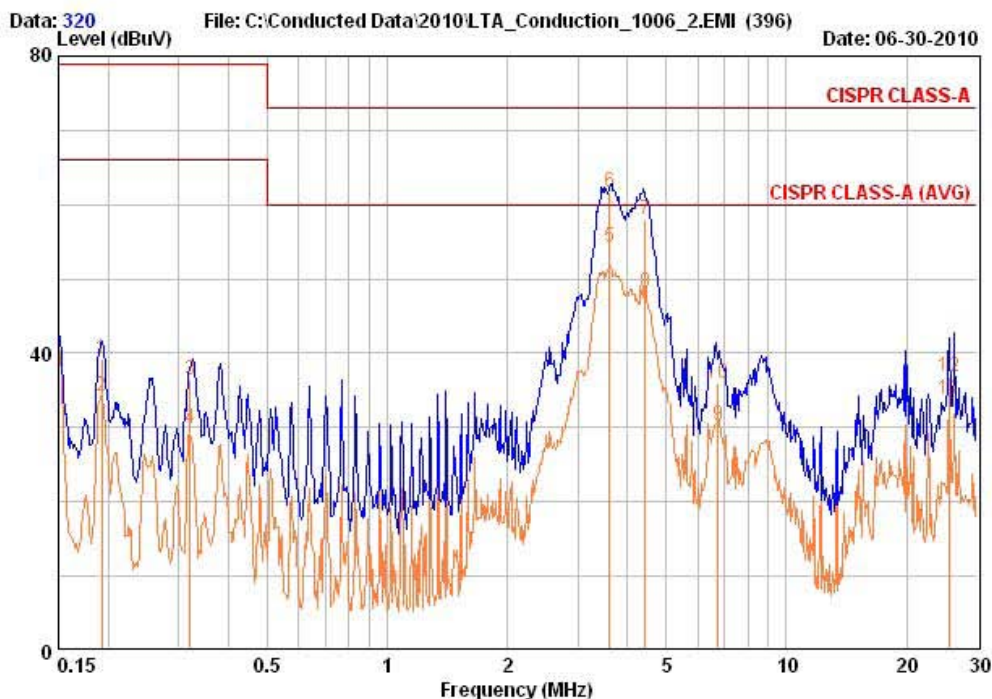
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RJ-45 – Negative_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : SmartNL-RF2000 (Car Adapter)	Phase : NEGATIVE
Test Mode : RJ-45 mode	Test Power : DC 12V
Temp./Humi. : 25 / 78	Test Engineer : PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.193	38.96	33.86	0.34	39.30	34.20	79.00	66.00	39.70	31.80
0.321	36.16	29.56	0.29	36.44	29.84	79.00	66.00	42.56	36.16
3.599	61.23	53.83	0.38	61.61	54.21	73.00	60.00	11.39	5.79
4.429	57.54	47.84	0.42	57.96	48.26	73.00	60.00	15.04	11.74
6.757	35.57	29.77	0.45	36.01	30.21	73.00	60.00	36.99	29.79
25.594	36.07	32.97	0.77	36.85	33.75	73.00	60.00	36.15	26.25

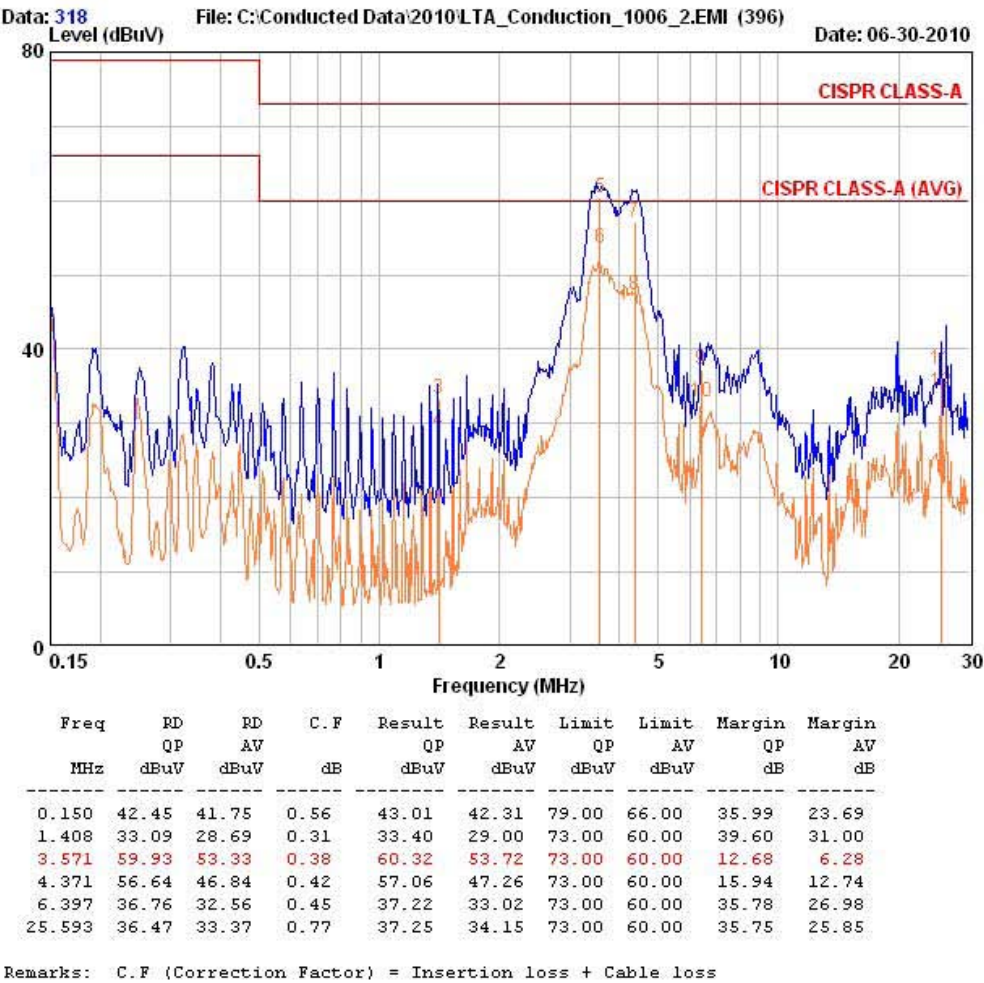
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RJ-45 – Positive_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(Car Adapter)	Phase	: POSITIVE
Test Mode	: RJ-45 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W

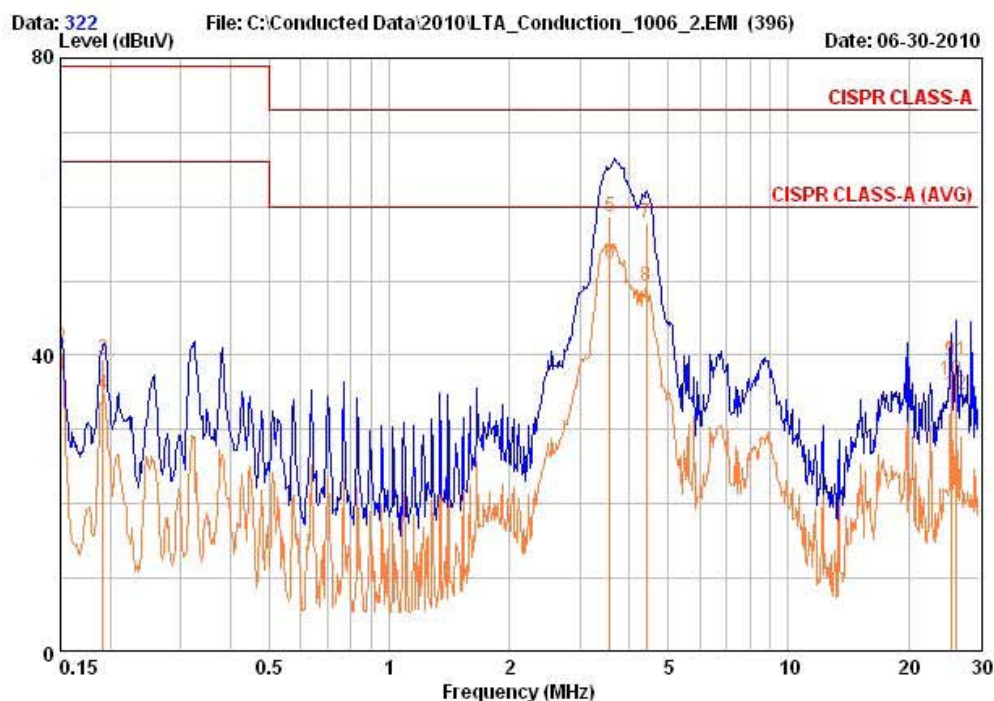


AC Conducted Emissions – CAR Adapter RS-232 – Negative_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : SmartNL-RF2000 (Car Adapter)	Phase : NEGATIVE
Test Mode : RS-232 mode	Test Power : DC 12V
Temp./Humi. : 25 / 78	Test Engineer : PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	41.15	40.35	0.56	41.71	40.91	79.00	66.00	37.29	25.09
0.192	39.16	34.36	0.34	39.50	34.70	79.00	66.00	39.50	31.30
3.568	58.33	51.83	0.38	58.72	52.22	73.00	60.00	14.28	7.78
4.409	57.34	48.74	0.42	57.76	49.16	73.00	60.00	15.24	10.84
25.592	38.57	35.87	0.77	39.35	36.65	73.00	60.00	33.65	23.35
26.424	38.48	33.78	0.79	39.27	34.57	73.00	60.00	33.73	25.43

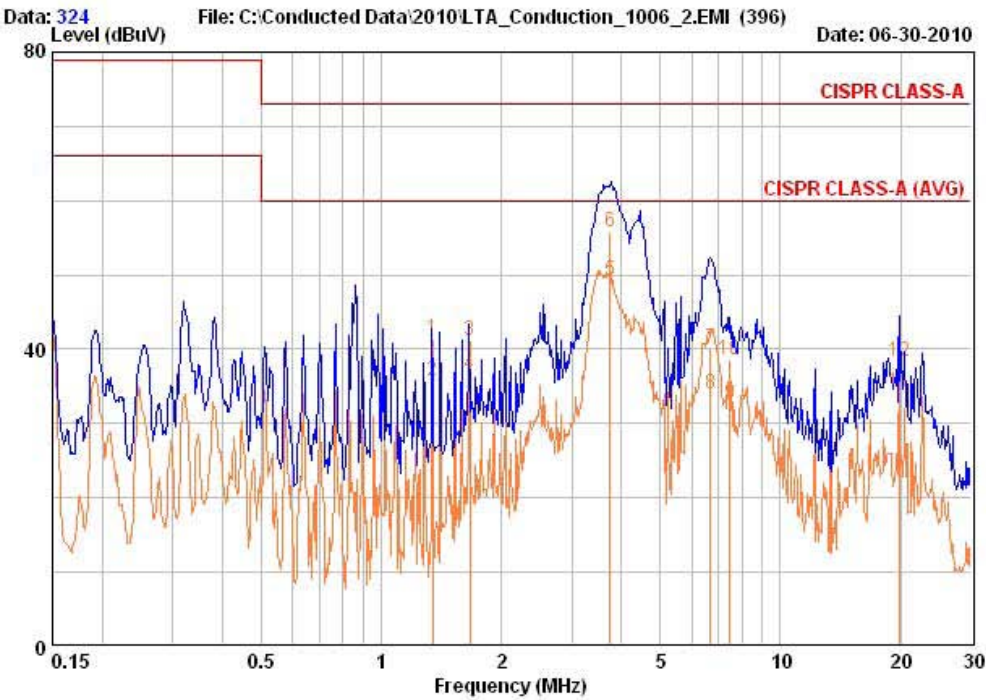
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RS-232 – Positive_DC 12V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000(Car Adapter)	Phase	: POSITIVE
Test Mode	: RS-232 mode	Test Power	: DC 12V
Temp./Humi.	: 25 / 78	Test Engineer	: PARK H W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
1.342	41.18	35.48	0.31	41.49	35.79	73.00	60.00	31.51	24.21
1.664	40.90	36.40	0.32	41.23	36.73	73.00	60.00	31.77	23.27
3.745	55.43	48.93	0.38	55.81	49.31	73.00	60.00	17.19	10.69
6.693	39.67	33.67	0.45	40.11	34.11	73.00	60.00	32.89	25.89
7.487	38.17	32.17	0.47	38.64	32.64	73.00	60.00	34.36	27.36
19.835	37.53	33.43	0.75	38.28	34.18	73.00	60.00	34.72	25.82

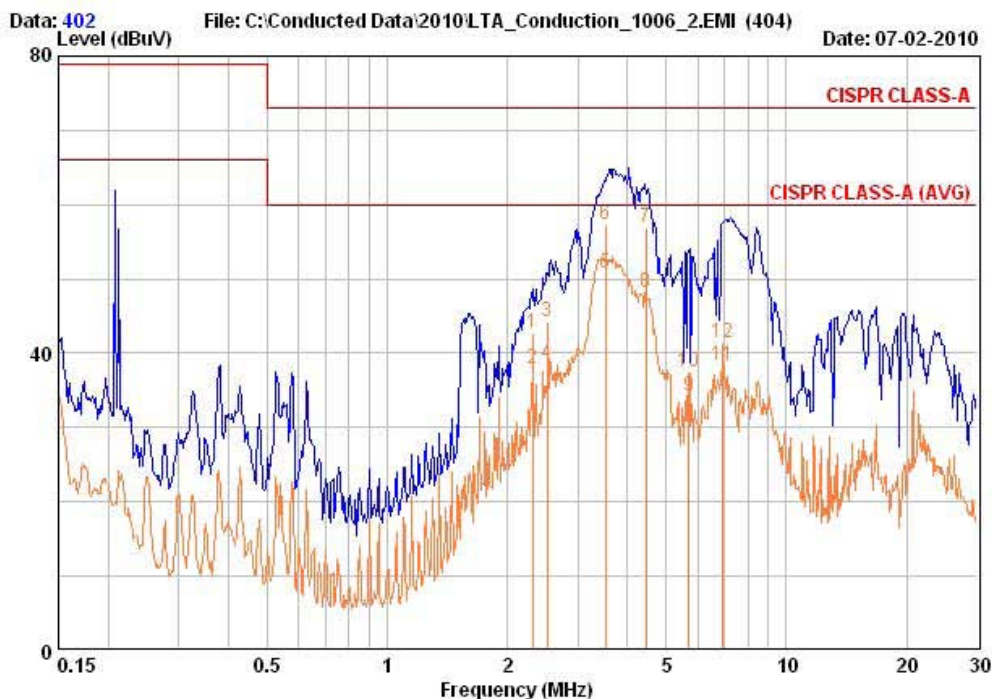
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RJ-45 – Negative_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : SmartNL-RF2000 (Car Adapter)	Phase : NEGATIVE
Test Mode : RJ-45 mode	Test Power : DC 24V
Temp./Humi. : 25 / 69	Test Engineer : PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
2.311	42.30	37.60	0.37	42.66	37.96	73.00	60.00	30.34	22.04
2.513	43.78	38.18	0.38	44.16	38.56	73.00	60.00	28.84	21.44
3.522	56.93	50.33	0.38	57.32	50.72	73.00	60.00	15.68	9.28
4.454	56.44	47.84	0.43	56.87	48.27	73.00	60.00	16.13	11.73
5.705	36.96	33.86	0.44	37.40	34.30	73.00	60.00	35.60	25.70
6.943	40.87	37.87	0.44	41.31	38.31	73.00	60.00	31.69	21.69

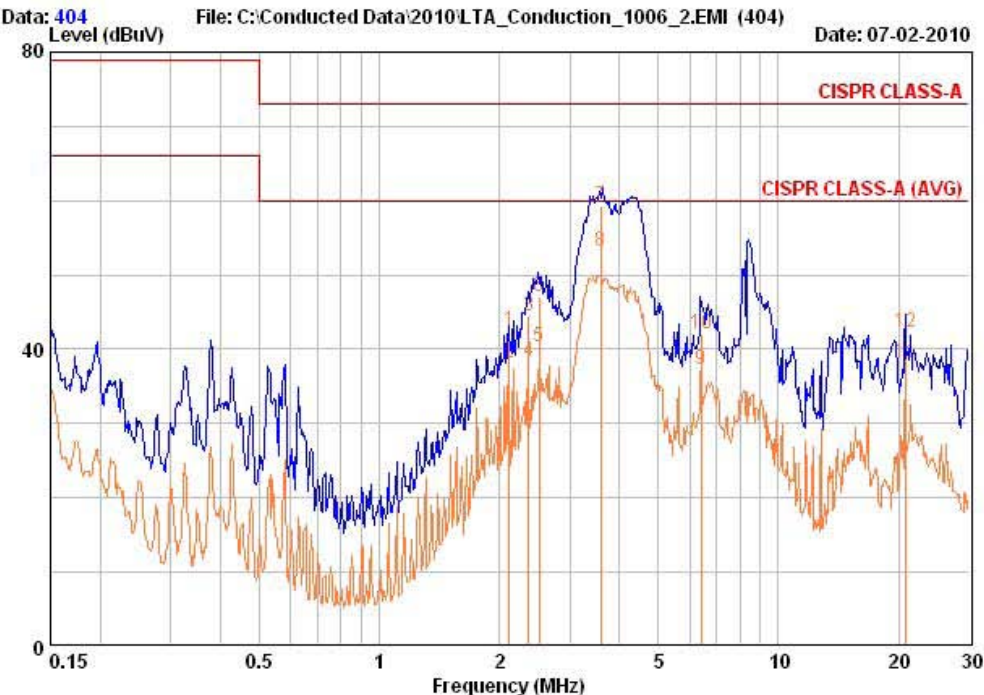
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RJ-45 – Positive_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : SmartNL-RF2000 (Car Adapter)	Phase : POSITIVE
Test Mode : RJ-45 mode	Test Power : DC 24V
Temp./Humi. : 25 / 69	Test Engineer : PARK.H.W



Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

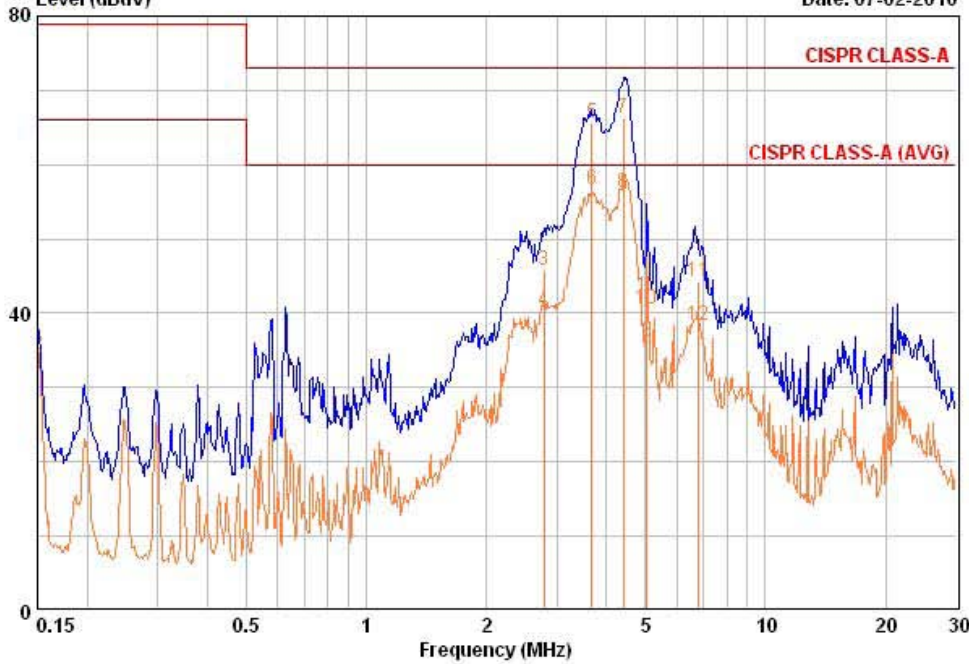
AC Conducted Emissions – CAR Adapter RS-232 – Negative_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. :	SmartNL-RF2000 (Car Adapter)	Phase	: NEGATIVE
Test Mode	: RS-232 mode	Test Power	: DC 24V
Temp./Humi.	: 25 / 69	Test Engineer	: PARK.H.W

Data: 400 File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (404) Date: 07-02-2010
Level (dBuV)



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.150	35.85	33.85	0.56	36.41	34.41	79.00	66.00	42.59	31.59
2.782	45.46	40.06	0.37	45.83	40.43	73.00	60.00	27.17	19.57
3.681	65.33	56.33	0.38	65.71	56.71	73.00	60.00	7.29	3.29
4.407	65.84	55.84	0.42	66.26	56.26	73.00	60.00	6.74	3.74
5.036	40.15	35.85	0.42	40.57	36.27	73.00	60.00	32.43	23.73
6.774	43.77	37.87	0.45	44.21	38.31	73.00	60.00	28.79	21.69

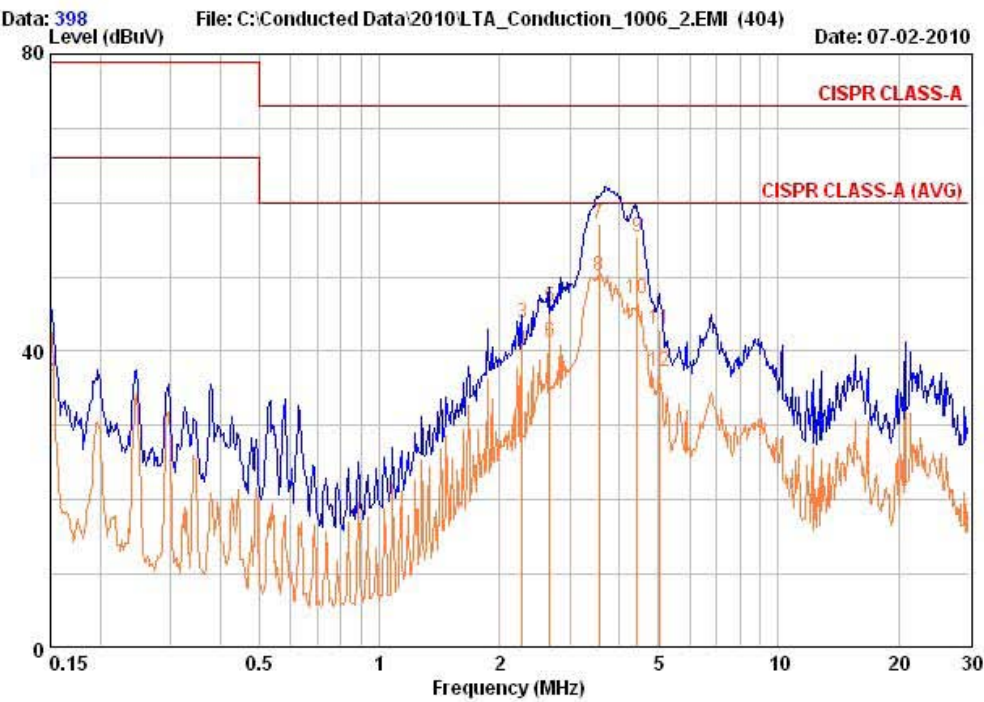
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – CAR Adapter RS-232 – Positive_DC 24V



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : SmartNL-RF2000 (Car Adapter)	Phase : POSITIVE
Test Mode : RS-232 mode	Test Power : DC 24V
Temp./Humi. : 25 / 69	Test Engineer : PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.150	37.05	36.15	0.56	37.61	36.71	79.00	66.00	41.39	29.29
2.281	43.40	39.70	0.36	43.76	40.06	73.00	60.00	29.24	19.94
2.677	45.67	40.87	0.37	46.04	41.24	73.00	60.00	26.96	18.76
3.561	56.73	49.83	0.38	57.12	50.22	73.00	60.00	15.88	9.78
4.418	54.84	46.74	0.42	55.26	47.16	73.00	60.00	17.74	12.84
5.012	42.55	36.85	0.42	42.98	37.28	73.00	60.00	30.02	22.72

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	8563E	3425A02505	HP	Mar-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-10
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-10
7	Attenuator (10dB)	8491A	63196	HP	Oct-10
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-10
9	EMI Test Receiver	ESVD	843748/001	R&S	Mar-11
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-10
13	RF Amplifier	8449B	3008A02126	HP	Mar-11
14	Test Receiver	ESHS10	828404/009	R&S	Mar-11
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-10
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-10
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-10
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-10
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-10
28	DC Power Supply	6622A	3448A03079	HP	Oct-10
29	Frequency Counter	5342A	2826A12411	HP	Mar-11
30	Power Meter	EPM-441A	GB32481702	HP	Mar-11
31	Power Sensor	8481A	2702A64048	HP	Mar-11
32	Audio Analyzer	8903B	3729A18901	HP	Oct-10
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-10
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-10
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Mar-11
37	LISN	ENV216	100408	R&S	Oct-10