FCC PART 15D

MEASUREMENT AND TEST REPORT

For

NEC Nederland B.V.

Olympia 4, 1213 NT Hilversum, The Netherlands

FCC ID: UTCAP400-001

Report Type:	**Product Type:**
Class II Permissive Change	UPCS Base

Test Engineer:	Candy Li
Report Number:	RSZ150330018-00A1
Report Date:	2015-04-15
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TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *NEC Nederland B.V.*'s product, model number: AP400 *(FCC ID: UTCAP400-001)* (the "EUT") in this report was a handset unit of *UPCS Base*, which was measured approximately: 17.5 cm (L) x 14.8 cm (W) x 3.5 cm (H), the input power is AC120 V/60Hz..

Note: This series products model: AP400, AP400A, AP400C, AP400G, AP400S, 8340 smart IP DECT AP integrated Antenna, 8340-C Smart IP-DECT AP Integrated antennas are identical schematics, the difference among them is just the model number due to marketing purpose, and model AP400 was selected for fully testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.

** All measurement and test data in this report was gathered from production sample serial number: 0003438800084 (Assigned by applicant, NEC Nederland B.V.). The EUT supplied by the applicant was received on 2015-03-30.*

Objective

This test report was based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.17 - 2006 and ANSI C63.4-2009.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart D, section 15.203, 15.315, 15.317, 15.319 and 15.323 rules.

This is a CIIPC application of the device, the differences between the original device and the current one are as follows:

This time the schematic only involve some minor changes. Some resistor arrays of 27R are added between IC1-B and IC9, and the number of layer of PCB is changed from 4 to 6 in order to improve the signal integrity between IC1-B and IC9. Both the resistors and PCB are passive device which do not transmit RF.

For the change made to the device, the test item “conducted Emission and spurious radiated emissions” was performed.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2006, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen).

The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in TBR6 mode which is provided by the manufacturer.

Equipment Modifications

Tera Term(software).

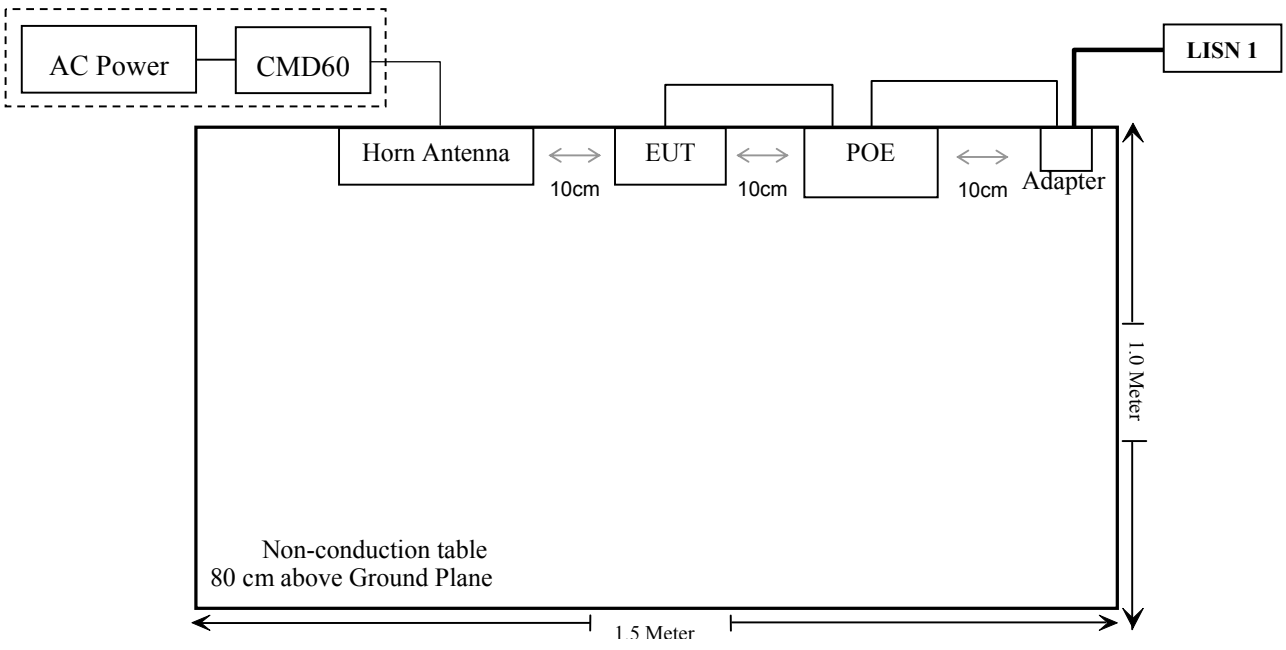
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
NETGEAR	ProSafe Switch wifi POE	FS108P	*1DL2943M003E5*
FUHUA	Adapter	ZY-480100	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielded Detachable AC POWER Line	1.5	Adapter	LISN
Un-shielded Un-detachable DC POWER Line	1.2	POE	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.319 (i)&2.1091	Maximum Permissible exposure (MPE)	Compliance
§ 15.317 § 15.203	Antenna Requirement	Compliance
§ 15.315 § 15.207	Conducted Emission	Compliance
§ 15.323 (a)	Emission Bandwidth	Compliance*
§ 15.319 (c)	Peak Transmit Power	Compliance*
§ 15.319 (d)	Power Spectral Density	Compliance*
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliance*
§ 15.319 (g)	Radiated Emission	Compliance
§ 15.323 (f)	Frequency Stability Handset	Compliance*
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliance*

Note:

Compliance*: The device is identical to the previously certified device except for changing schematic and PCB, the FCC ID: UTCAP400-001 granted on 2012-01-30, report No.: 176720-3.

§1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to FCC §15.319(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*(180/f\2\)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Calculation

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Channel	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
Low	1921.536	1.7	1.48	20.3	107.15	20	0.03	1.0

Result: The device meets MPE limit at 20 cm distance.

FCC§15.317&§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has two integrated antenna arrangement for DECT, which were permanently attached and the gain was 1.7 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliant.

FCC§15.315 & §15.207 - CONDUCTED EMISSIONS

Applicable Standard

FCC§15.315, an unlicensed PCS device that is designed to be connected to the public utility (AC) power line must meet the limits specified in §15.207.

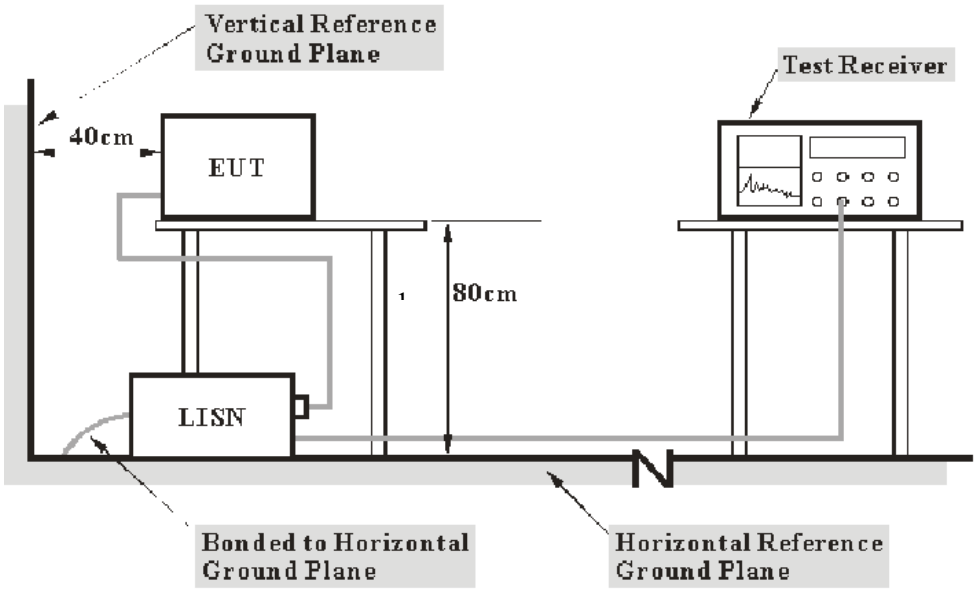
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC 15.315 and FCC 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-03	2015-06-03
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-06-09	2015-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-05-14	2015-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding the Outlet Cable Loss, LISN Insertion Loss, Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = Outlet Cable Loss + LISN Insertion Loss + Cable Loss + Transient Limiter Attenuation

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the worst margin reading as below:

4.8 dB at **4.857250 MHz** in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

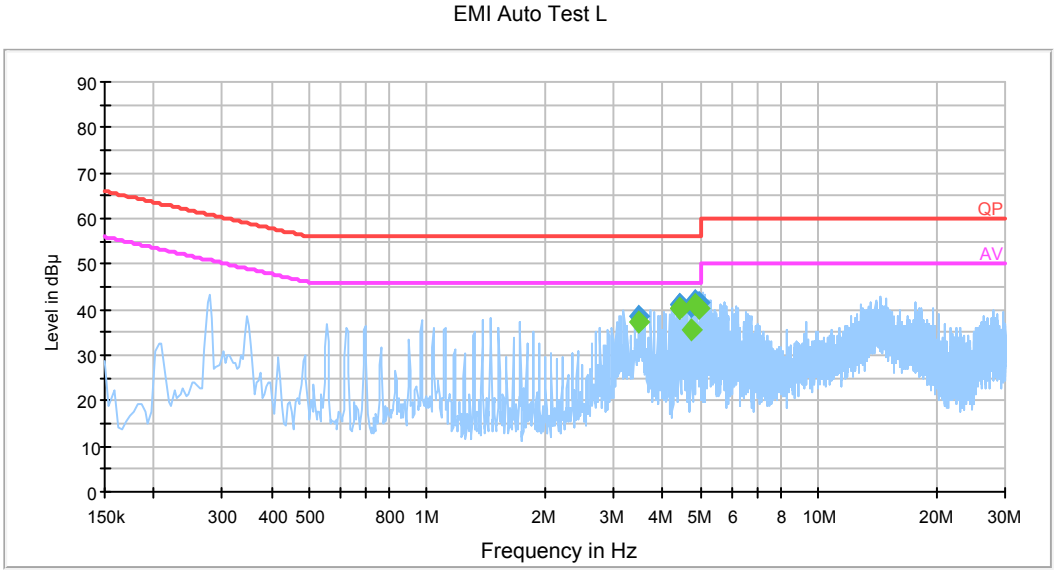
Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Candy Li on 2015-04-09.

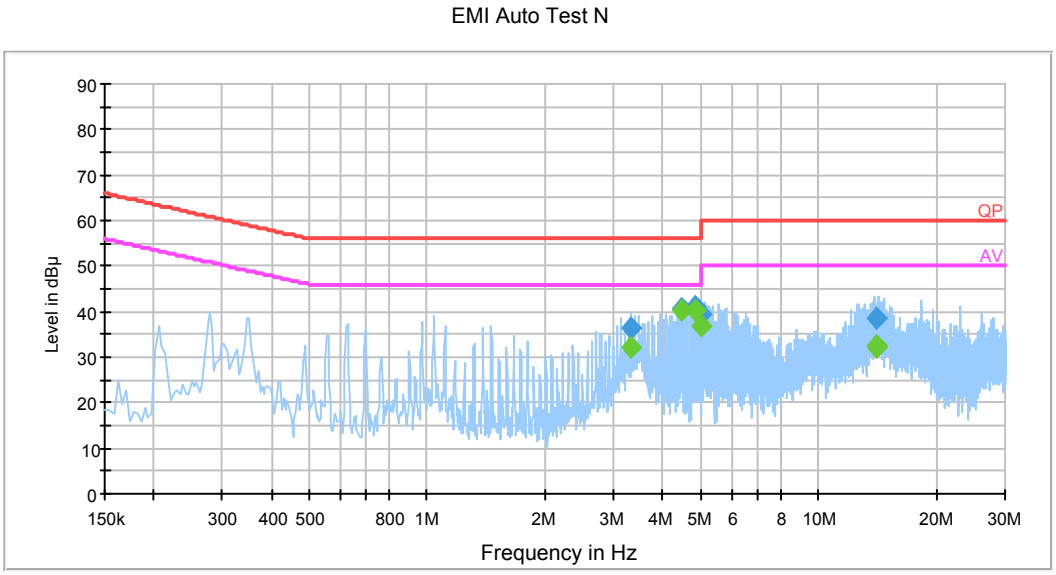
Test mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave)
3.466070	38.7	19.4	56.0	17.3	QP
3.466070	37.2	19.4	46.0	8.8	Ave.
4.438470	41.0	19.4	56.0	15.0	QP
4.438470	40.4	19.4	46.0	5.6	Ave.
4.439490	41.0	19.4	56.0	15.0	QP
4.439490	40.5	19.4	46.0	5.5	Ave.
4.714330	40.7	19.5	56.0	15.3	QP
4.714330	35.5	19.5	46.0	10.5	Ave.
4.857250	41.9	19.5	56.0	14.1	QP
4.857250	41.2	19.5	46.0	4.8	Ave.
4.928230	41.4	19.5	56.0	14.6	QP
4.928230	40.1	19.5	46.0	5.9	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave)
3.335990	36.3	19.4	56.0	19.7	QP
3.335990	32.3	19.4	46.0	13.7	Ave.
4.447370	40.7	19.4	56.0	15.3	QP
4.447370	40.1	19.4	46.0	5.9	Ave.
4.865070	41.0	19.4	56.0	15.0	QP
4.865070	40.4	19.4	46.0	5.6	Ave.
5.003270	39.5	19.5	60.0	20.5	QP
5.003270	37.0	19.5	50.0	13.0	Ave.
14.073710	38.6	19.7	60.0	21.4	QP
14.073710	32.5	19.7	50.0	17.5	Ave.
14.147530	38.7	19.7	60.0	21.3	QP
14.147530	32.3	19.7	50.0	17.7	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

FCC§15.319 (g) - RADIATED EMISSIONS

Applicable Standard

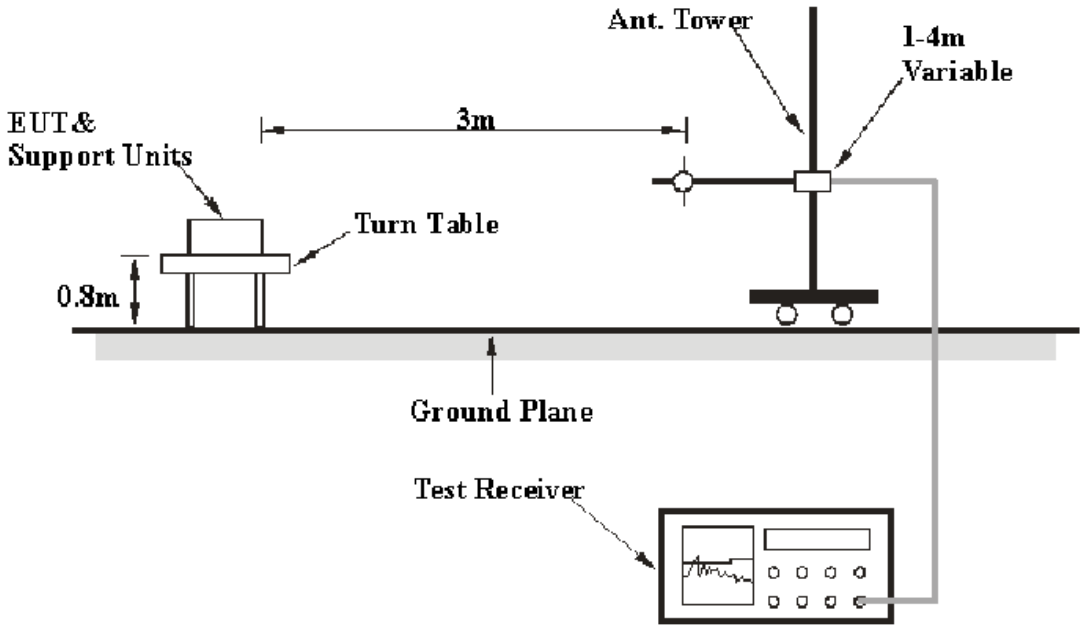
According to FCC§15.319(g), notwithstanding other technical requirements specified in this subpart, attenuation of emissions below the general emission limits in §15.209 is not required.

Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN /ISN and receiver, LISN /ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz. And this uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.17 - 2006. The specification used was the FCC 15§ 15.319(g).

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 20 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
SUPER ULTRA	Amplifier	ZVA-183-S+	5969001149	2014-04-23	2015-04-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2012-12-01	2015-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit - Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.319 (g), with the worst margin reading of:

3.39 dB at **900.17 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Candy Li on 2015-04-09.

Test mode: Transmitting

30 MHz ~ 20 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.319(g)/209/205	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (1921.536 MHz)									
800.02	46.02	QP	283	2.0	H	-4.3	41.72	46	4.28
900.17	45.71	QP	134	1.1	H	-3.1	42.61	46	3.39
1921.5	109.56	PK	288	2.3	H	3.53	113.09	/	/
1921.5	109.87	PK	288	2.3	V	3.73	113.60	/	/
3843.1	34.25	PK	322	1.4	H	11.65	45.90	74	28.10
3843.1	34.08	PK	322	1.4	V	11.75	45.83	74	28.17
5764.6	33.35	PK	12	2.4	H	14.89	48.24	74	25.76
5764.6	34.60	PK	12	2.4	V	15.09	49.69	74	24.31
7686.1	35.42	PK	25	2.4	H	19.12	54.54	74	19.46
7686.1	35.22	PK	25	2.4	V	19.22	54.44	74	19.56
Middle Channel (1924.992 MHz)									
800.02	45.78	QP	292	2.1	H	-4.3	41.48	46	4.52
900.17	45.35	QP	15	1.3	H	-3.1	42.25	46	3.75
1925	110.56	PK	193	2.4	H	3.53	114.09	/	/
1925	109.58	PK	193	2.4	V	3.73	113.31	/	/
3850	32.93	PK	56	2.2	H	10.99	43.92	74	30.08
3850	31.92	PK	56	2.2	V	11.09	43.01	74	30.99
5775	33.14	PK	167	1.1	H	14.89	48.03	74	25.97
5775	34.36	PK	167	1.1	V	15.09	49.45	74	24.55
7700	31.89	PK	184	2.4	H	19.12	51.01	74	22.99
7700	33.37	PK	184	2.4	V	19.22	52.59	74	21.41
High Channel (1928.448 MHz)									
800.02	45.83	QP	326	2.2	H	-4.3	41.53	46	4.47
900.17	45.57	QP	141	1.2	H	-3.1	42.47	46	3.53
1928.4	110.12	PK	187	1.1	H	3.53	113.65	/	/
1928.4	108.31	PK	187	1.1	V	3.73	112.04	/	/
3856.9	33.75	PK	213	1.8	H	10.99	44.74	74	29.26
3856.9	33.30	PK	213	1.8	V	11.09	44.39	74	29.61
5785.3	34.39	PK	143	1.6	H	14.89	49.28	74	24.72
5785.3	34.93	PK	143	1.6	V	15.09	50.02	74	23.98
7713.8	32.02	PK	249	2.4	H	19.12	51.14	74	22.86
7713.8	31.68	PK	249	2.4	V	19.22	50.90	74	23.10

Field Strength of Radiated Emission Average							
Freq. (MHz)	Peak Corrected Amplitude. @3m (dBμV/m)	Polar (H/V)	Duty Cycle Factor (dB)	Corrected Amplitude. (dBμV/m)	FCC 15.319/15.205/15.209		Comment
					Limit (dBμV/m)	Margin	
Low Channel (1921.536 MHz)							
1921.5	113.09	H	-27.86	85.23	/	/	Fundamental
1921.5	113.60	V	-27.86	85.74	/	/	Fundamental
3843.1	45.90	H	-27.86	18.04	54	35.96	Harmonic
3843.1	45.83	V	-27.86	17.97	54	36.03	Harmonic
5764.6	48.24	H	-27.86	20.38	54	33.62	Harmonic
5764.6	49.69	V	-27.86	21.83	54	32.17	Harmonic
7686.1	54.54	H	-27.86	26.68	54	27.32	Harmonic
7686.1	54.44	V	-27.86	26.58	54	27.42	Harmonic
Middle Channel (1924.992 MHz)							
1925	114.09	H	-27.86	86.23	/	/	Fundamental
1925	113.31	V	-27.86	85.45	/	/	Fundamental
3850	43.92	H	-27.86	16.06	54	37.94	Harmonic
3850	43.01	V	-27.86	15.15	54	38.85	Harmonic
5775	48.03	H	-27.86	20.17	54	33.83	Harmonic
5775	49.45	V	-27.86	21.59	54	32.41	Harmonic
7700	51.01	H	-27.86	23.15	54	30.85	Harmonic
7700	52.59	V	-27.86	24.73	54	29.27	Harmonic
High Channel (1928.448 MHz)							
1928.4	113.65	H	-27.86	85.79	/	/	Fundamental
1928.4	112.04	V	-27.86	84.18	/	/	Fundamental
3856.9	44.74	H	-27.86	16.88	54	37.12	Harmonic
3856.9	44.39	V	-27.86	16.53	54	37.47	Harmonic
5785.3	49.28	H	-27.86	21.42	54	32.58	Harmonic
5785.3	50.02	V	-27.86	22.16	54	31.84	Harmonic
7713.8	51.14	H	-27.86	23.28	54	30.72	Harmonic
7713.8	50.90	V	-27.86	23.04	54	30.96	Harmonic

Note：
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor = Antenna Factor (Rx) + Cable Loss – Amplifier Factor
Margin = Limit - Corrected Amplitude
Duty Cycle = Ton/Tp*100%, Ton = 405.22 μs, Tp= 10.018 ms
Duty Cycle Factor = 20lg(Duty Cycle) = -27.86
AV = PK + 20*lg(Duty Cycle)

PRODUCT SIMILARITY DECLARATION LETTER

NEC Nederland B.V.
Address: Anton Philipsweg 1, 1223 KZ Hilversum, The Netherlands
Tel: 0031356891137 FAX: 0031356891055

2015-04-24

Product Similarity Declaration

To Whom It May Concern,

We, NEC Nederland B.V. , hereby declare that we have a product named as UPCS Base (Model number:AP400) was tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models (AP400A, AP400C, AP400G, AP400S, 8340 smart IP DECT AP integrated Antenna , 8340-C Smart IP-DECT AP Integrated antennas) on reports and certificate, all the models are identical schematics.

Model No.	Trade Name	Model description
AP400	NEC	This model is tested in BACL.
AP400A	NEC	Compare to AP400, only small software differences for commercial reasons.
AP400C	NEC	
AP400G	NEC	
AP400S	NEC	
8340 smart IP DECT AP integrated Antenna	Alcatel-Lucent	Compare to AP400, only small software differences for commercial reasons and different trademark.
8340-C Smart IP-DECT AP Integrated antennas	Alcatel-Lucent	

No other changes are made to them.
We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Signature:

Federico Dosil

Advisor Regulatory Compliance

******* END OF REPORT *******