

## FCC TEST REPORT

### No. 150500694SHA-002

Applicant : NINGBO COMEN ELECTRONICS  
TECHNOLOGY CO., LTD  
No.599 Jinda Road, Zhenhai Economic  
Development Zone, 315221 Ningbo, P.R. China

Manufacturer : NINGBO COMEN ELECTRONICS  
TECHNOLOGY CO., LTD  
No.599 Jinda Road, Zhenhai Economic  
Development Zone, 315221 Ningbo, P.R. China

Product Name : Adaptor

Type/Model : PA-US1-01W, PA-USA-01W

**TEST RESULT : PASS**

#### SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

**47CFR Part 15 (2014):** Radio Frequency Devices (Subpart C)

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

**RSS-210 Issue 8 (December 2010):** Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

**RSS-Gen Issue 4 (December 2014):** General Requirements for Compliance of Radio Apparatus

Date of issue: July 20, 2015

Prepared by:



Nemo Li (*Project Engineer*)

Reviewed by:



Daniel Zhao (*Reviewer*)



## Description of Test Facility

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## 1 GENERAL INFORMATION

### 1.1 Description of Client

Applicant : NINGBO COMEN ELECTRONICS TECHNOLOGY  
CO., LTD

No.599 Jinda Road, Zhenhai Economic Development  
Zone, 315221 Ningbo, P.R. China

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Manufacturer : NINGBO COMEN ELECTRONICS TECHNOLOGY  
CO., LTD

No.599 Jinda Road, Zhenhai Economic Development  
Zone, 315221 Ningbo, P.R. China

### 1.2 Identification of the EUT

Product Name : Adaptor

Type/model : PA-US1-01W, PA-USA-01W

FCC ID : XK8-PAUS101W

IC : 8476A-PAUS101W

### 1.3 Technical Specification

Operation Frequency : 433.92MHz  
Band  
Modulation : ASK

Antenna Designation : Metal antenna, 0 dBi

Description of EUT : There are two models. They have the same electrical construction except the outside appearance. Only the model of PA-US1-01W was chosen to perform the full tests as representative.

Rating : 110-125V~, 60Hz

Category of EUT : Class B

EUT type :  Table top  
 Floor standing

Sample received date : May 28, 2015

Sample Identification : /  
No

Date of test : May 28, 2015 – July 20, 2015

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

**47CFR Part 15 (2014):** Radio Frequency Device

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

**RSS-210 Issue 8 (December 2010):** Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

**RSS-Gen Issue 4 (December 2014):** General Requirements for Compliance of Radio Apparatus

### 2.2 Mode of operation during the test

Within this test report, EUT was tested with modulation and tested under its rating voltage and frequency.

### 2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

### 2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Incandescent lamp	-	-

## 2.5 Instrument list

Selected	Instrument	EC no.	Model	Valid until date
<input type="checkbox"/>	Shielded room	EC 2838	GB88	2016-1-8
<input type="checkbox"/>	EMI test receiver	EC 2107	ESCS 30	2015-10-19
<input type="checkbox"/>	A.M.N.	EC 3119	ESH2-Z5	2015-12-16
<input type="checkbox"/>	A.M.N.	EC 3394	ENV 216	2015-8-1
<input checked="" type="checkbox"/>	Semi anechoic chamber	EC 3048	-	2016-5-11
<input checked="" type="checkbox"/>	EMI test receiver	EC 3045	ESIB26	2015-10-19
<input type="checkbox"/>	Broadband antenna	EC 4206	CBL6112D	2016-4-27
<input checked="" type="checkbox"/>	Broadband antenna	EC 3046-1	HL562	2016-5-15
<input type="checkbox"/>	Horn antenna	EC 3049	HF906	2016-4-27
<input checked="" type="checkbox"/>	Horn antenna	EC 4792-1	3117	2016-4-21
<input type="checkbox"/>	Horn antenna	EC 4792-3	HAP18-26W	2016-6-11
<input type="checkbox"/>	Pre-amplifier	EC 5262	pre-amp 18	2016-5-25
<input checked="" type="checkbox"/>	Pre-amplifier	EC 4792-2	TPA0118-40	2016-4-10
<input type="checkbox"/>	High Pass Filter	EC 4797-1	WHKX 1.0/15G-10SS	2016-1-8
<input type="checkbox"/>	High Pass Filter	EC 4797-2	WHKX 2.8/18G-12SS	2016-1-8
<input type="checkbox"/>	High Pass Filter	EC 4797-3	WHKX 7.0/1.8G-8SS	2016-1-8
<input type="checkbox"/>	Band Reject Filter	EC 4797-4	WRCGV2400/2483/10SS	2016-1-8
<input checked="" type="checkbox"/>	Test Receiver	EC 4501	ESCI 7	2016-1-13
<input checked="" type="checkbox"/>	PXA Signal Analyzer	EC5338	N9030A	2015-11-17
<input type="checkbox"/>	Power sensor/Power meter	EC4318	N1911A/N1921A	2016-4-8
<input type="checkbox"/>	Power sensor	EC5338-1	U2021XA	2016-3-5
<input type="checkbox"/>	MXG Analog Signal Generator	EC5338-2	N5181A	2016-3-5
<input type="checkbox"/>	MXG Vector Signal Generator	EC5175	N51812B	2016-1-8

## 2.6 Test Summary

**This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

TEST ITEM	FCC REFERENCE	IC REFERENCE	RESULT
Fundamental & spurious emission	15.231(b)	RSS-210 Issue 8 Annex A1.1.2	Pass
Restrict band radiated emission	15.205	RSS-210 Issue 8 Clause 2.2	Pass
Conducted emission	15.207	RSS-Gen Issue 4 Clause 7.2.4	Pass
Emission bandwidth	15.231(c)	RSS-210 Issue 8 Annex A1.1.3	Pass
Deactivating time	15.231(a)(1)	RSS-210 Issue 8 Annex A1.1.1	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 4.6.1	Tested

Notes: 1: NA =Not Applicable





### 3 Fundamental & Spurious Emission & Restrict band radiated emission

Test result: Pass

#### 3.1 Test limit

The emission shall test through the 10th harmonic or to 40GHz, whichever is lower. It must comply with the limits below:

Fundamental Frequency (MHz)	Fundamental limit (uV/m)	Spurious limit (uV/m)
<input type="checkbox"/> 40.66 – 40.70	2250	225
<input type="checkbox"/> 70 – 130	1250	125
<input type="checkbox"/> 130 - 174	1250 to 3750	125 to 375
<input type="checkbox"/> 174 - 260	3750	375
<input checked="" type="checkbox"/> 260 – 470	3750 to 12500	375 to 1250
<input type="checkbox"/> Above 470	12500	1250

The formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(Frequency) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(Frequency) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

For that the EUT use fundamental frequency of 433.92MHz, after calculation, the limit is:

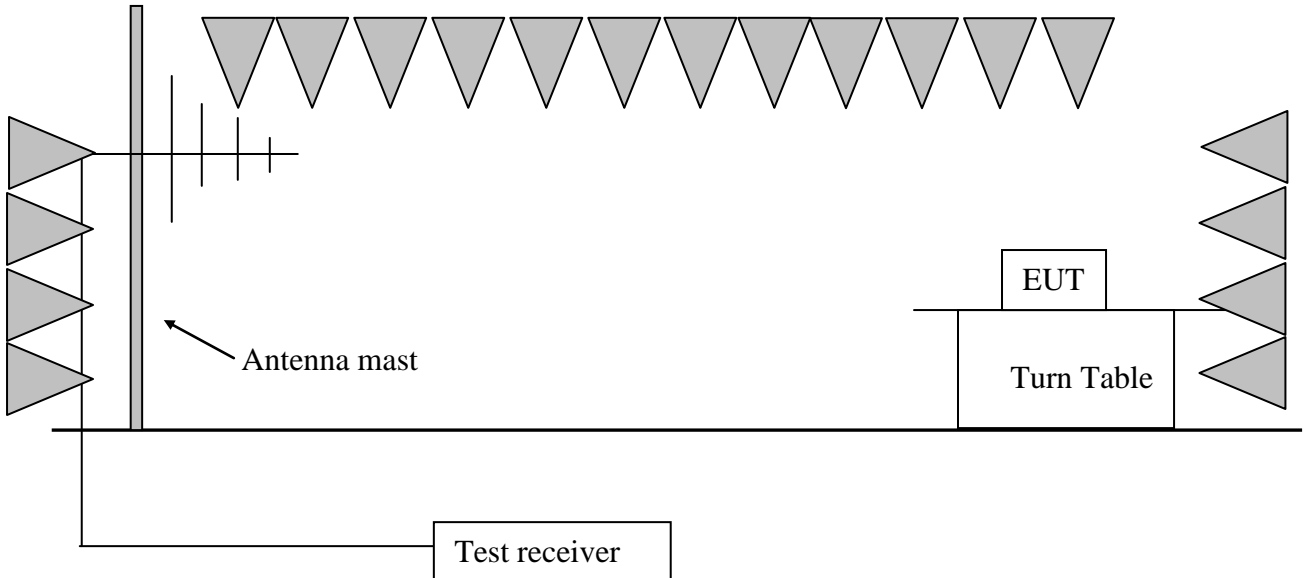
Fundamental limit = 41.6667 \* 433.92 - 7083.3333 = 10996.68uV/m =80.83 dBuV/m  
 Spurious limit = 80.83 – 20 = 60.83dBuV/m

////////////////////////////////////

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

### 3.2 Test Configuration



### 3.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, the pre-amplifier and high pass filter is equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Both horizontal and vertical polarities of the receiving antenna were assessed and the higher reading was listed in this report.

The radiated emission was measured using the test receiver with the resolutions bandwidth set as:

- RBW=300 Hz, VBW=1 kHz (9 kHz~150 kHz);
- RBW=10 kHz, VBW=30 kHz (150 kHz~30MHz);
- RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz)
- RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

### 3.4 Test protocol

Temperature : 22 °C  
Relative Humidity : 52 %

Antenna Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Emission Type	Limit (dBuV/m)	Margin	Detector
H	433.92	72.30	18.30	Fundamental	100.83	28.53	PK
H	1737.34	47.70	-11.40	Spurious	80.83	33.13	PK
H	2603.21	55.74	-7.60	Spurious	80.83	25.09	PK
H	3036.07	52.40	-6.20	Spurious	80.83	28.43	PK
H	3476.95	51.70	-5.30	Spurious	80.83	29.13	PK
H	325.49	40.70	15.90	Restrict	46.00	5.30	PK
H	401.52	35.30	19.00	Restrict	46.00	10.70	PK
V	433.92	72.60	18.30	Fundamental	100.83	28.23	PK
V	867.85	42.30	25.10	Spurious	80.83	38.53	PK
V	1286.59	52.40	-14.20	Spurious	80.83	28.43	PK
V	1737.34	46.80	-11.40	Spurious	80.83	34.03	PK
V	2603.21	52.28	-7.60	Spurious	80.83	28.55	PK
V	3036.07	45.10	-6.20	Spurious	80.83	35.73	PK
V	3476.95	55.40	-5.30	Spurious	80.83	25.43	PK
V	325.49	32.20	15.90	Restrict	46.00	13.80	PK
V	401.54	34.30	19.00	Restrict	46.00	11.70	PK

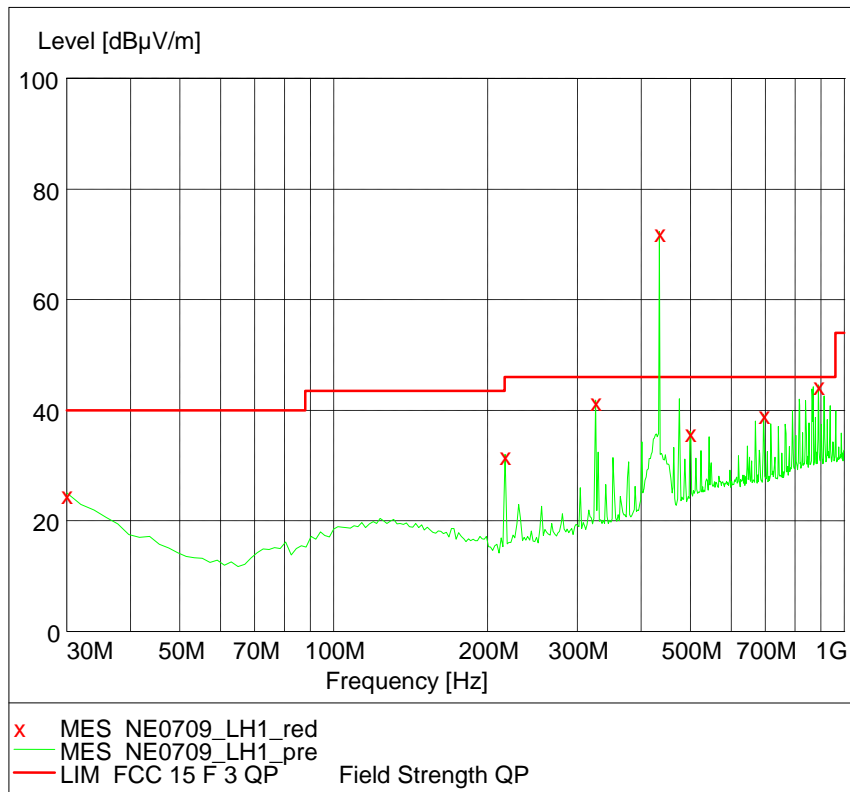
- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)  
 2. Corrected Reading = Original Receiver Reading + Correct Factor  
 3. Margin = Limit - Corrected Reading  
 4. If PK Corrected reading is less than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,  
limit = 40.00dBuV/m.  
Then Correct Factor =  $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$ ; Corrected Reading  
=  $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$ ; Margin =  $40.00\text{dBuV/m} -$   
 $10.20\text{dBuV/m} = 29.80\text{dB}$ .

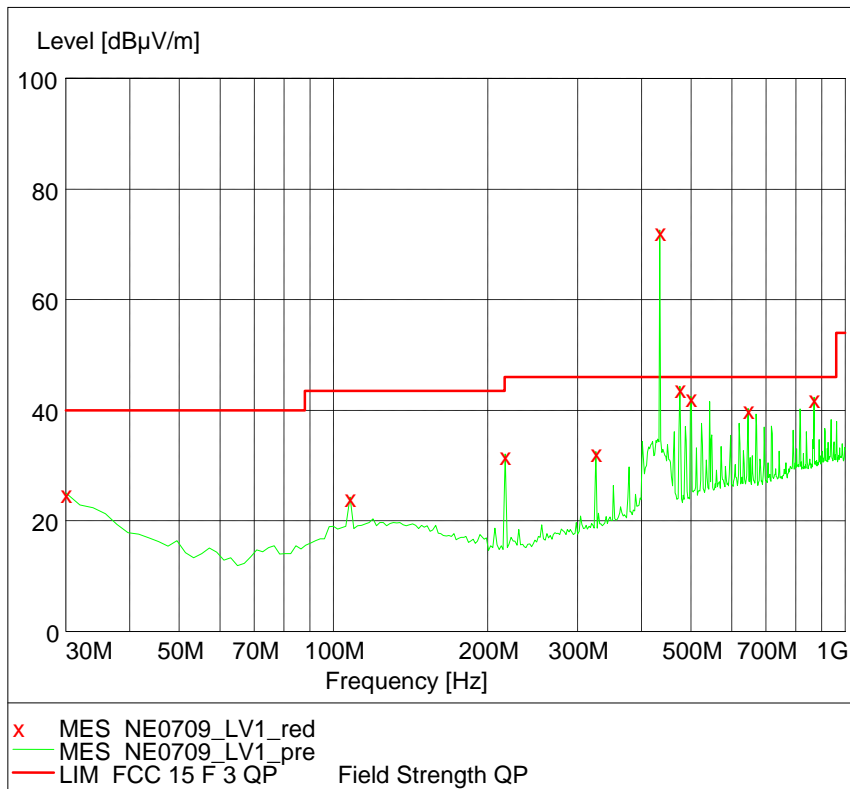
Test wave:

Horizontal:

30-1000MHz

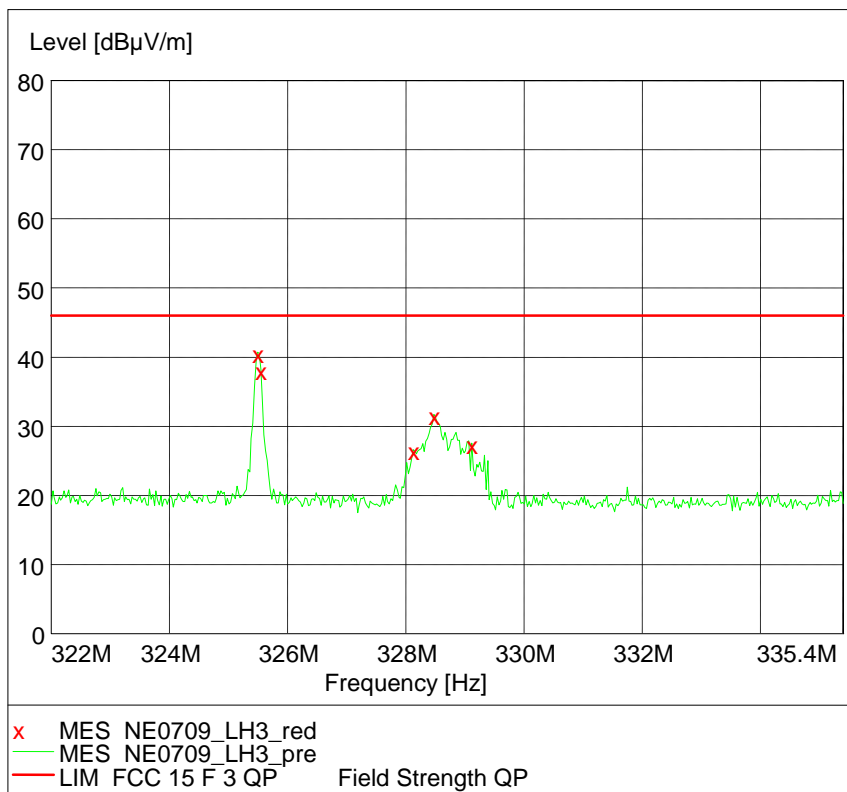
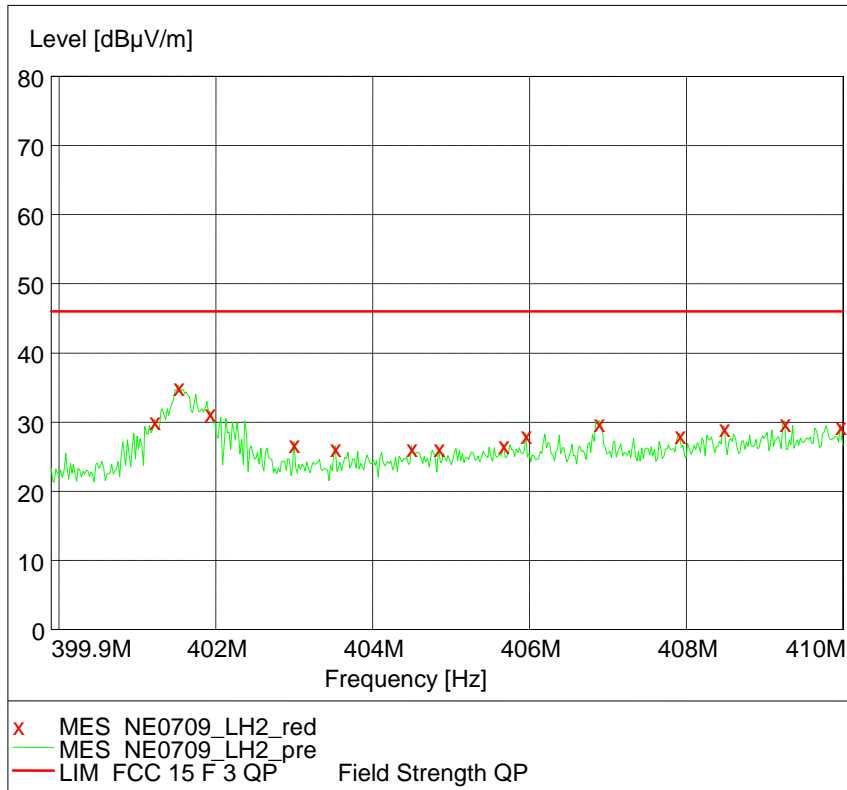


Vertical:

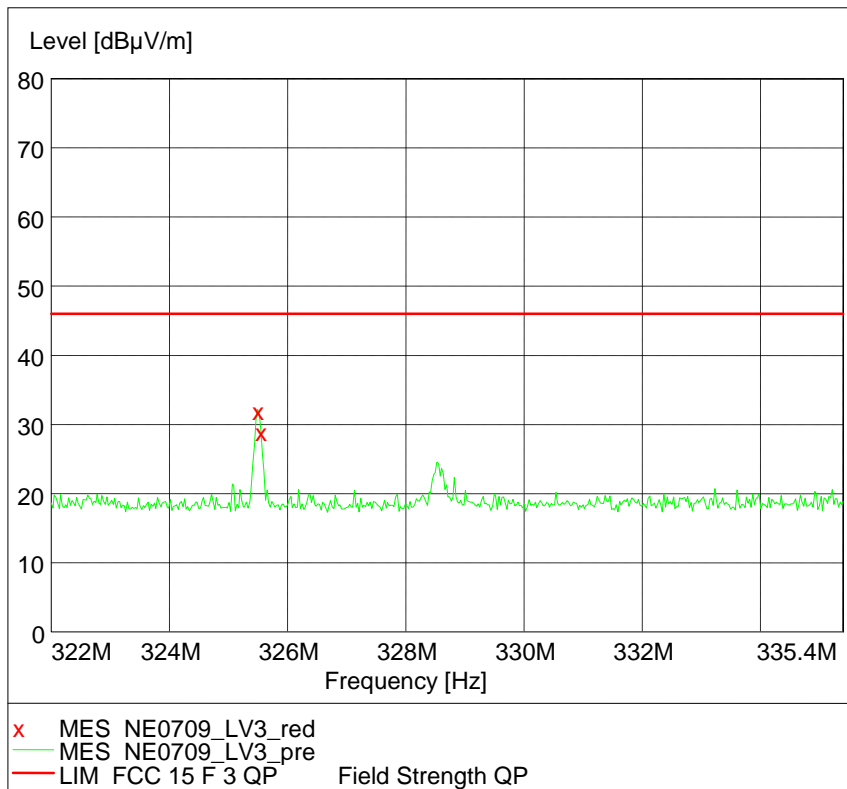
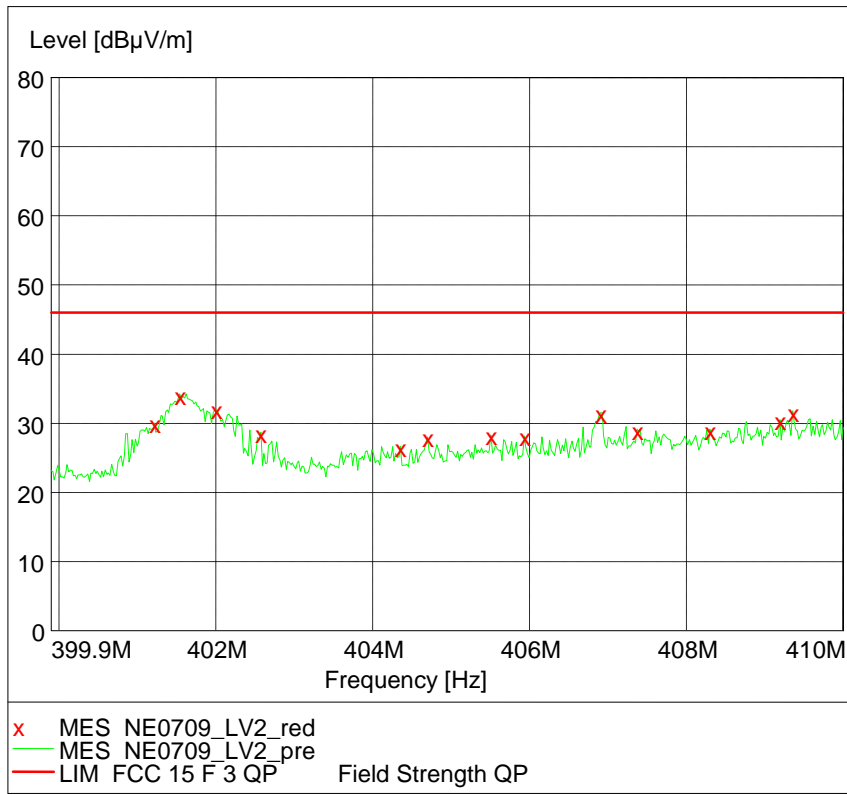


### Restrict band

Horizontal:

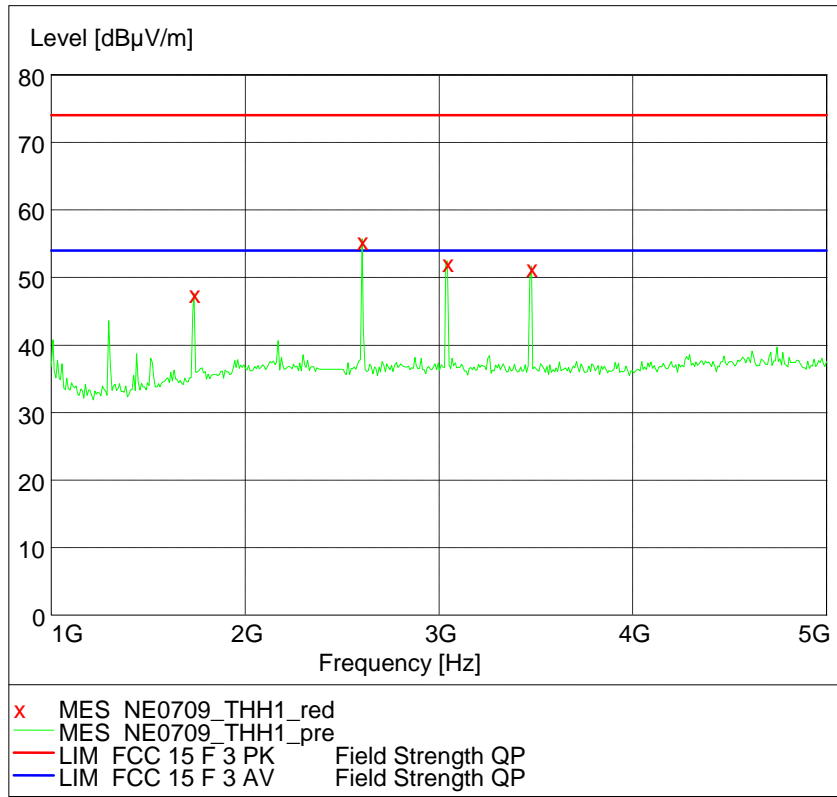


Vertical:

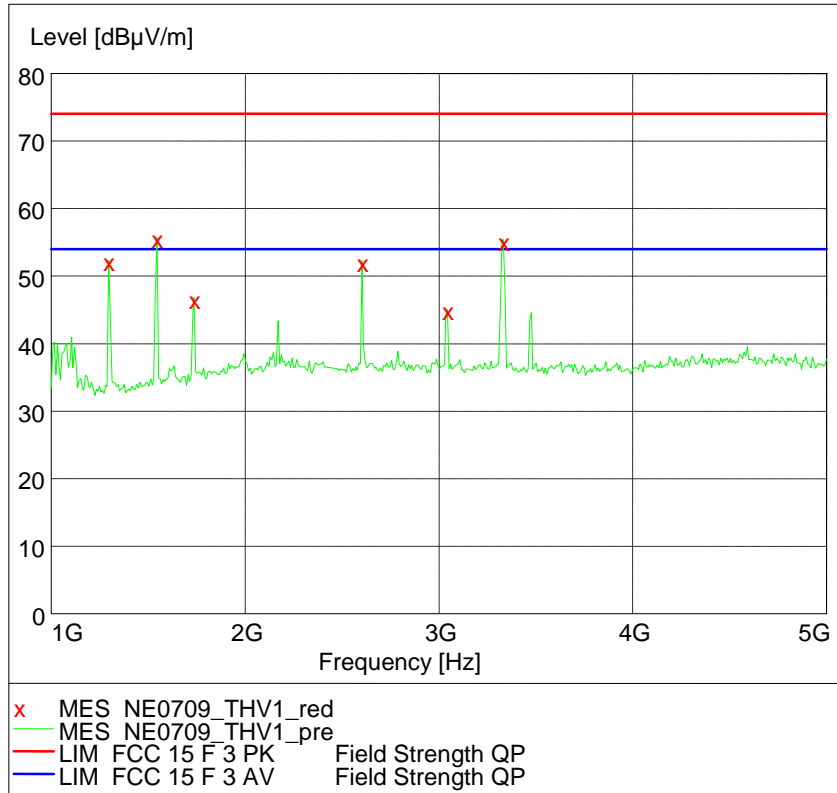


1000-5000MHz

Horizontal:



Vertical





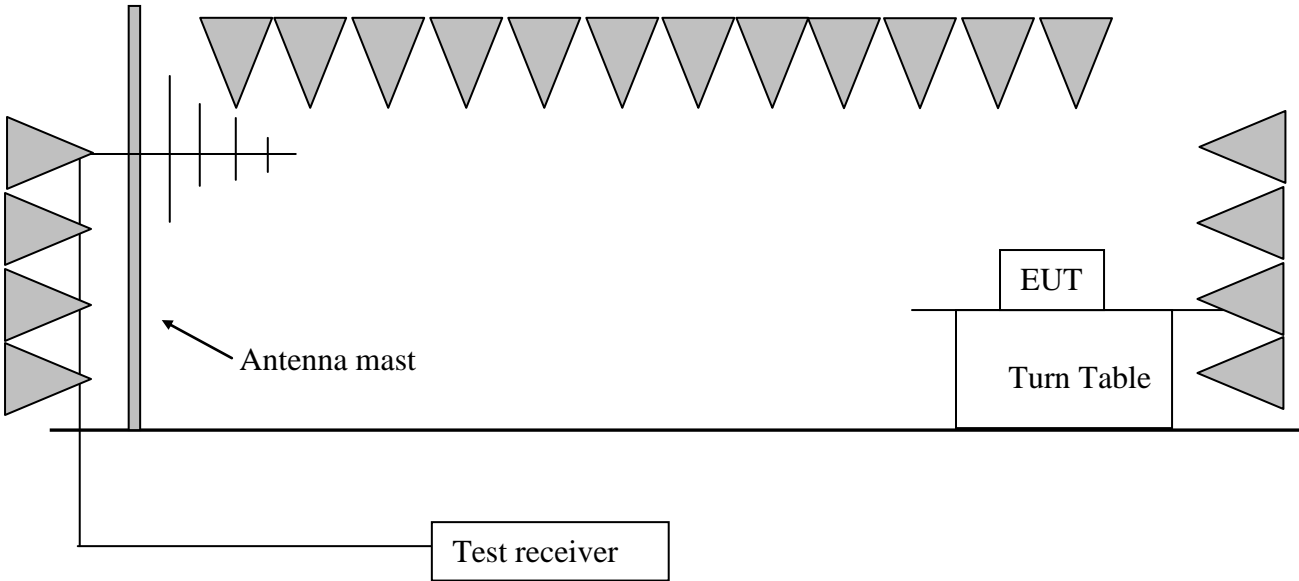
## 4 Deactivating time

**Test result: Pass**

### 4.1 Test limit

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.
- (5) Transmission of set-up information for security systems may exceed the transmission duration limits in (1) and (2) above, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

### 4.2 Test Configuration



### 4.3 Test procedure and test setup

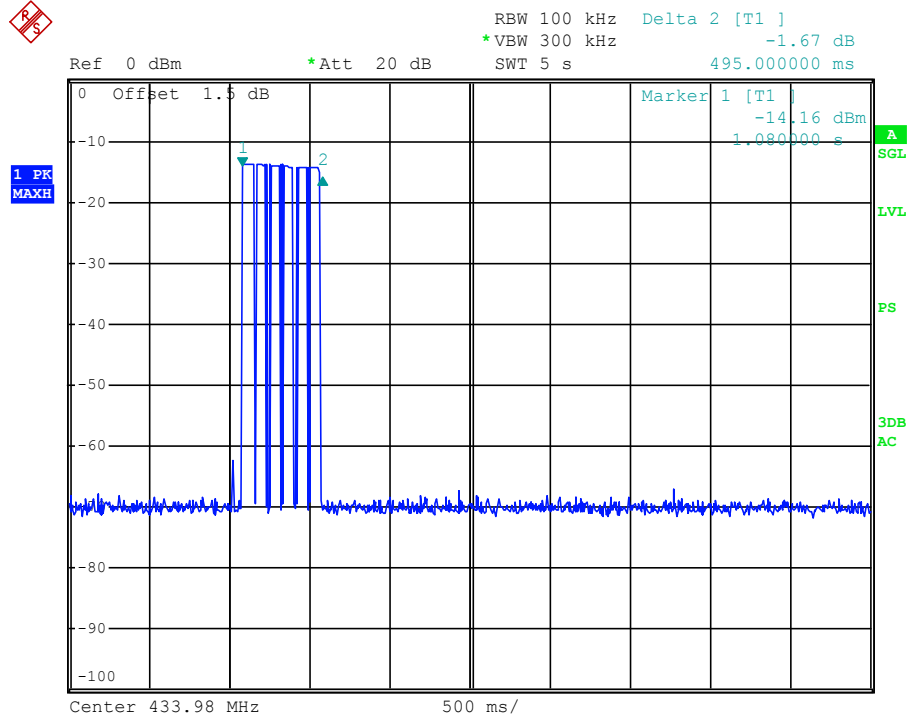
The measurement was applied in a semi-anechoic chamber.  
The central frequency of test receiver was set as the operating frequency of EUT and the Span was set as 0.  
The EUT was switched once. The test receiver recorded the whole time from the triggered moment to the time of stopping radiating. For manual switching, to avoid uncertainty, the operating above would be repeated five times and the worst data is recorded.

### 4.4 Test protocol

Temperature : 22 °C  
Relative Humidity : 52 %

Whole time from the triggered moment to the time of stopping radiating: 0.495s.  
As a result, the EUT complies with the limit of 5s' deactivating time.

Test wave:



## 5 Emission Bandwidth

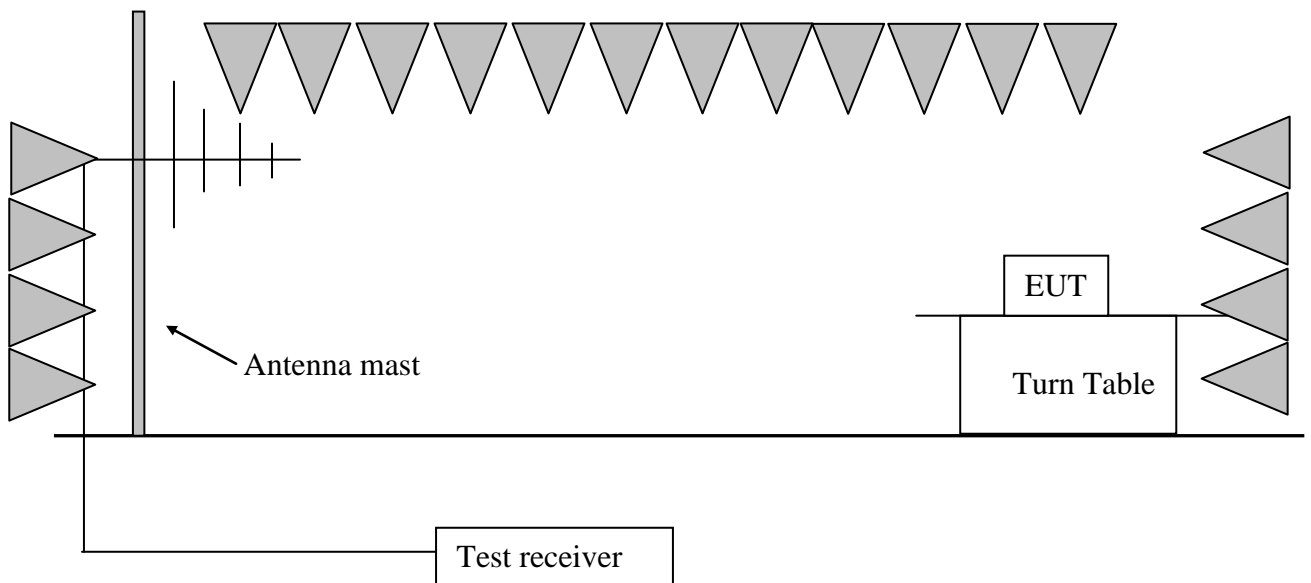
**Test Status: Pass**

### 5.1 Test limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

The limit for the EUT =  $0.25\% * 433.92\text{MHz} = 1084.8\text{kHz}$

### 5.2 Test Configuration



### 5.3 \*Test procedure and test setup

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level. The central frequency of test receiver was set near the operating frequency of EUT. The test was conducted using the Spectrum Analyzer with the resolutions bandwidth set below:

RBW = approximately 1% of the emission bandwidth.

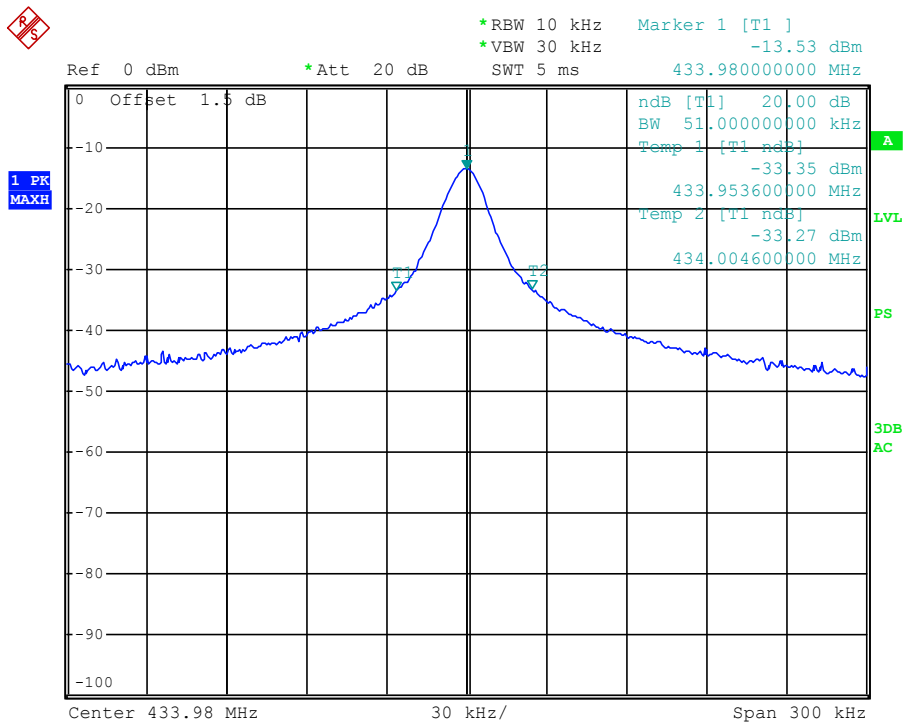
VBW > RBW.

### 5.4 Test protocol

Temperature : 22°C  
Relative Humidity : 52%

Channel	Emission Bandwidth (kHz)	Limit (kHz)
-	51.00	1084.8

Test wave:



Date: 18.JUL.2015 15:24:15

## 6 Conducted emission

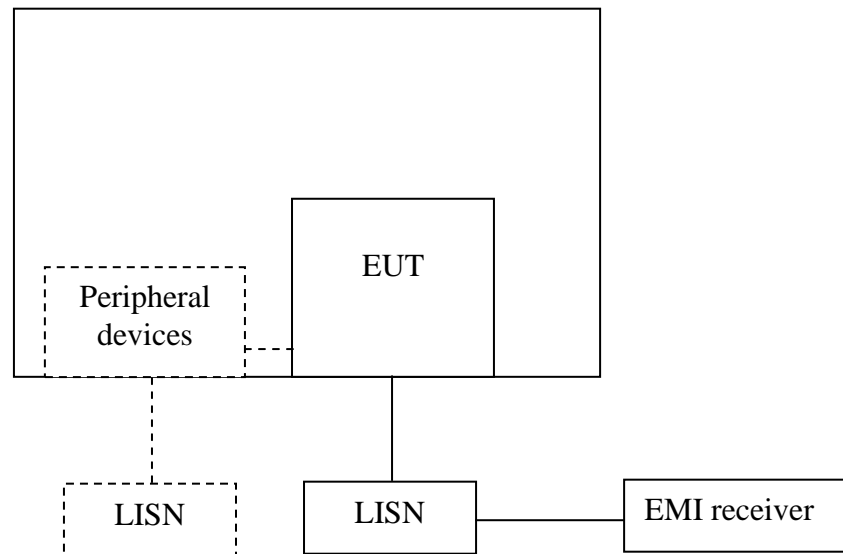
**Test result: Pass**

### 6.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### 6.2 Test configuration



For table top equipment, wooden support is 0.8m height table

For floor standing equipment, wooden support is 0.1m height rack.

### 6.3 Test procedure and test set up

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50  $\Omega$  LISN port (to which the EUT is connected), where permitted, terminated into a 50  $\Omega$  measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50  $\Omega$  measuring port is terminated by a measuring instrument having 50  $\Omega$  input impedance. All other ports are terminated in 50  $\Omega$  loads.

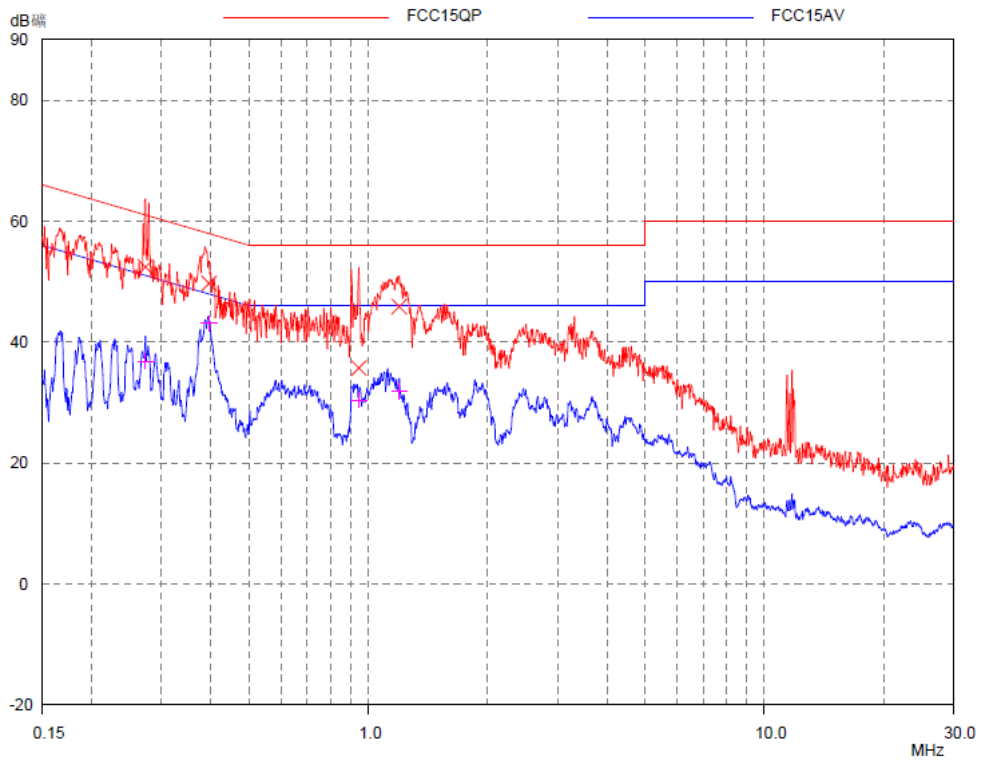
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

### 6.4 Test protocol

Temperature : 22 °C  
Relative Humidity : 52 %

#### L Line

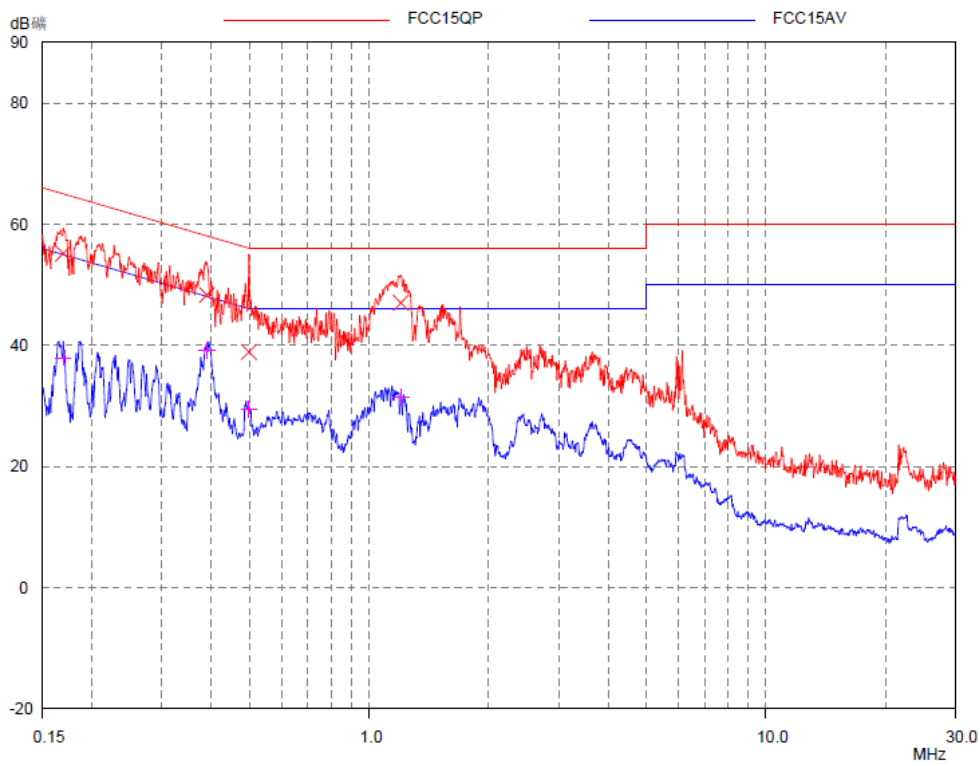


#### Test Data:

Frequency (MHz)	6.4.1.1.1 Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.273	52.43	61.03	8.60	36.81	51.03	14.22
0.396	49.70	57.94	8.24	43.13	47.94	4.81
0.945	35.71	56.00	20.29	30.40	46.00	15.60
1.196	45.87	56.00	10.13	31.84	46.00	14.16



### N Line



### Test Data:

Frequency (MHz)	6.4.1.1.1.2 Quasi-peak			Average		
	level dB(µV)	Limit dB(µV)	Margin (dB)	level dB(µV)	limit dB(µV)	Margin (dB)
0.169	55.17	65.01	9.84	37.95	55.01	17.06
0.389	48.33	58.08	9.75	39.22	48.08	8.86
0.497	38.92	56.05	17.13	29.41	46.05	16.64
1.200	47.01	56.00	8.99	31.47	46.00	14.53

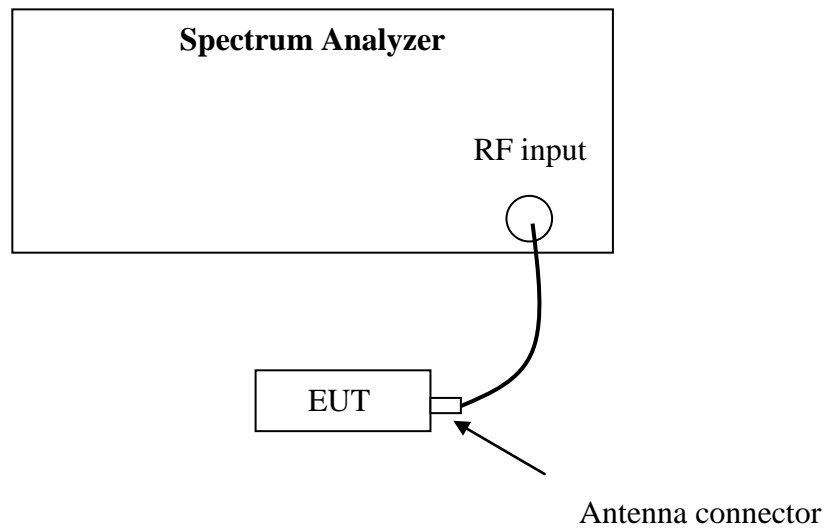
## 7 Occupied Bandwidth

**Test Status: Tested**

### 7.1 Test limit

None

### 7.2 Test Configuration



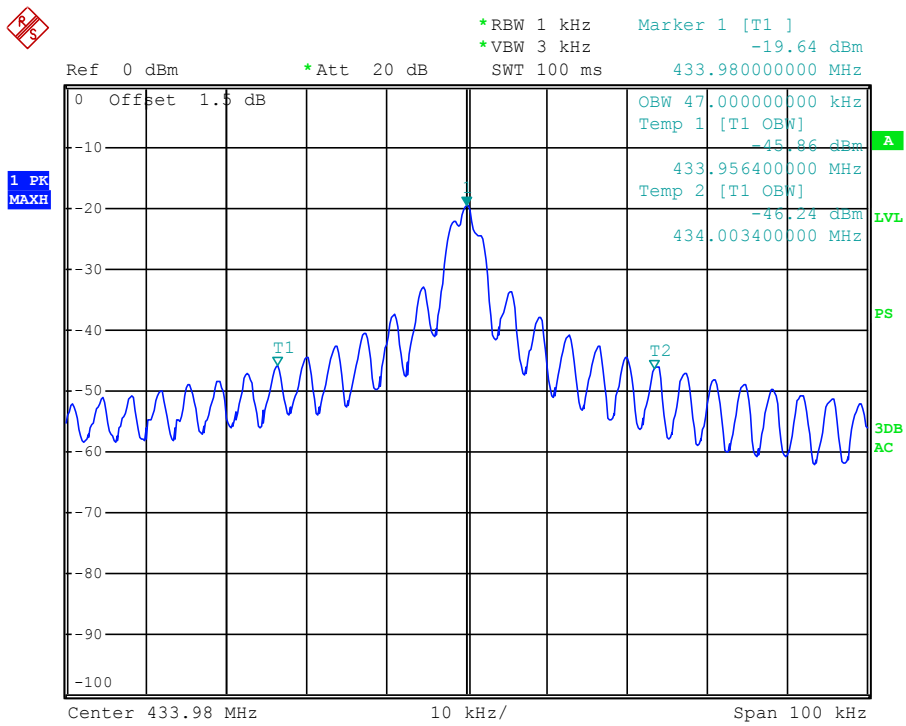
### 7.3 Test procedure and test setup

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

### 7.4 Test protocol

Temperature : 22 °C  
Relative Humidity : 52 %

Mode	Channel	99% Bandwidth (kHz)
-	-	47.00



Date: 18.JUL.2015 15:25:47