



# TEST REPORT

**Test Report No. : UL-RPT-RP11025775JD01D**

**Manufacturer** : EGATEL S.L.  
**Model No.** : Smart LNB  
**FCC ID** : 2AGKM820003-02  
**Test Standard(s)** : FCC Parts 15.107 & 15.109

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0.

**Date of Issue:** 01 March 2016

**Checked by:**

Sarah Williams  
Engineer, Radio Laboratory

**Company Signatory:**

Steven White  
Service Lead, Radio Laboratory,  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
performed in accordance with its terms  
of accreditation.

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## **1. Customer Information**

<b>Company Name:</b>	EGATEL S.L.
<b>Address:</b>	Av. Ourense, 1 Parque Tecnológico de Galicia 32901 Ourense Spain

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.107 and 47CFR15.109
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart B (Unintentional Radiators) – Sections 15.107 and 15.109
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	29 February 2016 to 01 March 2016

### 2.2. Summary of Test Results

FCC (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	✓
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	✓
<b>Key to Results</b>		
✓ = Complied		✗ = Did not comply

### 2.3. Methods and Procedures

<b>Reference:</b>	ANSI C63.4 (2014)
<b>Title:</b>	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.

### 2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	Egatel
<b>Model Name or Number:</b>	Smart LNB
<b>Test Sample Serial Numbers:</b>	311510061 (IDU) & 3115155009 (ODU)
<b>Hardware Version Number:</b>	820001.02.R03 (IDU) & 820002.02.R03 (ODU)
<b>Software Version Number:</b>	n25q064a_full_v0.3 (IDU) & s25fl512_full_v206F_v1.4_v0.2_v0.2 (ODU)
<b>FCC ID:</b>	2AGKM820003-02

<b>Brand Name:</b>	MOST Optoelectronics International Limited
<b>Description:</b>	AC to DC Adaptor
<b>Model Name or Number:</b>	M300200P911
<b>Serial Number:</b>	Not stated

#### **3.2. Description of EUT**

The equipment under test was an interactive satellite terminal operating in the Ku band using DSSS and burst transmission. The EUT comprised an outdoor unit (ODU) to be connected to the arm of a dish antenna and an indoor unit (IDU). The EUT was powered by an AC adaptor.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

#### **3.4. Additional Information Related to Testing**

<b>Type of Radio Device:</b>	Transceiver	
<b>Power Supply Requirement(s):</b>	Nominal	120 VAC

#### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Laptop Computer
<b>Brand Name:</b>	Lenovo
<b>Model Name or Number:</b>	L440
<b>Serial Number:</b>	R9-019EA0 14/04

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Receiver/Idle mode.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- A laptop computer was used to configure the EUT during testing using a browser based GUI. The laptop was connected to the IDU via Ethernet.
- The IDU and ODU were connected using an F type satellite coaxial cable provided by the customer.
- Testing was performed with the antenna port of the outdoor unit terminated into a  $50 \Omega$  load.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## 5.2. Test Results

### 5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions

#### Test Summary:

Test Engineer:	Nick Steele	Test Date:	29 February 2016
Test Sample Serial Numbers:	311510061 (IDU) & 3115155009 (ODU)		

FCC Reference:	Part 15.107
Test Method Used:	ANSI C63.4 Section 7

#### Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	33

#### Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Live	52.6	66.0	13.4	Complied
0.177	Live	47.4	64.6	17.2	Complied
0.461	Live	43.2	56.7	13.5	Complied
0.465	Live	43.1	56.6	13.5	Complied
3.737	Live	31.5	56.0	24.5	Complied
9.542	Live	35.6	60.0	24.4	Complied
13.691	Live	39.5	60.0	20.5	Complied

#### Results: Live / Average

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Live	38.1	56.0	17.9	Complied
0.461	Live	36.3	46.7	10.4	Complied
3.611	Live	24.6	46.0	21.4	Complied
3.696	Live	24.2	46.0	21.8	Complied
9.803	Live	28.3	50.0	21.7	Complied
13.470	Live	31.6	50.0	18.4	Complied

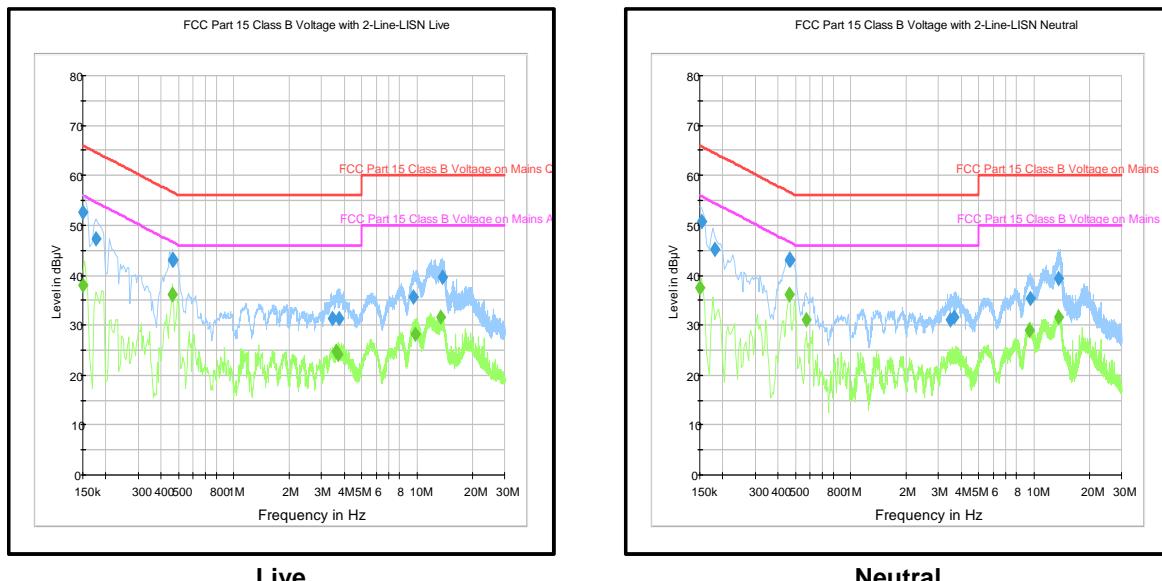
**Receiver/Idle Mode AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.155	Neutral	50.9	65.8	14.9	Complied
0.182	Neutral	45.1	64.4	19.3	Complied
0.465	Neutral	43.1	56.6	13.5	Complied
3.494	Neutral	31.1	56.0	24.9	Complied
3.674	Neutral	31.6	56.0	24.4	Complied
9.560	Neutral	35.4	60.0	24.6	Complied
13.610	Neutral	39.4	60.0	20.6	Complied

**Results: Neutral / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Neutral	37.5	56.0	18.5	Complied
0.461	Neutral	36.3	46.7	10.4	Complied
0.460	Neutral	36.2	46.7	10.5	Complied
0.573	Neutral	31.0	46.0	15.0	Complied
9.420	Neutral	28.9	50.0	21.1	Complied
13.515	Neutral	31.7	50.0	18.3	Complied

### **Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

#### **Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	16 Oct 2016	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	02 Mar 2016	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	27 Aug 2016	12
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	11 Jan 2017	12

**5.2.2. Receiver/Idle Mode Radiated Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	01 March 2016
<b>Test Sample Serial Numbers:</b>	311510061 (IDU) & 3115155009 (ODU)		

<b>FCC Reference:</b>	Part 15.109
<b>Test Method Used:</b>	ANSI C63.4 Section 8
<b>Frequency Range:</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

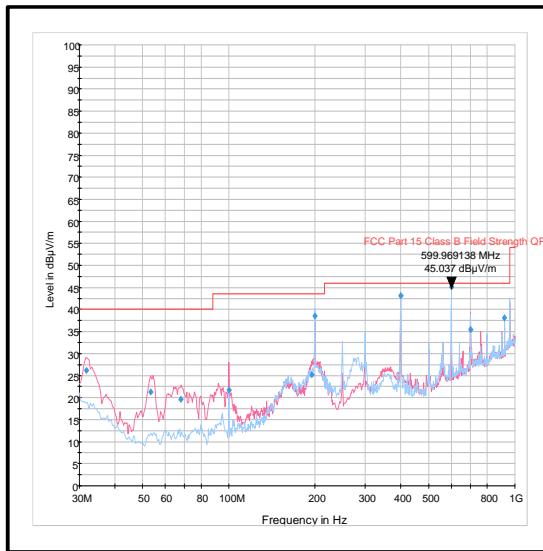
<b>Temperature (°C):</b>	21
<b>Relative Humidity (%):</b>	30

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
31.760	Vertical	26.1	40.0	13.9	Complied
53.284	Vertical	21.2	40.0	18.8	Complied
194.772	Vertical	25.2	43.5	18.3	Complied
199.987	Horizontal	38.5	43.5	5.0	Complied
399.952	Horizontal	43.2	46.0	2.8	Complied
599.969	Horizontal	45.0	46.0	1.0	Complied
699.952	Vertical	35.4	46.0	10.6	Complied
920.008	Horizontal	38.1	46.0	7.9	Complied

**Receiver/Idle Mode Radiated Spurious Emissions (continued)**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.*

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1623	Thermohygrometer	JM Handelpunkt	30.5015.13	0	11 Jan 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	19 Mar 2016	12
A1834	Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12
G0543	Amplifier	Sonoma	310N	230801	29 May 2016	3
A259	Antenna	Chase	CBL6111	1513	09 Apr 2016	12

**Receiver/Idle Mode Radiated Spurious Emissions (continued)****Test Summary:**

<b>Test Engineers:</b>	Nick Steele & David Doyle	<b>Test Dates:</b>	29 February 2016 & 01 March 2016
<b>Test Sample Serial Numbers:</b>	311510061 (IDU) & 3115155009 (ODU)		

<b>FCC Reference:</b>	Part 15.109
<b>Test Method Used:</b>	ANSI C63.4 Section 8
<b>Frequency Range:</b>	1 GHz to 12 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	24 to 25
<b>Relative Humidity (%):</b>	30 to 32

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Measurements were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

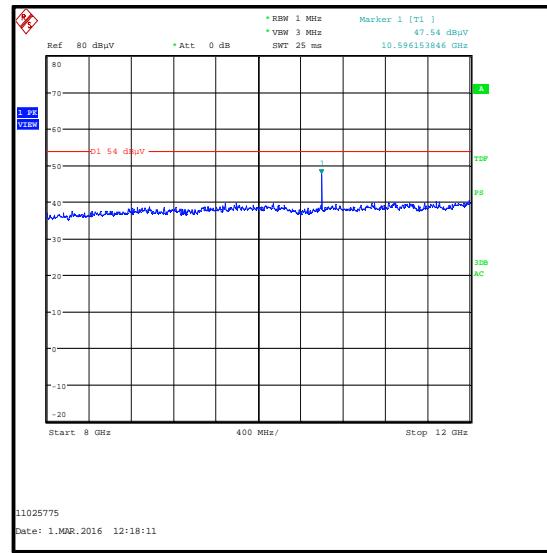
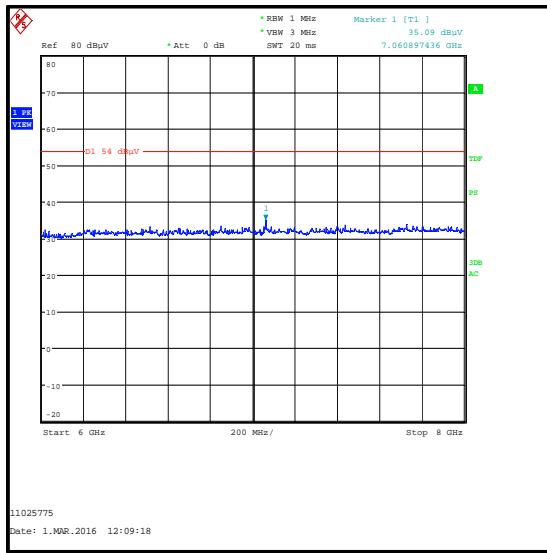
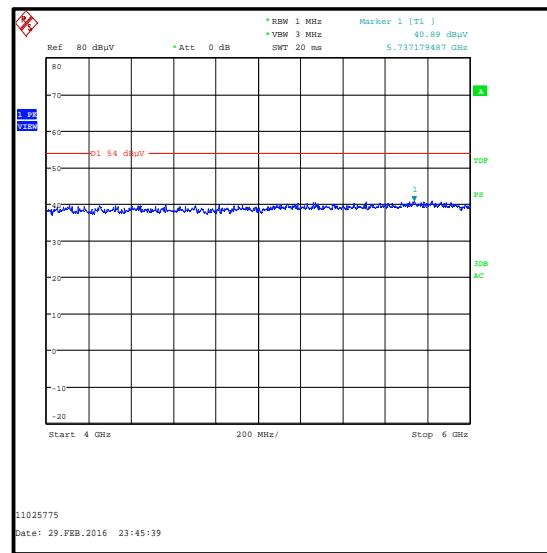
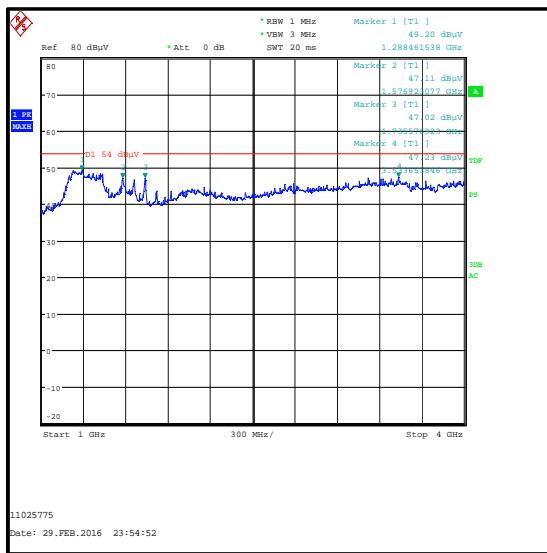
**Receiver/Idle Mode Radiated Spurious Emissions (continued)****Results: Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1279.971	Vertical	50.1	74.0	23.9	Complied
1288.994	Vertical	49.7	74.0	24.3	Complied
1576.980	Vertical	45.7	74.0	28.3	Complied
10593.854	Vertical	47.9	74.0	26.1	Complied

**Results: Average**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1279.971	Vertical	41.1	54.0	12.9	Complied
1288.994	Vertical	39.2	54.0	14.8	Complied
1576.980	Vertical	34.7	54.0	19.3	Complied
10593.734	Vertical	43.4	54.0	10.6	Complied

## Receiver/Idle Mode Radiated Spurious Emissions (continued)



## Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 May 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A253	Antenna	Flann Microwave	12240-20	128	17 Dec 2016	12
A254	Antenna	Flann Microwave	14240-20	139	17 Dec 2016	12
A255	Antenna	Flann Microwave	16240-20	519	17 Dec 2016	12

## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 6 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## **7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version

--- END OF REPORT ---