

RR-030-GTE-14-105103-1-A

"This report cancels and replaces the test report N°RR-030-GTE-14-105103-1-A Edition 0"

E.M.C Test Report

According to the standard:
FCC 47 CFR PART 15 : 2014

Equipment under test:
Musical instrument
DU-TOUCH
FCC ID: 2ADOS-DU-TOUCH


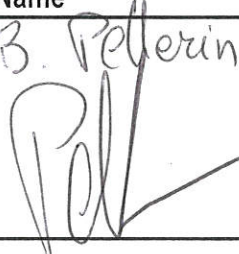
Company:
DUALO

FCC accredited: FR0004

DISTRIBUTION: Mr. MARDINIAN

(Company: DUALO)

Number of pages: 38 with 5 annexes

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TEST CERTIFICATION FOR: FCC Certification

NAME OF THE EQUIPMENT UNDER TEST: Musical instrument DU-TOUCH

Serial number (S/N): Prototype

NAME OF THE MANUFACTURER: DUALO

ADDRESS OF THE APPLICANT:

Company: DUALO

Address: Centre Commercial La Tour
93120 LA COURNEUVE
FRANCE

Person in charge: Mr. MARDINIAN

DATES OF TESTS: 2014, the 20th and the 21th of November

TESTS LOCATION: EMITECH Laboratory in Montigny – le- Bretonneux (78) -
FRANCE

TESTS OPERATORS: F. LHEUREUX and F. ROHRI

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1. INTRODUCTION

This document presents the results of Electromagnetic Compatibility tests performed on the equipment «Musical instrument DU-TOUCH» according to reference documents listed below.

2. REFERENCE DOCUMENTS

FCC 47 CFR Part 15: 2014

Code of Federal Regulations

Title 47- Telecommunication

Chapter 1- Federal Communication Commission

Part 15- Radio frequency devices

ANSI C63.4: 2003

Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

3. PRODUCT DESCRIPTION

Class:	B (residential environment)
Utilization:	<p>Musical instrument in a plastic shell, it is composed of 2 keyboard parts. During testing, the following cables are installed:</p> <ul style="list-style-type: none">- USB cable on charger AC/DC (120Vac/60Hz)- Line out Jack 6.35 cable- Headphone jack 3.5 cable- MiDi DIN out cable
Antenna type and gain:	Integral antenna: Not communicated.
Type of modulation:	F.S.K.
Operating frequency range:	from 2401 MHz to 2481 MHz
Choice of frequency:	<p>⇒ 2401 MHz Full tests (channel 1) ⇒ 2441 MHz Limited tests (channel 41) ⇒ 2481 MHz Full tests (channel 81)</p>
Number of channels:	80 (802.15.4)
Channel spacing:	1 MHz
Power source:	120 Vac / 60 Hz
Firmware application:	-
Modification of the equipment during the tests:	No.

4. TESTS AND CONCLUSION

The following table summarizes test results of the EUT.

Subpart B of the standard FCC 47 CFR part 15 – Unintentional radiators

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.107	Measurement of conducted emission on AC mains ports	X				
15.109	Radiated emission limits	X				
15.111	Antenna power conduction limits for receivers			X		

Subpart C of the standard FCC 47 CFR part 15 – Intentional radiators

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.203	Antenna requirement	X				
15.205	Restricted bands of operation	X				
15.207	Measurement of conducted emission on AC mains ports	X				
15.209	Radiated emission limits; general requirements	X				
15.212	Modular transmitters			X		
15.215	Additional provisions to the general radiated emission limitations					
	(a) Alternative to general radiated emission limits			X		
	(b) Unwanted emissions outside of § 15.249 frequency bands	X				
	(c) 20 dB bandwidth and band-edge compliance			X		
15.249	Intentional radiated emissions					
	a) Field strength fundamental + harmonics in the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz	X				
	b) Fixed point to point operation in the band 24.0-24.25 GHz			X		
	b) (1) Field strength			X		
	b) (2) Frequency tolerance for temperature variation and for variation voltage			X		
	b) (3) Gain antenna			X		
	c) Test at 3 m	X				
	d) Outside bands (spurious 50 dB or 15.209)	X				
	e) Possibility measurement in peak detector (> 1 GHz)	X				

N.A.: Not Applicable

N.P.: Not Performed

Conclusion:

The tested sample "**Musical instrument DU-TOUCH**" submitted to the tests complies with the requirements of the standard:

- FCC 47 CFR PART 15: 2014

according to the limits specified in this report.

5. CONDUCTED EMISSION

Standard: FCC 47 CFR Part 15: 2014

Section: 15.107 and 15.207

Test configuration:

Tested cable	Measure with	E.U.T. height
Power supply 120Vac/60Hz	L.I.S.N.	80 cm

Frequency band	Tested cables	Resolution bandwidth	Video bandwidth	Detection mode
150 kHz - 30 MHz	Power supply 120Vac/60Hz (Stand by mode)	10 kHz	30 kHz	Peak
150 kHz - 30 MHz	Power supply 120Vac/60Hz (Transmitter mode)	10 kHz	30 kHz	Peak
150 kHz - 30 MHz	Power supply 120Vac/60Hz (Transmitter mode)	9 kHz	30 kHz	Average

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
AC power source	CHROMA	6415	5331
Cable	-	N-2m	2812
Cable	-	N-2m	2813
Limiter	Hewlett Packard	11947A	1094
LISN	Rohde & Schwarz	ESH2-Z5	0326
Receiver	Rohde & Schwarz	FSP40 (V 4.00SP1-V3.0-10-2)	5175
Software	Nexio	BAT EMC v3.6.0.32	0000
Tests enclosure	Emitech	JD1	1804

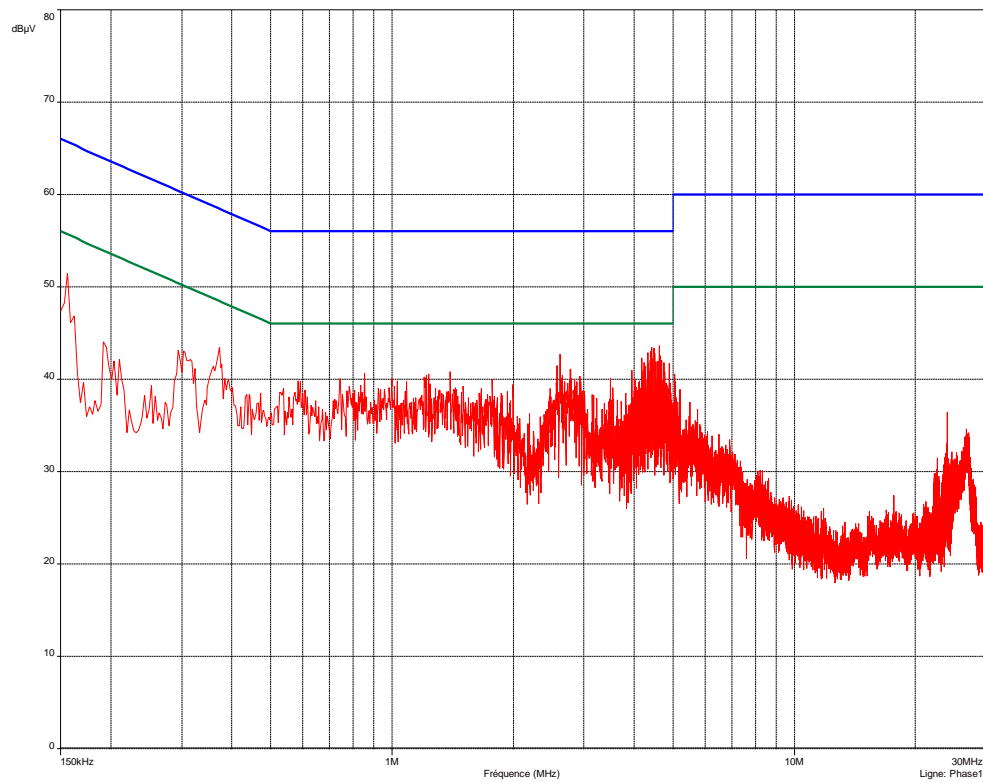
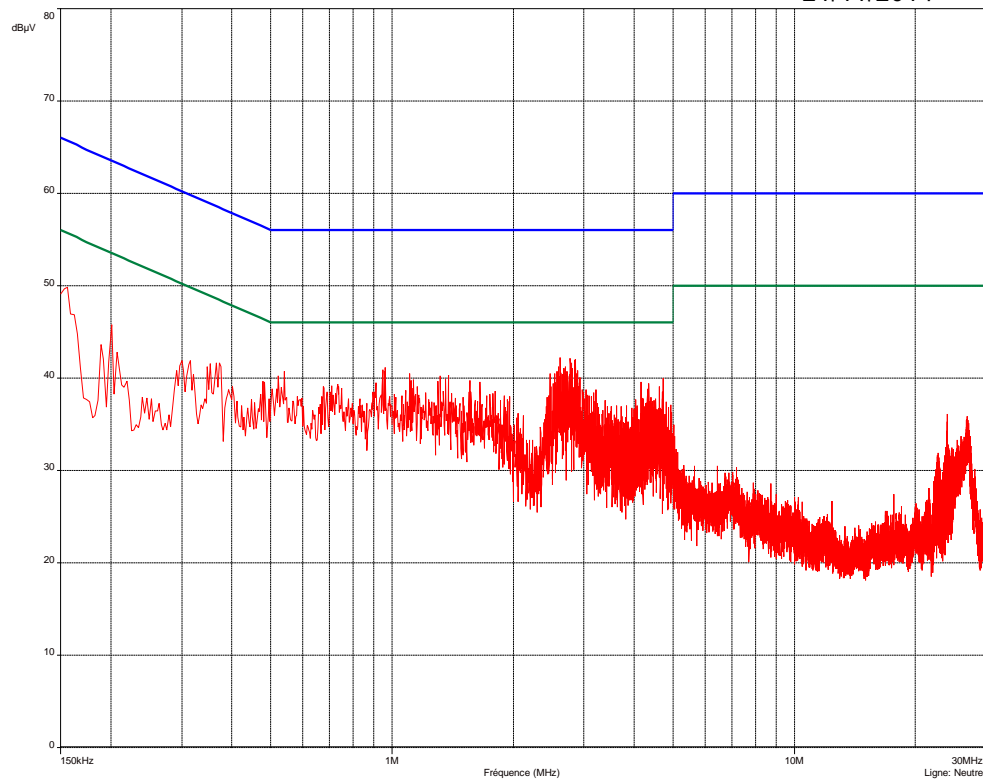
Results:

See curves hereafter. Limits and detections on the curves are peak (red), average (green) and quasi-peak (blue).

Curves 1 and 2

Conducted voltage emission (measurement): Power supply 120Vac/60Hz (Stand by mode) in Peak detection.

21/11/2014

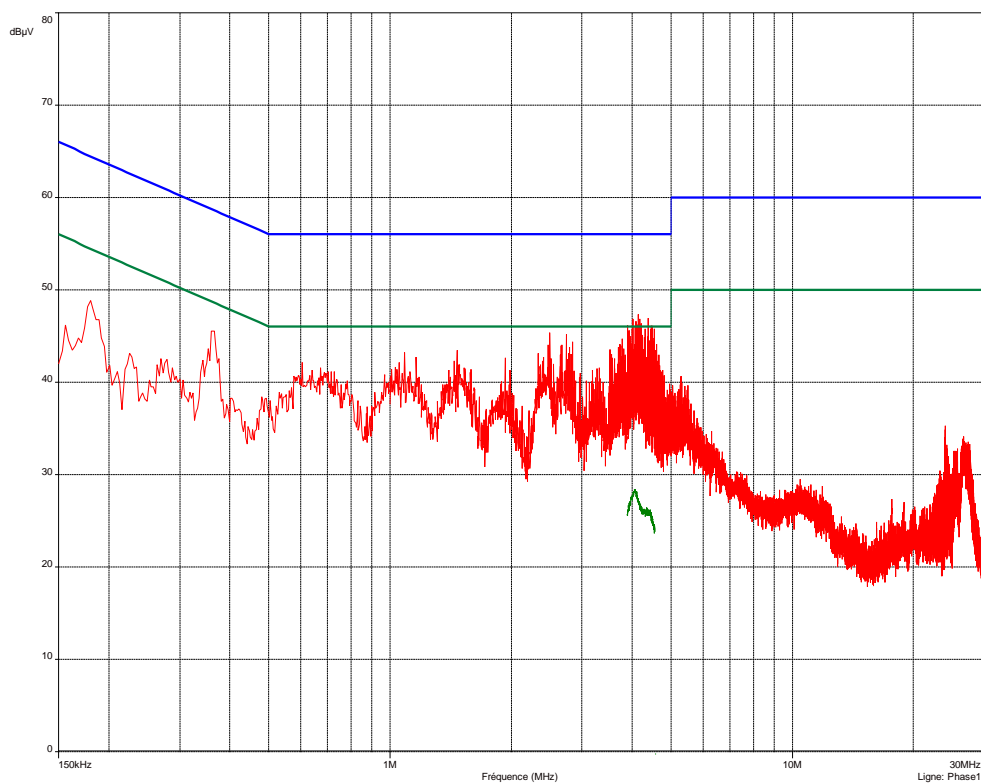
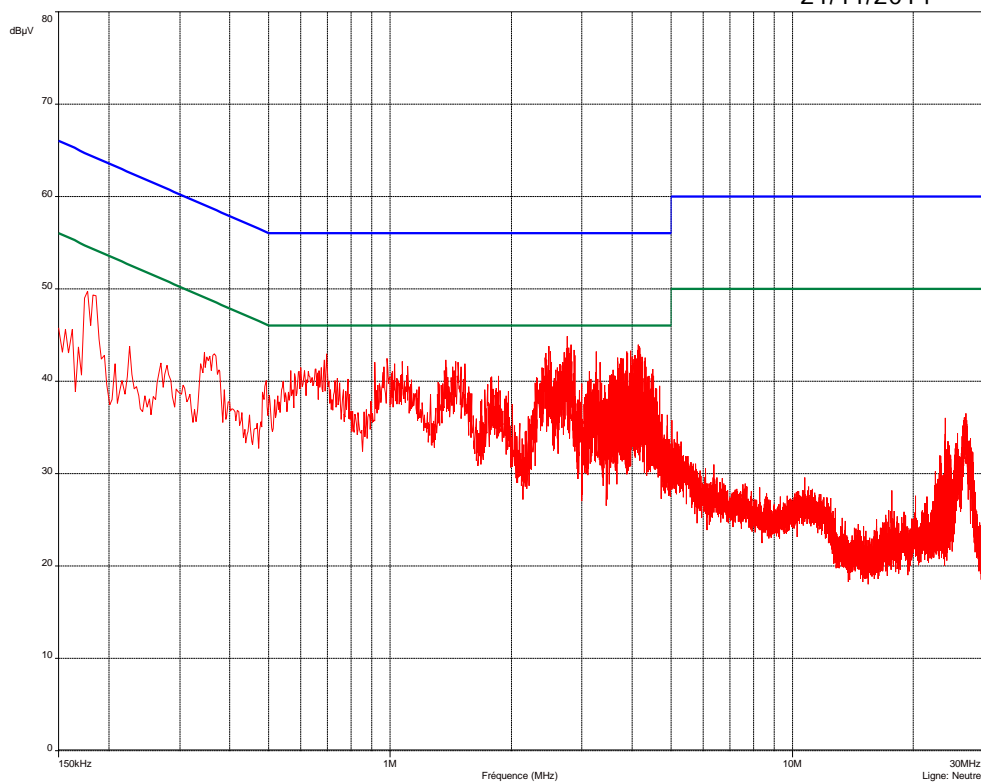


Class: B of the standard

Curves 3 and 4

Conducted voltage emission (measurement): Power supply 120Vac/60Hz (Transmitter mode) in Peak and Average detection.

21/11/2014



Class: B of the standard

6. INTENTIONAL RADIATED EMISSIONS

Standards: FCC 47 CFR PART 15: 2014

Sections: 15.249 (a)

Test configuration:

The system is tested in normalized site.

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The test unit is tested in three orthogonal planes and the final measures are performed in maximal position radiated level.

The level was maximised in antenna height, azimuth and polarization. The maximum level measured on the spectrum analyser was recorded.

Distance of antenna: 3 meters

Instrumentation test list:

CATEGORY	BRAND	TYPE	N° EMITECH
Antenna	Emco	3115	3374
Antenna mast	Maturo	AM 4.0-O	8411
Antenna mast	Maturo	MCU	8410
Cable	C&C	N-10m	11136
Cable	C&C	N-2m	11177
Cable	C&C	N-6m	11172
Cage de faraday	SIDT	C.4	0549
Receiver	Rohde & Schwarz	FSP40 (V 4.00SP1-V3.0-10-2)	5175

Equipment under test operating condition:

E.U.T. is in pulsed emission

Measure conditions:

Ambient temperature (°C): 22

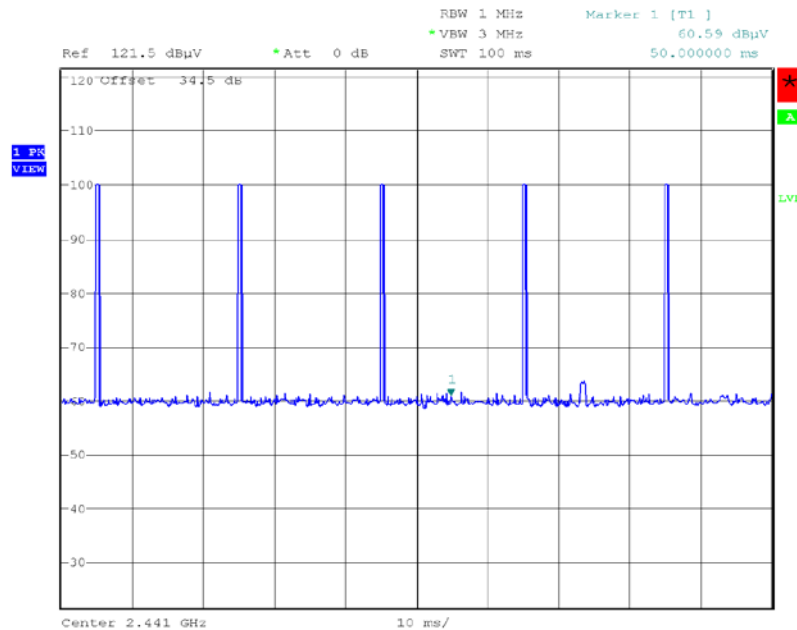
Relative humidity (%): 46

Resolution bandwidth: 1 MHz

Results:

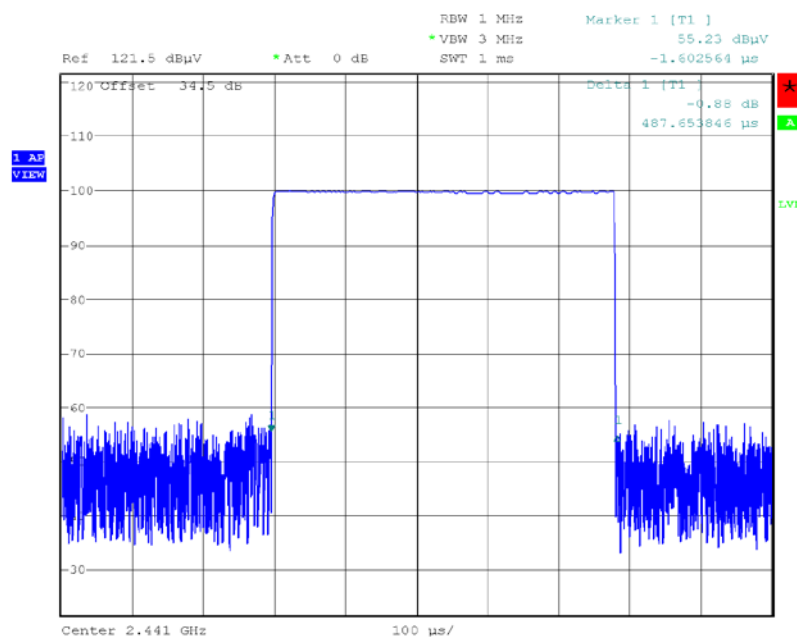
The device is not operating at 100 % duty cycle, then a peak measurement and a duty cycle correction factor is done to find the average value (as described in the FCC part 15 § 15.35 (c)).

Duty Cycle and application of the duty cycle correction factor:



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Figure 2 represents the packetized data transmission looking over a 100 ms period



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Figure 3 represents the time of a single pulse

The total on time over a 100 ms period then equals at:

Transmission On time per burst = 0.487 ms

Period = 100 ms

Total on time over 100 ms = 0.487ms x 5 = 2.435 ms

Duty Cycle Correction Factor = 20 log (2.435ms/100 ms)

Duty cycle Correction Factor = -32.27 dB

For 2401 MHz

Polarization of test antenna: Horizontal (height: 145 cm)

Position of equipment: Az: 172°

Power source: 120 Vac /60Hz

	Limit Peak dB μ V/m	Limit Average dB μ V/m
	114.0	94.0
Electro-magnetic field (dB μ V/m)	99.84	67.57

For 2441 MHz

Polarization of test antenna: Horizontal (height: 145 cm)

Position of equipment: Az: 172°

Power source: 120 Vac /60Hz

	Limit Peak dB μ V/m	Limit Average dB μ V/m
	114.0	94.0
Electro-magnetic field (dB μ V/m)	99.95	67.68

For 2481 MHz

Polarization of test antenna: Horizontal (height: 140 cm)

Position of equipment: Az: 172°

Power source: 120 Vac /60Hz

	Limit Peak dB μ V/m	Limit Average dB μ V/m
	114.0	94.0
Electro-magnetic field (dB μ V/m)	95.26	62.99

Test conclusion: Complies with the requirements of the standard.

7. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSIONS LIMITATION

Standard: FCC 47 CFR PART 15: 2014

Section: 15.109

Instrumentation test list:

CATEGORIE	MARQUE	TYPE	N° EMITECH
Antenna	SCHAFFNER	CBL 6143A	5647
Cable	C&C	N-10m	11136
Cable	Telegartner	N-11m	7405
Cable	-	N-2m	2788
Cable	-	N-2m	2881
Preamplifier	Mini-Circuits	ZFL-1000-LN	6368
Shielded enclosure	SIDT	C.4	0549
Antenna	Emco	3115	3374
AC power source	SCHAFFNER	NSG 1007-5-400	4637
Cable	C&C	N-2m	11176
Cable	C&C	N-2m	11177
Cable	C&C	N-6m	11172
Filter	Micro-tronics	HPM 14758	4691
Preamplifier	MITEQ	AFS42-00102650-42-10P-42	3229
Receiver	Rohde & Schwarz	FSP40 (V 4.00SP1-V3.0-10-2)	5175

Equipment under test arrangement:

The system is tested in normalized site (shielded enclosure N°4).

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

The test unit is tested in three orthogonal planes and the final measures are performed in maximal position radiated level.

Frequency range: from 30MHz to harmonic 5 (highest frequency used = 2481MHz).

Bandwidth: 120 kHz ($F < 1$ GHz)
1 MHz ($F > 1$ GHz)

Detection mode: Quasi-peak ($F < 1$ GHz)
Average ($F > 1$ GHz)

Distance of antenna: 3 meters.

Antenna height: 1 to 4 meters.

Antenna polarization: vertical and horizontal, only the highest level is recorded.

Operating mode during the test:

The E.U.T. is blocked in standby / reception mode.

Results:

Ambient temperature (°C): 22
Relative humidity (%): 46

Power source: 120Vac / 60Hz

FREQUENCY (MHz)	POLARIZATION	ANTENNA HEIGHT (cm)	AZIMUT (degrees)	MEASURE (dB μ V/m)	LIMIT (dB μ V/m)
84.400	Vertical	100	150	32.2	40
128.600	Vertical	100	340	34.5	43.5
240.000	Vertical	100	10	37.2	46
177.100	Horizontal	130	270	32.0	43.5
196.490	Horizontal	160	200	28.8	43.5
240.000	Horizontal	210	0	34.4	46

8. UNINTENTIONAL RADIATED EMISSIONS AND TRANSMITTER UNWANTED EMISSION IN THE BAND
9 KHz – 24.810 GHz

Standards: FCC 47 CFR PART 15: 2014

Sections: 15.205; 15.209 and 15.249

Equipment under test arrangement:

The equipment under test (EUT) is placed on a non-conductive test table at 0.8 m above the horizontal metal ground plane.

The test unit is tested in three orthogonal planes and the final measures are performed in maximal position radiated level.

For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization. The frequency azimuth and antenna height are presented in the table on the next pages.

The E.U.T. is in pulsed emission.

Frequency range: 9 kHz – 30 MHz
30 MHz - 1 GHz
1 GHz – 24.810 GHz

Detection mode: Quasi-peak for 9 kHz – 30 MHz
Quasi-peak for 30 MHz - 1 GHz
Average for 1 GHz – 24.810 GHz

Resolution bandwidth: 200 Hz for 9 kHz – 150 kHz
9 kHz for 150 kHz – 30 MHz
120 kHz for 30 MHz - 1 GHz
1 MHz for 1 GHz – 24.810 GHz

Measurement distance: 3 meters from 9 kHz to 24.810 GHz

- Limit for emission radiated outside the frequency band, except the harmonics, shall be attenuated by at least 50 dB below the level of fundamental or the general radiated emission limits in § 15.249 (see table).

From 9 kHz to 30 MHz

Frequency range	Limit $\mu\text{V/m}$	Measurement distance (meters)
9 – 490 kHz	$2400/F$ (F in kHz) *	300
490 – 1705 kHz	$24000/F$ (F in kHz)	30
1.705 – 30 MHz	30	30

* Limits in $\mu\text{V/m}$ can be extrapolated to 3 m using 20 dB / decade.

From 30 MHz to 24.810 GHz

Frequency range (MHz)	Limit		Measurement distance (meters)
	(dB $\mu\text{V/m}$)	$\mu\text{V/m}$	
30 to 88	40.0	100	3
88 to 216	43.5	150	3
216 to 960	46.0	200	3
Above 960	54.0	500	3

- Limit for field strength of harmonic: 54 dB $\mu\text{V/m}$ (500 $\mu\text{V/m}$)

Instrumentation test list:

CATEGORY	BRAND	TYPE	N° EMITECH
AC power source	SCHAFFNER	NSG 1007-5-400	4637
Antenna	SCHAFFNER	CBL 6143A	5647
Antenna	Emco	3115	3374
Antenna	EATON	96009/2	4713
Antenna	Oritel	CM 42/25	1045
Cable	C&C	N-10m	11136
Cable	Telegartner	N-11m	7405
Cable	-	N-2m	2788
Cable	-	N-2m	2881
Cable	C&C	N-2m	11176
Cable	C&C	N-2m	11177
Cable	C&C	N-6m	11172
Cable	C&C	K-2m	11132
Cable	C&C	K-2m	11133
Filter	Micro-tronics	HPM 14758	4691
Preamplifier	Mini-Circuits	ZFL-1000-LN	6368
Preamplifier	MITEQ	AFS42-00102650-42-10P-42	3229
Receiver	Rohde & Schwarz	ESRP7	10517
Receiver	Rohde & Schwarz	FSP40 (V 4.00SP1-V3.0-10-2)	5175
Shielded enclosure	SIDT	C.4	0549

Results:
For 2401 MHz

FREQUENCY (MHz)	POLARIZATION	ANTENNA HEIGHT (cm)	AZIMUT (degrees)	MEASURE (dBμV/m)	LIMIT (dBμV/m)	Δ (dB)
84.400	Vertical	100	150	32.2	40	7.8
128.600	Vertical	100	340	34.5	43.5	9
240.000	Vertical	100	10	37.2	46	8.8
4802.00	Vertical	100	180	19.1	54	34.9
7203.00	Vertical	120	180	27.9	54	26.1
177.100	Horizontal	130	270	32.0	43.5	11.5
196.490	Horizontal	160	200	28.8	43.5	14.7
240.000	Horizontal	210	0	34.4	46	11.6
4802.00	Horizontal	130	180	24.1	54	29.9
7203.00	Horizontal	130	180	27.0	54	27.0

For 2481 MHz

FREQUENCY (MHz)	POLARIZATION	ANTENNA HEIGHT (cm)	AZIMUT (degrees)	MEASURE (dBμV/m)	LIMIT (dBμV/m)	Δ (dB)
84.400	Vertical	100	150	32.2	40	7.8
128.600	Vertical	100	340	34.5	43.5	9
240.000	Vertical	100	10	37.2	46	8.8
4962	Vertical	150	180	19.6	54	34.4
7443	Vertical	150	180	30.8	54	23.2
177.100	Horizontal	130	270	32.0	43.5	11.5
196.490	Horizontal	160	200	28.8	43.5	14.7
240.000	Horizontal	210	0	34.4	46	11.6
4962	Horizontal	160	180	23.2	54	30.8
7443	Horizontal	160	180	27.8	54	26.2

Test conclusion:

The equipment complies with the requirements of the standards FCC.

« □□□ End of report, 5 annexes to be forwarded □□□ »

ANNEX 1

Antenna factors, insertion losses and amplifier values

BILL OF MATERIAL

The test antenna used for the radiated emission between 9 kHz and 30 MHz is the active loop antenna n°4713. Antenna factors are given in table 1.

The test antenna used for the radiated emission between 30 MHz and 1 GHz is the bi-log antenna n°5647. Antenna factors are given in table 2.

The measuring receiver n°10517 used in the frequency range 30 MHz to 1 GHz has an integrated preamplifier.

The spectrum analyzer n°5175 is used in the frequency range 1 GHz to 24.810 GHz.

The test cable used between 9 kHz and 30 MHz to connect the antennas to the receiver for measurements at a distance of 3 meters has losses given in table 3.

The test cable used between 30 MHz and 1 GHz to connect the antenna to the receiver for measurements at a distance of 3 meters has losses given in table 4.

The test antenna used for the radiated emission between 1 GHz and 18 GHz is the horn antenna n°3374. Factors are given in table 5.

The amplifier n°3229 used to connect the spectrum analyzer to the test cable has gain values given in the table 6.

The test cable used between 1 GHz and 18 GHz to connect the horn antenna to the amplifier for measurements at a distance of 3 meters has losses given in table 7.

The test antenna used for the radiated emission between 18 GHz and 24.810 GHz is the horn antenna n°1045. Factors are given in table 8.

The test cable used between 18 GHz and 24.810 GHz to connect the horn antenna to the amplifier for measurements at a distance of 3 meters has losses given in table 9.

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
0.009	26.3	9	9.8
0.01	25.6	10	9.7
0.015	22.8	11	9.6
0.02	21.0	12	9.5
0.03	18.7	13	9.4
0.05	15.4	14	9.3
0.08	12.8	15	9.2
0.1	11.8	16	9.1
0.15	10.5	17	9.0
0.2	9.9	18	8.8
0.3	9.7	19	8.7
0.5	9.7	20	8.5
0.8	9.9	21	8.3
1	10.0	22	8.1
1.5	10.1	23	7.9
2	10.1	24	7.7
3	10.0	25	7.4
4	10.0	26	7.2
5	10.0	27	6.9
6	9.9	28	6.5
7	9.9	29	6.1
8	9.8	30	5.6

TABLE 1 : ACTIVE LOOP ANTENNA

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
30	23.5	500	17.2
40	17.9	520	17.4
50	13.0	540	18.3
60	10.7	560	18.9
70	8.9	580	18.7
80	7.4	600	18.5
90	8.3	620	18.8
100	10.9	640	19.0
120	13.8	660	19.0
140	12.7	680	19.0
160	10.8	700	19.1
180	10.3	720	19.4
200	11.6	740	19.7
220	13.3	760	19.9
240	12.8	780	20.0
260	13.7	800	19.9
280	13.7	820	19.9
300	14.1	840	20.2
320	14.4	860	20.2
340	14.4	880	20.1
360	15.0	900	20.1
380	15.4	920	20.2
400	16.4	940	20.5
420	16.2	960	20.5
440	16.3	980	20.4
460	17.0	1000	20.6
480	17.2	-	-

TABLE 2 : BI-LOG ANTENNA

Frequency (MHz)	loss (dB)	Frequency (MHz)	loss (dB)
0.009	0.00	6.000	0.32
0.020	0.00	7.000	0.34
0.050	0.00	8.000	0.36
0.100	0.00	9.000	0.38
0.500	0.09	10.00	0.40
1.000	0.13	15.00	0.50
2.000	0.18	20.00	0.58
3.000	0.22	25.00	0.65
4.000	0.26	30.00	0.71
5.000	0.29	-	-

 TABLE 3 : TEST CABLE FOR 3M MEASUREMENT INTO 9 kHz
 AND 30 MHz

Frequency (MHz)	loss (dB)	Frequency (MHz)	loss (dB)
30	0.71	250	2.08
40	0.80	300	2.32
50	0.90	400	2.71
60	0.99	500	3.07
70	1.09	600	3.40
80	1.15	700	3.69
90	1.22	800	4.00
100	1.29	900	4.26
150	1.58	1000	4.51
200	1.86	-	-

TABLE 4 : TEST CABLE FOR 3M MEASUREMENT INTO 30 MHz
AND 1 GHz

Frequency (GHz)	Antenna factor (dB/m)	Frequency (GHz)	Antenna factor (dB/m)
1.0	23.700	10.0	37.600
1.5	25.000	10.5	37.800
2.0	27.500	11.0	38.100
2.5	28.800	11.5	38.300
3.0	29.800	12.0	38.800
3.5	31.200	12.5	38.800
4.0	32.500	13.0	39.400
4.5	32.500	13.5	40.000
5.0	33.500	14.0	40.100
5.5	34.100	14.5	40.600
6.0	34.100	15.0	40.600
6.5	34.400	15.5	39.700
7.0	35.400	16.0	39.300
7.5	36.600	16.5	39.900
8.0	36.600	17.0	41.400
8.5	37.000	17.5	45.100
9.0	37.100	18.0	46.300
9.5	37.200	-	-

TABLE 5 : HORN ANTENNA

Frequency (GHz)	Gain value (dB)	Frequency (GHz)	Gain value (dB)
1.0	33.422	13.5	32.547
1.5	33.647	14.0	31.598
2.0	33.928	14.5	31.941
2.5	33.947	15.0	32.979
3.0	33.967	15.5	32.854
3.5	34.127	16.0	33.420
4.0	34.229	16.5	33.338
4.5	34.715	17.0	33.742
5.0	35.174	17.5	34.107
5.5	35.098	18.0	34.287
6.0	34.629	18.5	34.700
6.5	34.295	19.0	34.400
7.0	33.914	19.5	33.500
7.5	33.729	20.0	32.900
8.0	33.897	20.5	32.700
8.5	32.951	21.0	33.200
9.0	31.877	21.5	34.600
9.5	31.070	22.0	34.300
10	30.488	22.5	35.300
10.5	30.666	23.0	34.600
11	30.972	23.5	34.600
11.5	31.326	24.0	34.400
12	32.371	24.5	35.100
12.5	32.893	25.0	34.500
13	32.541	-	-

TABLE 6 : AMPLIFIER GAIN VALUE

Frequency (GHz)	loss (dB)	Frequency (GHz)	loss (dB)
1.0	4.45	10.0	8.93
1.5	5.46	10.5	9.09
2.0	6.27	11.0	9.28
2.5	7.09	11.5	9.60
3.0	4.82	12.0	9.83
3.5	5.18	12.5	10.18
4.0	5.53	13.0	10.51
4.5	5.91	13.5	10.33
5.0	6.19	14.0	10.41
5.5	6.47	14.5	11.32
6.0	7.06	15.0	11.72
6.5	7.42	15.5	11.66
7.0	7.72	16.0	11.65
7.5	8.01	16.5	11.84
8.0	8.09	17.0	12.15
8.5	8.39	17.5	12.54
9.0	8.67	18.0	12.44
9.5	8.74	-	-

TABLE 7: TEST CABLE FOR 3M MEASUREMENT INTO 1 TO 18 GHz

Frequency (GHz)	Antenna factor (dB/m)	Frequency (GHz)	Antenna factor (dB/m)
18.0	31.510	22.0	32.430
18.5	31.760	22.5	32.690
19.0	31.940	23.0	33.180
19.5	32.070	23.5	33.080
20.0	32.200	24.0	33.210
20.5	32.440	24.5	33.330
21.0	32.460	25.0	33.320
21.5	32.370	-	-

TABLE 8 : HORN ANTENNA

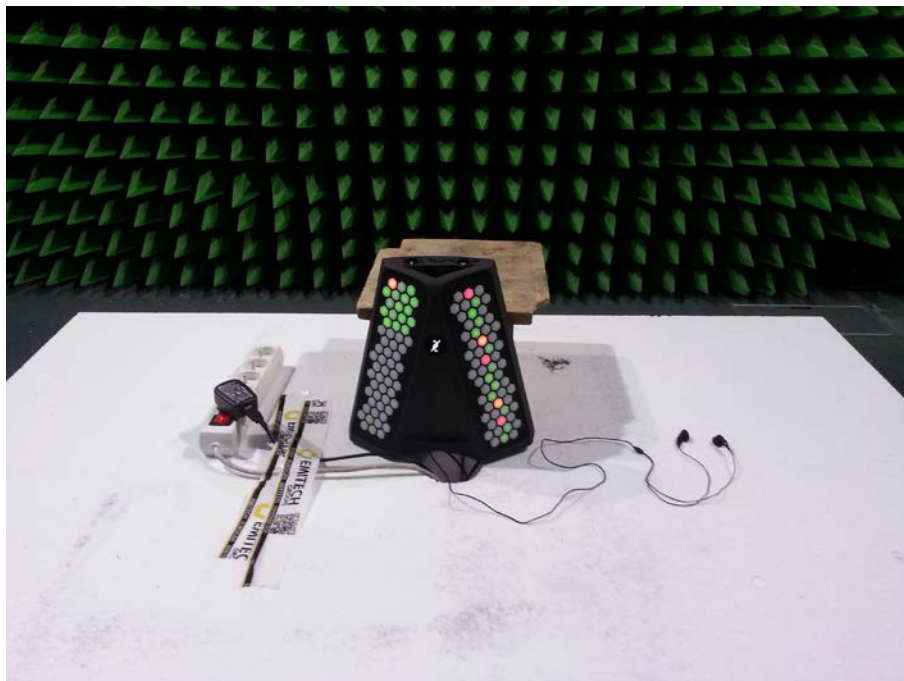
Frequency (GHz)	loss (dB)	Frequency (GHz)	loss (dB)
18	7.59	22	8.31
18.5	7.59	22.5	8.31
19	7.65	23	8.47
19.5	7.65	23.5	8.47
20	7.87	24	8.65
20.5	7.87	24.5	8.65
21	8.13	25	8.85
21.5	8.13	-	-

TABLE 9: TEST CABLE FOR 3M MEASUREMENT INTO 18 TO 24.410 GHz

ANNEX 2

External photographs

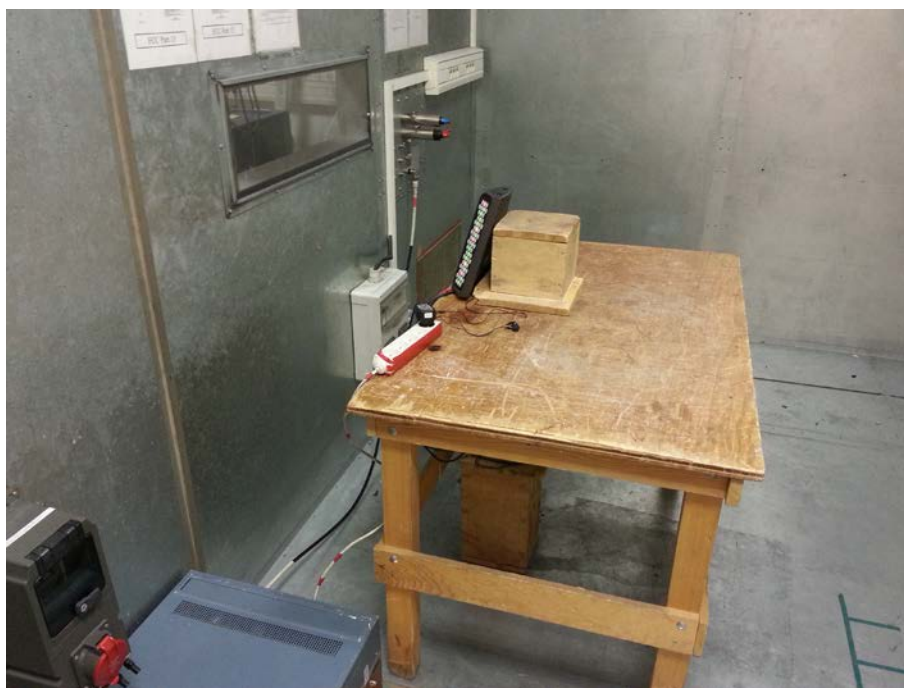
Musical instrument DU-TOUCH



ANNEX 3

Test setup photographs

Conducted emission



Radiated emission



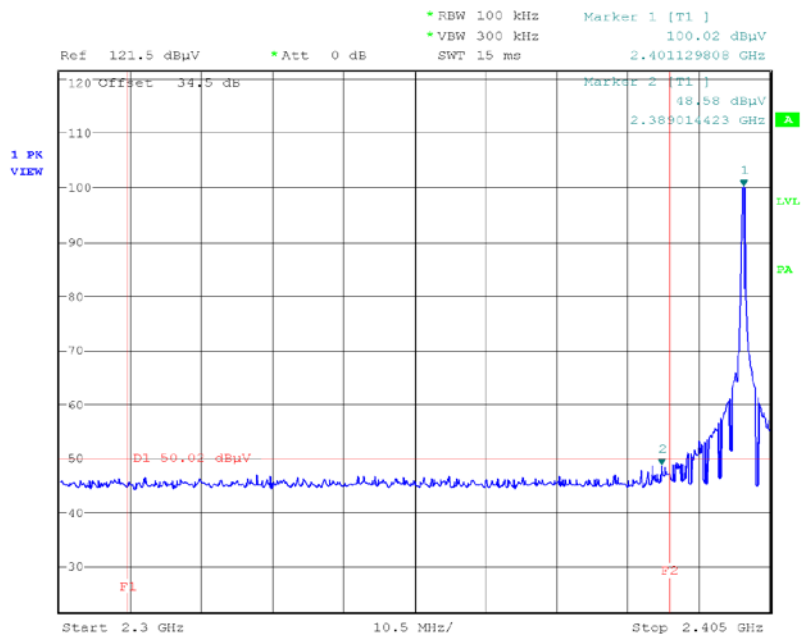




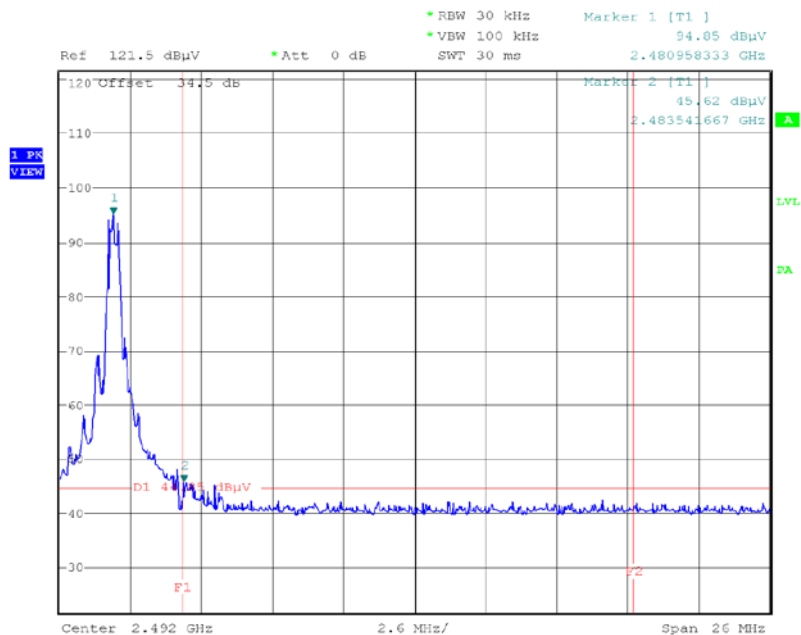
ANNEX 4

Band Edge

Musical instrument DU TOUCH



Date: 21.NOV.2014 08:58:21



Date: 21.NOV.2014 09:34:15

At 2.48 GHz, the level is of 45.62dBμV/m in peak detection for a limit at 44.8dBμV/m (fundamental level-50dB), but the limit of 54dBμV/m in average detection in according to the standard is respected.

ANNEX 5

Calibration dates

N° EMITECH	LAST CALIBRATION	CALIBRATION DUE DATE
0549	15/10/12	15/10/15
5175	23/06/14	23/06/16
10517	18/09/14	18/09/16
11177	28/03/14	28/03/16
2881	24/05/14	24/05/16
11136	10/03/14	10/03/16
2788	12/03/13	12/03/15
11176	28/03/14	28/03/16
6368	09/10/14	09/10/15
3229	04/02/14	04/02/15
4691	15/03/13	15/03/15
7405	06/01/14	06/01/16
11172	28/03/14	28/03/16
11132	10/03/14	10/03/16
11133	10/03/14	10/03/16
1045	13/12/10	13/12/14
4713	11/02/14	11/02/16
5647	25/02/13	25/02/17
3374	08/02/12	08/02/16
5331	22/09/14	22/09/15