REPORT

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The test site complies with RSS-Gen,
IC file no: 10247A-1

Date	Reference	Page
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Equipment Authorization measurements on 3PUSH+PEAR Transceiver Unit
FCC ID: 2AGLF1123001

(10 appendices)

5P07850-4 rev. 1 supersedes 5P07850-4 issued 2015-12-30.

Changes: Editorial and added information regarding EUT and test selection.

Test object

Product name: 3PUSH+PEAR
Product number: NE10 11230-04
Serial number: 001620 and 001622
Manufacturer: NEAT Electronics AB

Summary

See Appendix 1 for general information and Appendix 10 for photos.
Emission measurements as specified below have been performed.

Standard	Compliant	Appendix	Remarks
FCC 47 CFR Part 15 C 15.249 Operation within the band 902-928 MHz	**Yes**		
IC RSS-210, Issue 8, November 2014/ **IC RSS-Gen Issue 4 November 2014** Operation within the band 902-928 MHz	**Yes**		
Duty cycle measurements	N/A	2	Note 1
15.249 (a) / RSS-210 A2.9(a) Field strength of fundamental	**YES**	3	
15.249 (d) (e) / RSS-210 A2.9(b) Radiated emission	**YES**	4	
15.215 (c) 20 dB bandwidth	**YES**	5	
15.207 / RSS-Gen 8.8 AC Conducted emission	**YES**	6	
2.1049 / RSS-Gen 6.6 Occupied bandwidth	**YES**	7	
2.1049 / RSS-210 A2.9(b)/RSS-Gen 8.10 Band Edge	**YES**	8	
2.1093 / RSS-102 2.5.2 RF Exposure	**YES**	9	

Note 1: No duty cycle could be measured, as the EUT was set to continuous transmission (100% duty cycle) and with normal modulation.

SP Technical Research Institute of Sweden
Electronics - EMC

Performed by

Søren Søltoft

Examined by

Kennet Palm

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Performance test and requirements

The tests were performed to verify that 3PUSH+PEAR PN: NE10 11230-04 meets the electromagnetic compatibility requirements of FCC 47 CFR part 15 C and IC RSS-Gen/RSS-210.

Test facility

The used semi anechoic chamber is compliant with the requirements of section 2.948 of the FCC rules and listed, registration number 589866, as a facility accepted for certification under parts 15 and 18. The site complies with RSS Gen and is accepted by Industry Canada for the performance of radiated measurements, IC-file number10247A-1.

Test object

3PUSH+PEAR is judge to be worst case item in a range of variants.
The variations is described by Neat Electronic as follows:

"The PCB for 3PUSH+PEAR are made in two versions.
The two versions are identical and differ only in the respect whether the 6.5 mm stereo plug contact is mounted or depopulated. This stereo plug is only used for controlling a simple on/off switch and is "Minor circuitry for non-transmitter portions".

From these two PCB versions, eleven different products are made.
These product variants are done for commercial reasons.
These products differ only in respect (also see User's manual, which refers to the configuration software) :

1. The plastic cover. The plastic cover is basically identical and all versions are made in the same mould. They differ only in the number of button push buttons and if the 6.5 mm stereo plug contact is mounted or not.
Thus the covers goes from 3PUSH+PEAR version which as three push buttons and the stereo contact mounted, to WIOR which is only a flat plastic cover without holes.

2. Configuration of the functions of the firmware. The firmware is the same for different products, but functions can be turned on and off depending on model.

3. Added logic into firmware. Some products has added logic, so instead of acting on one input creating an output, they can combine input from several sensors to decide a specific output.

FCC ID: 2AGLF1123001 Appendix 1

From the two versions of the PCB, the versions of plastic covers and the firmware with and without logic, 11 different products are manufactured and sold:

PCB with stereo plug, basic logic	*product number*
PEAR	*NE10 11204-04*
PUSH+PEAR	*NE10 11208-04*
KEY	*NE10 11016-04*
3PUSH+PEAR	*NE10 11230-04*
PCB with stereo plug depopulated, basic logic	
WIOR	*NE10 11012-04*
PULL	*NE10 11211-04*
PUSH	*NE10 11206-04*
PUSH+PULL	*NE10 11217-04*
3PUSH	*NE10 11228-04*
PCB with stereo plug, logic	
ROOM+PEAR	*NE10 11213-04*
PCB with stereo plug depopulated, logic	
ROOM	*NE10 11212-04"*

Transceiver unit:	3PUSH+PEAR
Antenna connector	None
Antenna:	Internal
Antenna gain:	Unknown
Transmit frequencies:	916.2125 MHz, 916.2375 MHz, 916.4375 MHz
Receive frequencies:	916.2125 MHz, 916.2375 MHz, 916.4125 MHz
Frequencies used during test:	Transmit: 916.2375 MHz Receive: 916.2125 MHz
Modulation:	GFSK
Data rate:	2.4 kbit/s Manchester (4.8 kbit/s in air)
Power supply:	Battery or DC power
Battery type:	AAA
Software	Test software

During the test the EUT was powered by a AC/DC adaptor: mascot, P/N: 9725 which was placed next to the EUT on the table. The AC/DC adaptor was powered by an amplifier model STA-3000, controlled by a oscillator model B&O TG7 to deliver 120 VAC 60 Hz. The AC/DC-adapter was powered by 120 VAC/60 Hz. The voltage and frequency were measured with a calibrated multimeter Hewlett Packard 34401A.
The STA 3000, B&O TG7 and the Hewlett Packard 34401A were placed outside the anechoic chamber during the test.

All test except Radiated emission were performed on S/N 001622.
Radiated emission were performed on S/N 001620 which was modified by client to meet requirements. The modifications is judged to have no effect on previous performed tests.

Measurement equipment

Description	Model	ID tag	Cal. due
Analyzer 20Hz-26.5GHz	ESI	20763	2016-09-16
Antenna, Broadband, 30MHz-3GHz	HL562	19830	2016-04-25
Antenna Horn 1 – 18 GHz	BBHA 9120 D	20031	2016-01-10
Antenna Log Per 0.3 - 1 GHz	3148	50023	2016-04-15
Multimeter	34401A	14880	2016-02-25
Multimeter	34401A	14885	2016-06-12
Analyzer 20Hz-26.5GHz	ESIB 26	18880	2016-08-26
V-network Two Line	ESH3-Z5	13935	2016-09-11

Operational test mode
Frequency range is less than 1 MHz, thus only one channel 916.2375 MHz was tested

The test was performed with continuous transmission (100 % duty cycle) and with normal modulation.

The level of the radiated carrier was 0.2 dB lower measured with a RMS detector compared to a measurement with a Quasi peak detector.

Ancillary and/or support equipment
AC/DC adaptor: mascot, P/N: 9725

Cabling during emission test:

EUT port	Cable type	Termination
DC input	4-wire, unshielded, 2 m length.	Mascot adaptor P/N: 9725r
6.5 mm jack socket	2-wire unshielded, 1.6 m length	Neat Push button

Test support equipment

Description	Supplier	Model	ID tag
Oscillator 10Hz-1MHz	B&O	TG7	11199
Multimeter	Hewlett Packard	34401A	14880
Multimeter	Hewlett Packard	34401A	14885
Audio power amplifier	img Stage Line	STA-3000	50027

Uncertainties

	Frequency [MHz]	Polarization	Expanded Uncertainty [dB] (k=2)
Radiated Emission AEC 30 - 3000 MHz	30 - 200	Vertical	**4.73**
(CISPR 16-4)	200 - 3000	Vertical	**4.97**
HL562 Antenna	30 - 200	Horizontal	**4.72**
	200 - 3000	Horizontal	**5.08**
Radiated Emission AEC 1 - 18 GHz	1000 - 18000	Vertical	**3.76**
(CISPR 16-4)	1000 - 18000	Horizontal	**3.77**
Conducted emission	0.01 - 30		**3.44**

Compliancy evaluation is based on a shared risk principle with respect to the measurement uncertainty.

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered: 2015-11-10 and 2015-11-27.

Test engineers
Søren Søltoft

Duty cycle measurements

No duty cycle could be measured, as the EUT was set to continuous transmission (100 % duty cycle) and with normal modulation.

Field strength of fundamental measurements according to FCC 47 CFR part 15.249 (a) / RSS-210 A2.9 (a)

Date	Temperature	Humidity
2015-12-01	22°C ± 3 °C	45% ± 5 %
2016-03-10	21°C ± 3 °C	46% ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.10-2013.

The test was performed with continuous transmission (100 % duty cycle) and with normal modulation.

The radiated maximum peak output power measurements were performed in the semi-anechoic chamber.
The fundamental was scanned with peak detector with the antenna height 1-4 m and the turntable was varied between 0-360 degrees for maximum response. The antenna distance during the measurements was 3.0 m.
The EUT height above the reference ground plane was 0.8 m.
Final measurement was performed with detector according to the FCC rules.

Test set-up photos during the tests can be found in Appendix 10.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESI	20763
Antenna, Ultra Broadband, 30MHz-3GHz	Rohde&Schwarz	HL562	19830

Results

Field strength of fundamental measurements:
RBW= 120 kHz

		Max peak radiated output power Quasi-peak detector		
		916.2375 MHz	916.2375 MHz	916.2375 MHz
	EUT axis	X	Y	Z
	Antenna height	1.50 m	1.50 m	1.50 m
	Azimuth	329 deg	229 deg	335 deg
	Polarization	Horizontal	Horizontal	Horizontal
T_{nom} 22°C	V_{nom} V DC Note 1	90.8 dBµV/m	88.8 dBµV/m	93.5 dBµV/m

Note 1: According 47CFR 15.31(e), for intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Fundamental frequency: 916.2375 MHz	Supply voltage	Max Peak level
85 % of Nominal supply voltage	102 VAC	85.91 dBµV
Nominal supply voltage	120VAC	85.93 dBµV
115% of Nominal supply voltage	138 VAC	85.93 dBµV

The measurement of Max peak level were measured directly on the analyser without any correction for path or antenna factors. The EUT and antenna were in a fixed position during the change in supply voltage.

Limits

According to 47CFR 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

According to RSS-210 A2.9 (a), the field strength measured at 3 meter shall not exceed the following:

Fundamental Frequency	Field strength of fundamental
902-928 MHz	50 mV/m = 94 dBµV/m

Complies?	Yes

Radiated emission measurements according to FCC 47 CFR part 15.249 (d) (e) / RSS 210-210 A2.9 (b)

Date	Temperature	Humidity
2015-12-01	22°C ± 3 °C	45% ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.10-2013.

The test was performed continuous transmission (100% duty cycle) and with normal modulation.

The test of radiated emission was performed in a semi anechoic chamber. The measurements were performed with both horizontal and vertical polarizations of the antenna. The antenna distance during the measurements was 3.0 m.
The EUT height above the reference ground plane was 0.8 m in the frequency range 30-1000 MHz and 1.5 m in the frequency range 1-10 GHz.

The measurement procedure is as follows:

The pre-measurement were performed both with battery and external DC supply to identify the worst case. The measurements were performed with the EUT vertical and horizontal.

1. A pre-measurement is performed with peak detector. The test object is measured in eight directions with the antenna in the frequency range 30-1000 MHz and in eighteen directions at frequencies above 1 GHz, with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.

2. If the emission is close or above the limit during the pre-measurement, the test object is scanned 360 degrees and the antenna height scanned from 1 to 4 m for maximum response. Then the emission is measured with the quasi-peak detector on frequencies below 1 GHz and with the CISPR-average detector above 1 GHz.

The following RBW were used:
30 MHz-1 GHz: RBW=120 kHz
1-10 GHz: RBW=1 MHz

Test set-up photos during the tests can be found in Appendix 10.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESI	20763
Antenna, Ultra Broadband, 30MHz-3GHz	Rohde&Schwarz	HL562	19830
Antenna Horn 1 – 18 GHz	Schwarzbeck	BBHA 9120 D	20031

Results

The pre-measurement emission spectra can be found in the diagrams below:

Diagram 1:	Ambient, 30-1000 MHz vertical and horizontal polarization
Diagram 2:	Ambient, 1-3 GHz vertical and horizontal polarization
Diagram 3:	Ambient, 3-10 GHz vertical and horizontal polarization
Diagram 4:	30-1000 MHz, vertical and horizontal polarization
Diagram 5:	1-3 GHz, vertical and horizontal polarization
Diagram 6:	3-10 GHz, vertical and horizontal polarization

The highest detected levels during the final measurement in the frequency range 30 MHz-10 GHz are listed in the tables below.

Frequency (MHz)	QP level (dBµV/m)	CAV level (dBµV/m)	Peak level (dBµV/m)	EUT orint.	Limit (dBµV/m)	Height (m)	Azimuth (deg)	Polarization
687.6966	**29.2**	N/A	N/A	V	46.0	1.00	235	Horizontal
805.6632	**31.5**	N/A	N/A	V	46.0	1.00	209	Horizontal
1832.4988	N/A	**47.5**	**49.7**	V	54.0	1.89	252	Vertical
1832.5988	N/A	**41.9**	**46.1**	H	54.0	2.27	122	Vertical
3664.8012	N/A	**43.4**	**46.1**	V	54.0	1.50	11	Horizontal
4581.0503	N/A	**39.3**	**43.5**	V	54.0	1.50	194	Vertical
7330.0138	N/A	**39.8**	**46.2**	V	54.0	1.53	26	Vertical
3665.0161	N/A	**40.0**	**43.6**	H	54.0	1.50	347	Horizontal
4581.4503	N/A	**35.5**	**41.4**	H	54.0	1.50	17	Vertical
7330.0138	N/A	**37.2**	**45.0**	H	54.0	2.39	154	Vertical

Above 1 GHz the peak limit is 20 dB above the Average limit.

Limits

According to 47CFR 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolt/meter)	Field strength of harmonics (microvolt/meter)
902-928 MHz	50	500

Field strength of fundamental: 50 mV/m = 94 dBµV/m.
Field strength of harmonics: 500 µV/m = 54 dBµV/m

According to 47CFR 15.249(d), emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

According to 47CFR 15.249(e), the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

According to RSS-210 A2.9(b), emissions radiated the outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to table 2 limits, whichever is the less stringent.

Complies?	Yes

Diagram 1

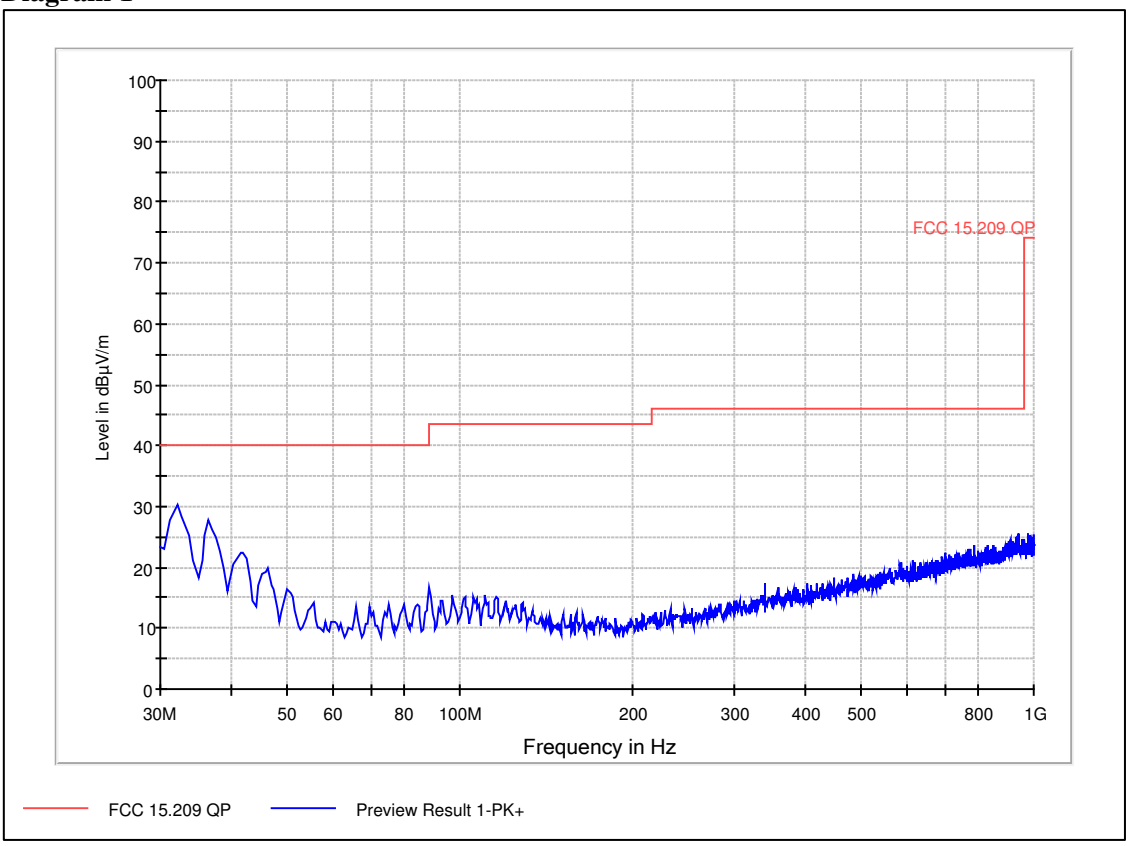


Diagram 2

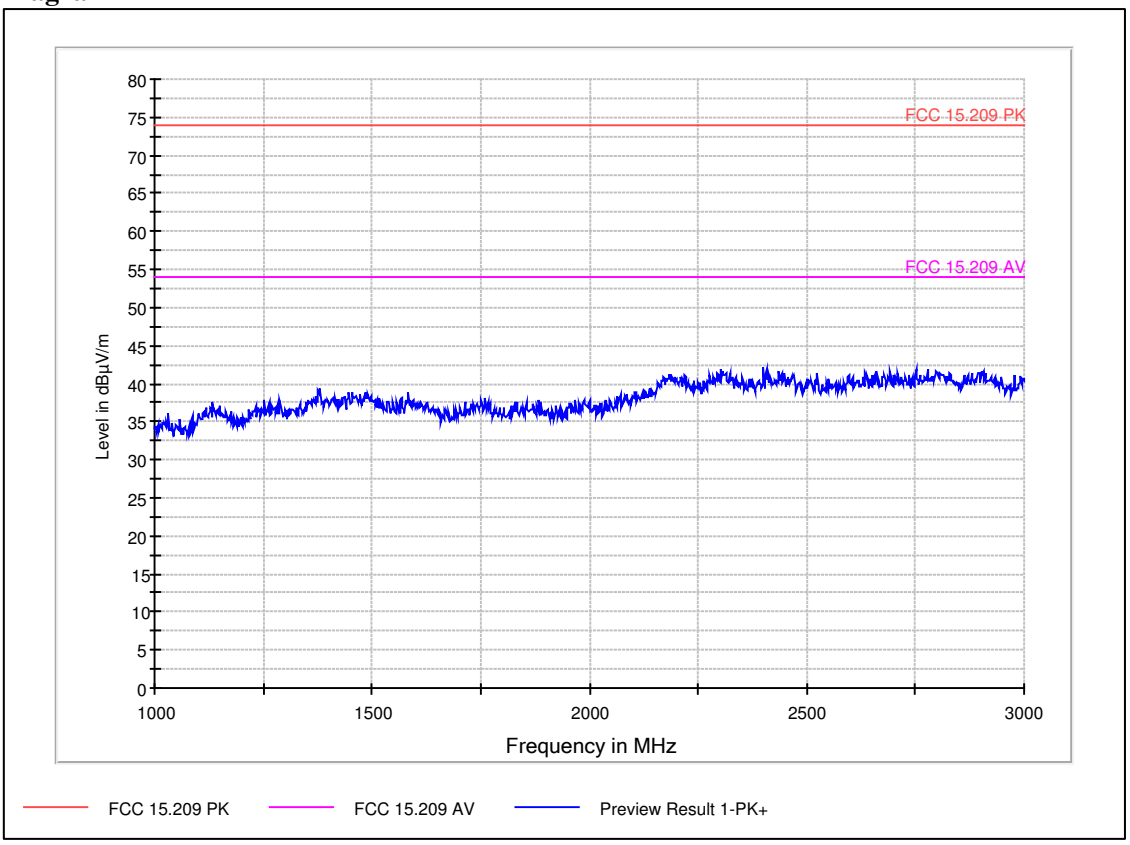


Diagram 3

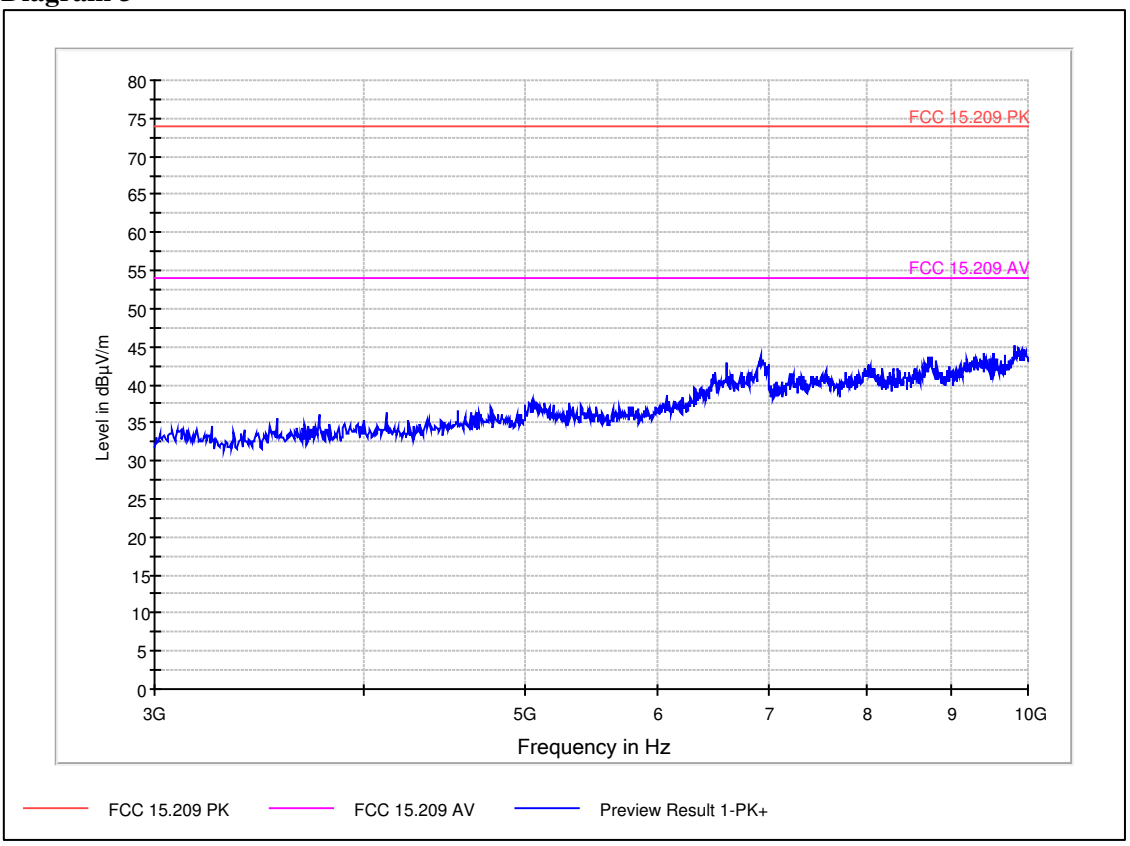


Diagram 4

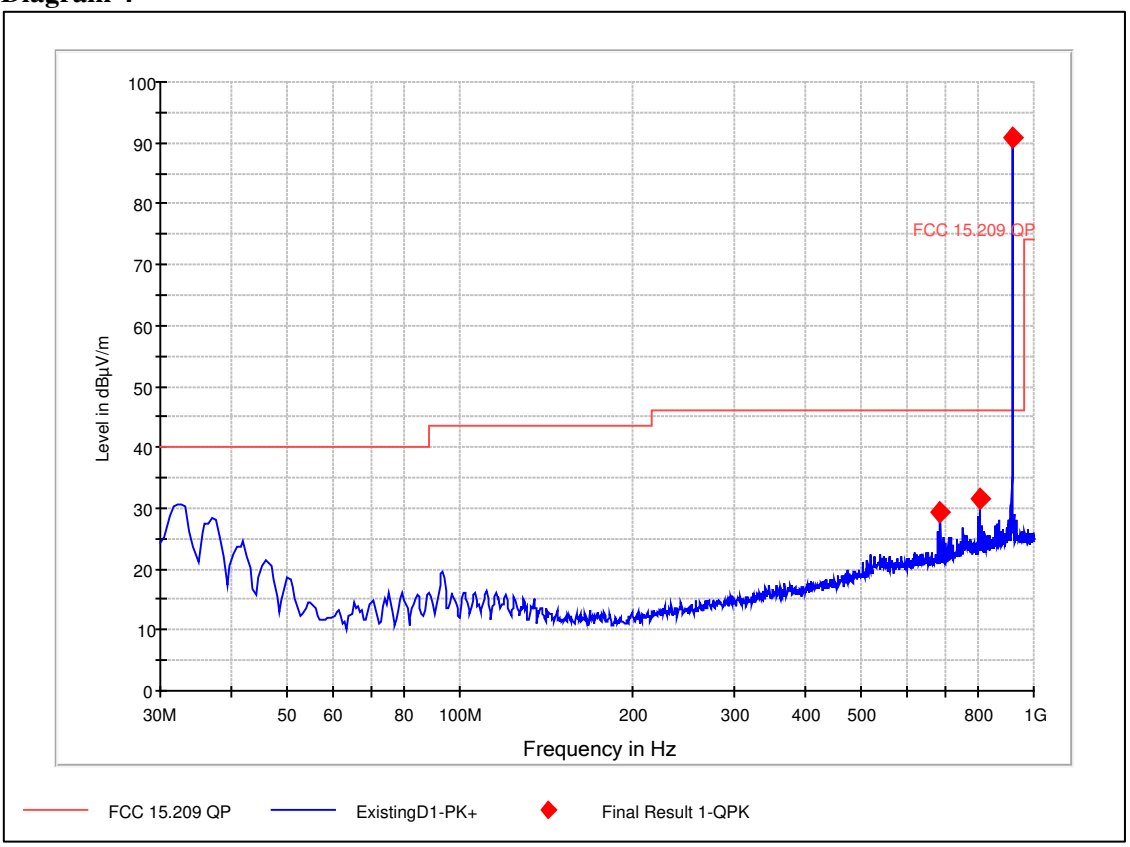


Diagram 5

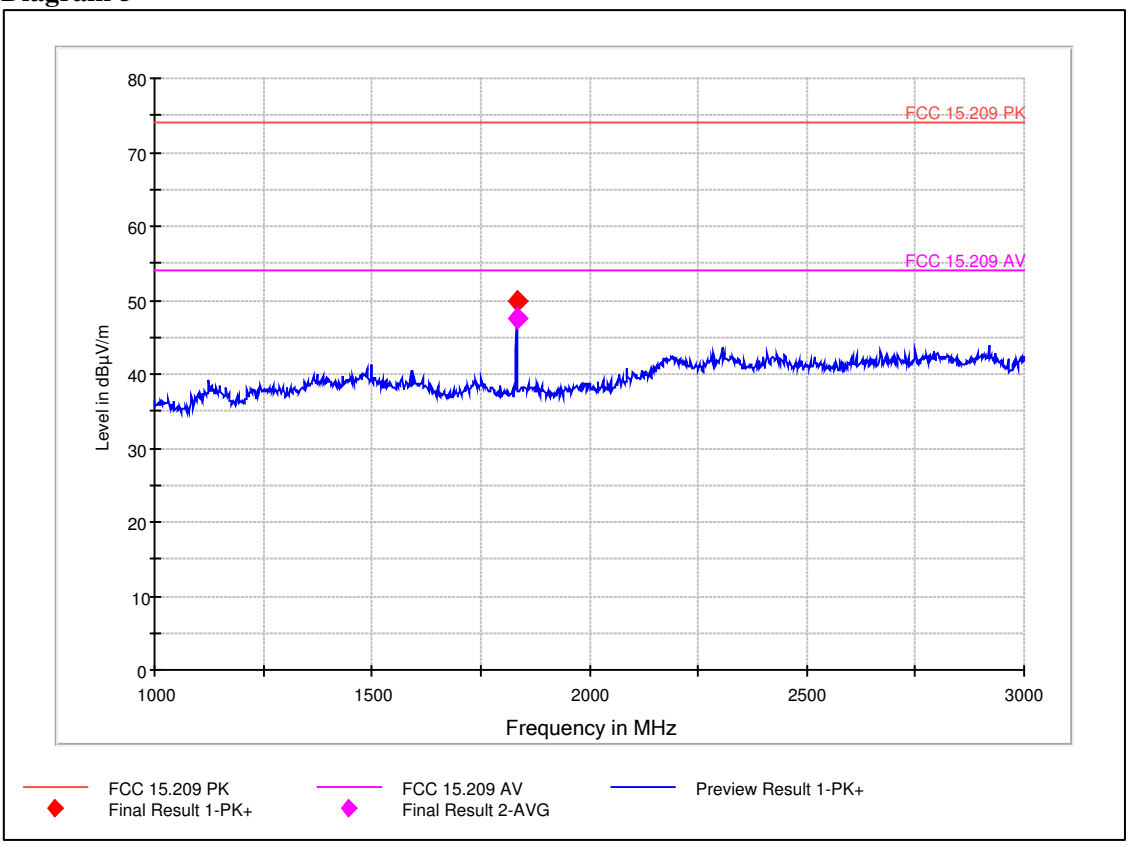
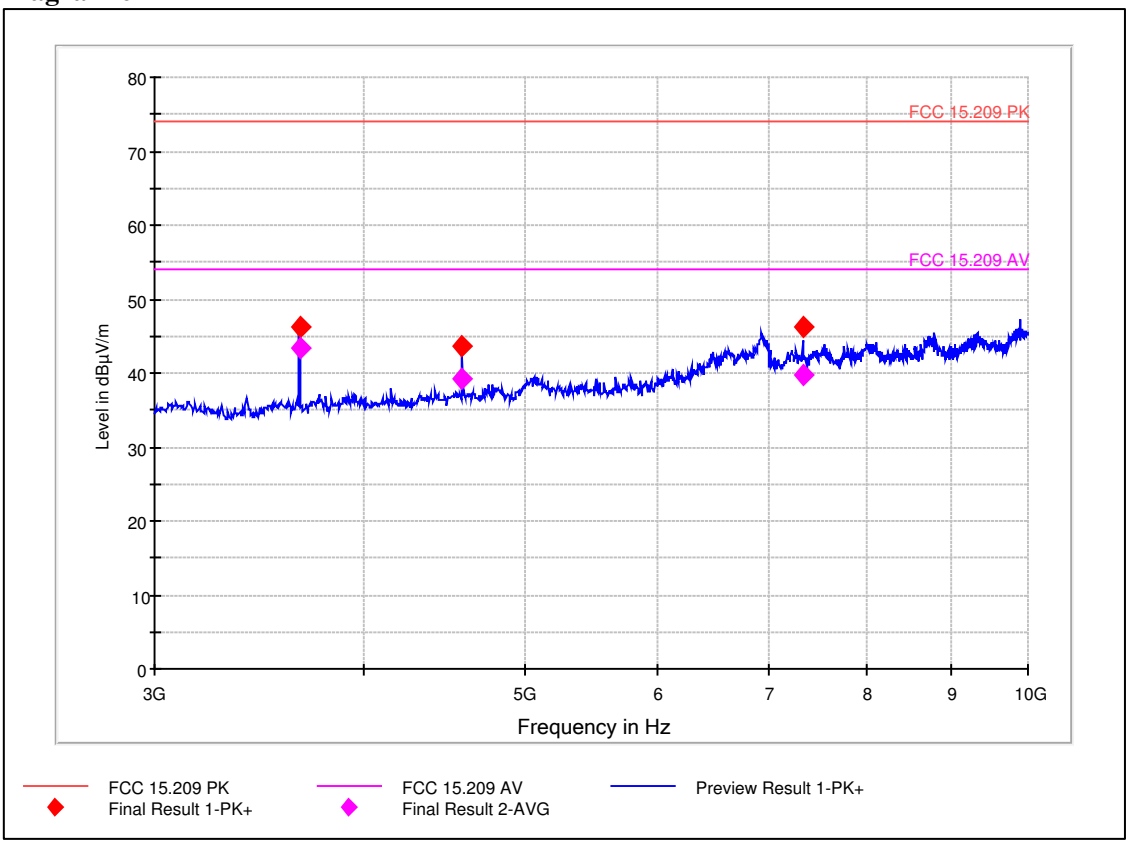


Diagram 6



20 dB bandwidth measurements according to FCC 47 CFR part 15.215 (c)

Date	Temperature	Humidity
2015-11-20	21°C ± 3 °C	46% ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.10-2013 cl. 6.9.2.

The test was performed with continuous transmission (100% duty cycle) and with normal modulation. The test was performed with peak detector.

Radiated measurements were performed in a semi anechoic chamber.
The antenna distance was 3.0 m.
The EUT height above the reference ground plane was 0.8 m.

Test set-up photos during the tests can be found in Appendix 10.

Test equipment.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESI	20763
Antenna, Ultra Broadband, 30MHz-3GHz	Rohde&Schwarz	HL562	19830

Results

The 20 dB BW measurements can be found in the diagram below:

Diagram 1	916.2375 MHz	20 dB BW = **10.34 kHz**

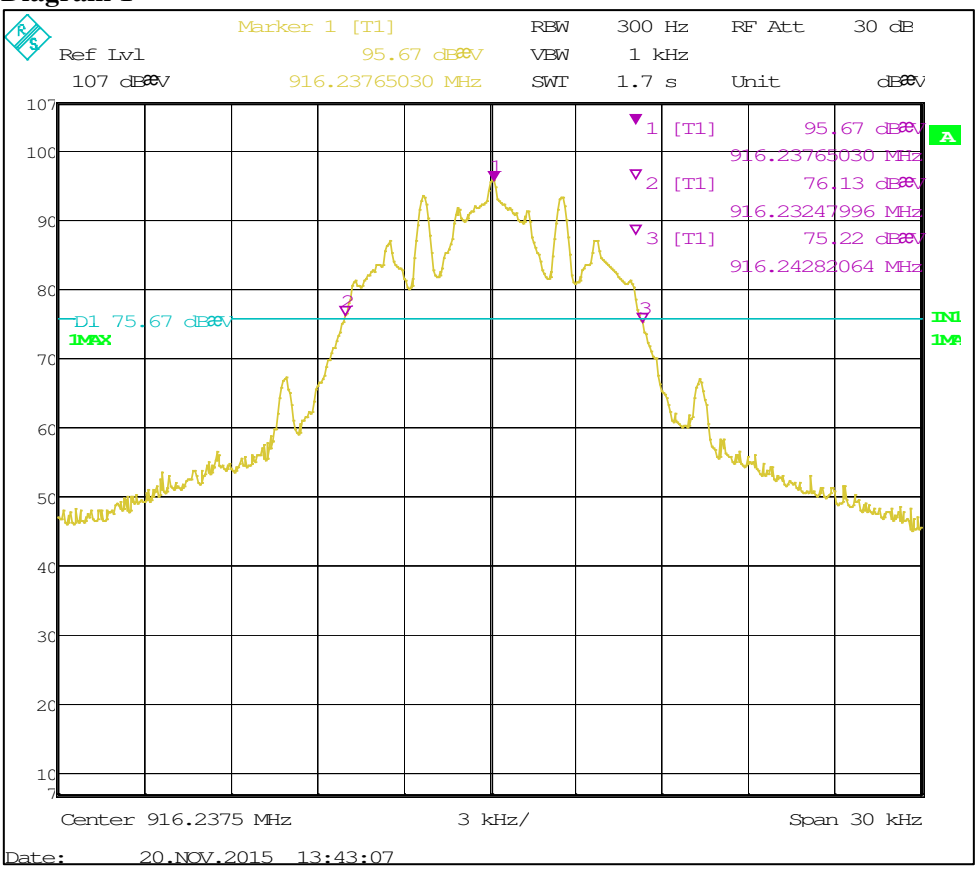
Limits

According to 47CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Complies?	Yes

FCC ID: 2AGLF1123001 Appendix 5

Diagram 1



AC Conducted emission measurements according to FCC 47 CFR part 15.207, class B / RSS-Gen 8.8

Date	Temperature	Humidity
2015-12-22	22 °C ± 3 °C	42 % ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.4-2014.

Measurements were performed with continuous transmission (100% duty cycle) and with normal modulation.
Measurements were performed on the 120 V AC/60 Hz, phase and neutral terminals, at the AC/DC adapter mascot, P/N: 9725.

Test set-up photos during the tests can be found in Appendix 10.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESIB 26	18880
V-network Two Line	Rohde&Schwarz	ESH3-Z5	13935

Result

The conducted emission spectra can be found in the diagrams below:

Diagram 1:	Ambient phase and neutral 120 VAC 60 Hz applied,
Diagram 2:	Phase and neutral 120 VAC 60 Hz

Limits

According to 47CFR 15.207 and according to RSS-Gen 8.8,

Frequency (MHz)	**Quasi-peak value (dBµV)**	**Average value (dBµV/m)**
0.15-0.5	66-56*	56-46*
0.5-5	56	46
5-30	60	50

*=Decreases with the logarithm of the frequency

Complies?	Yes

Diagram 1

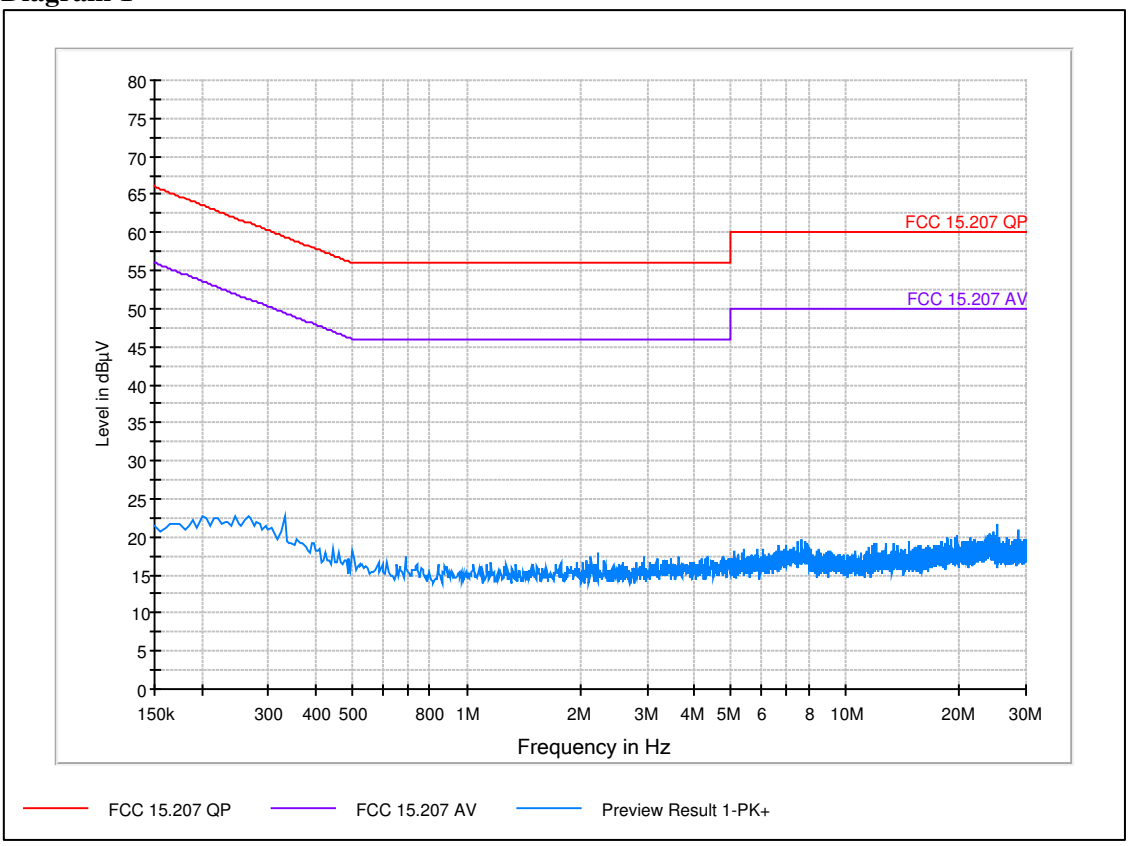
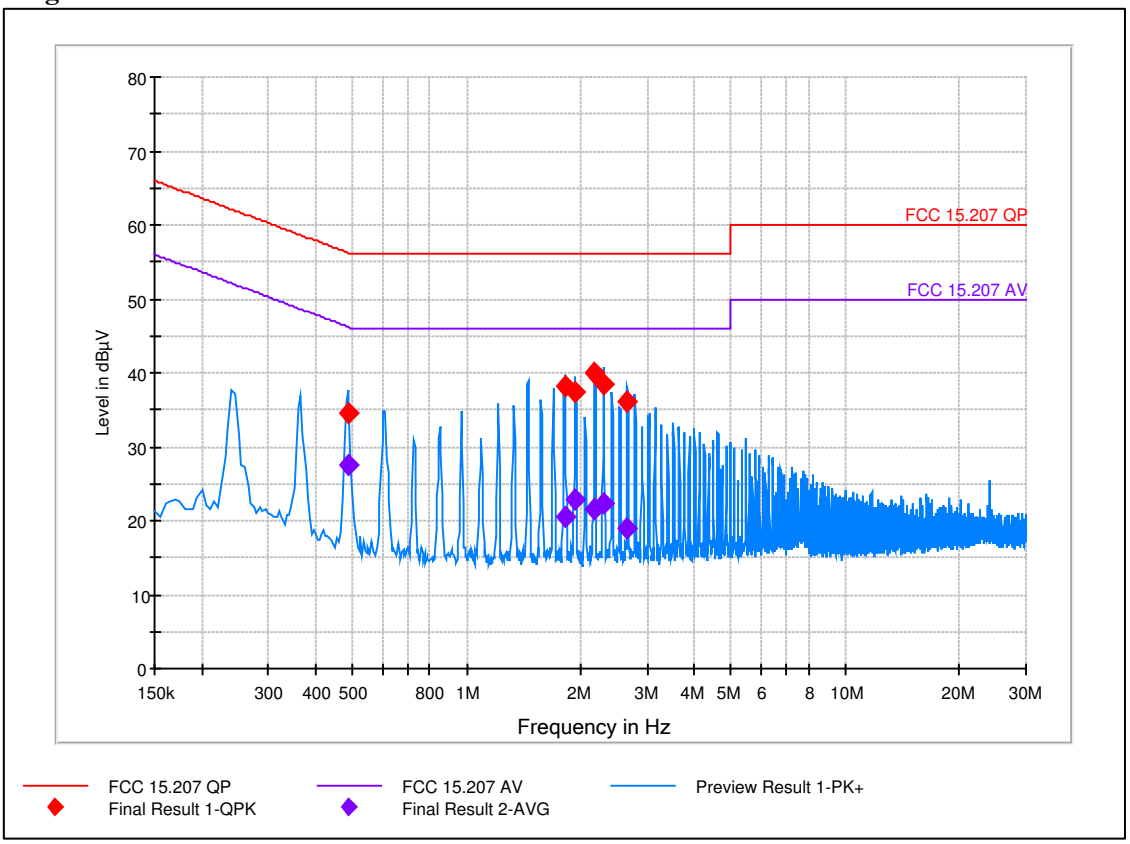


Diagram 2



Final measurements Quasi Peak detector

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Meas. time (s)	Margin (dB)	Limit (dBµV)
0.487100	**34.6**	9.000	L1	15	21.70	56.20
1.814100	**38.2**	9.000	L1	15	17.80	56.00
1.939800	**37.4**	9.000	N	15	18.60	56.00
2.176500	**40.1**	9.000	N	15	15.90	56.00
2.302300	**38.4**	9.000	N	15	17.60	56.00
2.660800	**36.2**	9.000	N	15	19.80	56.00

Final measurements Average detector

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Meas. time (s)	Margin (dB)	Limit (dBµV)
0.487100	**27.5**	9.000	L1	15	18.80	46.20
1.814100	**20.5**	9.000	L1	15	25.50	46.00
1.939800	**23.0**	9.000	N	15	23.00	46.00
2.176500	**21.4**	9.000	N	15	24.60	46.00
2.302300	**22.4**	9.000	N	15	23.60	46.00
2.660800	**18.9**	9.000	N	15	27.10	46.00

Occupied bandwidth measurements according to 47CFR 2.1049 / RSS-Gen 6.6

Date	Temperature	Humidity
2015-11-20	21°C ± 3 °C	45% ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.10-2013, cl. 6.9.3.

The test was performed with continuous transmission (100% duty cycle) and with normal modulation. The test was performed with peak detector.

Radiated measurements were performed in a semi anechoic chamber.
The antenna distance was 3.0 m.
The EUT height above the reference ground plane was 0.8 m.

Test set-up photos during the tests can be found in Appendix 10.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESI	20763
Antenna, Ultra Broadband, 30MHz-3GHz	Rohde&Schwarz	HL562	19830

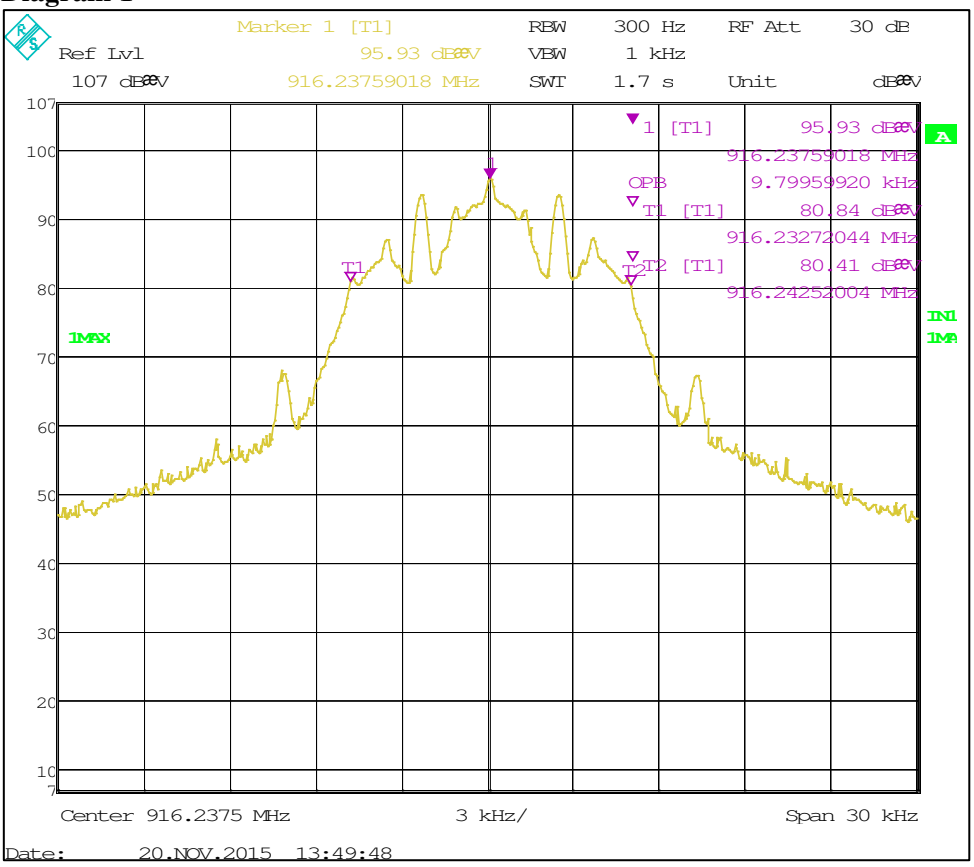
Results

The OBW measurements can be found in the diagram below:

Diagram 1	916.2375 MHz	OBW = **9.8 kHz** (99%)

Complies?	Yes

Diagram 1


Marker 1 [T1]
95.93 dBµV
916.23759018 MHz
RBW 300 Hz
VBW 1 kHz
SWT 1.7 s
RF Att 30 dB
Unit dBµV
Ref Lvl
107 dBµV
1 [T1] 95.93 dBµV
916.23759018 MHz
OPB 9.79959920 kHz
T1 [T1] 80.84 dBµV
916.23272044 MHz
T2 [T1] 80.41 dBµV
916.24252004 MHz
1MAX
Center 916.2375 MHz
3 kHz/
Span 30 kHz
Date: 20.NOV.2015 13:49:48

Band edge measurements according to 47CFR 2.1049 / RSS-210 A2.9 (b) / RSS-Gen 8.10

Date	Temperature	Humidity
2015-11-20	21°C ± 3 °C	45% ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.10-2013 cl. 6.10.

The test was performed with continuous transmission (100% duty cycle) and with normal modulation.

Radiated measurements were performed in a semi anechoic chamber.
The antenna distance was 3.0 m.
The EUT height above the reference ground plane was 0.8 m.

Test set-up photos during the tests can be found in Appendix 10.

Description	Supplier	Model	ID tag
Analyzer 20Hz-26.5GHz	Rohde&Schwarz	ESI	20763
Antenna, Ultra Broadband, 30MHz-3GHz	Rohde&Schwarz	HL562	19830

Results

Operation band 902-928 MHz

The pre-measurement diagrams with max. peak detector can be found in the diagrams below:

Diagram 1	916.2375 MHz	Band edge at 902 MHz and 938 MHz

The level is offset to meet the maximal measured radiated power.

No final measurements with QP detector were performed due to the margin of more than 6 dB in the pre-measurements.

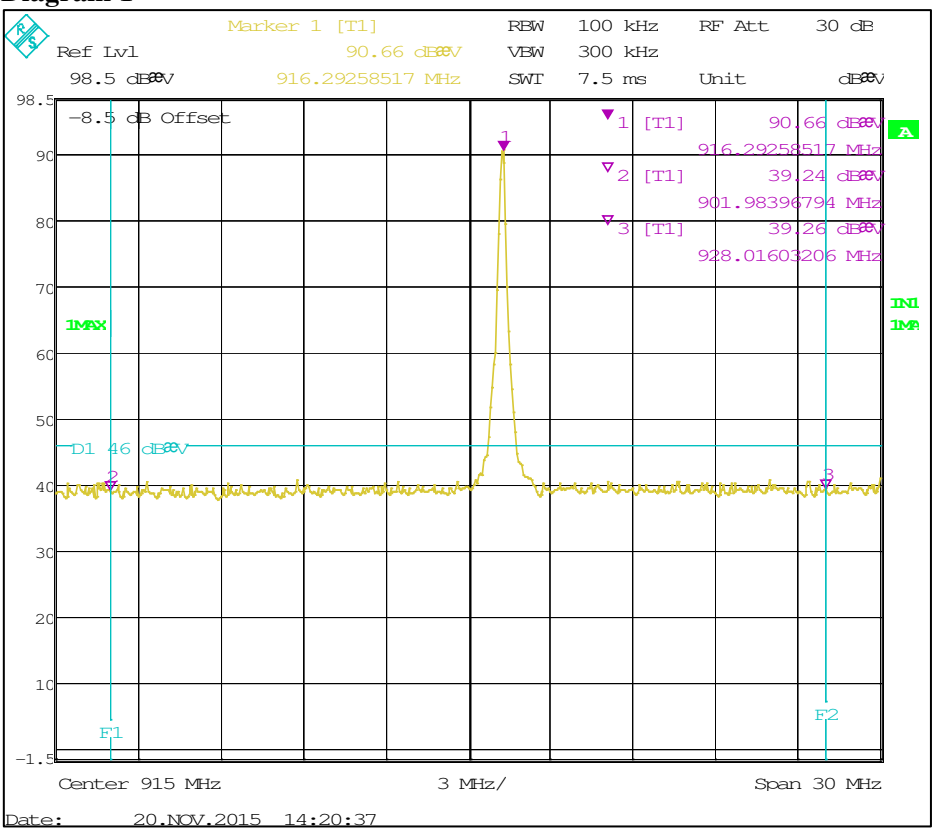
Limits

According to 47CFR 15.249(d), emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

According to RSS-210 A2.9(b), emissions radiated the outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is the less stringent.

Complies?	Yes

Diagram 1


Marker 1 [T1]
90.66 dBµV
916.29258517 MHz
Ref Lvl
98.5 dBµV
RBW 100 kHz
VBW 300 kHz
SWT 7.5 ms
RF Att 30 dB
Unit dBµV
-8.5 dB Offset
1 [T1] 90.66 dBµV
916.29258517 MHz
2 [T1] 39.24 dBµV
901.98396794 MHz
3 [T1] 39.26 dBµV
928.01603206 MHz
1MAX
D1 46 dBµV
F1
F2
Center 915 MHz
3 MHz/
Span 30 MHz
Date: 20.NOV.2015 14:20:37

RF exposure evaluation: 2.1093 Portable devices / RSS-102 2.5.1

Date	Temperature	Humidity
2015-12-01	22°C ± 3 °C	45% ± 5 %

Procedure

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 levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1093 this device has been defined as a portable device to be used within 20 centimetres of the body of the user.
According to KDB 447498 D01 General RF Exposure Guidance v06.

Results

Standalone SAR exclusion:

The following formula was used to calculate the RF exposure SAR exclusion threshold,
Thld = [Pout/r] x [√f]

where,
Thld = SAR exclusion threshold
Pout = Maximum output power measured with RMS detector, in mW
r = minimum test separation distance , in mm
f=frequency, in GHz
The difference between the output power measured with a RMS detector and a Quasi Peak detector was less than 0.1 dB thus the Quasi peak level measured during maximum fundamental radiation are used for the calculation.

Frequency f, (GHz)	Maximum output power Pout, (mW) Note 2	Distance r, (mm)	Exclusion threshold Thld	Limit Threshold 1-g SAR	Limit Threshold 10-g SAR
0.9162375	0.75	>5	0.14	< 3	< 7.5

The maximum radiated field strength stated by client was used for calculation.

Max. Field strength (dBµV/m)	Output power Pout (dBm) Note 1	Output power Pout, (mW)
94	-1.2	0.75

Note 1: The measurements were performed in field strength in dBµV/m. The EIRP level was then calculated by the formula $P = (E \times d)^2 / 30 \times G$, with G as unity gain of 1.

Note 2: According to RSS-102 cl. 2.5.1 the RMS value shall be adjusted for tune-up tolerance. According to the client the data sheet for the radio circuit, the RF power accuracy is declared to+0 dB/-7 dB, thus the values at Note 2 are increased with 0 dB.

Limits

FCC- 2.1093 / KDB 447498 D01 General RF Exposure Guidance v06

4.3.1 Standalone SAR exclusion:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] x [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

• f(GHz) is the RF channel transmit frequency in GHz
• Power and distance are rounded to the nearest mW and mm before calculation
• The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, , and as illustrated in Appendix B.
a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

IC RSS-102 Issue 5 cl. 2.5.1 Exemption from Routine Evaluation Limits – SAR Evaluation

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	193 mW
450	141 mW	159 mW	177 mW	195 mW	123 mW
835	80 mW	92 mW	105 mW	117 mW	67 mW
1900	99 mW	153 mW	225 mW	316 mW	60 mW
2450	83 mW	123 mW	173 mW	235 mW	52 mW
3500	86 mW	124 mW	170 mW	225 mW	55 mW
5800	56 mW	71 mW	85 mW	27 mW	41 mW

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.
For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

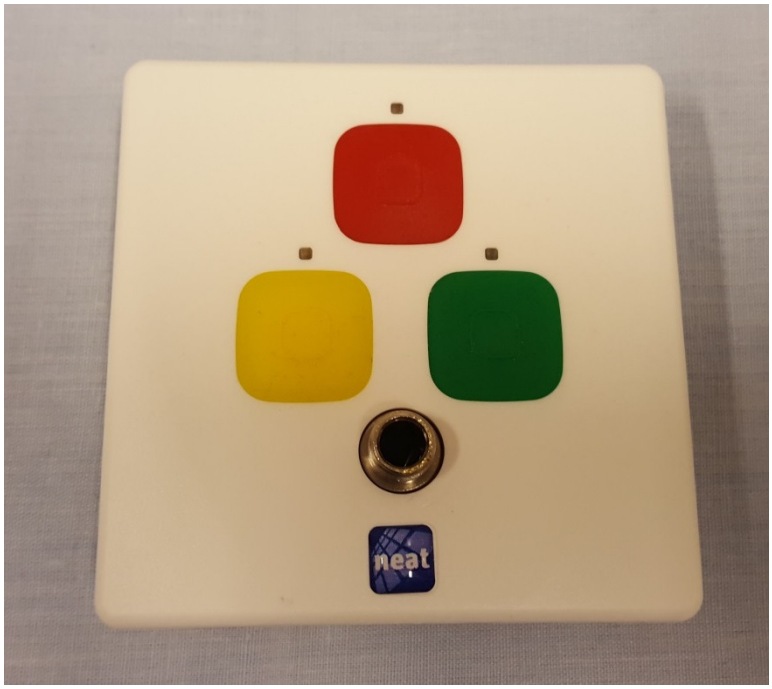
For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

Complies?	Yes

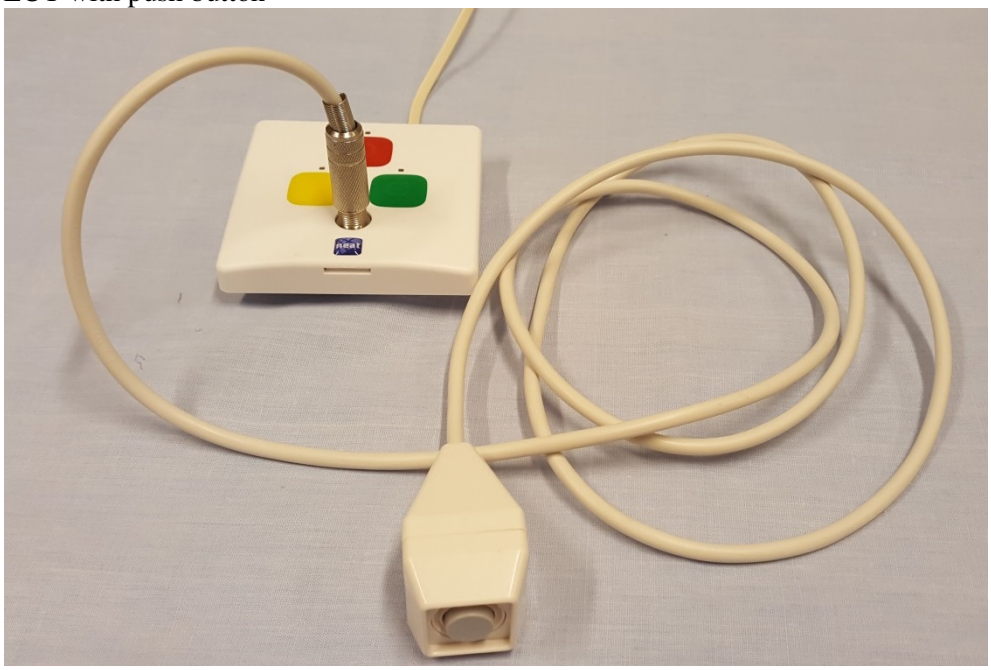
Photos

The test set-up during the radiated tests can be seen in the pictures below.

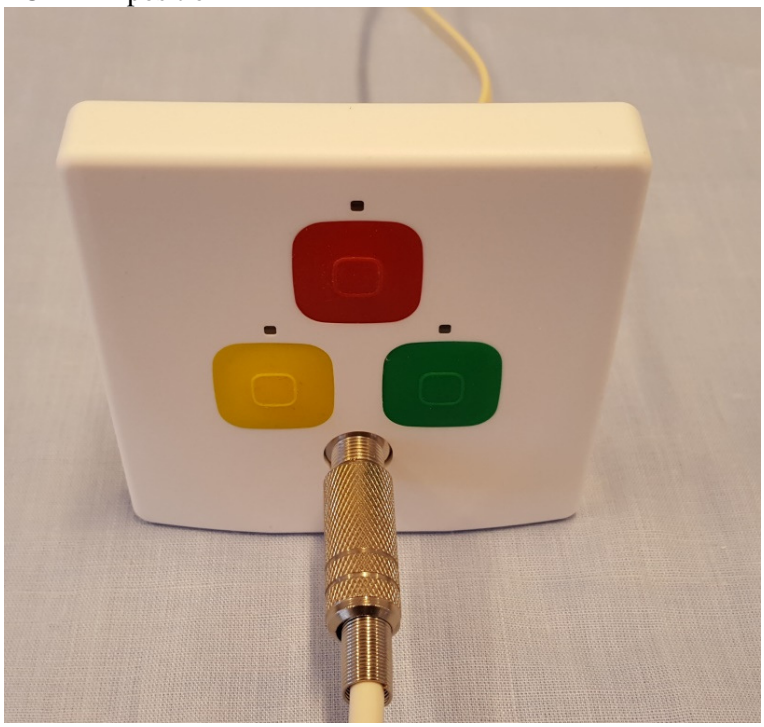
EUT



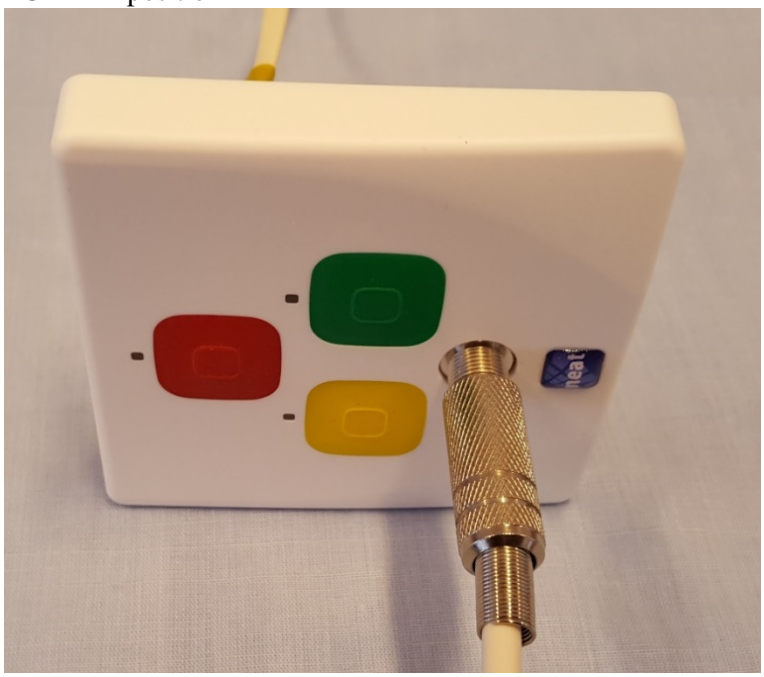
EUT with push button



EUT in X position



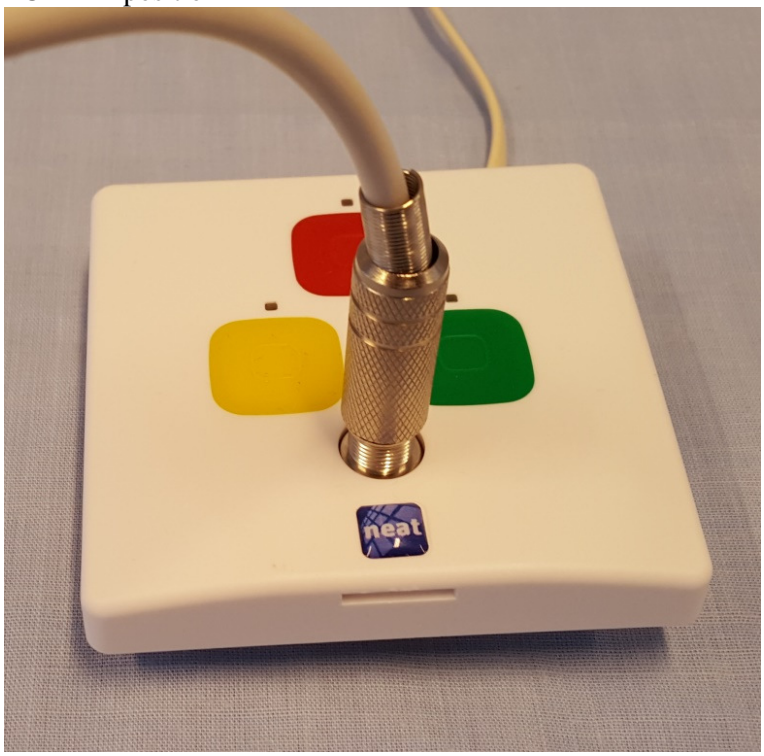
EUT in Y position



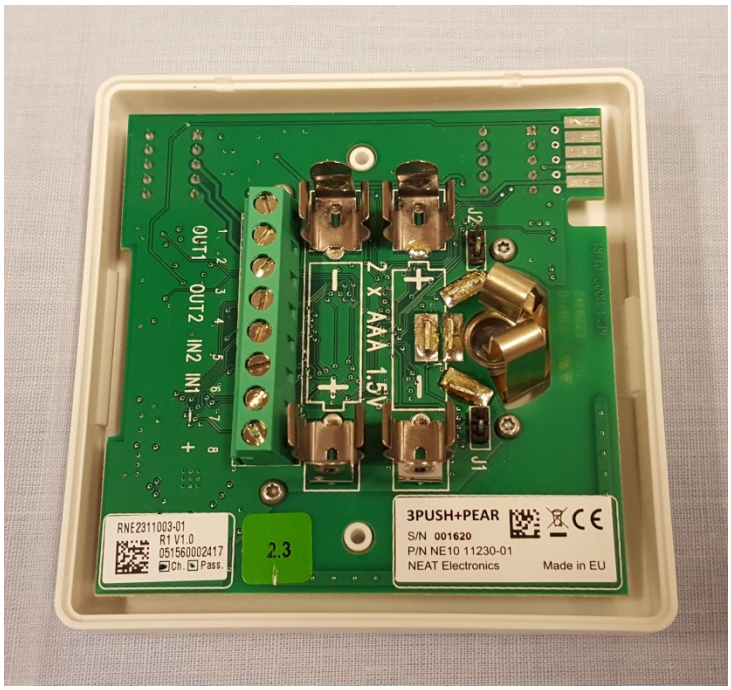
FCC ID: 2AGLF1123001

Appendix 10

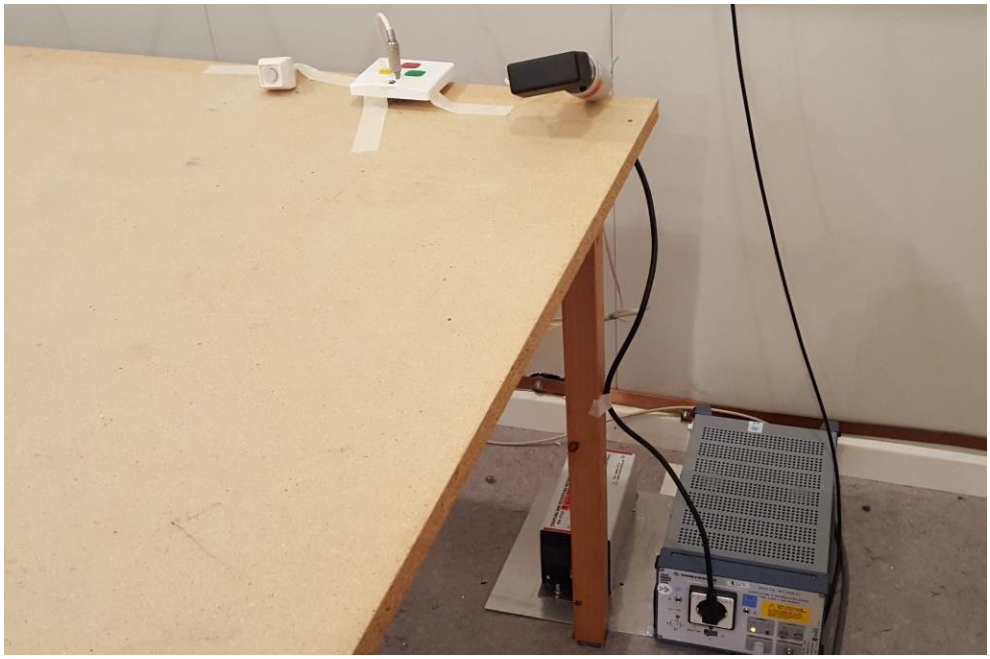
EUT in Z position



EUT back side view



Radiated measurements below 1 GHz

Radiated measurements 1-10 GHz

Conducted measurements 150 kHz to 30 MHz