

Test Report



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C and INDUSTRY CANADA REQUIREMENTS

Equipment Under Test: Location indicating safety device

Model: Yepzon

Manufacturer /
Customer: Yepzon Oy
Hermiankatu 3 A
FI-33720 TAMPERE
FINLAND

FCC Rule Part: 15.207: 2014
15.209: 2014

IC Rule Part: RSS-210, Issue 8, 2010
RSS-GEN Issue 4, 2014

Date: 9 July 2015

Issued by:

A blue ink signature of Niko Kotsalo.

Niko Kotsalo
Testing Engineer

Date: 9 July 2015

Checked by:

A blue ink signature of Janne Nyman.

Janne Nyman
Compliance Specialist

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Equipment Under Test (EUT)

Location indicating safety device:
Yepzon
IMEI 863071016267103

Yepzon is a location indicating safety device. A paired smartphone can be used to indicate the location of the person who is carrying Yepzon. It has GSM, Bluetooth, GPS/GNSS and a build-in tag for NFC. Bluetooth and NFC technologies are used to pair the smartphone with Yepzon. The location is sent via GSM. The EUT has a Micro USB-port which is only used for battery loading. There are no buttons. The highest internal clock frequency is 2 MHz.

The radio modules:

- GSM800/1900 (FCC ID XMR201202M95, CE)
- Bluetooth (FCC ID QOQBLE113, CE)
- GPS/GNSS
- NFC 13.56 MHz (Tag)

Mechanical Size

Length: 85 mm, Width: 46 mm, Thickness: 17 mm
Weight: 65 g

Classification of the device

Fixed device	<input type="checkbox"/>
Mobile Device (Human body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human body distance < 20cm)	<input checked="" type="checkbox"/>

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing

Peripherals

- Smartphone: Samsung Galaxy Note 3

Ratings and declarations

Operating Frequency Range (OFR):	13.56 MHz
Channels:	1
Modulation:	ASK

Power Supply

The EUT has internal rechargeable 3.7V Li-Ion battery. The AC-charger was connected to the Micro USB-port during the tests. The charger was supplied by the customer.

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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.209, RSS-210, RSS-GEN	Radiated Emissions 9 kHz to 1 GHz	PASS
§15.207, RSS-GEN	Conducted emissions 150 kHz – 30 MHz	PASS

EUT Test Conditions during Testing

Configuration of the EUT was made to correspond to the actual assembling conditions as far as possible. In the normal case the smartphone pairing is done only once but there was a special exercising program to make continuous tag reading. This feature was supplied by the customer. During radiated spurious emissions test the EUT was tested battery powered and during conducted emissions the EUT was connected to AC/DC charger. Tests were done in three orthogonal positions X, Y, Z.

Test Facility

<input type="checkbox"/>	Testing Location / address: FCC registration number: 90598	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
<input checked="" type="checkbox"/>	Testing Location / address: FCC registration number: 178986 Industry Canada registration number: 8708A-2	SGS Fimko Ltd Karakaarenkuja 4 FI-02610, ESPOO FINLAND

Conducted Emissions In The Frequency Range 150 kHz - 30 MHz.

Standard: ANSI C63.10 (2009)
Tested by: NKO
Date: 6.02.2015
Temperature: 22 °C
Humidity: 31 % RH
Measurement uncertainty: ± 2.9 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.207 (a)

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4.5 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors.

During the test the EUT was powered from the separate power supply (115VAC / 60 Hz) through the LISN.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
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.

Conducted Emission Mains FCC Part 15 Class A with ESH3-Z5 8019

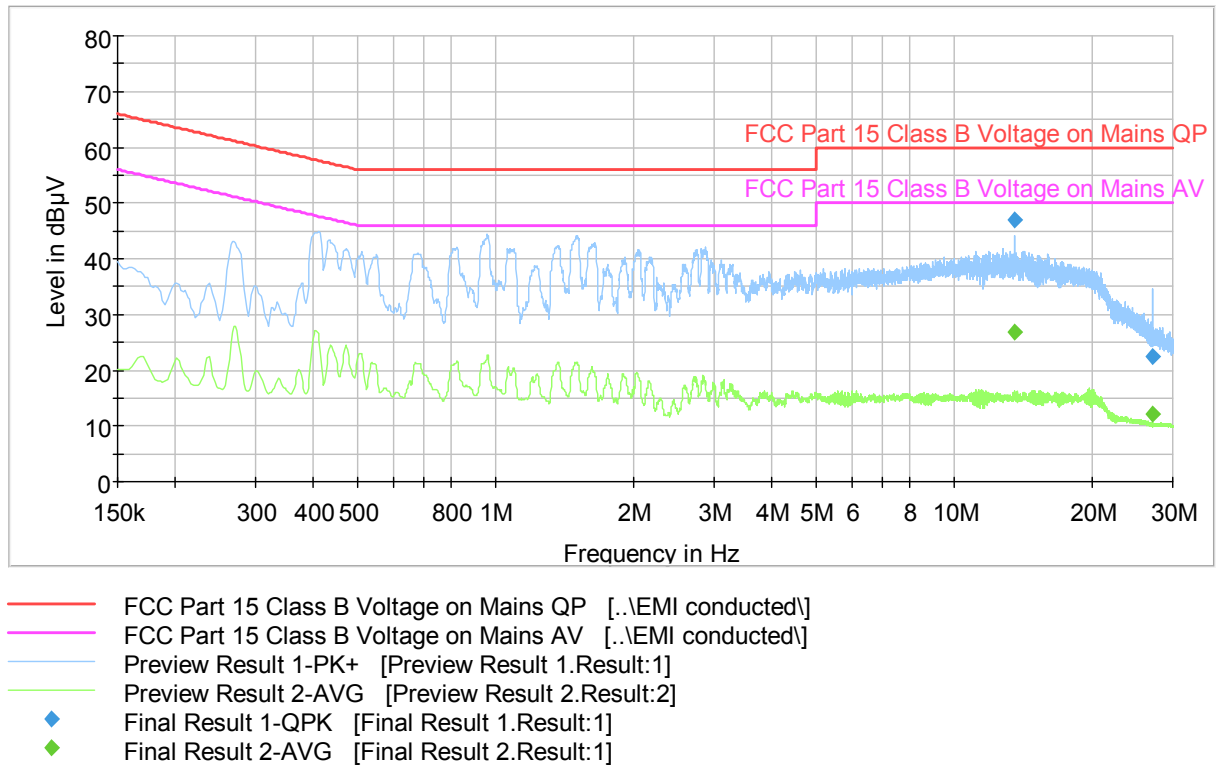


Figure 1. The measured curves with peak- and average detector from the AC input of a Laptop computer.

Table 1. Final Quasipeak results.

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
13.557250	47.1	1000.0	9.000	GN	L1	11.4	12.9	60.0	
27.115750	22.4	1000.0	9.000	GN	L1	12.1	37.6	60.0	

Table 2. Final Average results.

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
13.557250	26.8	1000.0	9.000	GN	L1	11.4	23.2	50.0	
27.115750	12.2	1000.0	9.000	GN	L1	12.1	37.8	50.0	

Radiated Emissions 9 kHz to 1 GHz

Standard: ANSI C63.10 (2009)
Tested by: NKO
Date: 6.2.2015
Temperature: 23 °C
Humidity: 31 % RH
Measurement uncertainty ± 4.51 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.209

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

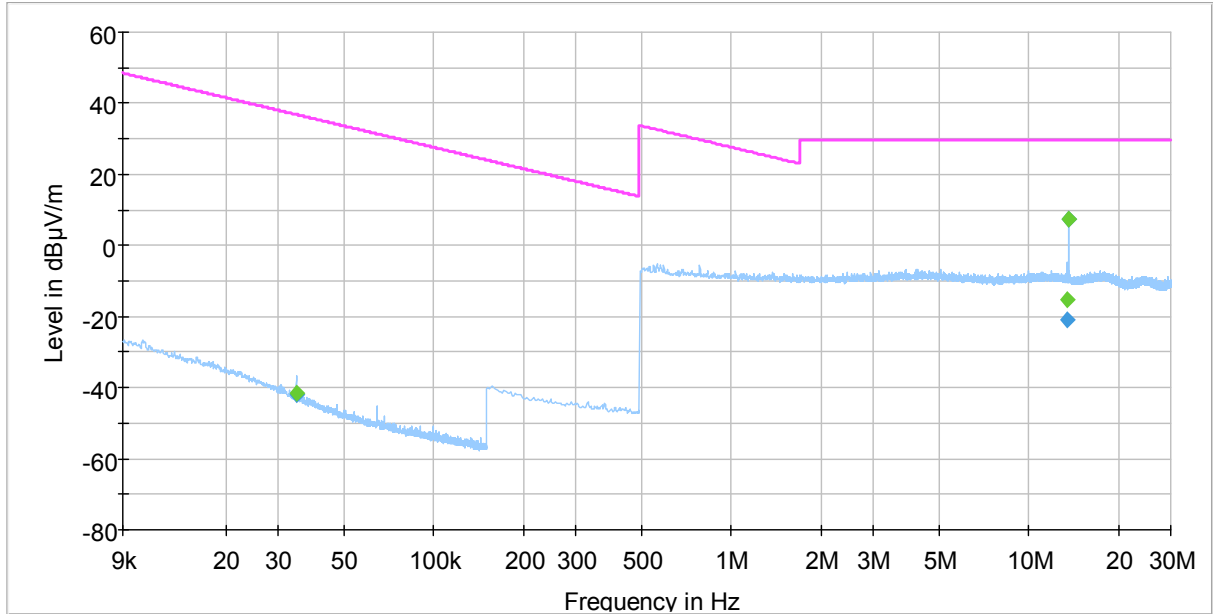
The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

According to ANSI C63.10 (clause 5.3.2) and RSS-Gen (Clause 4.11) the measurements below 30 MHz can be performed at a closer distance than the EUT limit distance, the results shall be extrapolated to shorter distance by using the square of an inverse linear distance extrapolation factor (40 dB/ decade). This method was used when performing measurements at a distance of 3 m instead of limit distances 300 m or 30 m.

The correction factor in the final result table contains the sum of the transducers (antenna + cables + distance). The result value is the measured value corrected with the correction factor.

Test results

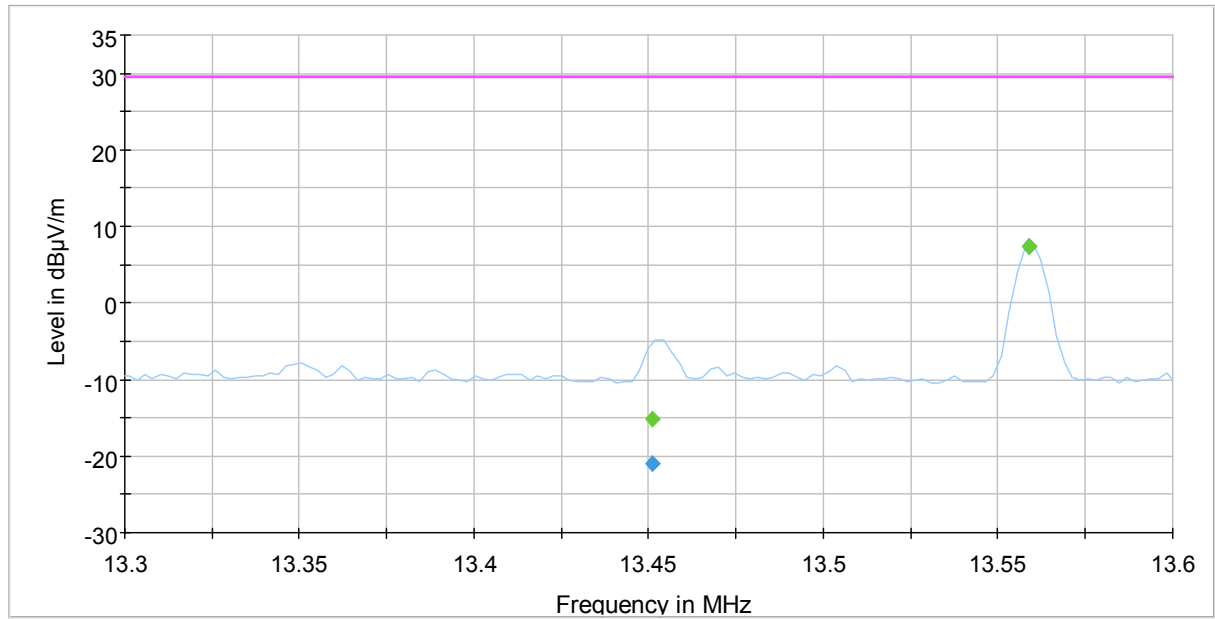
FCC Part 15 Class B (15.209) Spurious Emission 9 kHz - 30 MHz 3m



- FCC 15.209 9kHz - 30 MHz [.\NEMI radiated\]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- ◆ Final Result 1-AVG [Final Result 1.Result:1]
- ◆ Final Result 2-QPK [Final Result 2.Result:1]

Figure 2. TX radiated emission 9 kHz to 30MHz.

FCC Part 15 Class B (15.209) Spurious Emission 9 kHz - 30 MHz 3m



- FCC 15.209 9kHz - 30 MHz [.\EMI radiated\]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- ◆ Final Result 1-AVG [Final Result 1.Result:1]
- ◆ Final Result 2-QPK [Final Result 2.Result:1]

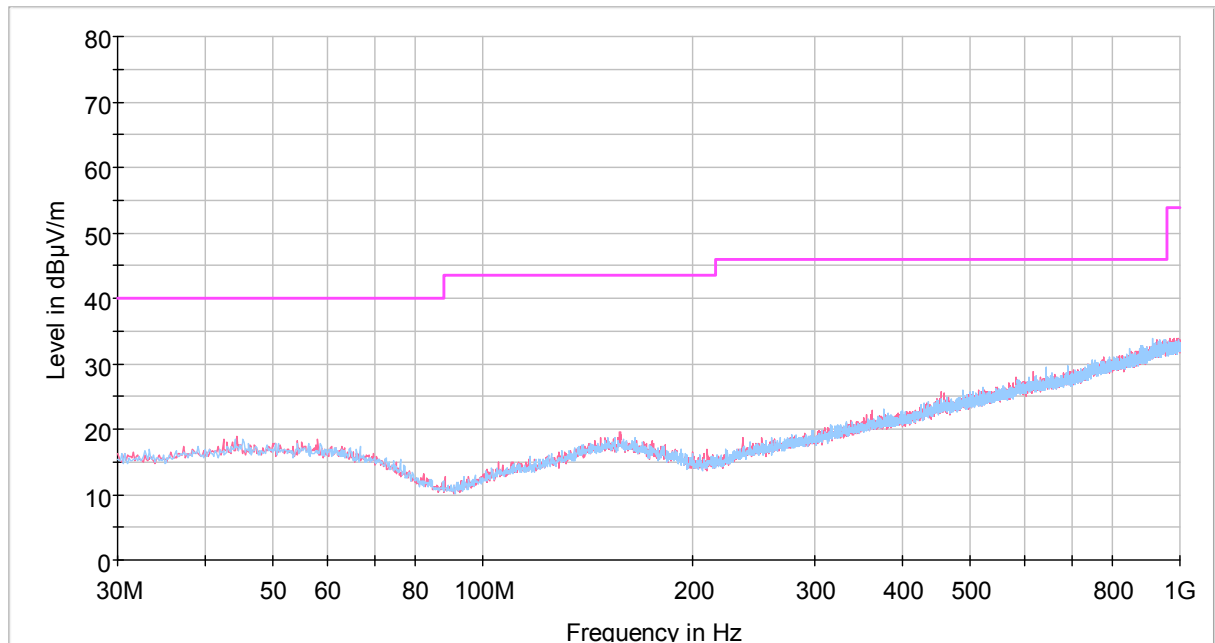
Figure 3. Tx radiated emission 13.3 MHz – 13.6 MHz.

Final measurements from the worst frequencies

Table 3. The final results with Quasipeak detector.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna angle (°)	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)	Comment
0.034490	-41.4	1000.0	0.200	90.0	257.0	78.3	36.8	
13.451000	-15.1	1000.0	9.000	0.0	289.0	44.6	29.5	
13.559000	7.4	1000.0	9.000	0.0	287.0	22.1	29.5	

FCC Part 15 Class B Spurious Emission 30-1000MHz 3m



- FCC Part 15 Class B Electric Field Strength 3 m QP [.\EMI radiated\]
- Preview Result 1V-PK+ [Preview Result 1V.Result:1]
- Preview Result 1H-PK+ [Preview Result 1H.Result:1]

Figure 4. TX radiated emission 30 MHz to 1000 MHz.

Final measurements from the worst frequencies

No final measurements were made due to low emission level.

TEST EQUIPMENT

Conducted Emissions

Equipment	Manufacturer	Type	Serial no	Inv.no
TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	100185	8453
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-
PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	#1	8359
LISN	ROHDE & SCHWARZ	ESH3-Z5	863794/014	8019
POWER SUPPLY	CALIFORNIA INSTRUMENTS	5001 iX Series II	58209	7826

Radiated Emissions

Equipment	Manufacturer	Type	Serial no	Inv.no
TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	100185	8453
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-
ANTENNA (30-1000 MHz)	SCHWARZBECK	VULB 9168	8168-503	8911
ANTENNA (9 kHz-30 MHz)	ROHDE & SCHWARZ	HFH2-Z2	860004/016	8013
ANTENNA MAST	DEISEL	MA240	240/455	5017
TURNTABLE	DEISEL	DS420	-	5015
CONTROLLER	COMTEST	HD100	100/457	5018
POWER SUPPLY	CALIFORNIA INSTRUMENTS	5001 iX Series II	58209	7826

All used measurement equipment was calibrated (if required).