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The ‘New’ BS 4142:2014

Settings and Practical Assessment

Norsonic

2014 vs Previous Revision

- Need to state credentials of the author to demonstrate competence
- Consideration of the context of the report
- Clarification on which scenarios are suitable and which are not
- Night time measurement periods altered from 5mins to 15mins
- Exclusion of the use of Class/Type 2 instruments
- **Graduated correction for Tonal Noise**
- **Gradual scale for Impulse noise penalties**
- Measurement at 10-25ms for Impulsive Noise penalty
- Consideration of levels of uncertainty

BS4142 - Scope

Not Used for

- Noise nuisance – Use statutory noise nuisance powers
- Public road and railway (CRTN and CRN)
- Motorsport/ Music Events
- Shooting grounds (CIEH guidance)
- Construction, Demolition (BS 5228)
- Domestic animals
- People/ PA systems
- Other sources falling in the remit of other standards

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Norsonic 140/150 Set-Up for BS4142

- Getting the Settings Right

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Nor-150 Standby Screen

Power Icon

View Selected

Parameter and weighting being displayed. This can be toggled using the up & down arrow keys on the keypad.

‘Soft Key’ Menus

Start button to begin measurements as an alternative to the keypad button

Current Time

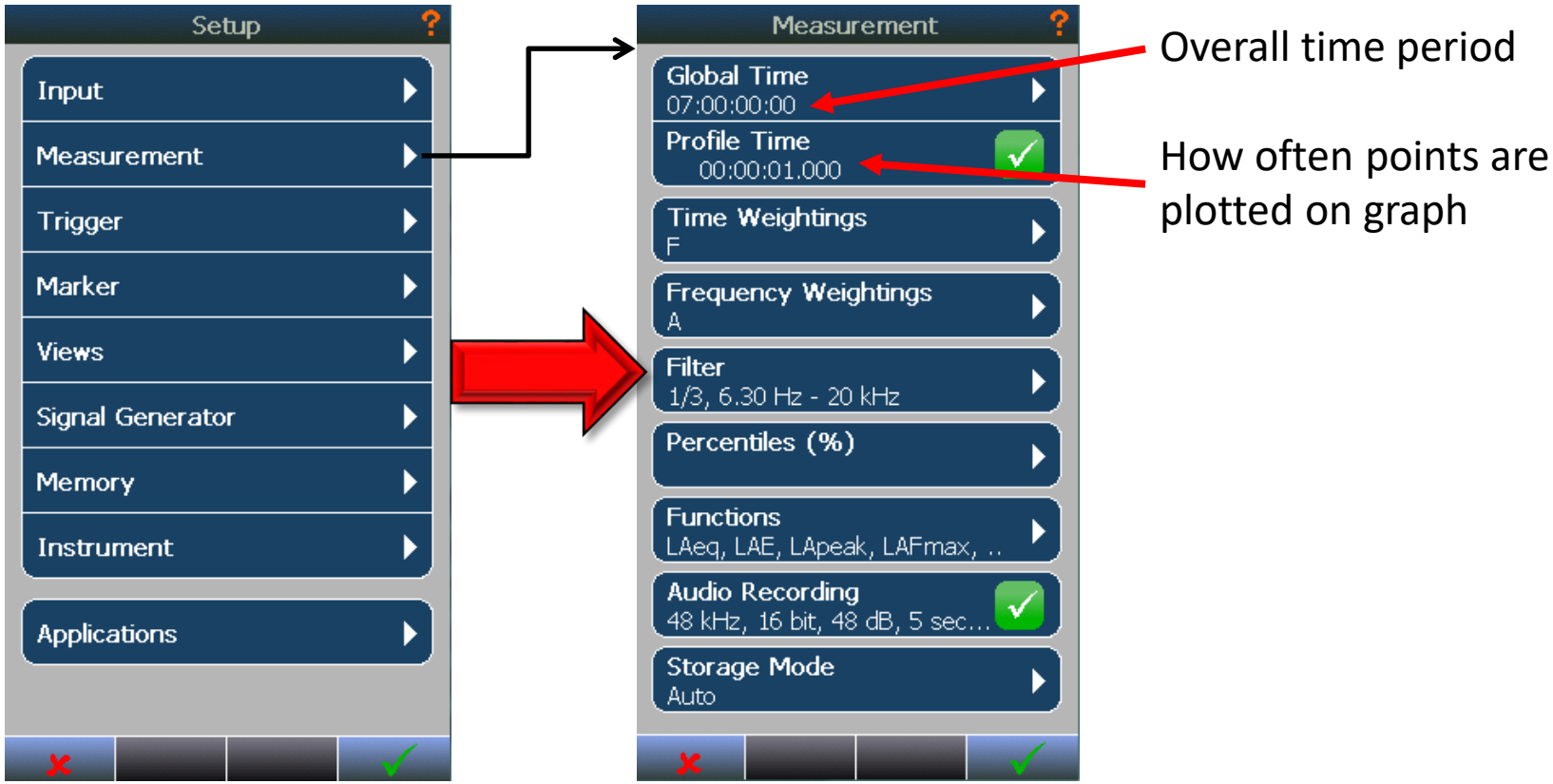
dB Level

Level Display Range – press and hold on the screen to display menu. Select Y-Axis and range is displayed

Nor-150 Storing Methods

Automatic – Automatic saving, Repeat – Repeat measurement duration and save until stopped, Syncro – Synchronise with the clock, Manual – Waits for MEM key to be pressed before saving.

Nor-150 Measurement Duration



For BS4142 the Global time should be adjusted depending on day & night measurements. For impulsive noise assessments the Profile must be set from 10-25ms. Please note that the faster you log the less parameters can be logged. A message with restrictions will be displayed as soon as you select below 25ms. There must also be a green tick next to Profile

Nor-150 L(t) Parameters

Select Measurement and then Functions to display what is logged in the global (overall) and the profile (per second or less). This will affect what is displayed in NorReview.

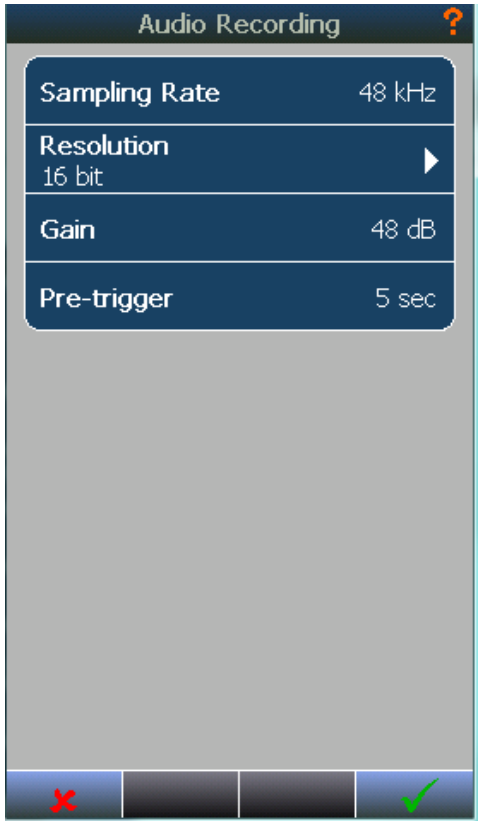
LAeq and LAFspl are needed for the BS4142 standard under the profile column. Make sure these are selected.

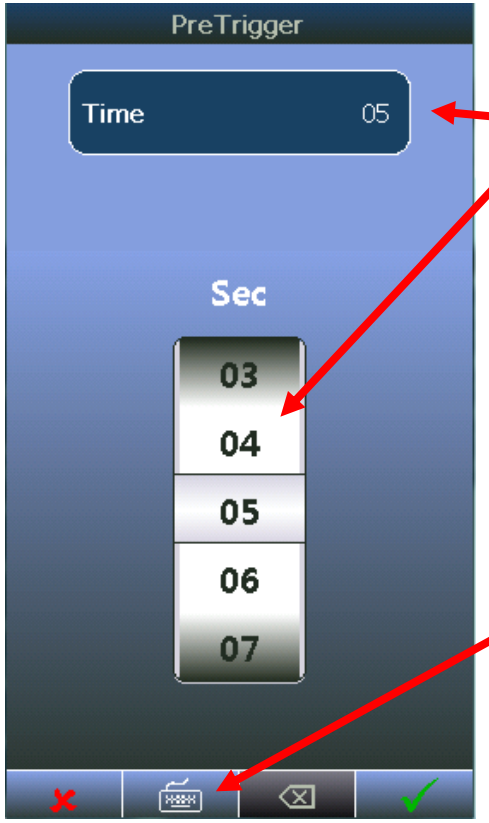
Select LAn for L90s etc and Lfn for L90s by frequency

Nor-150 Triggers

Global triggers are for starting the measurements. The Max Action time is the how long the trigger is allowed to last for. Once this time is hit it stops regardless. The Minimum Event Duration is the minimum amount of time the event will last for even if the trigger is no longer there. Min Duration Out is the time the trigger must not be active for in order for the event to stop. You can add recordings to these events as well. For BS4142 you would use the threshold trigger to capture recordings to later analyse in NorReview for Tones and/or impulsive noise

Audio Recording Settings





Select trigger length

Use Keyboard to type numbers in

Audio settings should always be sampling 48Hz, Resolution 16bit, Gain 48dB. There should also be a green tick next to the audio recording in the main measurement menu to show that audio recordings are active.

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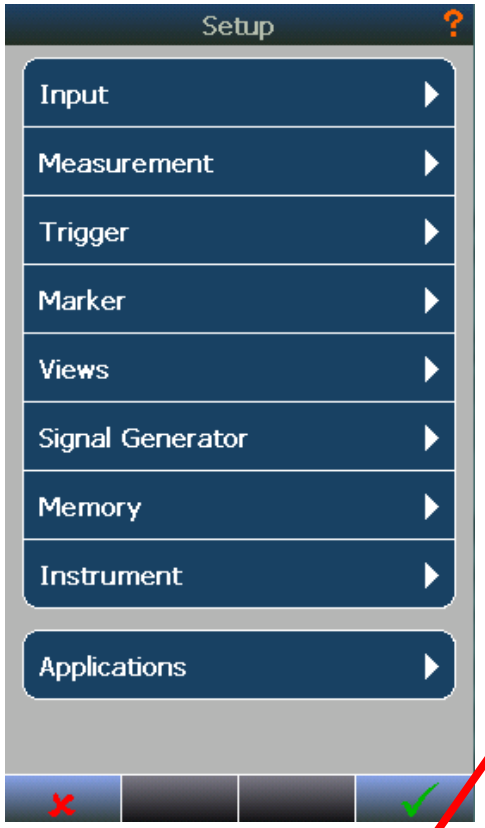
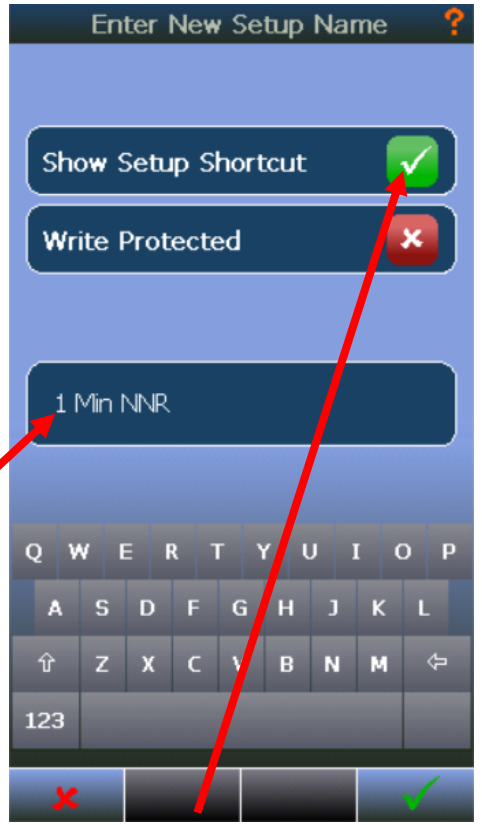
Nor-150 Saving New Icons for Front Screen



To save an icon on the front screen simply select Memory and then 'Save Setup As'

Add Name to appear on front screen



Make sure 'Show Setup Shortcut' is selected or icon will not appear on 1st screen

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Running Measurements

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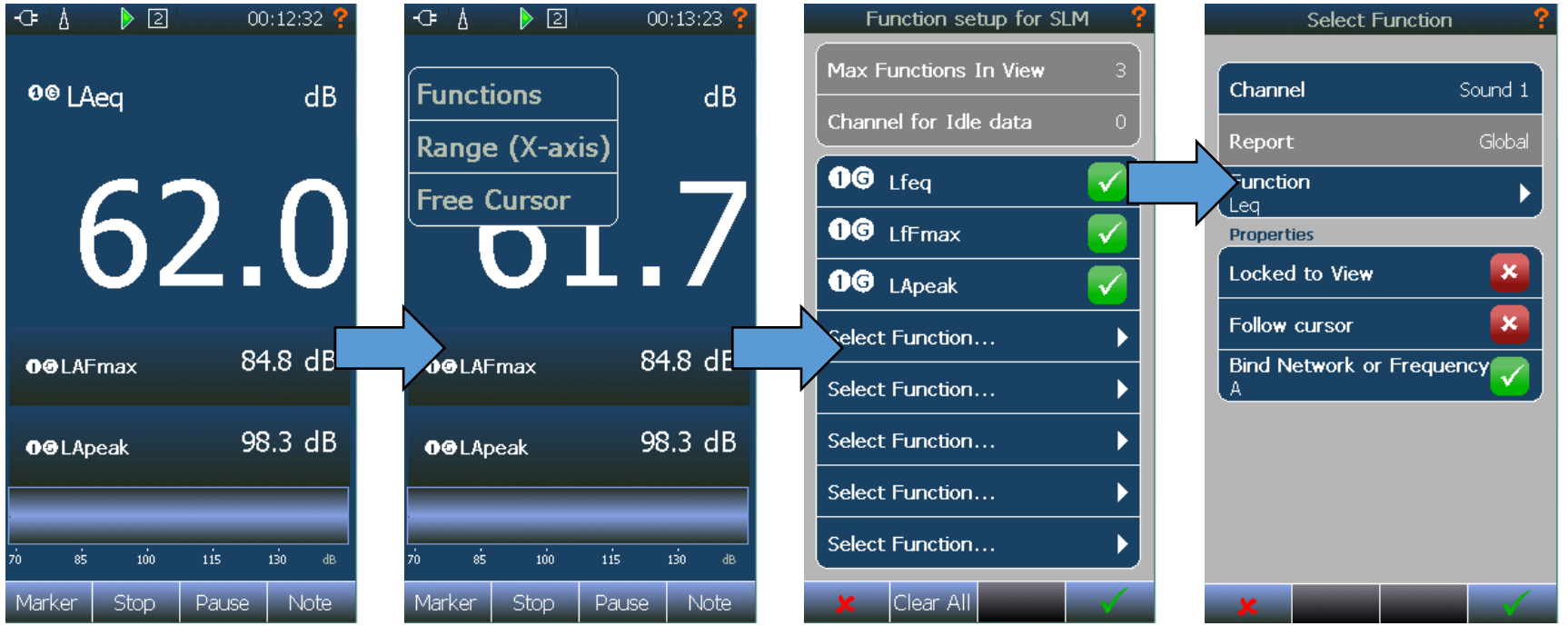
Nor-150 Views/Displays



The displays in the SLM screen view can be altered by either using the up & down arrow keys on the keypad or by using the functions to change the parameter. To enter this press & hold on the screen, then select functions. From here you can specify how many functions are displayed and in what order they are displayed. If you are logging L90s they can also be seen in this menu.

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Assessment

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Tonal Analysis – Acoustic Camera File

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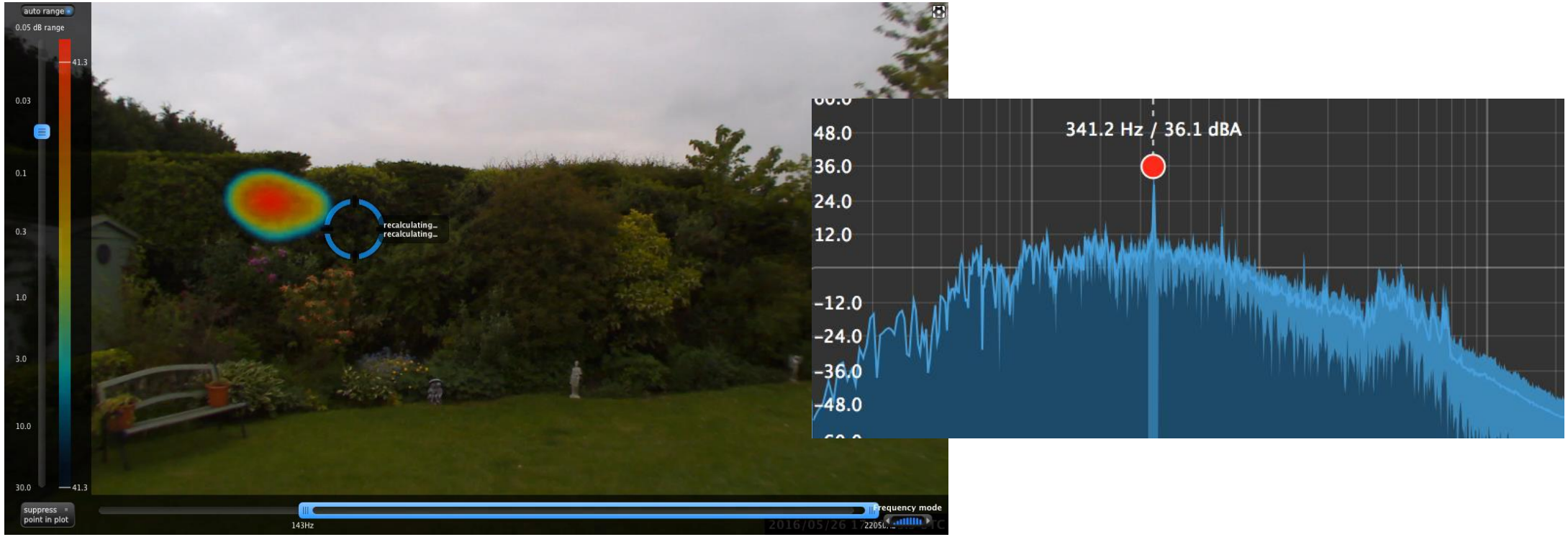
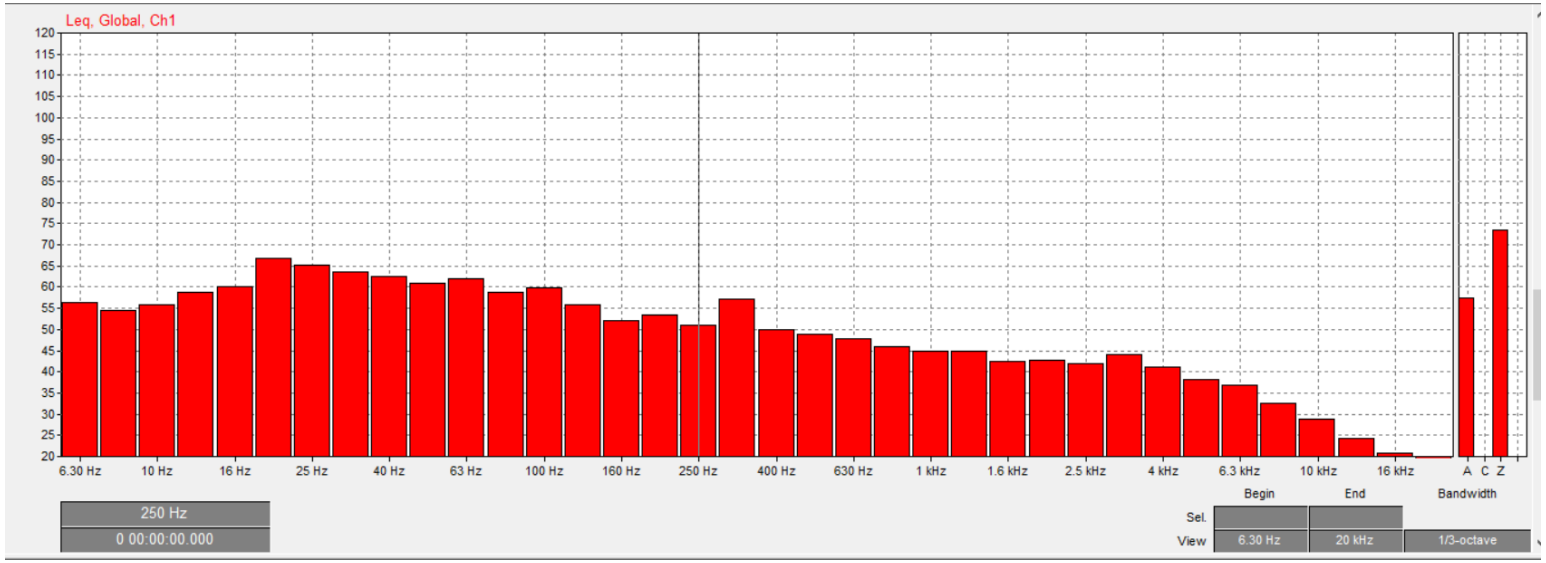
Can you guess what tonal frequency this is?



Tonal Penalty Options – Annex C



Subjective

- 2dB –Just Perceptible
- 4dB –Clearly Perceptible
- 6dB –Highly Perceptible

Objective

- The 6dB penalty is also applied instead of the above if the adjacent 1/3 octave values;
- Exceeds by 15dB from 25Hz-125Hz
- Exceeds by 8dB from 160-400Hz
- Exceeds by 5dB from 500-10kHz

Tonal Penalty Options – Annex D

- Objective Method 3

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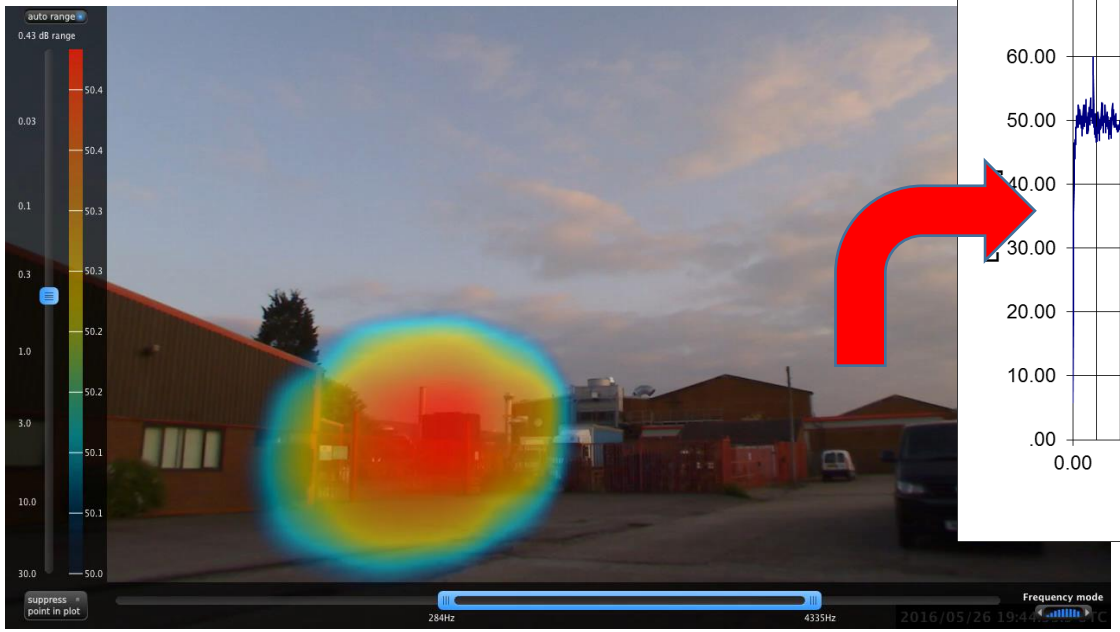
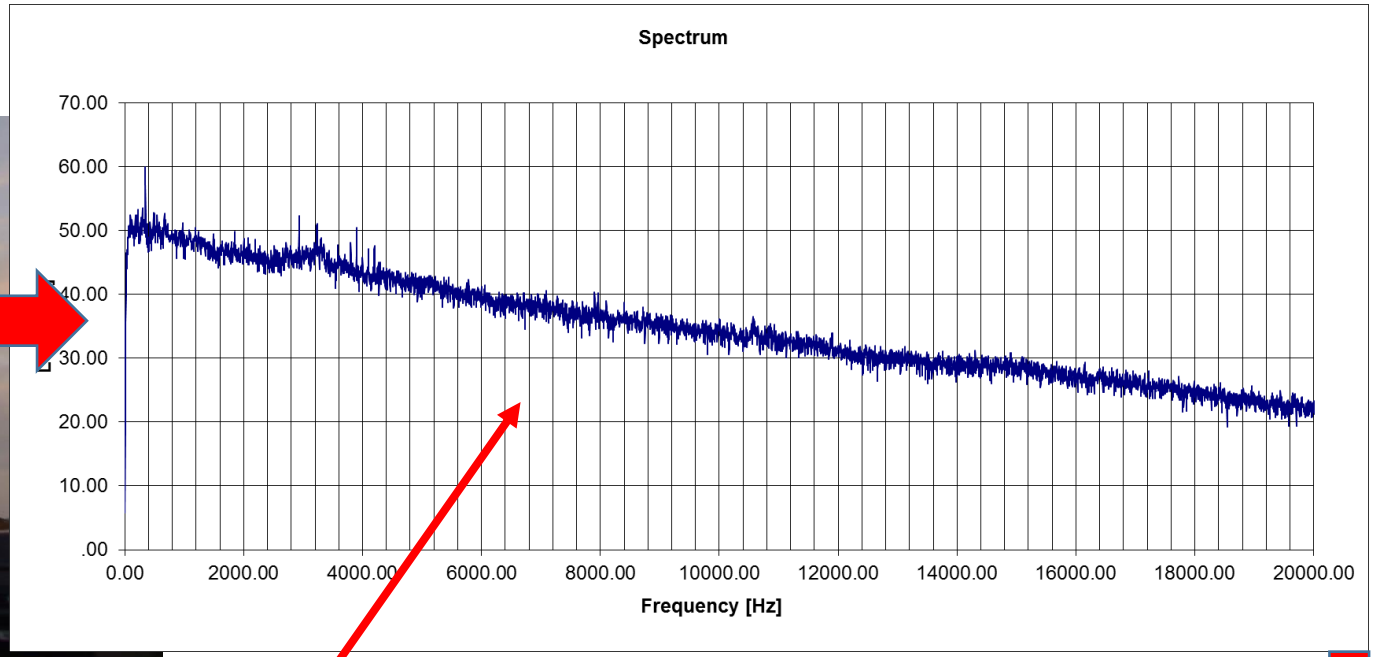


Acoustic Camera measurement file of noise source identifying location by frequency



FFT Output Graph from NorReview – based on audio file

Frequency [Hz]	3 dB Bandwidth [%]	Lpti [dB]	Kt [dB]
342.77	2.94	59.99	6.00
380.86	8.82	52.49	6.00
424.80	5.88	51.87	6.00
295.90	8.82	54.77	5.58

Tones & Penalty Rating for Source

Impulsive Correction – Annex E

Subjective

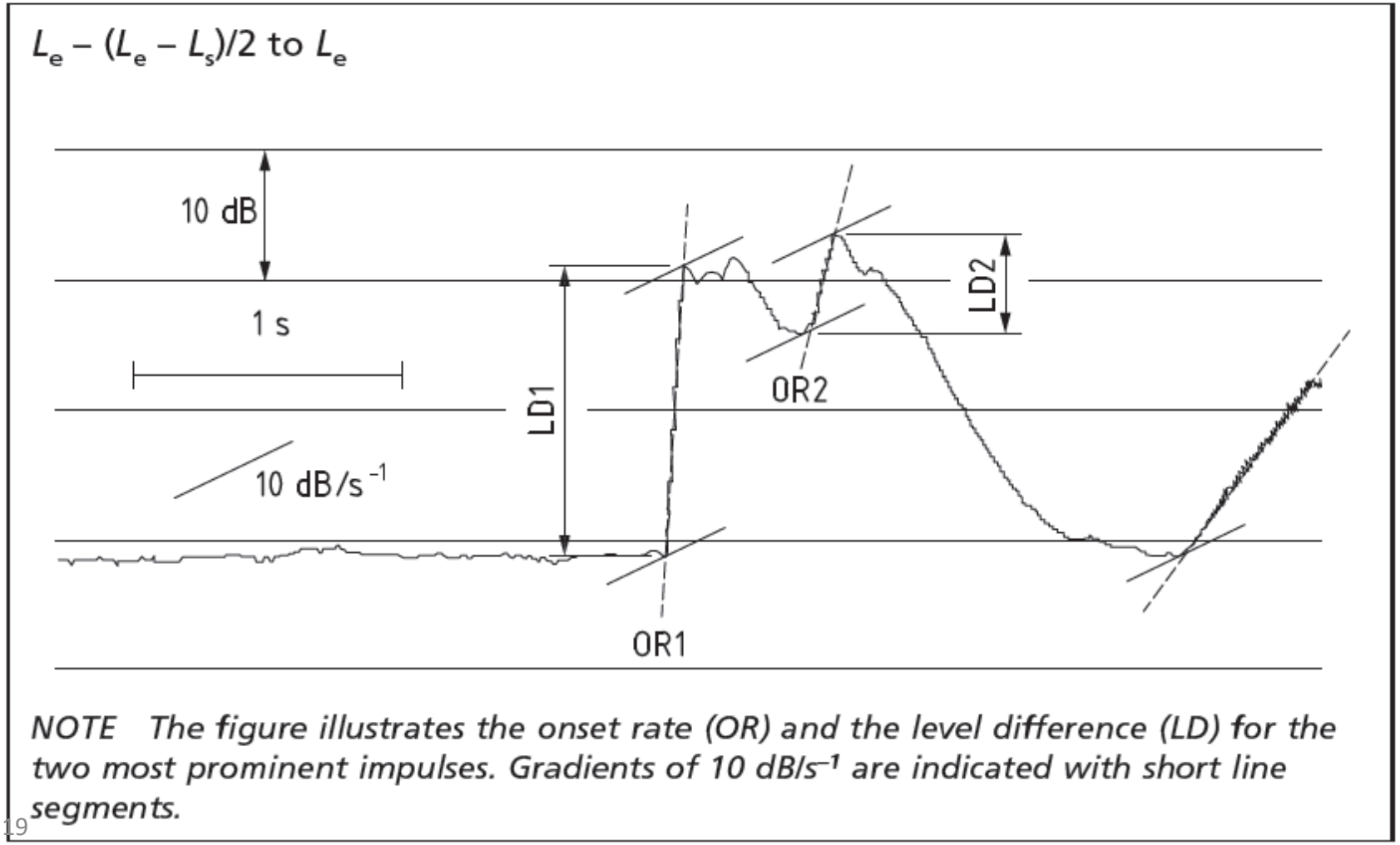
- 3dB –Just Perceptible
- 6dB –Clearly Perceptible
- 9dB –Highly Perceptible

Objective – Nordtest Method (complex)

- The 10ms-25ms A SPL are reviewed
- Difference between start and end of impulse used to calculate the Onset rate. This is turn is used to calculate the Prominance and in turn to calculate Penalty between 0 and 9dB.

Impulsive Correction – Annex E

Time history of the A-weighted sound pressure levels with time weighting F



NOTE The figure illustrates the onset rate (OR) and the level difference (LD) for the two most prominent impulses. Gradients of 10 dB/s^{-1} are indicated with short line segments.

Impulsive Correction – Annex E

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Table E.1 **Examples of the prominence *P* and the adjustment K_I for different sound sources**

Sound source	L_{AFmax} dB	Level diff. dB	Onset rate dBs	Prominence *P*	Adj. K_I dB
Background sound $L_{PA,F}$ = 40 dB					
Tyre change, pneumatic tool, L	48	7	38	6.4	2.6
Tyre change, pneumatic tool, H	67	17	76	8.1	5.5
Compressed air release, L	48	9	65	7.3	4.1
Compressed air release, H	67	27	140	9.3	7.8
Metal hammering, L	54	15	194	9.2	7.6
Metal hammering, H	75	35	222	10.1	9.2

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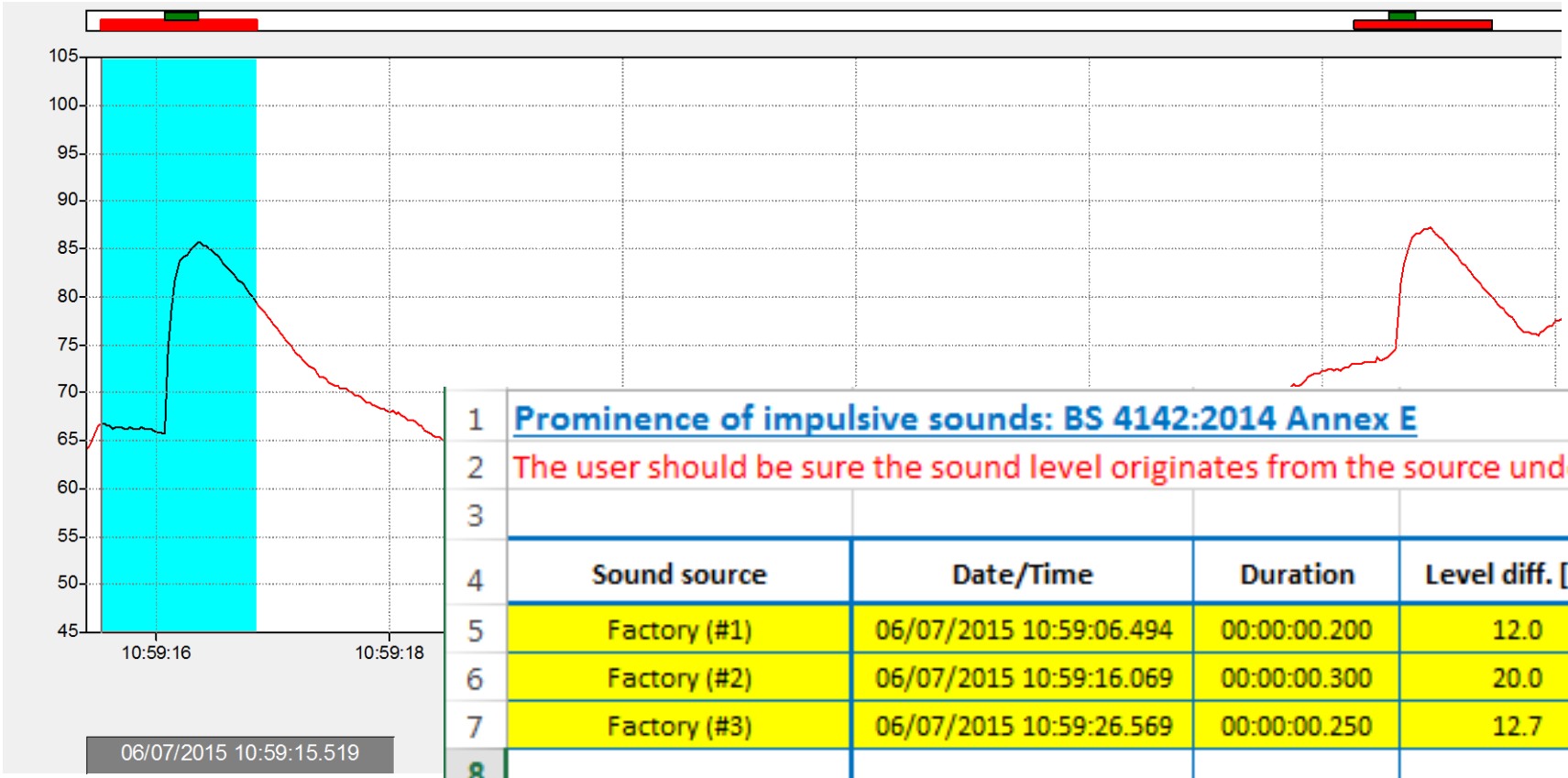
Impulsive Example

Impulsive Correction – Annex E

Objective – Software Calculations



Prominence of impulsive sounds: BS 4142:2014 Annex E

The user should be sure the sound level originates from the source under investigation before applying penalties

Sound source	Date/Time	Duration	Level diff. [dB]	Onset rate [dBs]	Prominence	Adj. Ki [dB]
Factory (#1)	06/07/2015 10:59:06.494	00:00:00.200	12.0	77.2	7.8	5.1
Factory (#2)	06/07/2015 10:59:16.069	00:00:00.300	20.0	53.7	7.8	5.0
Factory (#3)	06/07/2015 10:59:26.569	00:00:00.250	12.7	66.1	7.7	4.8

Applying Corrections – Caution

- Corrections are cumulative and can be large!
- Software calculations are very useful when justifying penalties…..
- Be careful when running the calculations that they are on the source under investigation!

Prominence of impulsive sounds: BS 4142:2014 Annex E
The user should be sure the sound level originates from the source under investigation before applying penalties

- Bird song nearby is tonal and impulsive.
- Record audio in parallel with measurements so you can be sure what you are analysing.

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Notes

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