

EMC Technologies (NZ) Ltd

Test Report No **00729.1**

Report date: 4 September 2001

Transient frequency behaviour

Transient frequency behaviour measurements are applicable to wide band transmitters operating in the frequency band 412 – 512 MHz as required by section 90.214.

Measurements were carried out at 420.0 MHz using the method described in ETS 300-086.

While this transmitter usually operates with a 100% duty cycle, measurements have been made to show the affect of the transmitter being powered on and off.

In summary this method calls for the use of an external signal generator tuned to 420.0 MHz with a output level 0.1 % (-30 dB) of the level from the transmitter with a 1 kHz tone with a frequency deviation of 25.0 kHz being applied to the input of a modulation analyser along with the output from the transmitter.

The modulation analyser produces an amplitude difference signal and a frequency difference signal, which are applied to the input of a storage oscilloscope.

The unmodulated transmitter is then keyed which produces a trigger pulse and a picture on the oscilloscope.

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The result of the change in the ration of power between the test signal from the signal generator and the transmitter output will produce 2 separate sides on the oscilloscope picture. One will show the 1000 Hz test modulation and the other will be the frequency difference of the transmitter versus time.

Measured Transient Deviation		
Period t ₁ (ms)	period t ₂ (ms)	period t ₃ (ms)
10.0	25.0	10.0
Frequency Difference from the Nominal Frequency (kHz)		
less than 5 kHz	Nil	Nil

Result: Complies

Measurement Uncertainty: *Frequency difference* ± 1.6 kHz
Time period ± 1 ms

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Transmitter turn on:

Green Trace = 1 kHz tone with FM deviation of 25 kHz.

Black trace = transmitter amplitude response (printed for information purposes only).

Green trace has been maximised to give full screen indication of a +/- 25 kHz.

Therefore each Y axis division = 6.25 kHz per division.

The X axis has been set to a sweep rate of 10 mS/division.

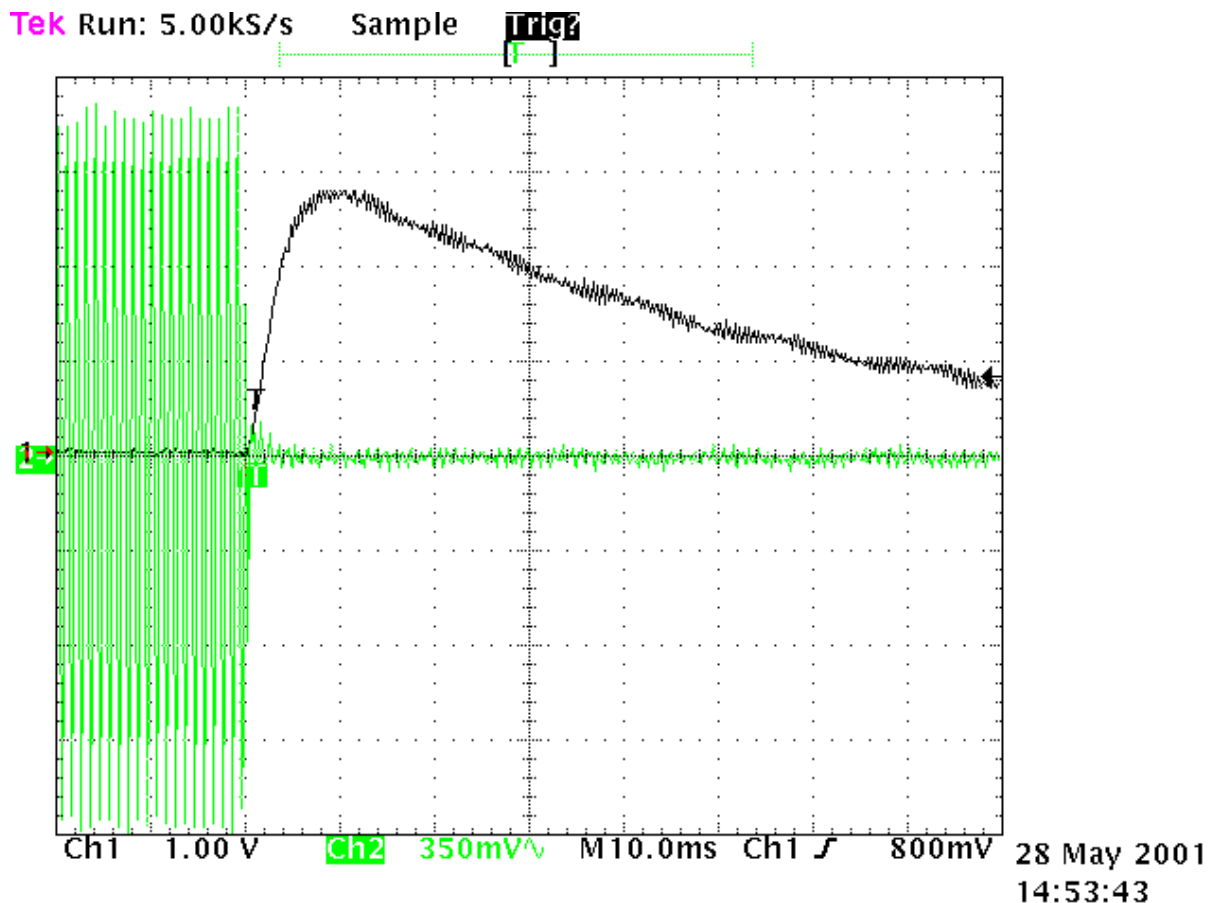
Triggering has been set to occur 2 divisions from the left hand edge (20 mS).

This is position *ton*.

t1 occurs between 2 and 3 divisions from the left hand edge.

t2 occurs between 3 and 5.5 divisions from the left hand edge.

A very small transient response can be observed after *ton* which is indicated by the green trace and not the black trace.



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Transmitter turn off:

Green Trace = 1 kHz tone with FM deviation of 25 kHz.

Black trace = transmitter amplitude response (printed for information purposes only).

Green trace has been maximised to give full screen indication of a +/- 25 kHz.

Therefore each Y axis division = 6.25 kHz per division.

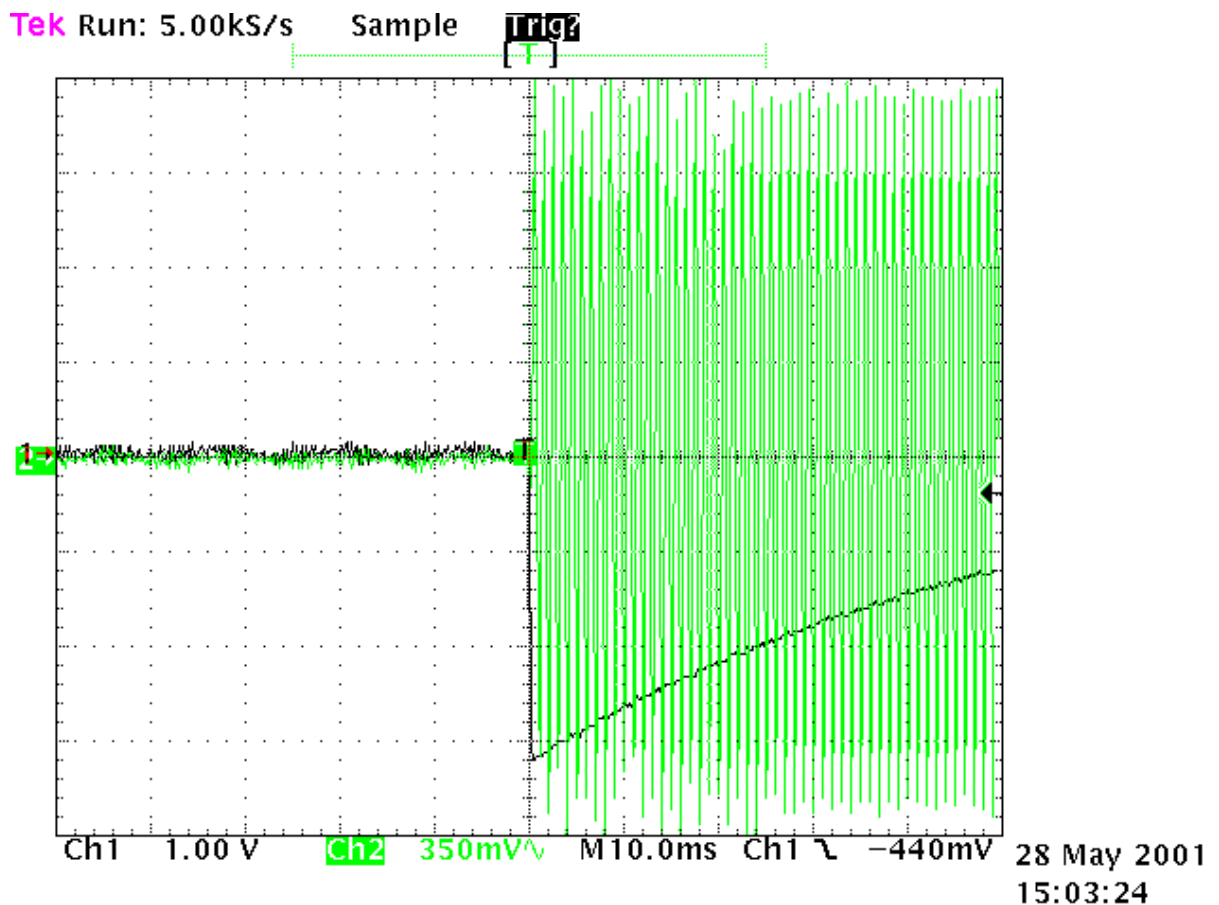
The X axis has been set to a sweep rate of 10 mS/division.

The display of the 1 kHz signal rising has been positioned 5 divisions from the left hand edge (50 mS).

This is position *toff*.

t3 occurs between 4.0 and 5.0 divisions from the left hand edge.

No transient response can be observed before *toff* which is indicated by the green trace and not the black trace.



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