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TEST REPORT

Crescendo RFI-450 UHF Digital Modem

tested to the

Code of Federal Regulations (CFR) 47

Part 90 –Private Land Mobile Services

for

STI Engineering Pty Ltd

This Test Report is issued with the authority of:

Andrew Cutler - General Manager

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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1. COMPLIANCE STATEMENT

The **Crescendo RFI-450 UHF Digital Modem** complies with the limits defined in 47 CFR Part 90 and 47 CFR Part 2 when tested in-accordance with the test methods described in 47 CFR Part 2 and ANSI C63.4, 2002.

2. RESULT SUMMARY

The results of testing, carried out in 24th – 30th September and October 7th 2013, are summarised below.

Clause	Description	Result
90.203	Certification required	Noted
2.1046 90.205	RF power output Power and antenna height limits	Noted Complies
2.1047 2.1047(a) 2.1047(b)	Modulation Characteristics Low pass filter response Modulation limiting characteristics	Noted Noted Noted
2.1049 2.202 90.207 90.209 90.210	Occupied bandwidth Bandwidths Types of emissions Bandwidth limitations Emission masks	Noted Noted Complies Complies Complies
2.1051	Spurious emissions at antenna terminals	Complies
2.1053	Field strength of spurious radiation	Complies
2.1055 90.213	Frequency stability Frequency stability	Noted Complies
90.214	Transient frequency behaviour	Complies
1.1310	Radio frequency exposure limits	Complies

3. ATTESTATION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification with the following conditions:

The client selected the test sample.

The report relates only to the sample tested.

This report does not contain corrections or erasures.

Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both Class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate.

In addition this equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations.

To the best of my knowledge, these tests were performed using measurement procedures that are consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards.

I further certify that the necessary measurements were made by EMC Technologies NZ Ltd, 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand.

Andrew Cutler
General Manager
EMC Technologies NZ Ltd

4. CLIENT INFORMATION

Company Name	STI Engineering Pty Ltd
Address	22 Boulder Rd Malaga, WA 6090
Country	Australia
Contact	Mr Lahiru Raffel

5. TEST SAMPLE DESCRIPTION

Brand Name	Crescendo
Model Number	RFI-450
Versions Tested	HWHDD03 (375- 465 MHz, 19.2 kbps, 25.0 kHz Channel) HNMDD03 (375- 465 MHz, 9.6 kbps, 12.5 kHz Channel) HWHDD08 (405-500 MHz, 19.2 kbps, 25.0 kHz Channel) HNMDD08 (405-500 MHz, 9.6 kbps, 12.5 kHz Channel)
Product	UHF digital modem
Manufacturer	RF Innovations
Manufactured in	Australia
Designed in	Australia
Serial Numbers	Version HWHDD03 serial number: B03191202021 Version HWHDD08 serial number: C08261202326
FCC ID	P5MRFI450H

The Crescendo RFI-450 is a UHF digital radio modem designed for telemetry and SCADA radio applications in point to point and point to multipoint industrial systems.

The test sample has sockets for a transmit antenna, dc power, Main RS232 and Aux RS232 ports.

The radio was tested for emissions using 4 –level FSK modulation with two different channel bandwidths, 25.0 kHz (19.2 kbps air rate) and 12.5 kHz 9.6 kbps air rate.

The sample tested has the following specifications:

Rated Transmitter Output Power

5.0 Watts (37.0 dBm)

Transmitter FCC frequency range

Part 90: 421- 512 MHz

Test frequencies

Chl	Frequency MHz	Power Watts	Spacing kHz
1	422.000	5.0	12.5 & 25.0
2	469.000	5.0	12.5 & 25.0
3	500.000	5.0	12.5 & 25.0

Emission Designators / Modes of operation

F1D – 19.2 kbps baud digital data
F1D – 9.6 kbps baud digital data

Power Supply

Rechargeable Lead acid battery DC voltage supply typically 12.0 Vdc

Standard Temperature and Humidity

Temperature: +15°C to + 30°C maintained.
Relative Humidity: 20% to 75% observed.

Standard Test Power Source

Standard Test Voltage: 13.8 Vdc

Extreme Temperature

High Temperature: + 50°C maintained.
Low Temperature: - 30°C maintained.

Extreme Test Voltages

High Voltage: 15.6 Vdc
Low Voltage: 10.8 Vdc

6. TEST RESULTS

Certification required

Part 90.203(j)

4) Applications for part 90 certification of transmitters designed to operate on frequencies in the 150.8–162.0125 MHz, 173.2–173.4 MHz, and/or 421–512 MHz bands, received on or after January 1, 2011,

(ii) 12.5 kHz for multi-bandwidth mode equipment with a maximum channel bandwidth of 12.5 kHz if it is capable of operating on channels of 6.25 kHz or less;

(iii) 25 kHz for multi-bandwidth mode equipment with a maximum channel bandwidth of 25 kHz if it is capable of operating on channels of 6.25 kHz or less; and

(iv) Up to 25 kHz if the equipment meets the efficiency standard of paragraph (j)(5) of this section.

(5), Applications for part 90 certification of transmitters designed to operate on frequencies in the 150.8–162.0125 MHz, 173.2–173.4 MHz, and/or 421–512 MHz bands, after January 1, 2011, must include a certification that the equipment meets a spectrum efficiency standard of one voice channel per 6.25 kHz of channel bandwidth.

Additionally, if the equipment is capable of transmitting data, has transmitter output power greater than 500 mW, and has a channel bandwidth of more than 6.25 kHz, the equipment must be capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth.

Result: Complies.

RF power output

Measurements were carried out at the RF output terminals of the transmitter using a 30 dB power attenuator and a 50 Ω dummy load.

Measurements were carried out when the transmitter was not being modulated.

Testing was carried out at maximum rated power output of 5 watts (37 dBm).

Frequency (MHz)	Voltage (Vdc)	Rated (dBm)	Measured (dBm)
469.000	13.8 Vdc	37.0	36.8
469.000	15.6 Vdc	37.0	36.8
469.000	10.8 Vdc	37.0	36.4

Limits:

90.205 Power and antenna height limits,

(s) The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with § 90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

Result: Complies.
Measurement Uncertainty: ± 0.5 dB

Part 90.207 – Emission types:
The following emission types are used:

- F1D: 4 level FSK (Frequency Shift Keying) sending data

Part 90.209 – Bandwidth limitations:

The authorised bandwidth is taken to be the necessary bandwidth.

Measurement has been used to determine as in cases not covered by paragraph (c) (1), (2), or (3) of section 90.209

Measurements have been made to verify the declared bandwidth.

The occupied bandwidth has been measured and compared against the occupied bandwidth declared by the client.

Measurements have been made of each modulation type using a spectrum analyser operating in peak hold mode and a 30 dB attenuator.

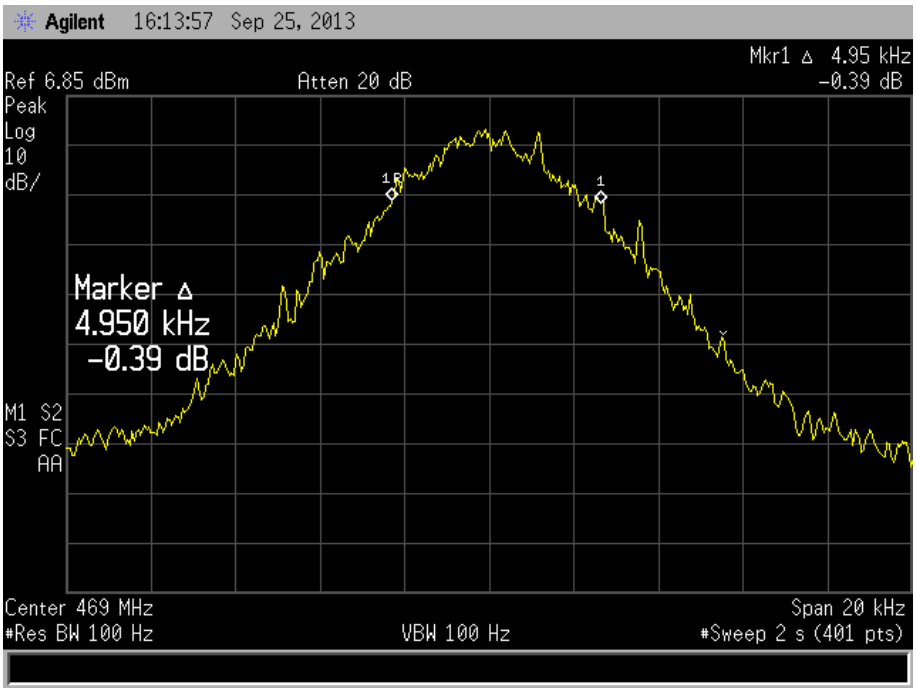
Initially power measurements are made using a resolution bandwidth of 120 kHz.

This level is used as a reference level on the spectrum analyser.

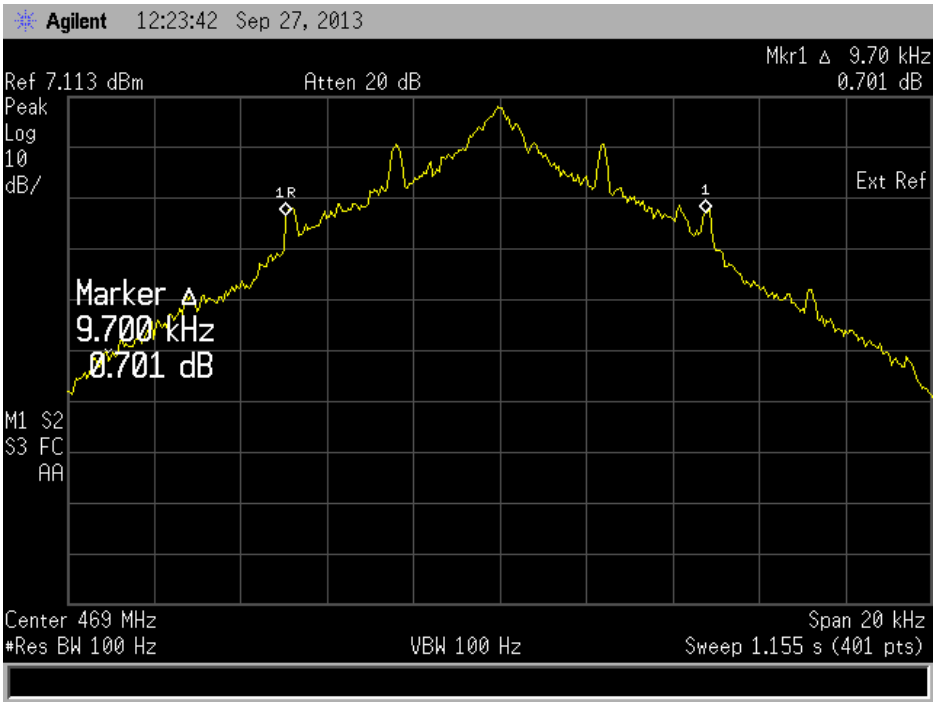
The resolution bandwidth is then changed to 100 Hz and the reference level minus 23 dB (99%) absolute bandwidth points determined

Emission	Channel	Measured	Authorised Bandwidth
F1D 9.6 kbps	12.5 kHz	4.950 kHz	11.25 kHz
F1D 19.2 kbps	25.0 kHz	9.700 kHz	20.0 kHz

F1D 12.5 kHz channel space, 9600 bps baud



F1D 25.0 kHz channel space, 19200 bps baud



Result: Complies

Spectrum Masks

Part 90.210 (2) states equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D.

Masks C and D have been applied as the transmitter has no audio low pass filter.

The transmitter can operate in the band 421-512 MHz using an authorised bandwidth of 11.25 kHz and channel spacing of 12.5 kHz and an authorised bandwidth of 20 kHz and a channel spacing of 25 kHz.

Measurements have been made of each modulation type using a spectrum analyser operating in peak hold mode and a 30 dB attenuator.

Initially power measurements are made using a resolution bandwidth of 120 kHz.

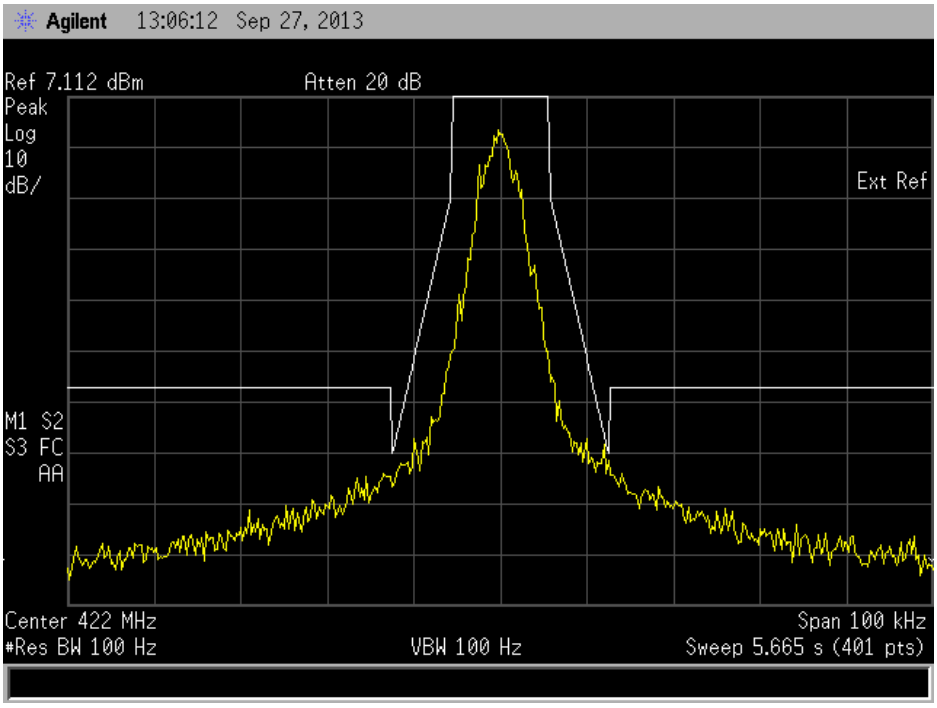
This level is used as a reference level on the spectrum analyser.

The resolution bandwidth is then changed to 100 Hz and the reference level minus 23 dB (99%) absolute bandwidth points determined.

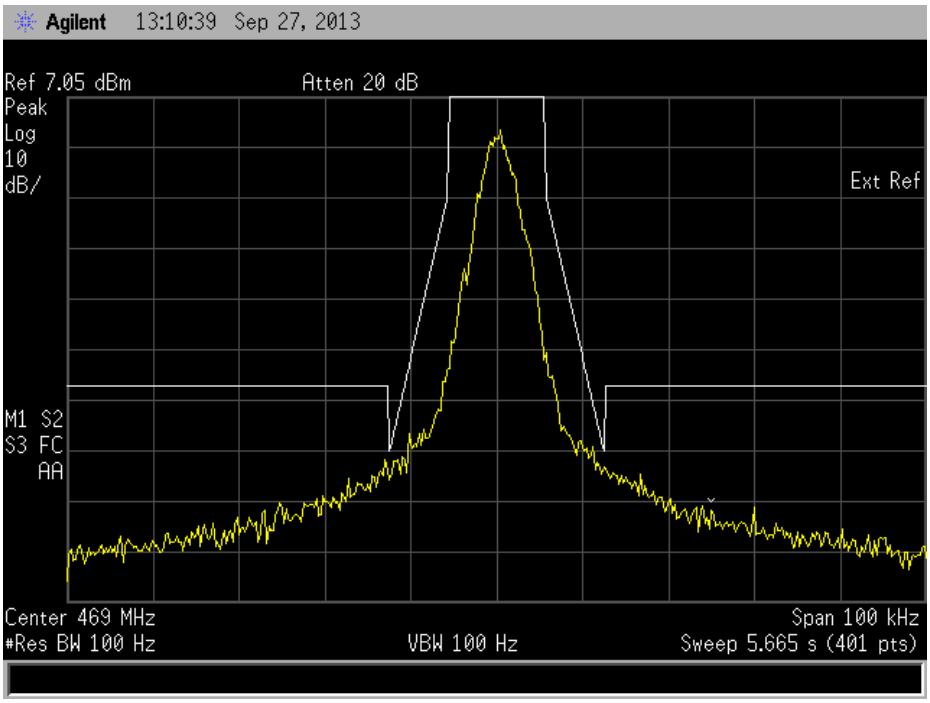
Measurements were made with the spectrum analyser operating in peak hold centred on the allocated frequency.

Result: Complies

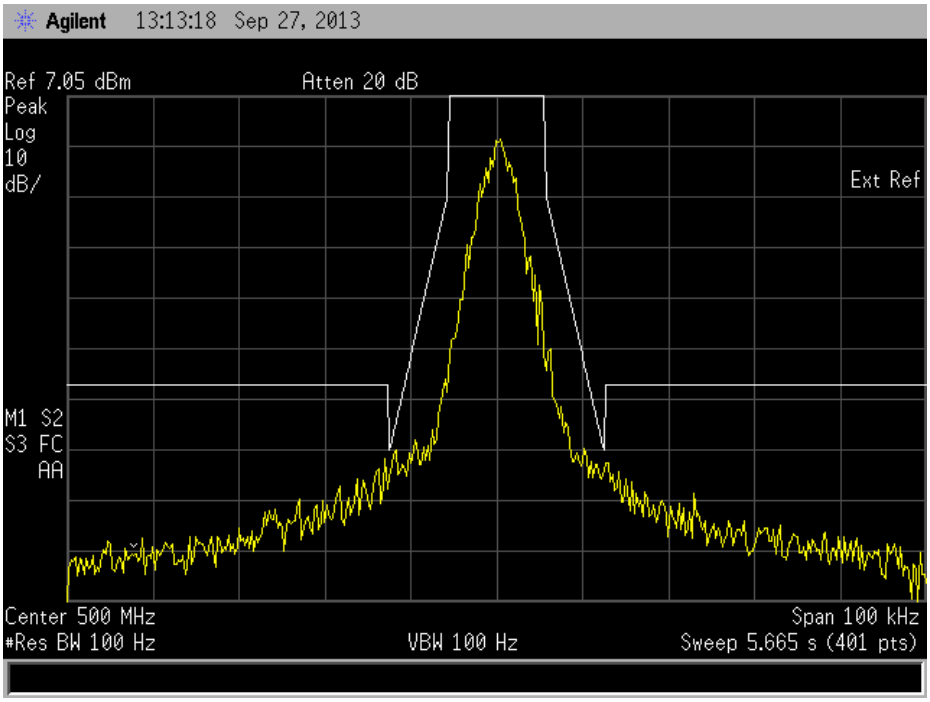
F1D 12.5 kHz Mask D, 422.000 MHz. 9600 bps



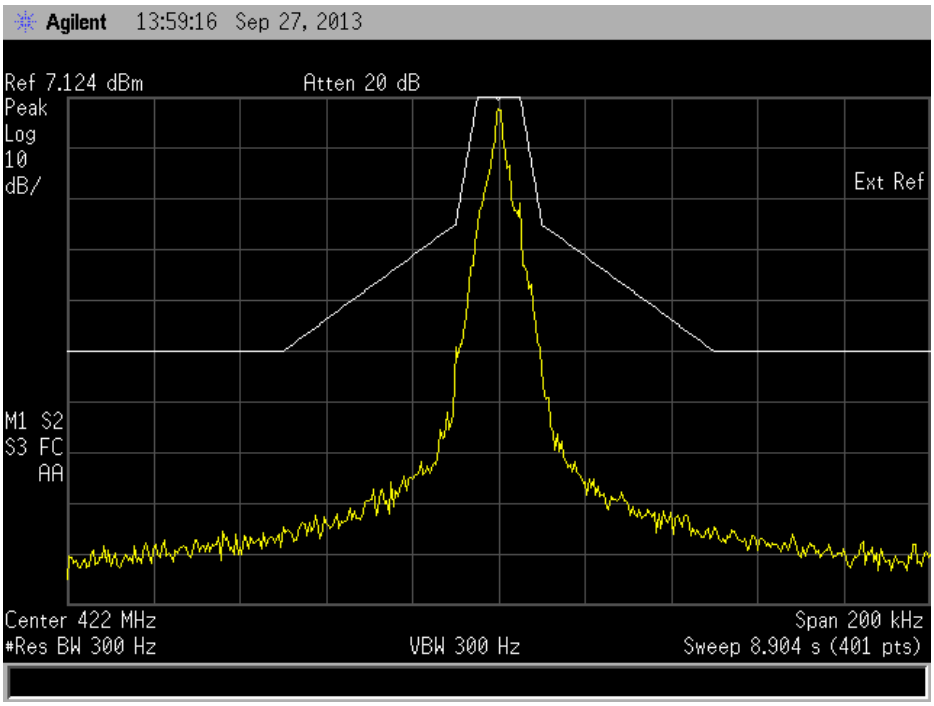
F1D 12.5 kHz Mask D, 469.000 MHz. 9600 bps



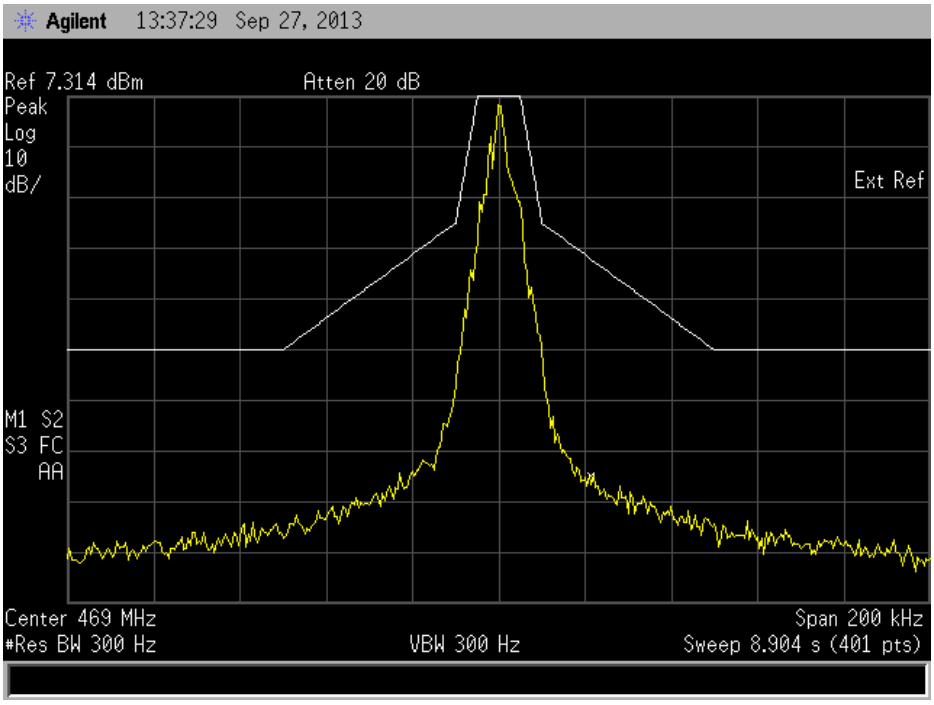
F1D 12.5 kHz Mask D, 500.000 MHz. 9600 bps



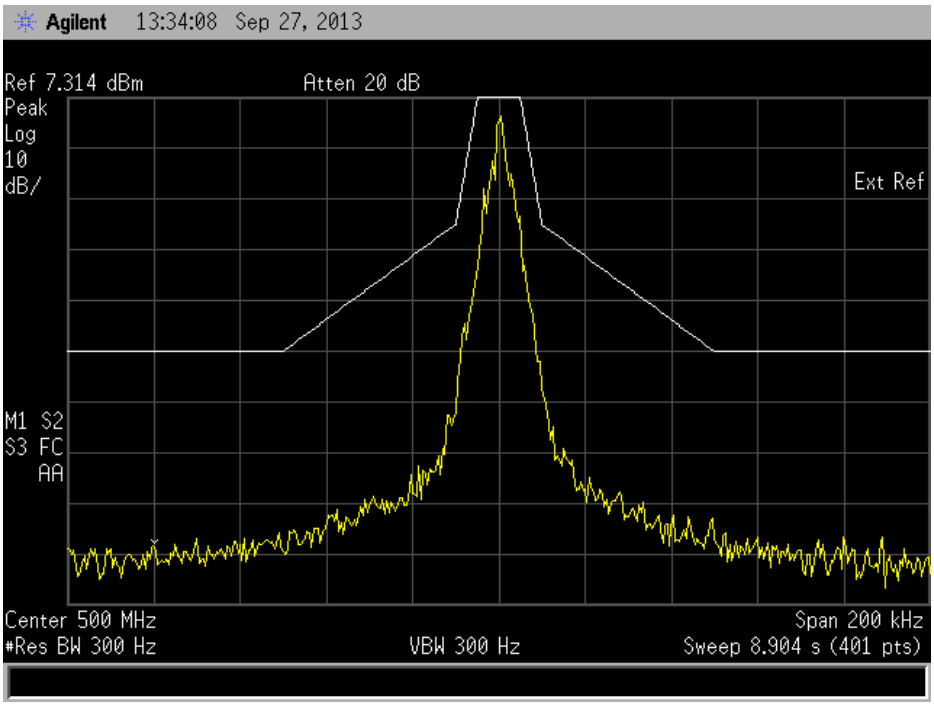
F1D 25.0 kHz Mask C, 422.000 MHz. 9600 bps



F1D 25.0 kHz Mask C, 469.000 MHz. 9600 bps



F1D 25.0 kHz Mask C, 500.000 MHz. 9600 bps



Transmitter spurious emissions at the antenna terminals

Frequency: 422.000 MHz

Spurious emission (MHz)	Emission level (dBm)	Limit (dBm)
844.000	-78.0	-20.0
1266.000	-77.4	-20.0
1688.000	< -80.0	-20.0
2110.000	< -80.0	-20.0
2532.000	< -80.0	-20.0
2954.000	< -80.0	-20.0
3376.000	< -80.0	-20.0
3798.000	< -80.0	-20.0
4220.000	< -80.0	-20.0

Frequency: 469.000 MHz

Spurious emission (MHz)	Emission level (dBm)	Limit (dBm)
938.000	-53.0	-20.0
1407.000	< -80.0	-20.0
1876.000	-73.0	-20.0
2345.000	< -80.0	-20.0
2814.000	< -80.0	-20.0
3283.000	< -80.0	-20.0
3752.000	< -80.0	-20.0
4221.000	< -80.0	-20.0
4690.000	< -80.0	-20.0

Frequency: 500.000 MHz

Spurious emission (MHz)	Emission level (dBm)	Limit (dBm)
1000.000	-63.0	-20.0
1500.000	< -80.0	-20.0
2000.000	< -80.0	-20.0
2500.000	< -80.0	-20.0
3000.000	< -80.0	-20.0
3500.000	< -80.0	-20.0
4000.000	< -80.0	-20.0
4500.000	< -80.0	-20.0
5000.000	< -80.0	-20.0

Limit:

Applied mask D, on any frequency removed from the centre of the authorised bandwidth by a displacement frequency of more than 12.5 kHz shall be attenuated by at least 50 + 10 log (P) or 70.0 dB whichever is the lesser attenuation.

The spectrum has been investigated up to the 10th harmonic of the transmitter.

A rated power of 5.0 watts gives a limit of –20 dBm.

The spurious emission limit defined by Mask D has been applied as this transmitter can operate using channel spacing of 12.5 kHz.

Part 2.1051 states that emissions greater than 20 dB below the limit need not be specified.

Part 2.1057 states that the spectrum should be investigated up to the 10th harmonic if the transmitter operates below 10 GHz.

Result: Complies.
Measurement Uncertainty: ± 3.3 dB

Field strength of the transmitter spurious emissions

Frequency: 422.000 MHz

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Polarity	Margin (dB)
844.0000	54.0	-43.4	-20.0	Vertical	23.4
	57.6	-39.8	-20.0	Horizontal	19.8
1266.0000	56.0	-41.4	-20.0	Vertical	21.4
	56.0	-41.4	-20.0	Horizontal	21.4
1688.0000	59.0	-38.4	-20.0	Vertical	18.4
	59.0	-38.4	-20.0	Horizontal	18.4
2110.0000	64.2	-33.2	-20.0	Vertical	13.2
	63.5	-33.9	-20.0	Horizontal	13.9
2532.0000	66.2	-31.2	-20.0	Vertical	11.2
	65.3	-32.1	-20.0	Horizontal	12.1
2954.0000	54.1	-43.3	-20.0	Vertical	23.3
	54.0	-43.4	-20.0	Horizontal	23.4
3376.0000	54.3	-43.1	-20.0	Vertical	23.1
	54.5	-42.9	-20.0	Horizontal	22.9
3798.0000	57.0	-40.4	-20.0	Vertical	20.4
	57.0	-40.4	-20.0	Horizontal	20.4
4220.0000	58.8	-38.6	-20.0	Vertical	18.6
	58.7	-38.7	-20.0	Horizontal	18.7

Frequency: 469.000 MHz

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Polarity	Margin (dB)
938.0000	51.0	-46.4	-20.0	Vertical	26.4
	55.1	-42.3	-20.0	Horizontal	22.3
1407.0000	44.4	-53.0	-20.0	Vertical	33.0
	45.2	-52.2	-20.0	Horizontal	32.2
1876.0000	48.1	-49.3	-20.0	Vertical	29.3
	47.6	-49.8	-20.0	Horizontal	29.8
2345.0000	53.0	-44.4	-20.0	Vertical	24.4
	53.0	-44.4	-20.0	Horizontal	24.4
2814.0000	54.0	-43.4	-20.0	Vertical	23.4
	54.0	-43.4	-20.0	Horizontal	23.4
3283.0000	54.3	-43.1	-20.0	Vertical	23.1
	54.3	-43.1	-20.0	Horizontal	23.1
3752.0000	57.0	-40.4	-20.0	Vertical	20.4
	57.1	-40.3	-20.0	Horizontal	20.3
4221.0000	58.8	-38.6	-20.0	Vertical	18.6
	58.8	-38.6	-20.0	Horizontal	18.6
4690.0000	60.3	-37.1	-20.0	Vertical	17.1
	60.3	-37.1	-20.0	Vertical	17.1

Frequency: 500.000 MHz

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Polarity	Margin (dB)
1000.0000	48.0	-49.4	-20.0	Vertical	29.4
	50.2	-47.2	-20.0	Horizontal	27.2
1500.0000	45.9	-51.5	-20.0	Vertical	31.5
	45.5	-51.9	-20.0	Horizontal	31.9
2000.0000	53.1	-44.3	-20.0	Vertical	24.3
	53.2	-44.2	-20.0	Horizontal	24.2
2500.0000	53.0	-44.4	-20.0	Vertical	24.4
	53.0	-44.4	-20.0	Horizontal	24.4
3000.0000	54.1	-43.3	-20.0	Vertical	23.3
	54.1	-43.3	-20.0	Horizontal	23.3
3500.0000	55.0	-42.4	-20.0	Vertical	22.4
	55.0	-42.4	-20.0	Horizontal	22.4
4000.0000	58.0	-39.4	-20.0	Vertical	19.4
	58.0	-39.4	-20.0	Horizontal	19.4
4500.0000	60.0	-37.4	-20.0	Vertical	17.4
	60.0	-37.4	-20.0	Horizontal	17.4
5000.0000	61.0	-36.4	-20.0	Vertical	16.4
	61.0	-36.4	-20.0	Horizontal	16.4

In transmit mode the transmitter was tested while transmitting continuously while attached to a dummy load.

The power level of each emission was determined by replacing the transmitter with a dipole antenna that was connected to a signal generator.

The signal generator output level was increased until the same field strength level was observed at each emission frequency.

The level recorded is the signal generator output level in dBm less any gains / losses due to the coax cable and the dipole antenna.

Device was tested on an open area test site at a distance of 3 metres.

Testing was carried out at EMC Technologies NZ Ltd Open Area Test Site, which is located at Driving Creek, Orere Point, Auckland. Details of this site have been filed with the Commission, Registration Number: 90838, which was last updated in July 2013

Limit:

All spurious emissions are to be attenuated by at least 50 + 10 log (P). The rated power of 5 watts gives a limit of –20 dBm.

No measurements were made above the 10th harmonic.

Result: Complies.
Measurement Uncertainty: ± 4.1 dB

Frequency Stability

Frequency stability measurements were between - 30°C and + 50°C in 10°C increments.

At each temperature the transmitter was given a period of 30 minutes to stabilise.

The transmitter was then turned on and the frequency error measured after a period of 1 minute.

Frequency: 469.000 MHz

Temperature	Voltage 10.8 Vdc	Voltage 13.8 Vdc	Voltage 15.6 Vdc
+50°C	-63.0	-69.0	-65.0
+40°C	-99.0	-99.0	-104.0
+30°C	+53.0	+52.0	+52.0
+20°C	+76.0	+78.0	+77.0
+10°C	+238.0	+251.0	+241.0
0°C	+260.0	+277.0	+263.0
-10°C	-187.0	+247.0	+240.0
-20°C	+181.0	+143.0	+135.0
-30°C	+87.0	+112.0	+125.0

Limit:
Part 90.213 states that mobile station transmitters operating between 421 – 512 MHz with 12.5 kHz channelling are required to have a frequency tolerance of 2.5 ppm.

The Part 90 frequency stability requirement has been applied to this transmitter.

This transmitter was tested on 469.000 MHz.

2.5 ppm = 2.5 x 469 = 1173 Hz.

Result: Complies.
Measurement Uncertainty: ± 30 Hz.

Transient frequency behaviour

Transient frequency behaviour measurements are applicable to wide band and narrow band transmitters operating in the frequency band 421 - 512 MHz.

Measurements were carried out using the method described in TIA-603 and EN 300-086.

In summary this method calls for the use of an external signal generator tuned to transmitter transmit frequency of 440.075 MHz with an output level 0.1 % (-30 dB) of the level from the transmitter with a 1 kHz tone with a frequency deviation of 12.5 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 that is AC coupled to the oscilloscope that produces a display on the screen.

The result of the change in the ratio 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.

Channel Spacing	Period t_1 (kHz)	Period t_2 (kHz)	Period t_3 (kHz)
12.5 kHz	Nil	Nil	Nil
25.0 kHz	Nil	Nil	Nil

Limits:

Time Interval	Period	12.5 kHz Deviation (kHz)	25 kHz Deviation (kHz)
t_1	10 mS	± 12.5	± 25.0
t_2	25 mS	± 6.25	± 12.5
t_3	10 mS	± 12.5	± 25.0

Result: Complies.
Measurement Uncertainty: Frequency difference ± 1.6 kHz, Time period ±1 ms.

12.5 kHz transmitter turn on

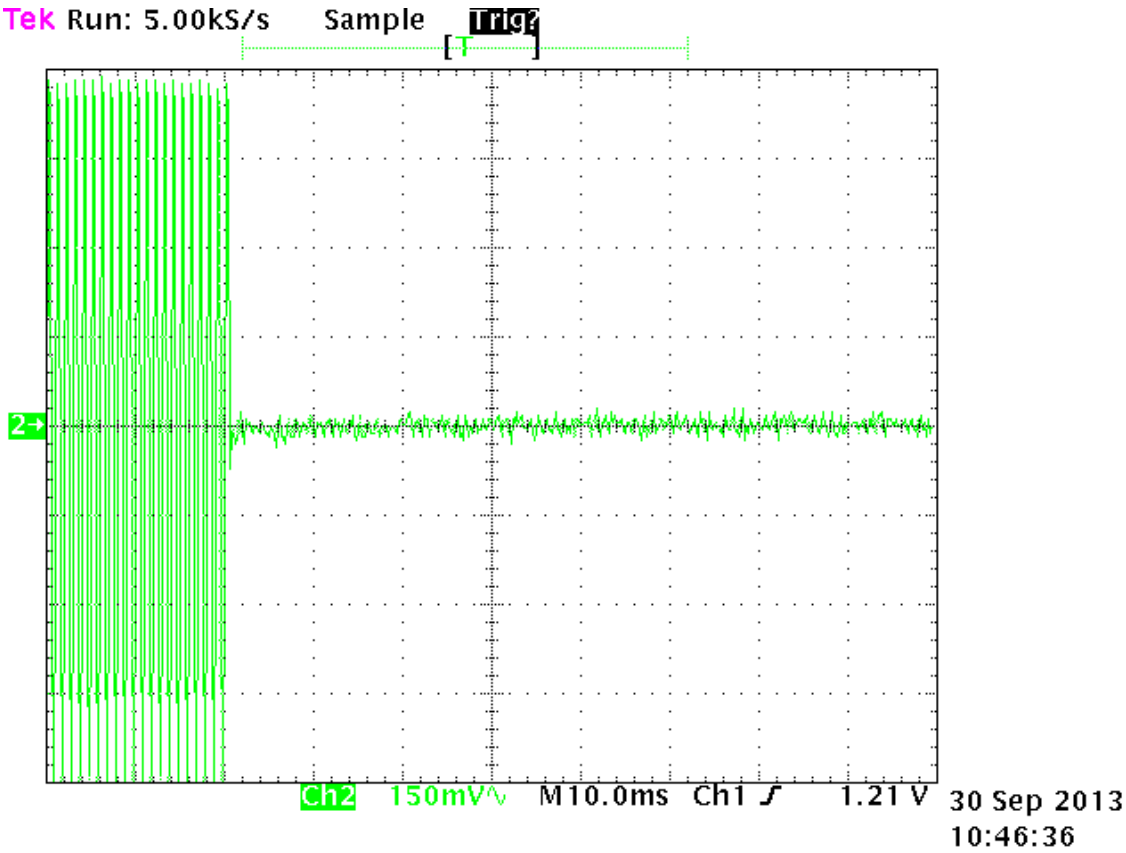
Green Trace = 1 kHz tone with FM deviation of 12.5 kHz and any transient.

Green trace has been maximised to give full screen indication of a ±12.5 kHz.
Therefore each Y axis division = 3.125 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 *t*on.

*t*1 occurs between 2.0 and 3.0 divisions from the left-hand edge.
t2 occurs between 3.0 and 5.5 divisions from the left-hand edge.

No transient response can be observed during *t*1 and *t*2.



12.5 kHz transmitter turn off

Green Trace = 1 kHz tone with FM deviation of 12.5 kHz and any transient.

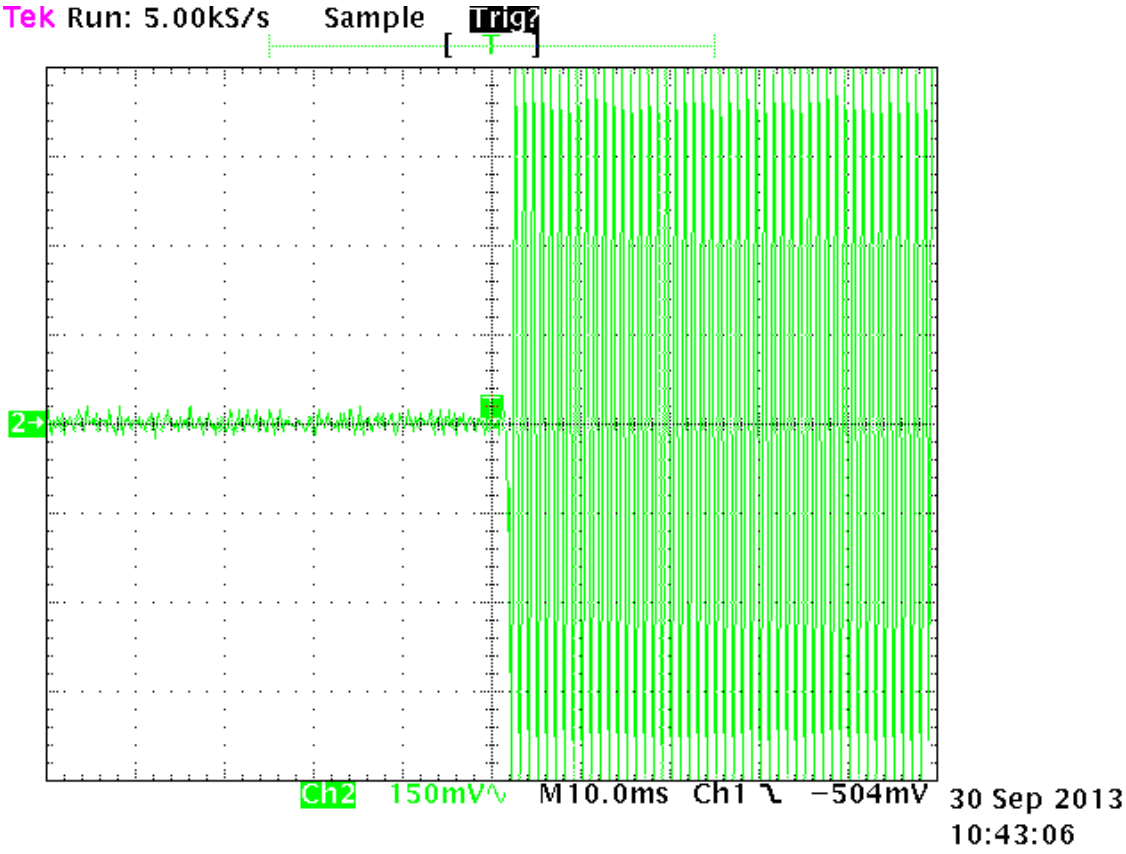
Green trace has been maximised to give full screen indication of a ± 12.5 kHz.
Therefore each Y axis division = 3.125 kHz per division.
The X axis has been set to a sweep rate of 10 ms/division.

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

This is position *t*off.

*t*3 occurs between 4.0 and 5.0 divisions from the left hand edge.

No transient response can be observed before *t*off.



25.0 kHz transmitter turn on

Green Trace = 1 kHz tone with FM deviation of 25.0 kHz.

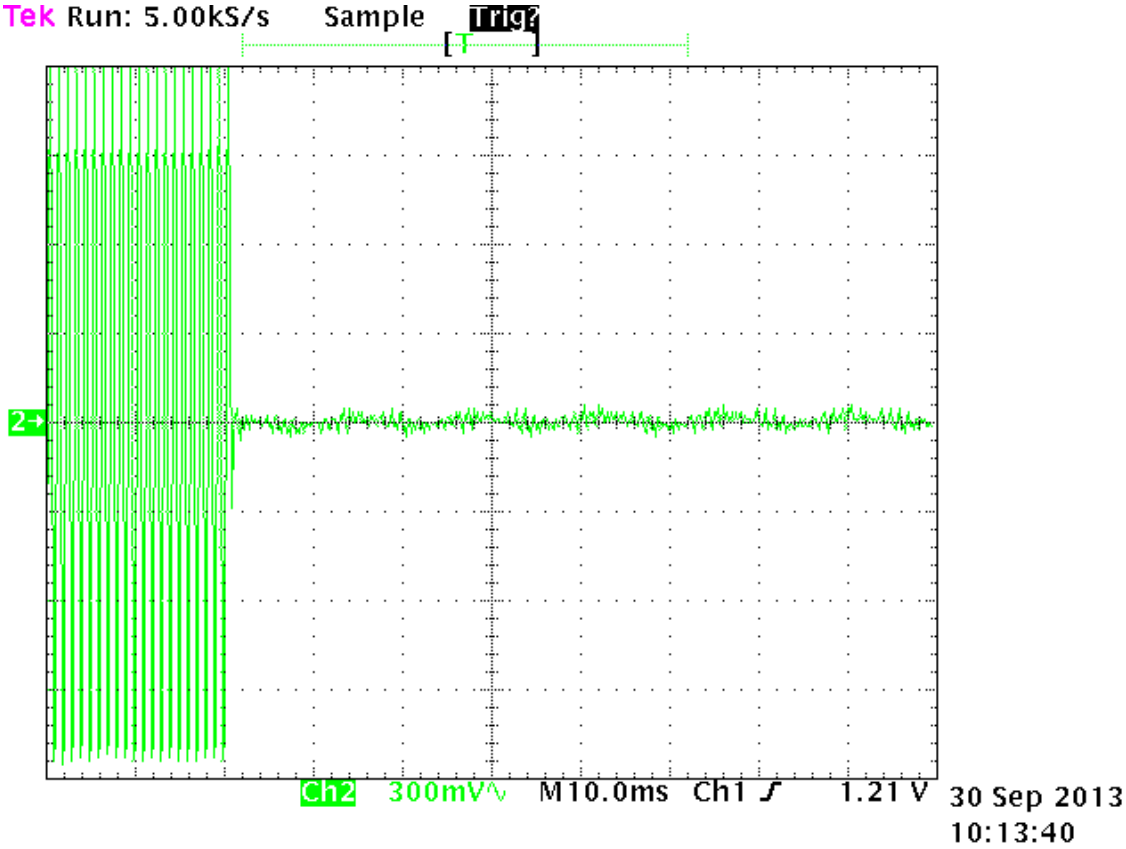
Green trace has been maximised to give full screen indication of +/- 25.0 kHz.
Therefore each Y axis division = 6.25 kHz per division.
The X axis has been set to a sweep rate of 10 mS/division.

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

*t*on occurs at 20 mS.

*t*1 occurs between 2.0 and 3.0 divisions from the left hand edge.
*t*2 occurs between 3.0 and 5.5 divisions from the left hand edge.

No transient response can be observed during *t*1 and *t*2.



25.0 kHz transmitter turn off

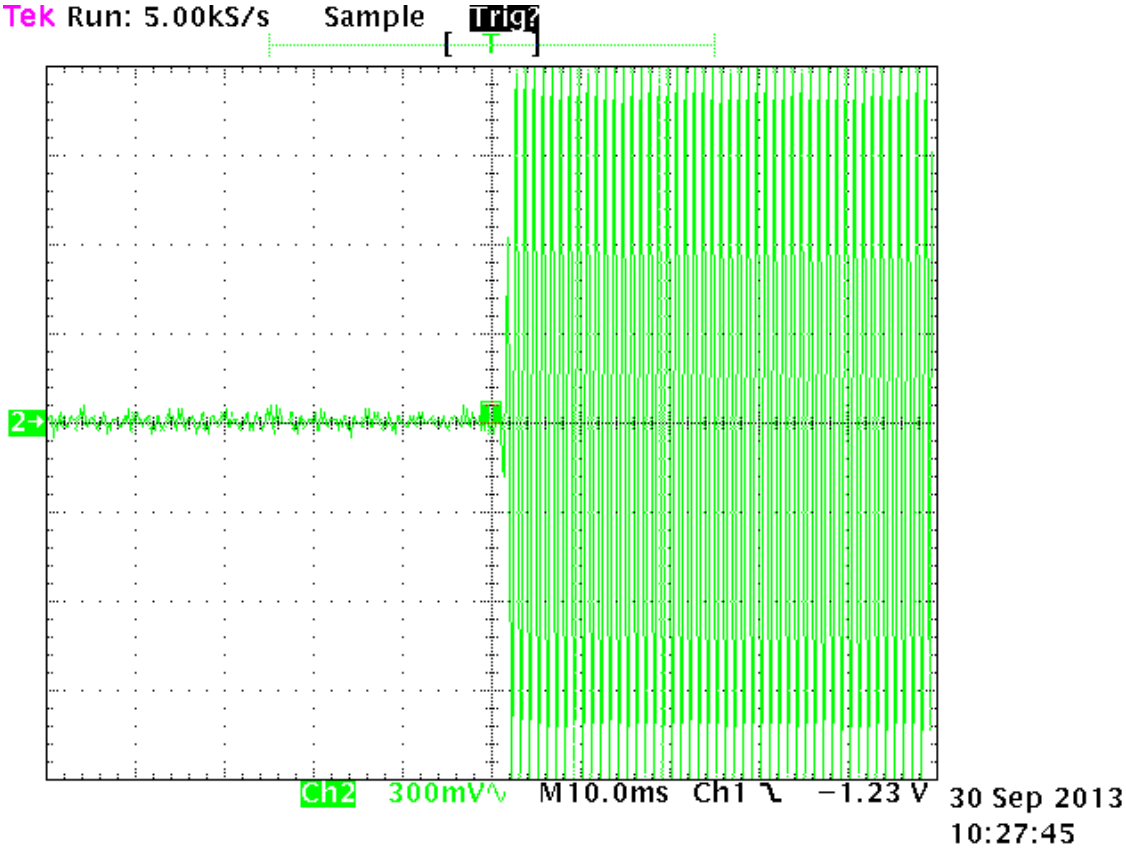
Green Trace = 1 kHz tone with FM deviation of 25.0 kHz.

Green trace has been maximised to give full screen indication of +/- 25.0 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 *t*off.

*t*3 occurs between 4.0 and 5.0 divisions from the left hand edge..

No transient response can be observed before *t*off.



Exposure of humans to RF fields

As per Section 1.1310 mobile transmitters are required to be operated in a manner that ensures the public is not exposed to RF energy levels in accordance with OST/OET Bulletin Number 65.

Calculations have been made using the General Public Exposure limits.

Minimum safe distances have been calculated below at 422 MHz.

Power density, $mW/cm^2 = E^2/3770$

- General Public / Uncontrolled exposure limit will be 0.281 mW/cm^2 or 32.5 V/m.

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in metres:

E, V/m = (√ (30 * P * G * DC)) / d

The rated maximum transmitter power (P) = 5 watts.

Transmitter is operated using an antenna with a gain (G) of up to 20 (+13 dBi).

The client has declared a duty cycle (DC) of 100% (1)

General Public / Uncontrolled

d = √ (30 * P * G*DC) / E

d = √ (30 * 5 * 20 * 1) / 32.5

d = 1.68 metres or 168 cm

Result: Complies if the above safe distance is defined in the user manual for this equipment.

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial #	Asset	Cal Due
Aerial Controller	EMCO	1090	9112-1062	3710	N/a
Aerial Mast	EMCO	1070-1	9203-1661	3708	N/a
Turntable	EMCO	1080-1-2.1	9109-1578	3709	N/a
VHF Balun	Schwarzbeck	VHA9103	-	3603	12/01/2015
Biconical Antenna	Schwarzbeck	BBA 9106	-	3612	12/01/2015
Log Periodic	Schwarzbeck	VUSLP 91111	9111-228	3785	12/01/2015
Horn Antenna	Electrometrics	RGA-60	6234	E1494	04/07/2014
Measuring receiver	Rohde & Schwarz	ESIB-40	100171	EMC4003	20/10/2013
Modulation Analyzer	Rohde & Schwarz	FMA	837807/020	E1552	15/01/2015
Oscilloscope	Tektronics	745A	B010643	E1569	15/01/2015
Power Attenuator	Weinschel	49-20-43	GC104	E1308	N/a
Power Supply	Hewlett Packard	6032A	2743A-02859	E1069	N/a
Signal Generator	Rohde & Schwarz	SMHU	838923/028	E1493	22/01/2015
Spectrum Analyzer	Hewlett Packard	E7405A	US39150142	RFS 3776	26/02/2015
Thermal chamber	Contherm	M180F	86025	E1129	01/06/2015
Thermometer	DSIR	RT200	035	E1049	01/06/2015

8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd registration with the Federal Communications Commission as a listed facility, Registration Number: 90838, which was last updated in July 2013.

All testing has been carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to ISO/IEC 17025.

All measurement equipment has been calibrated in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to ISO/IEC 17025.

International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with 46 accreditation bodies in 34 economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

9. PHOTOGRAPHS