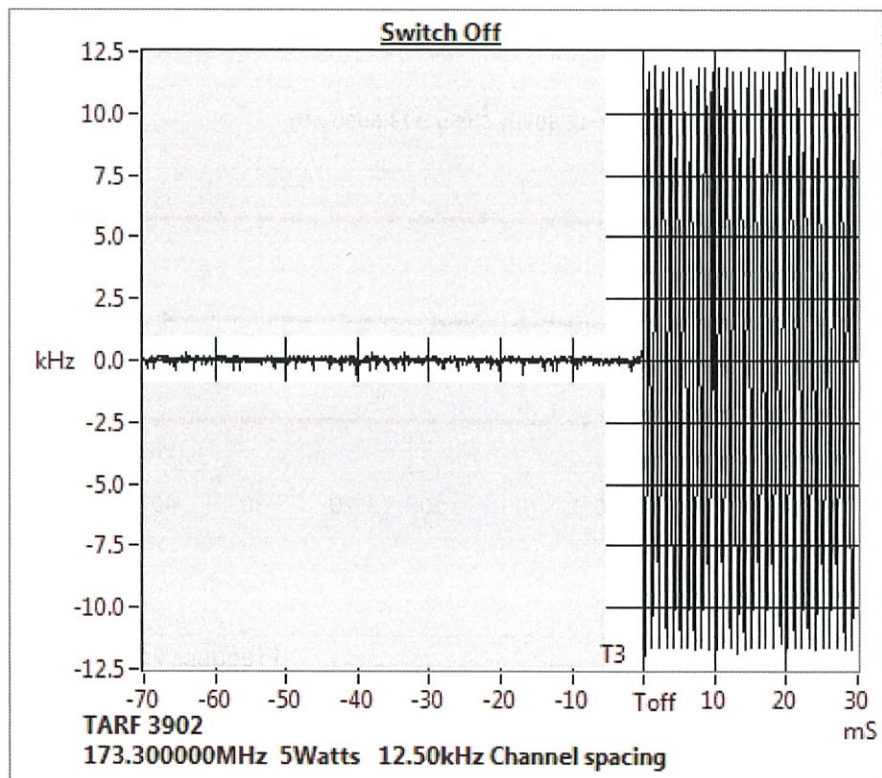
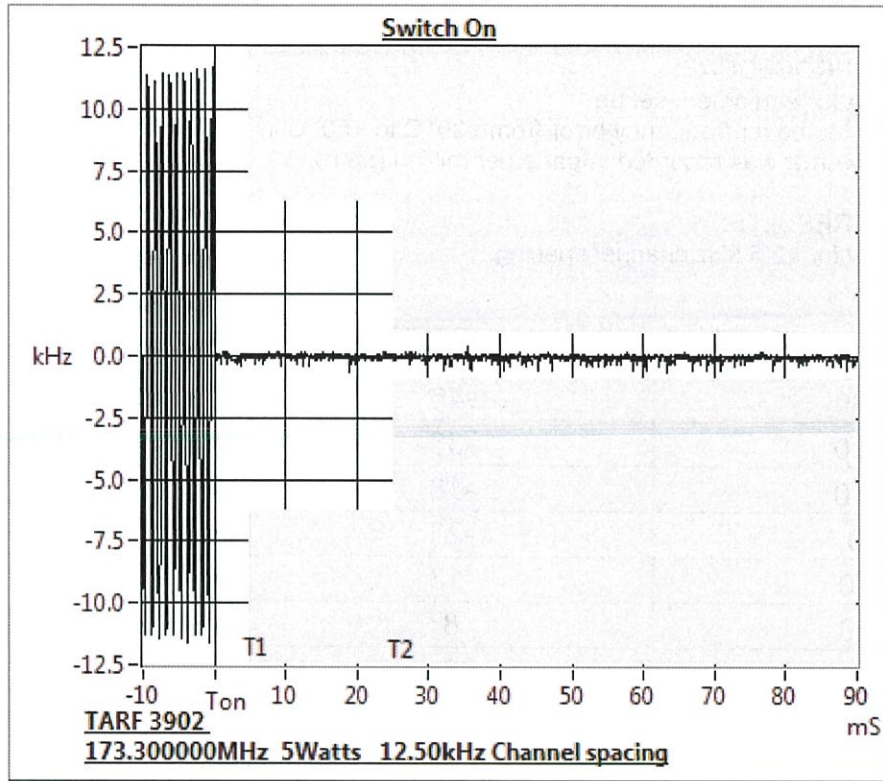


Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 173.3 MHz 5 W 12.5 kHz Channel Spacing



TRANSMITTER FREQUENCY STABILITY - TEMPERATURE

SPECIFICATION: FCC 47 CFR 2.1055 (a) (1)

GUIDE: TIA/EIA-603D 2.2.2

MEASUREMENT PROCEDURE:

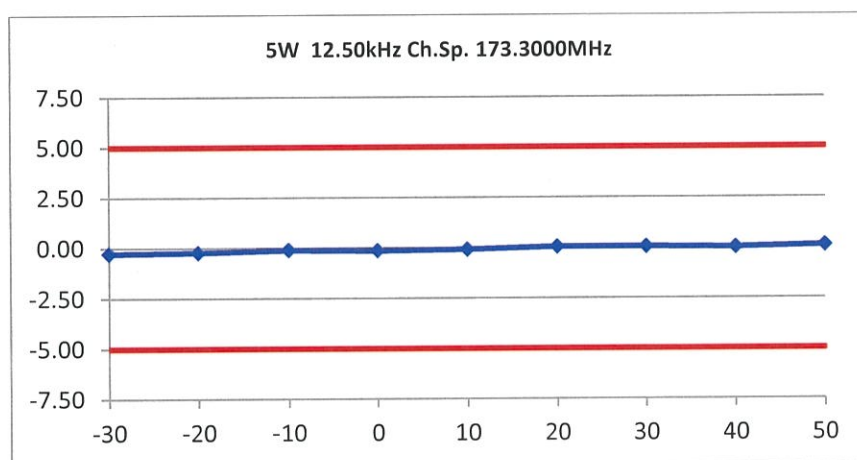
1. Refer Annex A for equipment set up.
2. The EUT was tested for frequency error from -30°C to $+50^{\circ}\text{C}$ in 10°C increments
3. The frequency error was recorded in parts per million (ppm).

MEASUREMENT RESULTS:

See the plot below for 12.5 kHz channel spacing.

173.3 MHz

Temperature ($^{\circ}\text{C}$)	Frequency (Hz)	Error (ppm)
-30	-46	-0.27
-20	-38	-0.22
-10	-18	-0.10
0	-23	-0.13
10	-13	-0.08
20	8	0.05
30	8	0.05
40	3	0.02
50	19	0.11
Measurement Uncertainty	$\pm 7 \times 10^{-8}$	



LIMIT: FCC 47 CFR 90.213

Channel Spacing (kHz)	Frequency Error (ppm)
12.5	5.0

TRANSMITTER FREQUENCY STABILITY - VOLTAGE

SPECIFICATION: FCC 47 CFR 2.1055 (d) (1)

GUIDE: TIA/EIA-603D 2.2.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. The EUT was tested for frequency error at an input voltage to the radio of 85% to 100%.
3. The frequency error was recorded in parts per million (ppm).

MEASUREMENT RESULTS:

Voltage	FREQUENCY ERROR (ppm) for 12.5 kHz
	173.3 MHz
6.375 V _{DC}	0.00
7.500 V _{DC}	0.01
Measurement Uncertainty	$\pm 7 \times 10^{-8}$

LIMIT CLAUSE: FCC 47 CFR 90.213

Channel Spacing (kHz)	Frequency Error (ppm)
12.5	5.0

TEST EQUIPMENT LIST

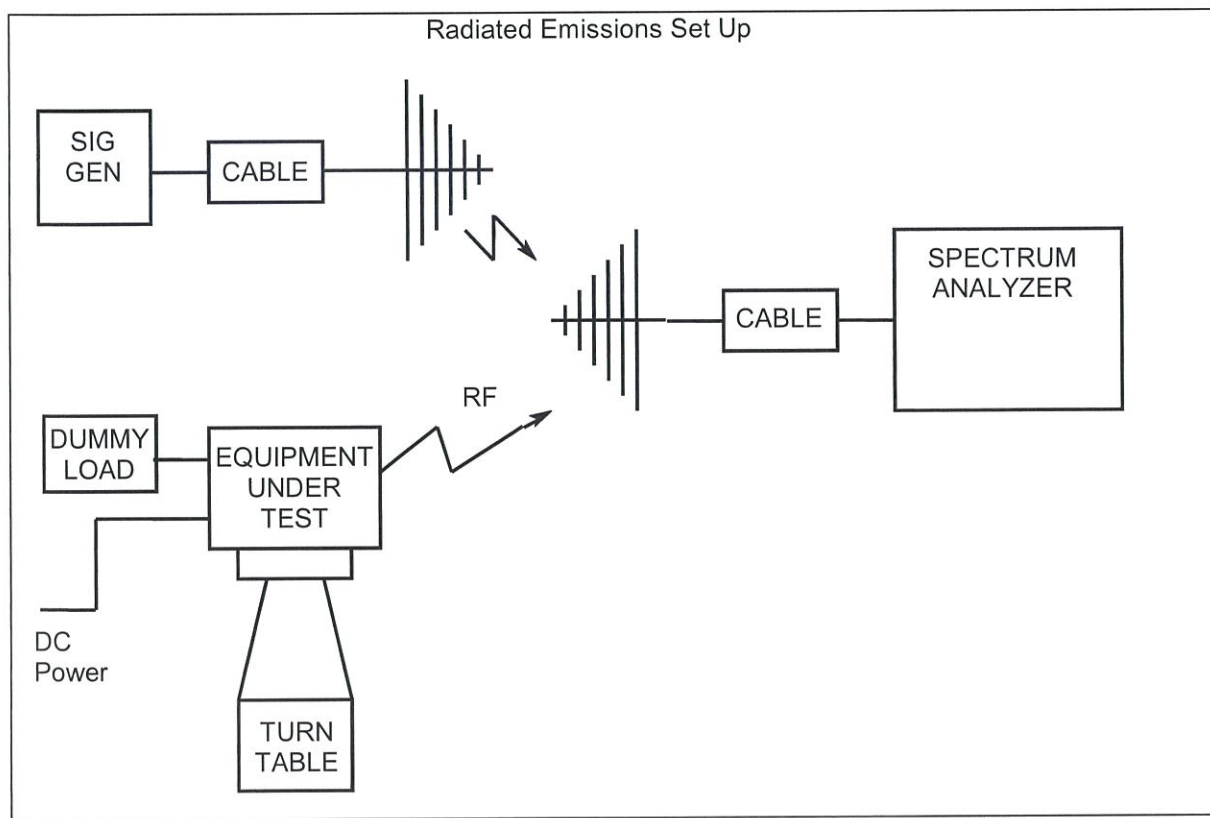
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	Reference Dipoles	Emco	3121C DB1	9510-1164	E3559	14-Apr-19
Antenna	18GHz DRG	Emco	DRG3115	9512-4638	E3560	15-May-20
Antenna	Log Periodic	Schwarzbeck	VUSLP	9111-219	E4617	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Audio Analyser	TREVA2	Hewlett Packard	HP8903B	2818A04275	E3710	6-Oct-18
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack2	E4623	20-Dec-18
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack3	E4624	20-Dec-18
Coax Cable	OATS Turntable Cable 1	Intelcom	RG214	OATS1	E4621	1-Jan-19
Coax Cable	OATS Tower Cable	Intelcom	RG214	OATS2	E4622	1-Jan-19
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack5	E4850	20-Dec-18
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack6	E4849	20-Dec-18
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	20-Dec-18
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	20-Dec-18
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	20-Dec-18
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	20-Dec-18
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	20-Dec-18
Coax Cable	OATS Turntable Cable 2	Intelcom	RG215	OATS3	E4995	1-Jan-19
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack8	E5005	1-Jan-19
Environ. Chamber	Chest	Contherm	Chest	E3397	E3397	1-Aug-18
Modulation Analyser	TREVA2	Hewlett Packard	HP8901B (Opt 002)	3704A05837	E3786	4-Oct-18
Multimeter		Fluke	77	35069359	E3237	26-Sep-18
OATS	NSA	Tait				9-Jul-18
OATS	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
OATS	Controller	Electrometrics	EM-4700	119	E4445	
OATS	Turntable	Electrometrics	EM-4704A	105	E4446	
OATS	FCC Listing Registration			837095		8-May-19
Oscilloscope	100MHz Digital	Tektronics	TDS340	B013611	E3585	28-Sep-19
Power Meter	TREVA2 Power Head for HP8901	Hewlett Packard	HP11722A	2716A02037	1575	5-Oct-18
Power Supply		Rohde & Schwarz	NGS M32/10 192.0810.31	Fnr 434	E3556	20-Apr-18
Power Supply	TREVA2 60V/25A	Agilent	N5767A	US09F4901H	E4656	7-Oct-19
Power Supply	60V/50A/1000W	Hewlett Packard	HP6012B	2524A00616	E3712	30-Sep-19
Power Supply	60V/25A	Agilent	N5767A	3111A05573	E4979	10-Oct-18
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	17-Apr-19
RF Amplifier	Pre-amplifier	Agilent	87405C	MY47010688	E4941	9-Oct-18
RF Attenuator	30dB 250W	Weinschel	45-30-34	JW663	E3386	20-Dec-18
RF Attenuator	10dB 150W	Weinschel	57-10-34	LB590	E3674	20-Dec-18
RF Attenuator	10dB 50W	Weinschel	24-10-34	AZ0401	E3388	20-Dec-18
RF Attenuator	20dB 50W	Weinschel	24-20-44	AW1266	E3562	20-Dec-18

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RF Attenuator	20dB 25W	Weinschel	33-20-33	BD5871	E3673	20-Dec-18
RF Attenuator	TREVA2 20dB 150W	Weinschel	40-20-33	CJ405	E3733	20-Dec-18
RF Attenuator	30dB 350W	Weinschel	67-30-33	BR0531	E4280	20-Dec-18
RF Attenuator	10dB 50W	Weinschel	24-10-34	BC3293	E4364	21-Dec-18
RF Attenuator	TREVA2 3dB	Weinschel	Model 1	BL9950	E4080	20-Dec-18
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	
RF Chamber	Reverb - Stirrer controller for reverb chamber	Teseq	Stirrer Controller	29765.1	E4854	
RF Chamber	Reverb - 0.5 - 18GHz Reverberation Chamber	Teseq	RVC XS	29765	E4855	
RF Combiner	TREVA2	Minicircuits	ZFSC-4-1	-	E4084	
RF Combiner	Three port resistive	Weinschel	1506A	MD719	E5008	22-Aug-18
RF Load	50W	Weinschel	F1426	AE2490	E3624	20-Dec-18
Signal Generator	Analog 4GHz	Agilent	E4422B	GB40050320	E3788	28-Sep-18
Signal Generator	Analog 3.2GHz	Hewlett Packard	HP8648C	3443U00543	E3558	26-Sep-18
Spectrum Analyser	26.5GHz	Agilent	PXA N9030A	MY49432161	E4907	18-Oct-18
Spectrum Analyser	13.2GHz	Hewlett Packard	HP8562E	3821A00779	E3715	2-Oct-18
Spectrum Analyser	13.2GHz	Agilent	E4445A	MY42510072	E4139	15-Oct-18
Temp & Humidity Datalogger		Hobo	U21-011	10134275	E4980	
Testware	Conducted Emissions		16/12/2015	-	-	
Testware	Radiated Emissions		September 2015	-	-	
Testware	Reverb Emissions		28 May 2015	-	-	
Testware	Sideband Spectrum		February 2017	-	-	
Testware	S-Line Radiated Emissions		May 2016	-	-	
Testware	TREVA		December 2015	-	-	

NOTE: Items without calibration dates are calibrated immediately before use, or set using calibrated instruments.

ANNEX A – TEST SETUP DETAILS



All other testing is performed using the Teltest Radio **EVAL**uation system (TREVA), which is configured as shown below. The Spectrum Analyser is connected to the EUT via the attenuator network for Conducted Emissions testing, and Occupied Bandwidth.

