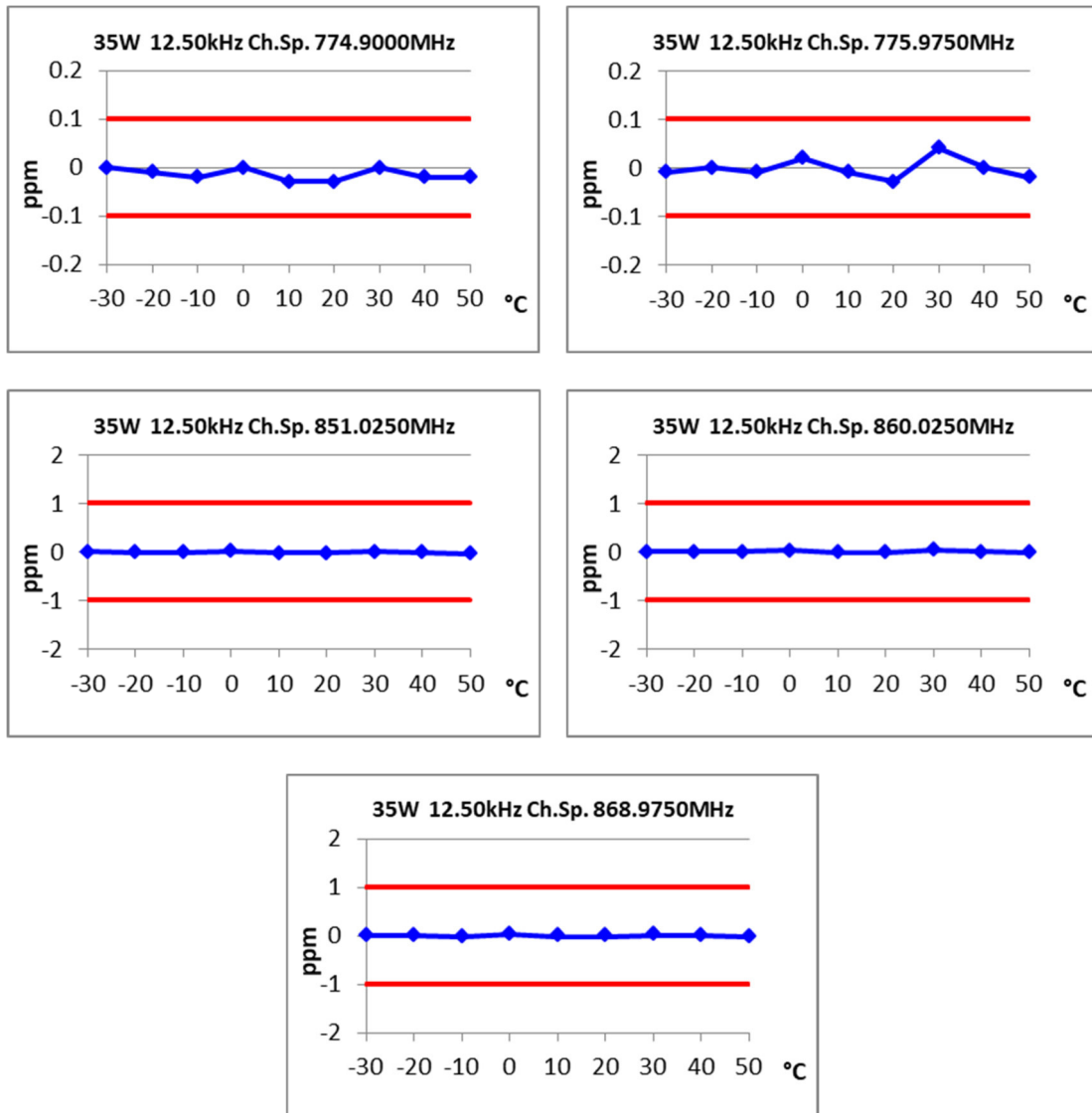


Transmitter Frequency Stability - Temperature



LIMIT CLAUSES:

Frequency Band	Frequency Error (ppm)	
	FCC 47 CFR 90.213	RSS-119 5.3
768-776, 798-806	~	0.1
806-821/851-866 and 821-824/866-869	~	1.0
851-854	1.0	~
854-869	1.5	~

TRANSMITTER FREQUENCY STABILITY - VOLTAGE

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

RSS-119 5.3

GUIDE: ANSI C63.26 5.6.5

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 115%.
3. The frequency error was recorded in parts per million (ppm).
4. A 10 MHz reference was fitted to the EUT for this test.

MEASUREMENT RESULTS:

	FREQUENCY ERROR (ppm) for 12.5 kHz		
	13.8 V _{AC}	11.73 V _{AC}	15.87 V _{AC}
768.025 MHz	0.05	0.05	0.04
769.075 MHz	0.02	0.02	0.03
774.9 MHz	-0.03	0.01	-0.01
775.975 MHz	0.02	0.02	0.02
851.025 MHz	-0.03	-0.01	0.00
860.025 MHz	0.01	0.02	0.00
868.975 MHz	-0.01	0.00	0.00
Measurement Uncertainty	$\pm 5 \times 10^{-8}$		

LIMIT CLAUSES:

Frequency Band	Frequency Error (ppm)	
	FCC 47 CFR 90.213	RSS-119 5.3
768-779, 798-806	~	0.1
806-821/851-866 and 821-824/866-869	~	1.0
851-854	1.0	~
854-869	1.5	~

RECEIVER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: RSS-Gen 7.4

GUIDE: TIA-603-E 2.1.2 (analogue)
TIA-102-CAAA-C 2.1.2 (digital)

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up diagram.
2. The frequency range examined was from 30 MHz to 3 times the highest tunable frequency.
3. Spurious emissions which were attenuated more than 20 dB below the limit were not recorded.
4. A scan is performed with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for frequencies up to 1 GHz, and a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz for frequencies above 1 GHz
5. For each frequency range the spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables and attenuator losses allowing the emission levels to be read directly with no further calculation.

Example of attenuation correction: (dB)

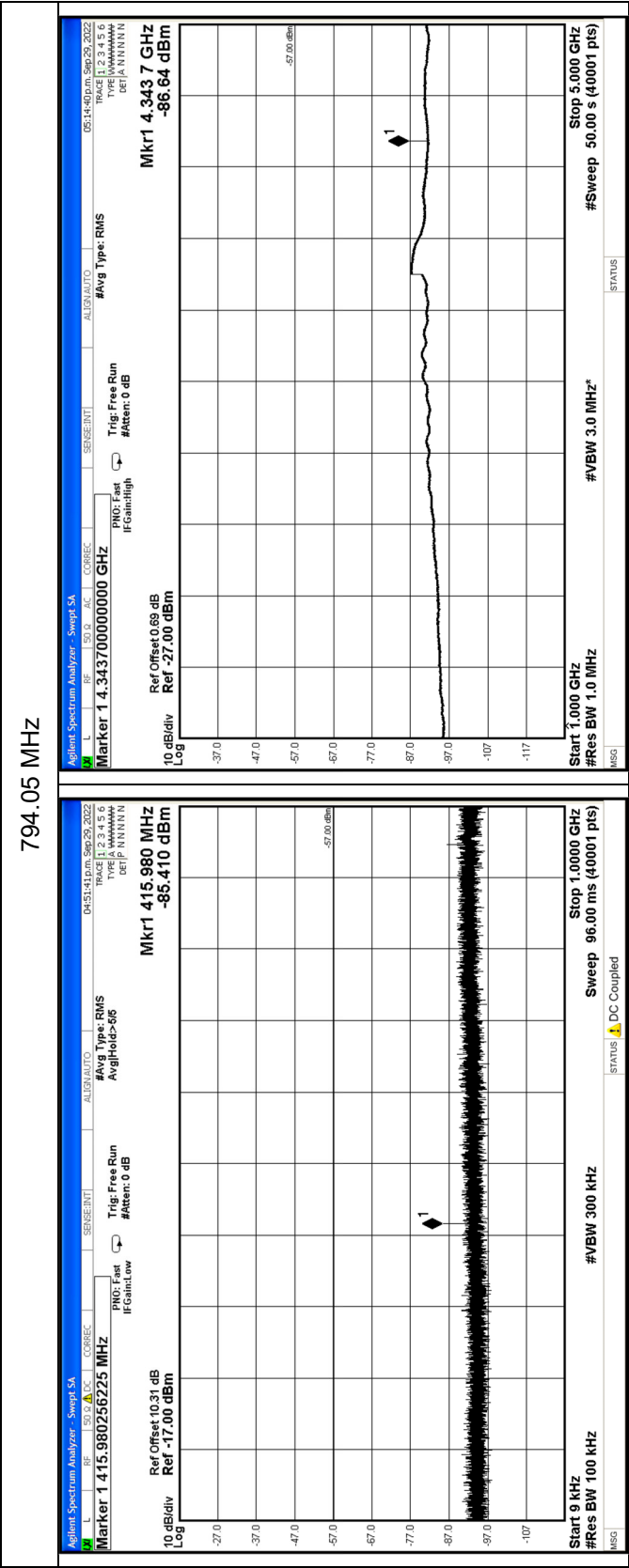
E3388 10dB 50W AZ0401	10.05	
E5028 1m5 Blue 501868	0.35	
Total Attenuation @ 794.05 MHz	10.4	Sum of component attenuation (a)
Amplitude offset	10.31	(b)
Correction @ 794.05 MHz	0.09	(a-b)

LIMIT CLAUSE: RSS-Gen 7.4

LIMIT	30 → 1000 MHz	2 nW	- 57 dBm
	> 1000 MHz	5 nW	- 53 dBm

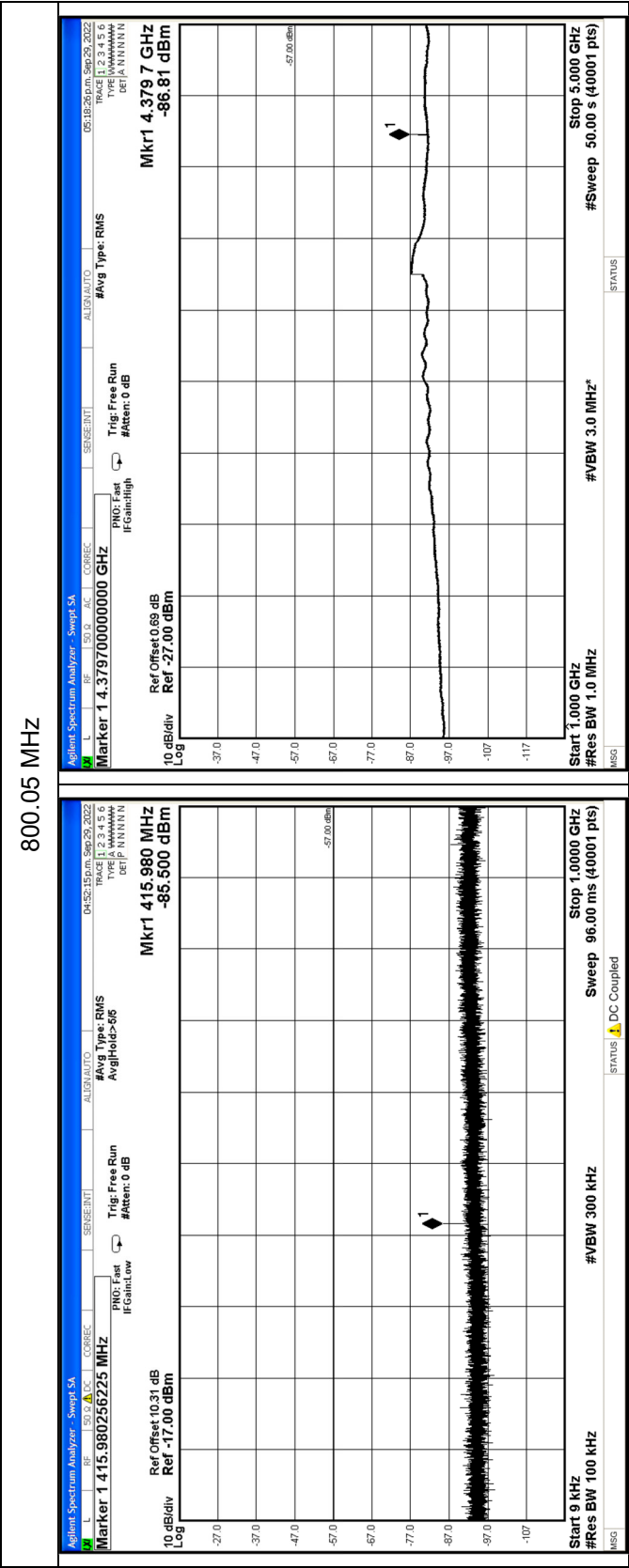
Receiver Spurious Emissions (Conducted) – Continued

794.05 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



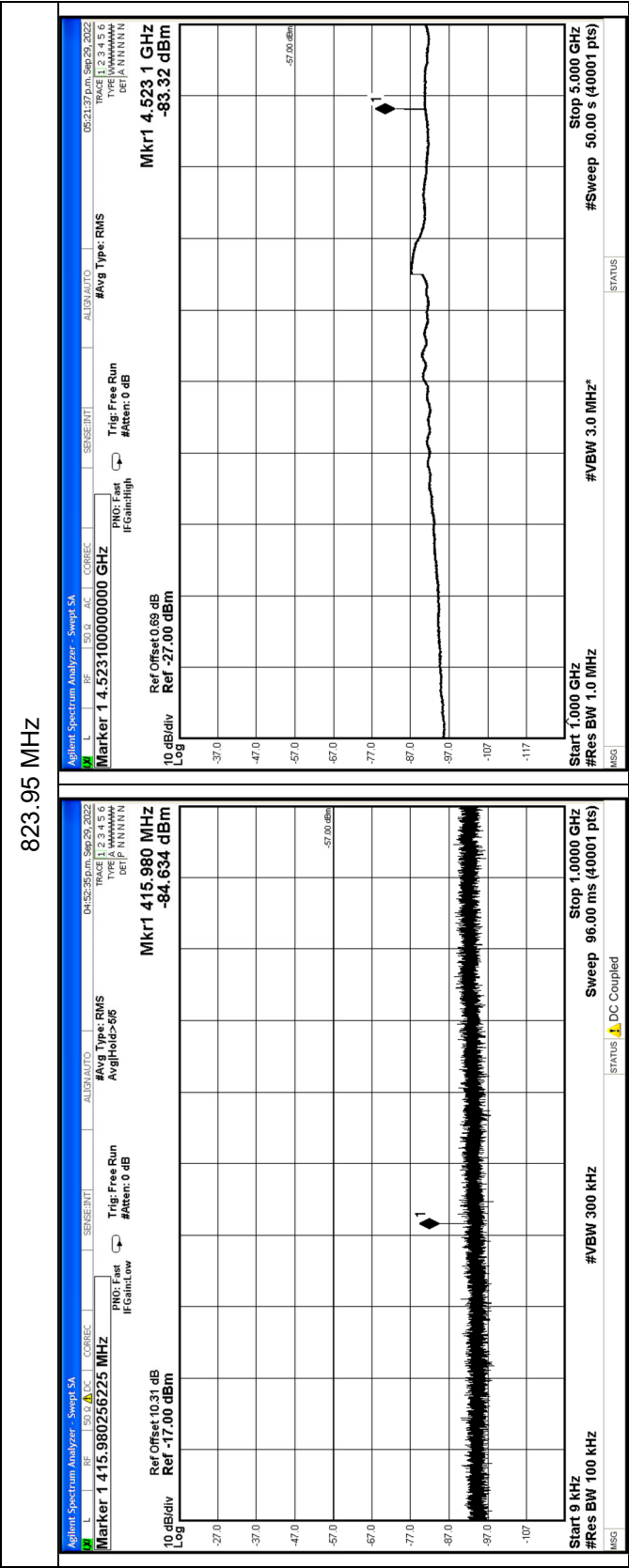
Receiver Spurious Emissions (Conducted) – Continued

800.05 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



Receiver Spurious Emissions (Conducted) – Continued

823.95 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



TRANSMITTER STANDBY SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: RSS-Gen 7.4

GUIDE: TIA-603-E 2.1.2 (analogue)
TIA-102-CAAA-C 2.1.2 (digital)

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up diagram.
2. The frequency range examined was from 30 MHz to 3 times the highest tunable frequency.
3. Spurious emissions which were attenuated more than 20 dB below the limit were not recorded.
4. A scan is performed with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for frequencies up to 1 GHz, and a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz for frequencies above 1 GHz
5. For each frequency range the spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables and attenuator losses allowing the emission levels to be read directly with no further calculation.

Example of attenuation correction:

E3388 10dB 50W AZ0401	10.05	
E5028 1m5 Blue 501868	0.35	
Total Attenuation @ 794.05 MHz	10.4	Sum of component attenuation (a)
Amplitude offset	10.31	(b)
Correction @ 794.05 MHz	0.09	(a-b)

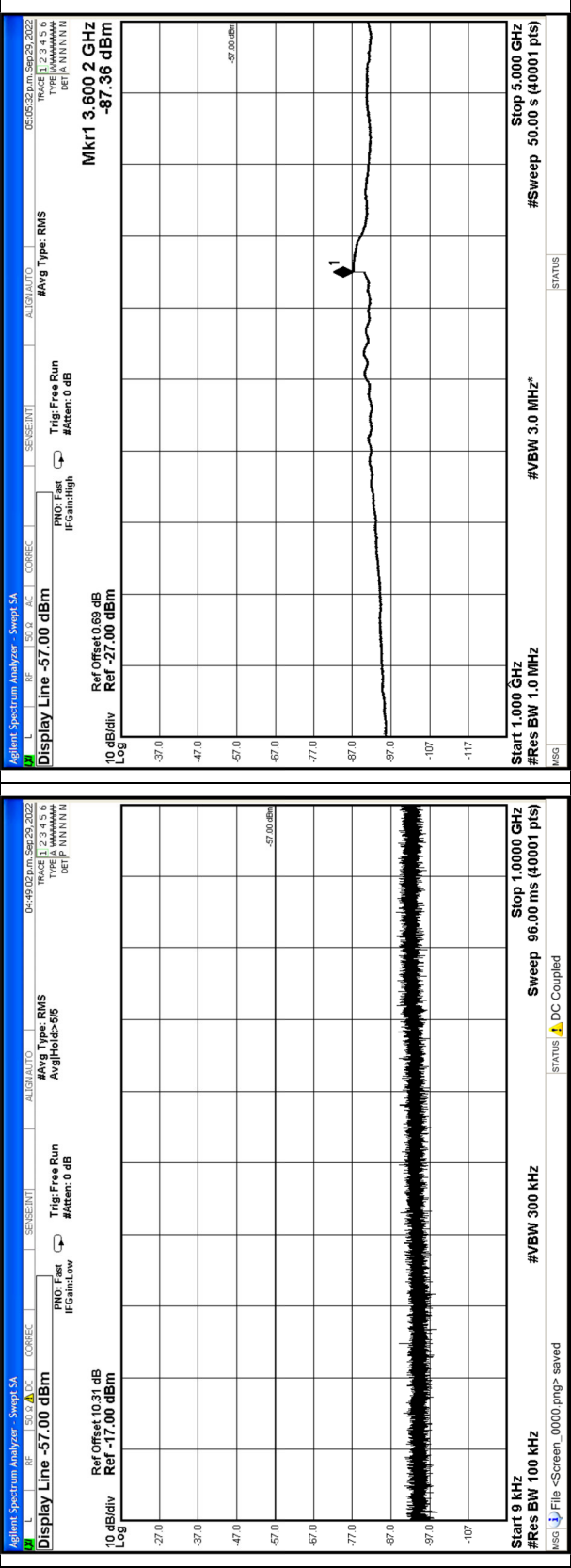
LIMIT CLAUSE: RSS-Gen 7.4

LIMIT	30 → 1000 MHz	2 nW	- 57 dBm
	> 1000 MHz	5 nW	- 53 dBm

Transmitter Standby Spurious Emissions (Conducted) – Continued

768.025 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

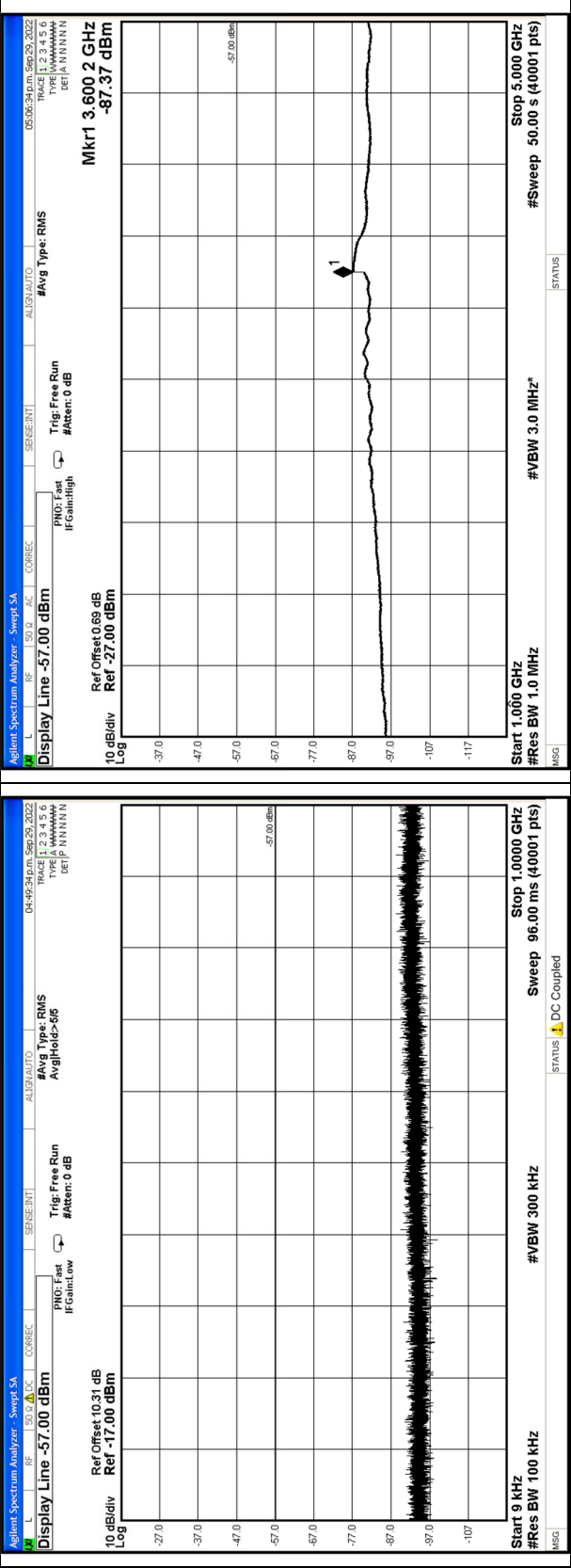
768.025 MHz



Transmitter Standby Spurious Emissions (Conducted) – Continued

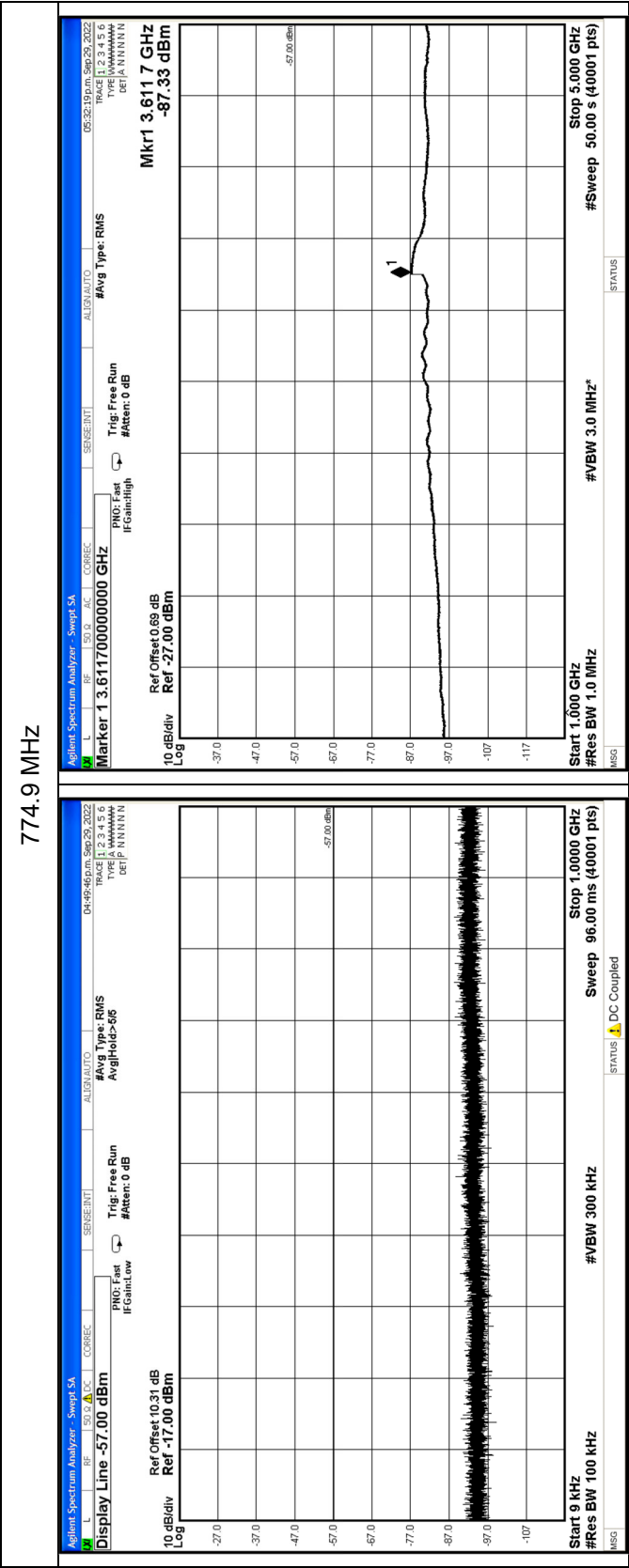
769.075 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

769.075 MHz



Transmitter Standby Spurious Emissions (Conducted) – Continued

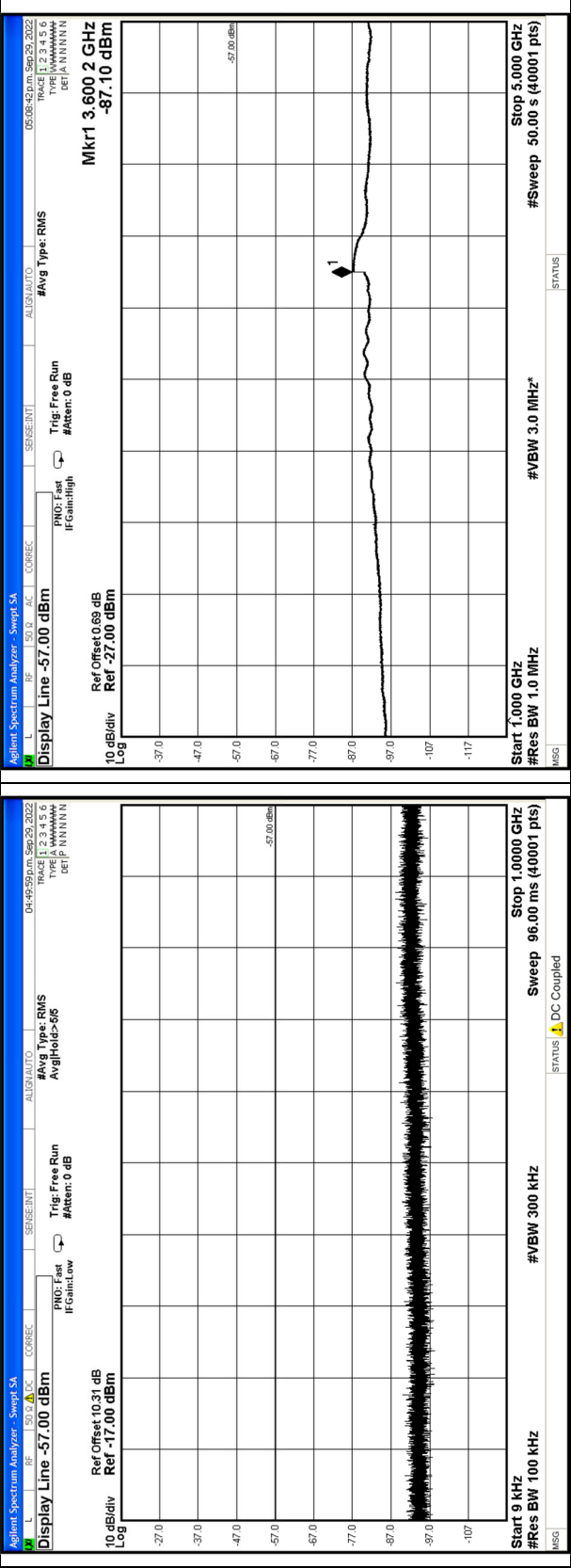
774.9 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



Transmitter Standby Spurious Emissions (Conducted) – Continued

775.975 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

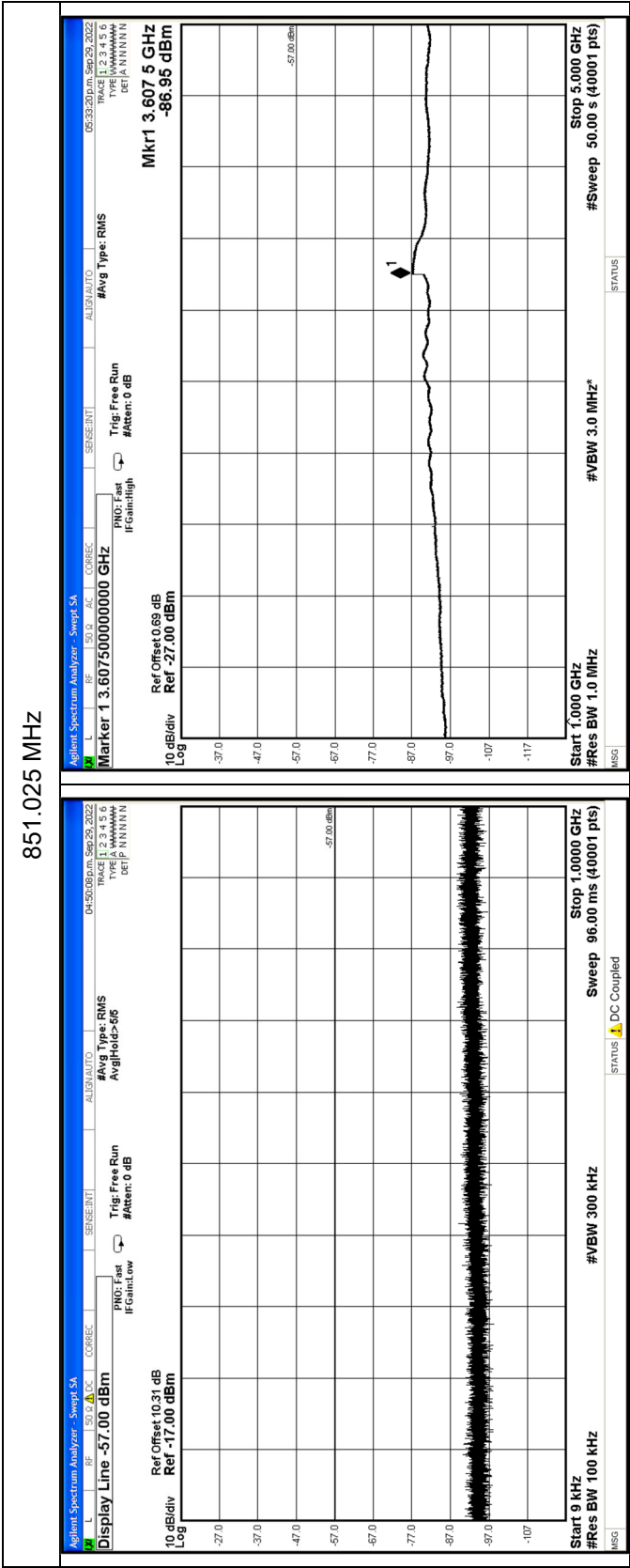
775.975 MHz



Transmitter Standby Spurious Emissions (Conducted) – Continued

851.025 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

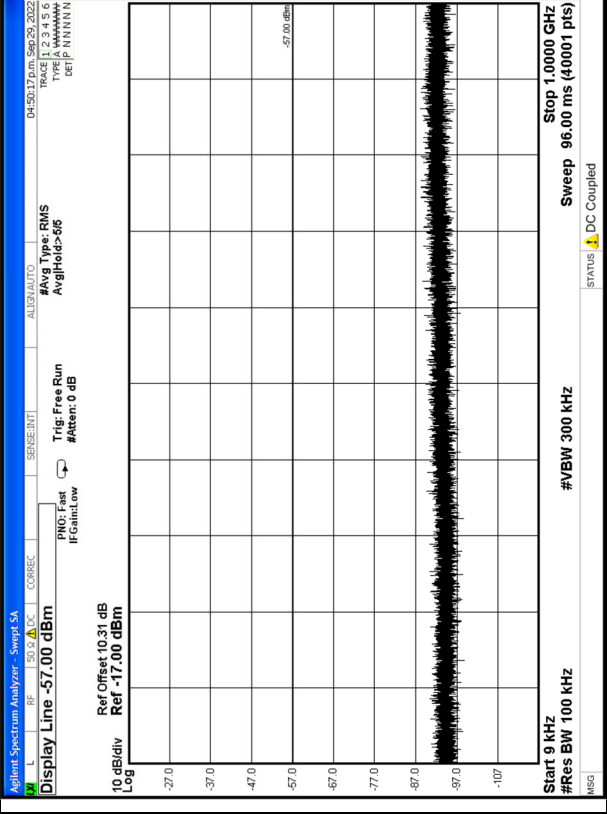
851.025 MHz



Transmitter Standby Spurious Emissions (Conducted) – Continued

860.025 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

860.025 MHz



Transmitter Standby Spurious Emissions (Conducted) – Continued

868.975 MHz Transmitter Standby (Transmitter RF Output Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		

868.975 MHz



TEST EQUIPMENT LIST

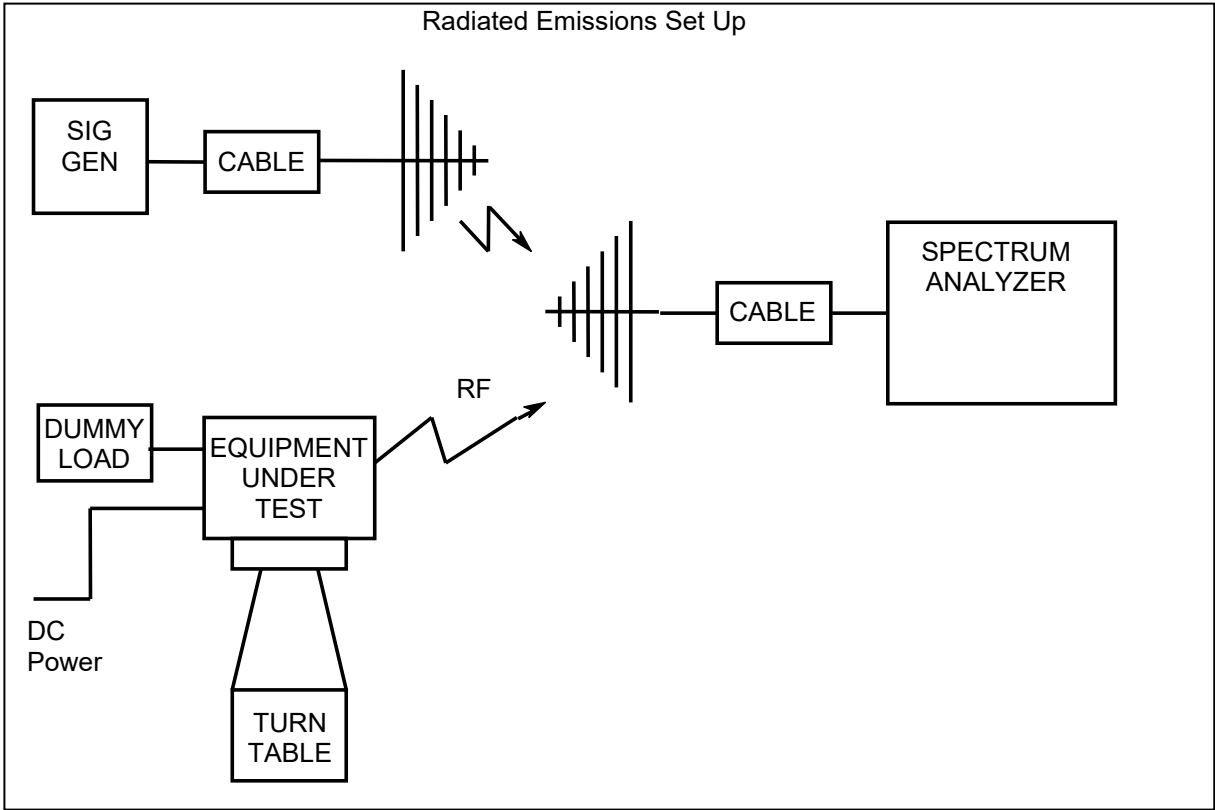
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	18GHz DRG	Emco	DRG3115	2084	E3076	12-Jul-24
Antenna	18GHz DRG	Emco	DRG3115	9512-4638	E3560	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Audio Analyser	TREVA2	Hewlett Packard	HP8903B	2818A04275	E3710	8-Oct-23
Coax Cable	OATS Turntable Cable 1	Intelcom	RG214	OATS1	E4621	11-Jan-23
Coax Cable	OATS Tower Cable	Intelcom	RG214	OATS2	E4622	11-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/2000	TeltestBlack2	E4623	10-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/2000	TeltestBlack3	E4624	10-Jan-23
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	11-Jan-23
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	11-Jan-23
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	11-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue3	MF 141	TeltestBlue3	E4846	11-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	10-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	11-Jan-23
Coax Cable	OATS Turntable Cable 2	Intelcom	RG215	OATS3	E4995	11-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/2000	TeltestBlack8	E5005	11-Jan-23
Coax Cable	3m Blue	Suhner	Sucoflex 126EA	503429/126EA	E5015	23-Dec-22
Coax Cable	1.5m Blue	Suhner	Sucoflex 126EA	502868/126EA	E5028	23-Dec-22
Environ. Chamber	Chest	Contherm	Chest	E3397	E3397	28-Nov-24
Environ. Chamber	Chest	Contherm	Chest	E3397	E3397	30-Aug-23
Filter High Pass/ Notch	550 to 885MHz	Tait		N/A	E3785	27-Jun-23
Modulation Analyser	TREVA2	Hewlett Packard	HP8901B (Opt 002)	2441A00393	E3073	10-Oct-23
OATS	Controller	Electrometrics	EM-4700	119	E4445	
OATS	Turntable	Electrometrics	EM-4704A	105	E4446	
OATS	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
Power Meter	TREVA2 Power Head for HP8901	Hewlett Packard	HP11722A	2716A02037	1575	7-Oct-23
Power Supply	60V/50A/1000W	Hewlett Packard	HP6012B	2524A00616	E3712	9-Oct-23
Power Supply	TREVA2 60V/25A	Agilent	N5767A	US09F4901H	E4656	8-Oct-23
Power Supply	40V/38A	Agilent	N5766A	US09E4663L	E4719	4-Oct-23
Power Supply	60V/25A	Agilent	N5767A	3111A05573	E4979	9-Oct-24
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	5-Aug-23
RF Amplifier	Pre-amplifier	Agilent	87405C	MY47010688	E4941	19-Oct-22
RF Attenuator	10dB 50W	Weinschel	24-10-34	AZ0401	E3388	22-Dec-22
RF Attenuator	TREVA2 20dB 150W	Weinschel	40-20-33	CJ405	E3733	11-Jan-23
RF Attenuator	30+3dB 350W	Weinschel	67-30-33 & BW-N3W5+	CK9178	E5023	12-Jan-23
RF Attenuator	TREVA2 3dB	Weinschel	Model 1	BL9950	E4080	11-Jan-23

TELTEST Laboratories
Tait International Ltd
Report Number 4187

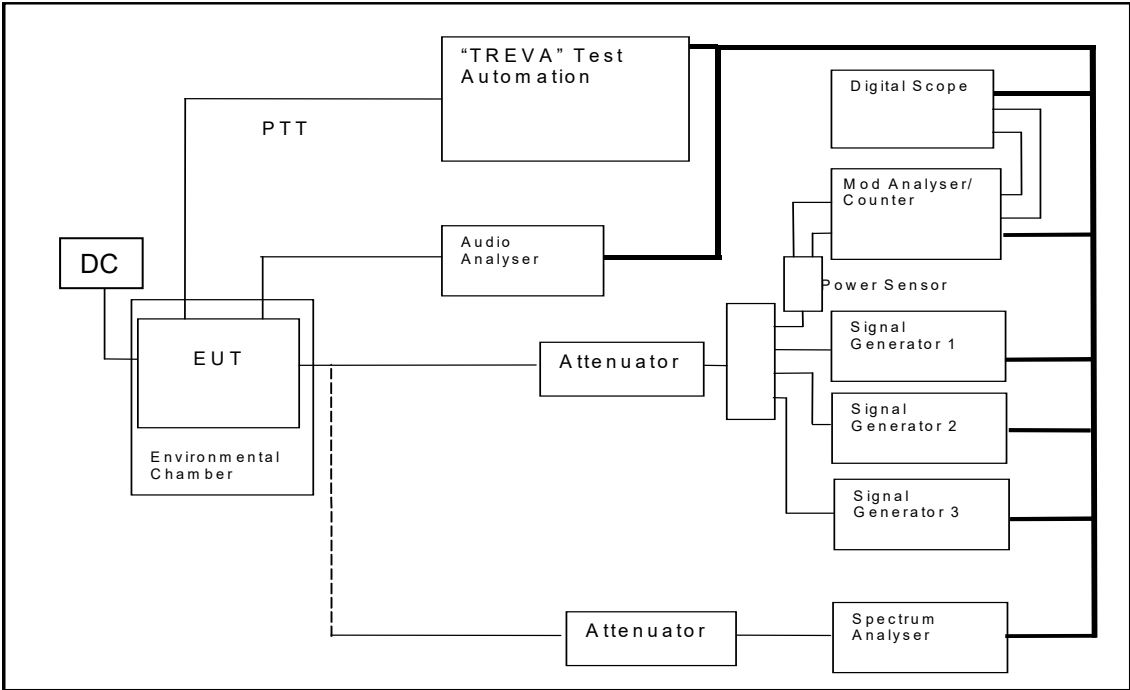
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
RF Attenuator	3dB 0.5W	Weinschel	Model 1	CH6863	E5013	22-Dec-22
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	28-Oct-22
RF Chamber	Reverb - Stirrer controller for reverb chamber	Teseq	Stirrer Controller	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 Load	150W	Bird	8166	524	E3625	22-Dec-22
Signal Generator	Analog 4GHz	Agilent	E4422B	GB40050320	E3788	8-Oct-23
Signal Generator	Digital 4GHz	Agilent	E4437B	US39260389	E4764	19-Oct-23
Signal Generator	Analog 12.75GHz	Rohde & Schwarz	SMB100A	183236	E11369	24-Oct-23
Spectrum Analyser	13.2GHz	Agilent	PSA E4445A	MY42510072	E4139	14-Jan-24
Spectrum Analyser	26.5GHz	Agilent	PXA N9030A	MY49432161	E4907	18-Feb-23
Temp & Humidity datalogger		Hobo	U21-011	10134276	E4981	26-Jul-23
TREVA 2		Teltest	-	2	-	4-Nov-22
Testware	Frequency Vs Temperature		April 2018	-	-	
Testware	Occupied Bandwidth		TTEL_OCCBW 2.00.01	-	-	
Testware	Radiated Emissions		APRIL 2018	-	-	
Testware	Reverb Emissions		TTEL_REVEMIS 2.00.03	-	-	
Testware	Sideband Spectrum		February 2017	-	-	
Testware	S-Line Radiated Emissions		TTEL_SLINERADEM 2.00.01	-	-	
Testware	TREVA		TTEL_TREVA 2.00.00	-	-	
Testware	Spec An Correction Loader		June 2019	-	-	

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 **R**adio **E**VAuation 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.



END OF REPORT