FCC Part 15C

Test Report

for

Salunda Limited

Gateway

FCC ID: 2ALTW1702

Project Engineer: L. Marsh

Approval Signatory

Approved signatories: R. P. St John James ☑ J. A. Jones ☐ A. V. Jones ☐

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Document History:

Issue#1: 24th January 2018 was withdrawn and replaced by Issue#2: updated with editorial correction.

1.0 DECLARATION

1.1 FCC Part 15C Statement

The Equipment Under Test (EUT), as described and reported within this document, complies with the selected sections of part 15C of the CFR 47:2017 FCC rules.

- RADIATED EMISSIONS - Airborne, from 30.0 MHz to 26.5 GHz

Note: The highest associated operating frequency on the system, as declared by the manufacturer, was 2475 MHz.

The uncertainty of measurement for each test has been included to support a level of confidence of approximately 95%.

For emissions outside the 2400 – 2483.5 MHz band the EUT, as described and reported within this document, complies with the parts 15.207 and 15.209 of the CFR 47 FCC rules in accordance with ANSI C63.10:2013, ANSI C63.4:2014 and KDB 558074 D01 DTS Meas Guidance v04.

This report relates to the sample tested and may not represent the entire population. It is valid only for the product identified, either in part or in full, to the relevant electromagnetic requirements necessary for compliance.

Hursley EMC Services Limited is recognised by the Federal Communications Commissions (FCC) as an EMI laboratory, outside of the USA, for the measurement of conducted emissions and radiated emissions at three and ten metres.

1.2 Product Modifications

None to sample submitted.

1.3 EMC Test Lab Reference

Hursley EMC Services file: 17R696.

1.4 EUT Manufacturer

Trade name:	Salunda Limited
Company name:	Salunda Limited
Company address:	Unit 6 Avonbury Business Park Bicester OX26 2UA United Kingdom
Manufacturing address:	As above.

2.0 EUT DESCRIPTION

2.1 Identity

Product (EUT): Gateway
Serial numbers: 0022

Note: The EUT was re-programmed to operate on the required channel.

Product build level: Production sample

2.2 EUT Description

The device operates inside the 2400 – 2483.5 MHz band with a single bandwidth and single modulation. The EUT is DC powered over Ethernet.

The following test frequencies were used to cover the full band of operation of the device:

Test Channel	Centre Frequency (MHz)
Bottom, channel 11	2405.0
Middle, channel 18	2440.0
Top, channel 25	2475.0

2.3 EUT Support Equipment

- POE injector

2.4 EUT Test Exerciser

For the purposes of testing, the EUT was configured with test firmware that transmitted continuously with a 100% duty cycle. The Antenna port was terminated for the radiated emission tests.

2.5 Supported Antennae

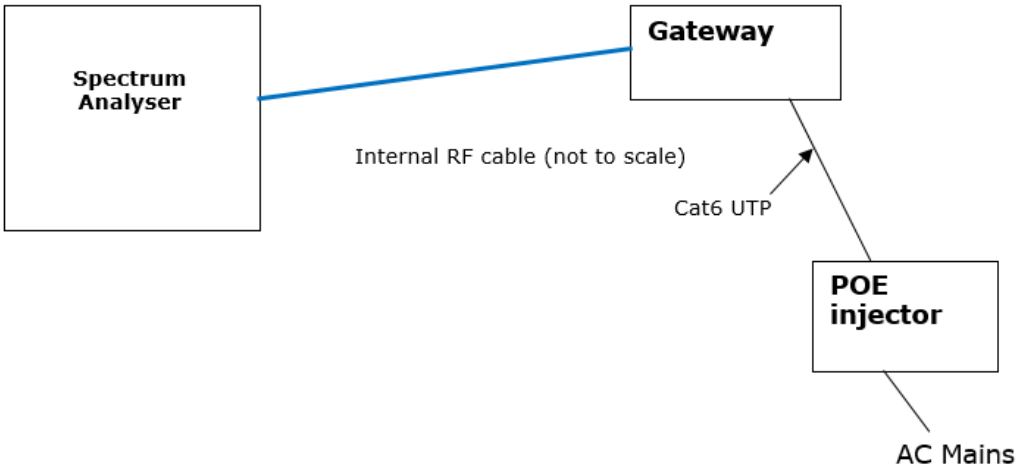
The EUT supports operation with the following antennae:

Antenna type	Type	Gain
Internal	PCB mount	2.0 dBi

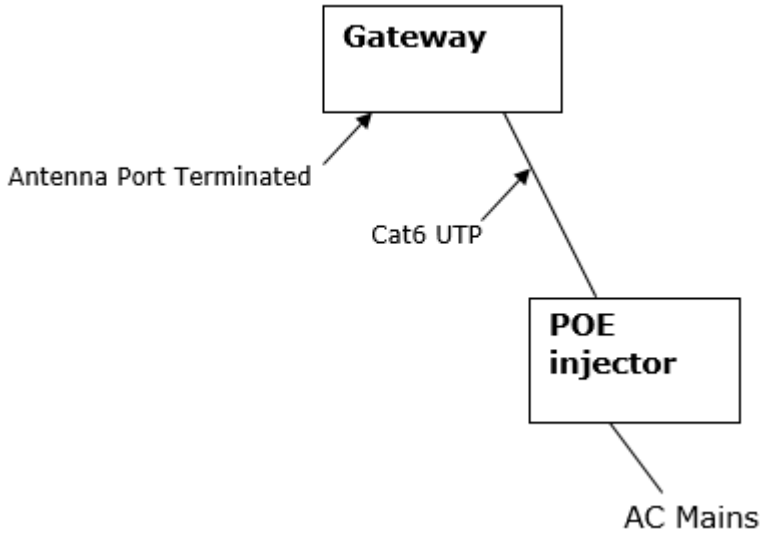
Note: The antenna is integral to the unit, but is connected to the main PCB via an F-type to SMA cable. The SMA cable is connected direct to Spectrum Analyser when making antenna port measurements

2.6 EUT Test Configuration

Antenna port conducted configuration



Radiated Emissions configuration



3.0 MEASUREMENT PROCEDURE AND INSTRUMENTATION

3.1 EMI Site Address & Test Date

EMI Company Office	Hursley EMC Services Ltd Trafalgar House, Trafalgar Close, Chandlers Ford, Hampshire
EMI Measurement Site	Hursley EMC Services Ltd Trafalgar House, Trafalgar Close, Chandlers Ford, Hampshire
Test Dates	19th December 2017 and 31st January 2018

3.2 General Operating Conditions

Testing was performed according to the procedures in accordance with ANSI C63.10 2013. Final radiated testing was performed at a EUT to antenna distance of three metres. Instrumentation, including receiver and spectrum analyser bandwidth, comply with the requirements of ANSI C63.2:1996.

3.3 Environmental Ambient

Temperature	20.7 to 22.2º Celsius
Relative Humidity	33 to 39%
Atmospheric Pressure	1005.6 to 1037 millibars

3.4 Summary of Tests Performed

Test	Clause	Limit / Requirement	Result
Max peak conducted TX power	15.247(b)(3)	1 W	Pass
Out of Band Emissions Non-restricted bands	15.247(d)	-20 dBc (peak power)	Pass
Out of Band Emissions Restricted-band: Conducted	15.247(d) / 15.205(a) and 15.209(a)	15.209(a) table	Pass
Max antenna gain	15.247(b)(4)(11)	≤ 6dBi	Pass
Enclosure radiated emissions	15.209	Class B	Pass

3.5 Radiated Emissions

Initial Scan

Radiated profile scans were taken on eight azimuths between 30.0 MHz and 26.5 GHz in both the vertical and horizontal polarities of the antennae in a semi-anechoic chamber at 110V/60Hz. The resulting data obtained from these scans was used to determine subsequent measurement for final measurement evaluation.

Final Measurements

The EUT was then measured at three metres in the chamber using the pre-scan results as a guide. Emissions from the EUT were maximised by revolving the system on the turntable and moving the antennae in height and azimuth. Cable and system component positions had been investigated for maximum emissions, and the system under test represented the worst-case configuration. The highest values obtained are presented in this report.

The instrumentation used in the CISPR 16-1-4 compliant semi-anechoic chamber was as below:

#ID	CP	Manufacturer	Type	Serial Nø	Description	Calibration due date
050	2	HP	8447D	1937A02341	Pre-amplifier (30-1000MHz)	06/10/2019
071	0	Q-par Angus	WBH218HN	2895	Horn antenna (2-18GHz)	Internal
250	1	HP	8449B	3008A01077	Pre-amplifier (1.0-26.5GHz)	31/08/2018
256	0	HEMCS	PA XVIII	001	Pre-amp, 1-18GHz 55dB	Internal
289	1	Rohde & Schwarz	ESCI 7	100765	CISPR 7GHz Receiver	24/08/2018
466	3	Schwarzbeck	BBHA 9120 571	571	1-10GHz Horn	24/02/2019
538	1	HP	8593EM Analyser	3710A00204	Spectrum analyser	20/01/2018
651	1	Rohde & Schwarz	ESIB 40 no.2	100262	40GHz receiver	07/07/2018
762a	3	Schwarzbeck	DGA 9552N	0	6dB attenuator for #762	07/04/2019

CP = Interval period [year] prescribed for external calibrations

Note: 'Calibration due date' means that the instrument is certified with a UKAS or traceable calibration certificate.
'Internal' means internally calibrated using HEMCS procedures

4.0 TEST DATA

The EUT was tested for radiated and disturbance measurements. The worst-case results are reported within this document.

4.1 Radiated Emissions; 30 to 1000 MHz

A peak detector max-hold search was made of the frequency spectrum from 30 MHz to 26.5 GHz and the measurements reported are the highest emissions relative to the 'FCC CFR 47 Section 15.209 and 15.249 Limits' at a measuring distance of three metres.

Testing was performed with the EUT at the top, bottom and middle transmitter operating frequencies.

Final measurements were taken for emissions in restricted bands. Below 1 GHz a quasi-peak detector was used (bandwidth 120 kHz), above 1 GHz a peak and average detector was used (bandwidth 1 MHz). The worst-case results from all tests are presented here.

The measurements were made according to ANSI C63-10 test standard and Hursley EMC Services test procedure RAD-01.

4.1.1 Data

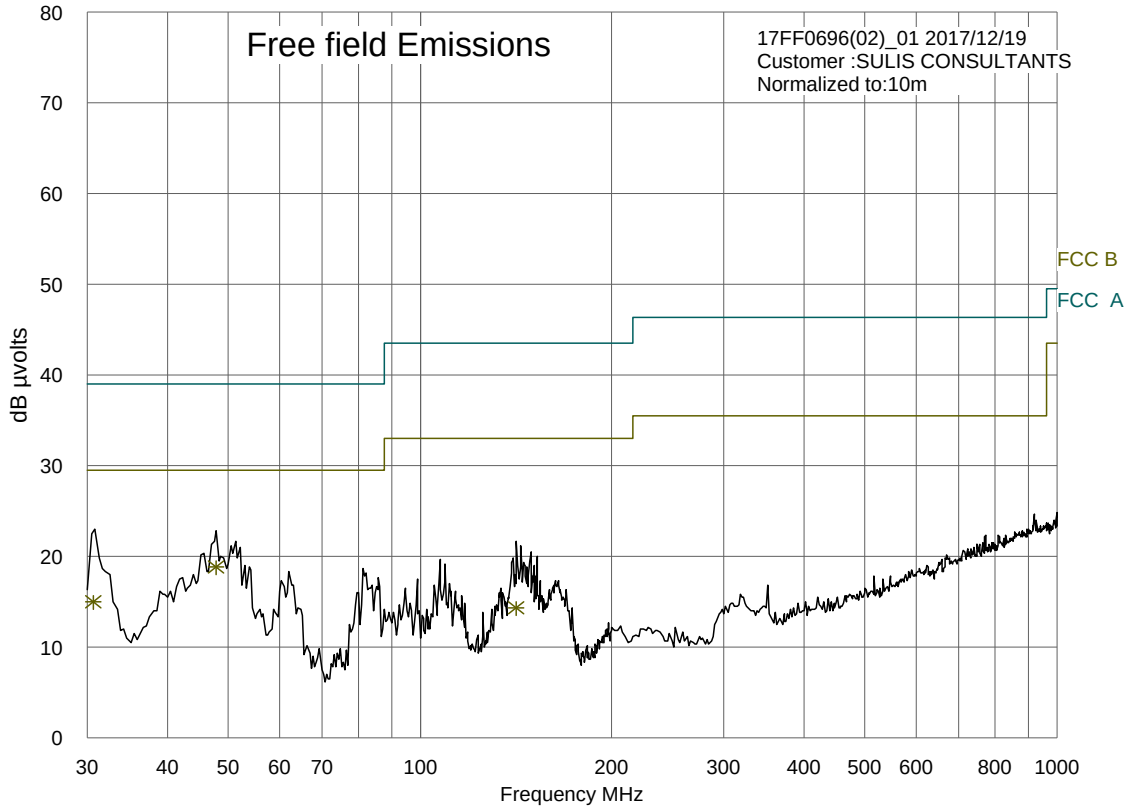
Emission frequency	Measured quasi-peak value	Class B specified quasi-peak limit	Pass Margin	Antenna polarity	Antenna height	Turntable azimuth	
MHz	dBµV/m	dBµV/m	dB	H/V	m	deg	Status
30.660	15.08	29.54	14.47	V	1.0	0	Pass
47.822	18.85	29.54	10.69	V	1.0	14	Pass
141.213	14.32	33.04	18.73	V	1.0	230	Pass

V = Vertical
H = Horizontal

TEST ENGINEER: Luke Marsh

4.1.2 Profile

Maximum peak hold trace with quasi-peak values (✳)



4.2 Radiated Emissions; 1.0 to 26.5 GHz (worst-case)

Radiated emissions pre-scan profile measurements were taken at a distance of three metres with the EUT turned through 360°, with both horizontal and vertical antennae polarities in an anechoic chamber. This pre-scan profile was made from 1.0 GHz to 26.5 GHz and evaluated against the FCC limits.

Using the pre-scan results as a guide, each emission from the EUT was maximised. Measurements were carried out a distance of three metres in a CISPR 16-1-4 compliant semi-anechoic chamber. Cable positions were then finally adjusted to produce the maximum emission levels. The worst-case results are recorded below.

4.2.1 Data

		AVERAGE @ 3m			PEAK @ 3m			
	Frequency	Measured	Specified Limit	Pass Margin	Measured	Specified Limit	Pass Margin	
Channel	GHz	dBµV/m	dBµV/m	dB	dBµV/m	dBµV/m	dB	STATUS
11	2.390	26.94	54.0	27.06	40.60	74.0	33.40	Pass
25	2.483	26.99	54.0	27.01	40.03	74.0	33.97	Pass
11	7.213	49.70	54.0	4.30	58.95	74.0	15.05	Pass
18	7.318	48.08	54.0	5.92	57.20	74.0	16.80	Pass
25	7.422	41.78	54.0	12.22	53.11	74.0	20.89	Pass

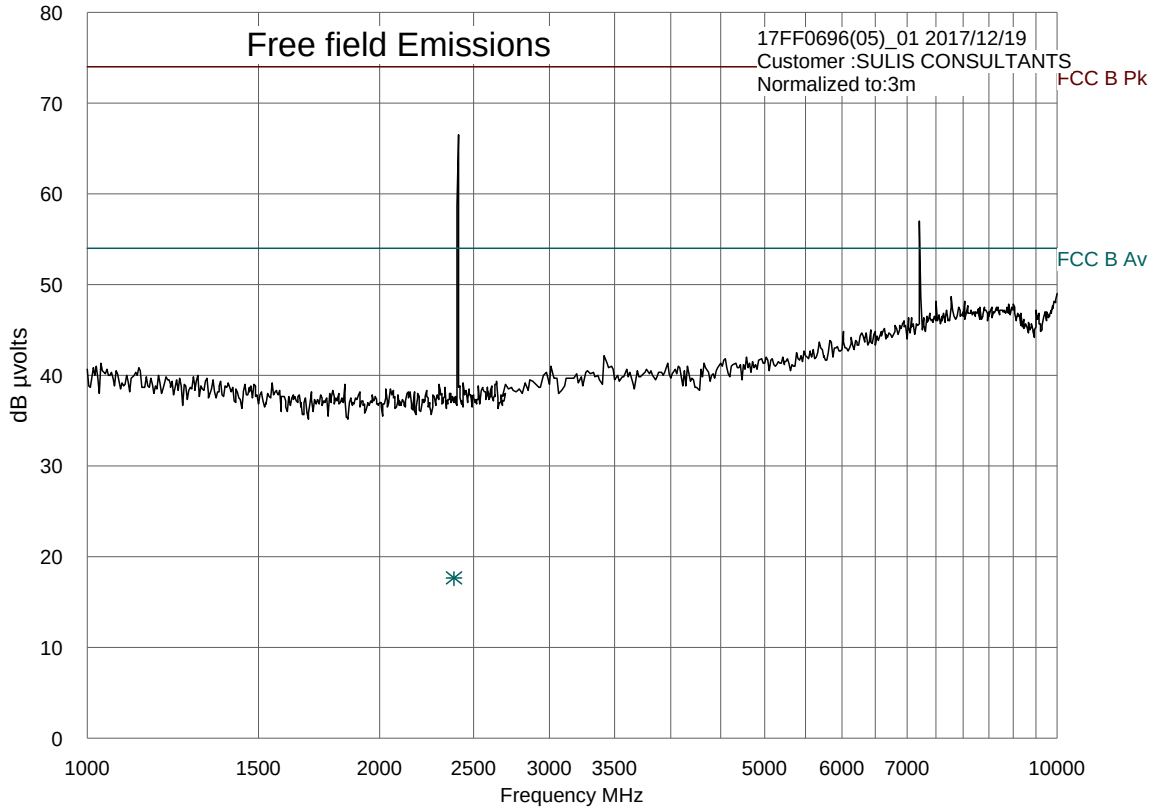
The measurements reported are the highest emissions relative to the FCC limits and take into account the antenna and cable loss factors. Measurements made according to the ANSI C63-10 test standard and Hursley EMC Services test procedure RHF-01.

Procedure: In accordance with ANSI C63.10:2013 and ANSI C63.4:2014.

TEST ENGINEER: Daniel Tiroke

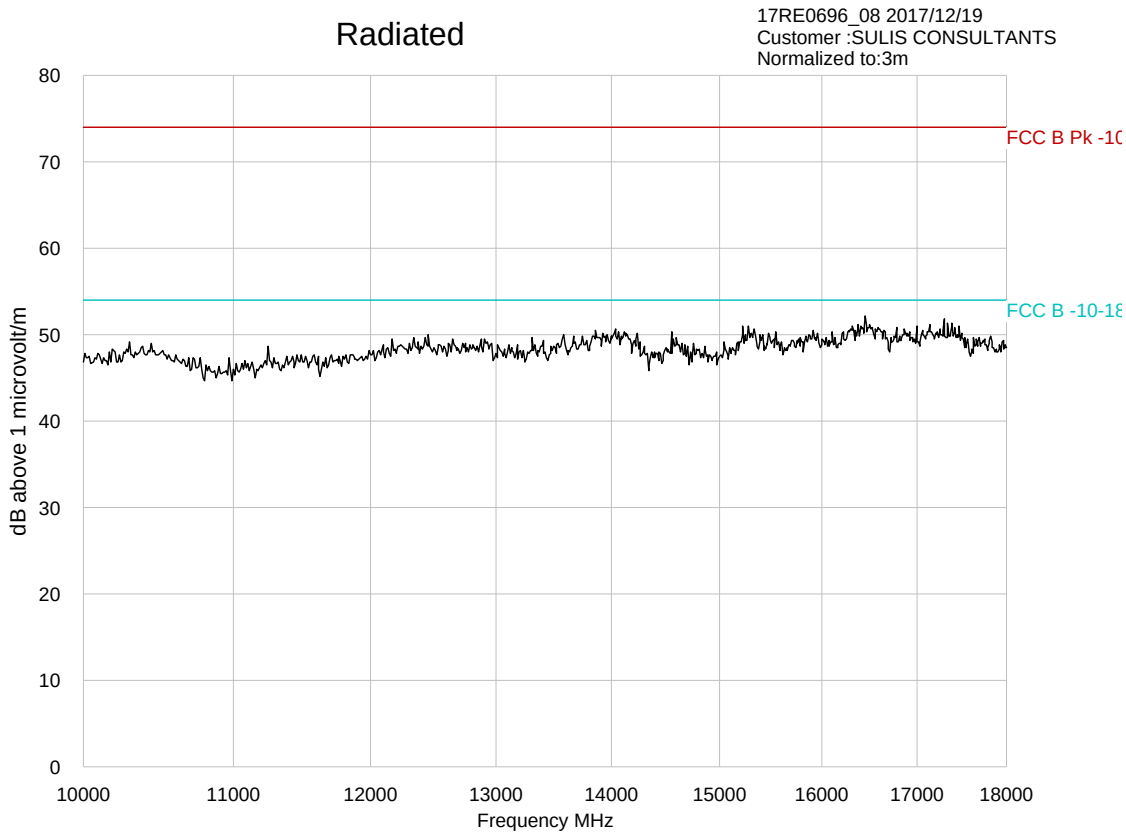
4.2.2 Profiles

1.0 to 10.0, maximum peak hold trace



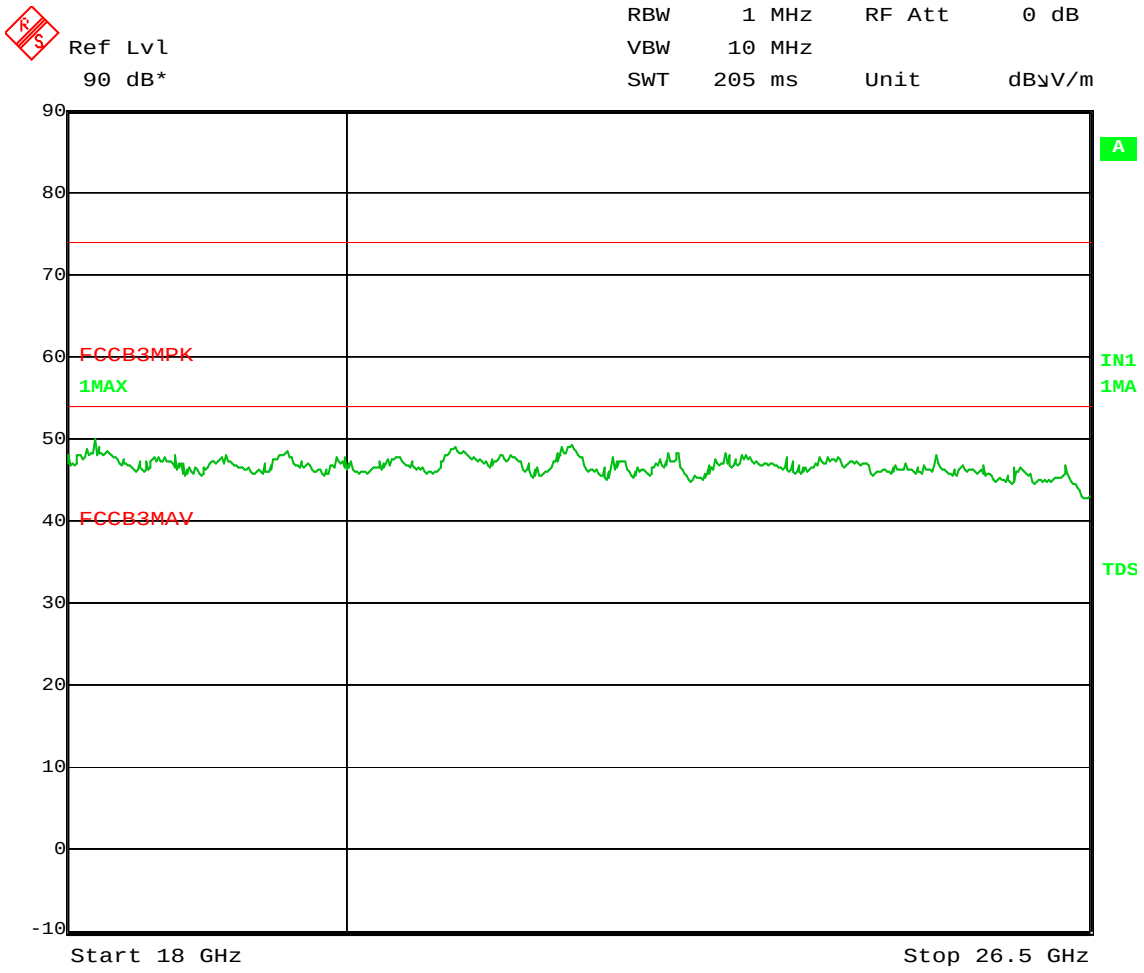
Profiles (continued)

10.0 to 18.0, maximum peak hold trace



Profiles (continued)

18.0 to 26.5, maximum peak hold trace



5.0 MAXIMUM PEAK CONDUCTED OUTPUT POWER

5.1 Measurement method

As the analyser could be set RBW ≥ DTS bandwidth, the test was conducted in accordance with KDB 558074 section 9.1.1:

a) Set the RBW ≥ DTS bandwidth.

b) Set VBW ≥ 3 x RBW.

c) Set span ≥ 3 x RBW

d) Sweep time = auto couple.

e) Detector = peak.

f) Trace mode = max hold.

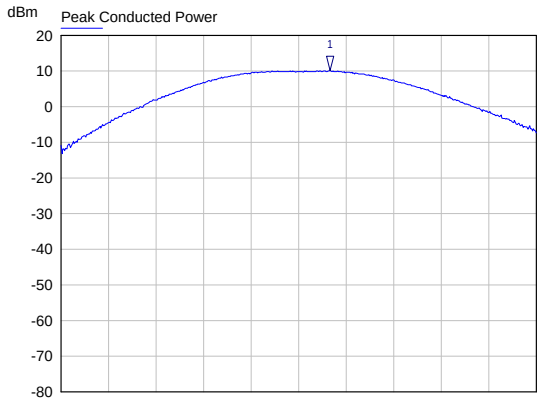
g) Allow trace to fully stabilize.

h) Use peak marker function to determine the peak amplitude level.

5.1.1 Channel Power Results

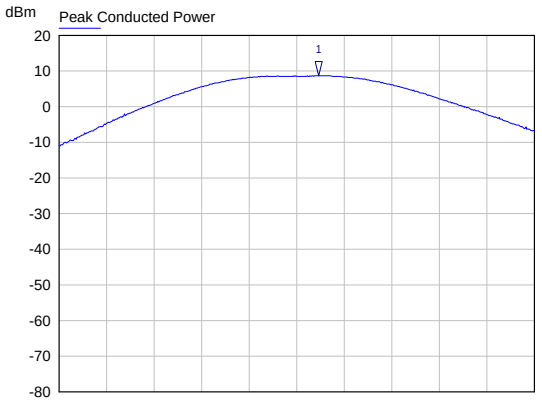
Channel	Channel Power (dBm)	Limit (dBm)	Result
11	10.14	30.0	Pass
18	8.67	30.0	Pass
25	11.17	30.0	Pass

5.1.1 Channel Power Plots



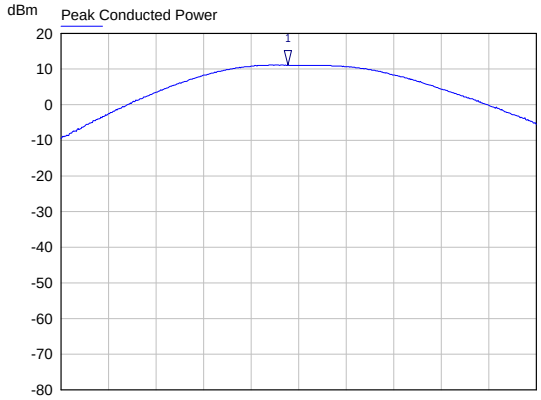
Mkr	Trace	X-Axis	Value	Notes
1	Peak Conducted Power	2.4057 GHz	10.14 dBm	

Ch 11



Mkr	Trace	X-Axis	Value	Notes
1	Peak Conducted Power	2.4405 GHz	8.67 dBm	

Ch 18



Mkr	Trace	X-Axis	Value	Notes
1	Peak Conducted Power	2.4748 GHz	11.17 dBm	

Ch 25

6.0 EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

6.1 Measurement method

Since peak power measurements were made using a peak detector, the same detector will be used for unwanted emissions. The unwanted emissions shall be at least 20dB lower than the wanted emission.

First, establish a reference level in accordance with KDB 558074 section 11.2:

a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 x DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Then measure the emission levels in accordance with KDB 558074 section 11.3
a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

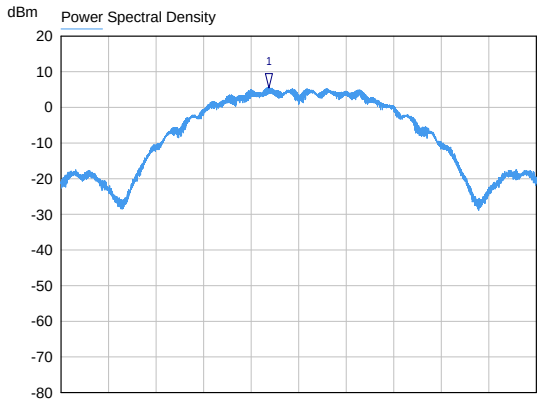
6.2 Emissions in non-restricted bands Results

The reference trace was taken from the Power Spectral Density Measurement which used the same settings.

For ease of measurement, maximum values are reported anywhere in the frequency band of investigation, whether or not it is outside a restricted band. Further measurements in restricted bands are in the next section.

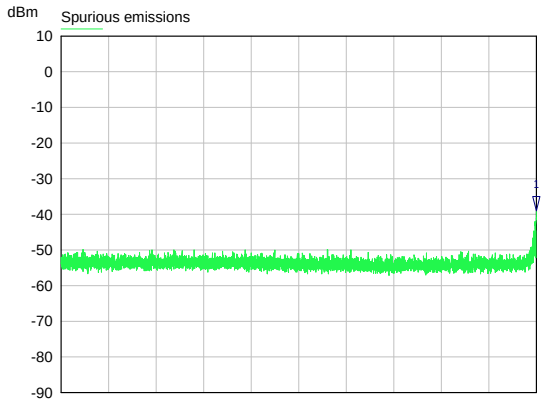
Channel	Maximum Peak level in 100 kHz RBW (dBm)	-20 dBc (dBm)	Maximum emission (dBm)	Result
11	5.48	-14.52	-39.02	Pass
18	3.83	-16.17	-49.73	Pass
25	6.48	-13.52	-49.95	Pass

6.2.1 Emissions in non-restricted bands



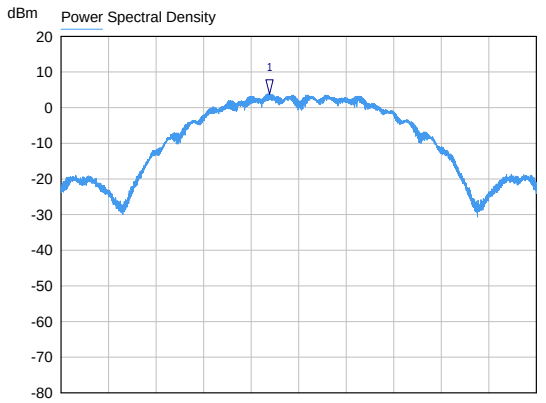
Mkr	Trace	X-Axis	Value	Notes
1	Power Spectral Density	2.4048 GHz	5.48 dBm	Peak

Ch 11 reference



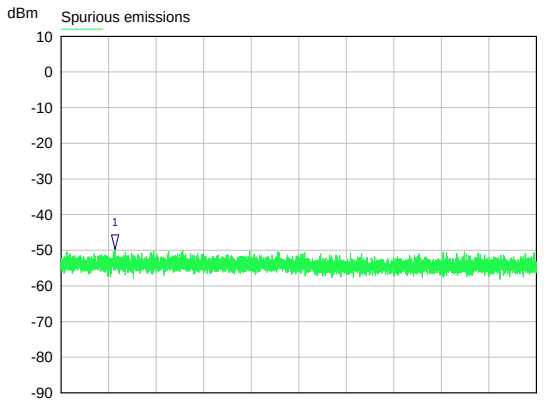
Mkr	Trace	X-Axis	Value	Notes
1	Spurious emissions	2.4000 GHz	-39.02 dBm	

Ch 11: 1500 – 2400 MHz



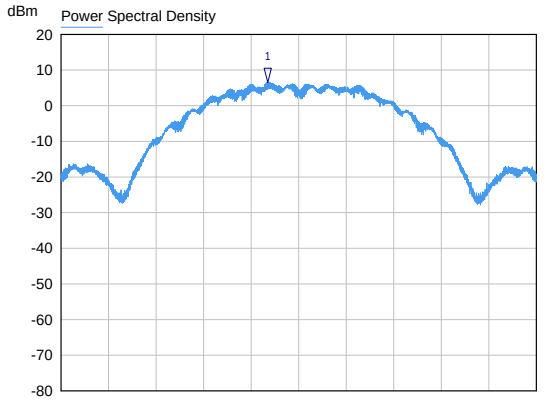
Mkr	Trace	X-Axis	Value	Notes
1	Power Spectral Density	2.4398 GHz	3.83 dBm	Peak

Ch 18 reference



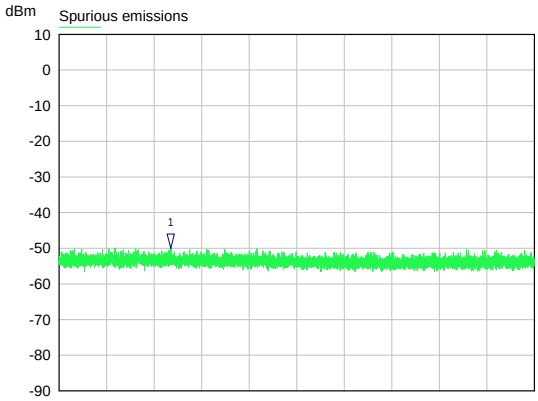
Mkr	Trace	X-Axis	Value	Notes
1	Spurious emissions	2.0457 GHz	-49.73 dBm	

Ch 18: 1500 – 2400 MHz



Mkr	Trace	X-Axis	Value	Notes
1	Power Spectral Density	2.4747 GHz	6.48 dBm	Peak

Ch 25 reference



Mkr	Trace	X-Axis	Value	Notes
1	Spurious emissions	2.0941 GHz	-49.95 dBm	

Ch 25: 1500 – 2400 MHz

7.0 MAXIMUM EMISSIONS IN RESTRICTED BAND

This testing is done in two parts:
• Antenna port conducted measurement (this section 7.0)
• Radiated measurement with antenna port terminated (section 4.0)

7.1 Conducted Antenna port

7.1.1 Measurement method

The conducted antenna port power is converted to a radiated emissions field strength limit specified in 15.209(a) as per KDB 558074 12.2.2:

Electric field strength, E = EIRP – 20log D + 104.8

Which can be re-written as EIRP = E + 20logD – 104.8

Since EIRP = conducted power + antenna gain + ground reflection
This can be re-written:

Max. conducted power = E + 20logD – 104.8 - antenna gain - ground reflection

If "E" is the limit, and the measurement distance taken as 3 m, the maximum conducted power can be determined as shown in the table:

7.1.1.1 Restricted band limits at antenna port

Frequency range	Limit	Field strength (µV/m)	Field Strength (dBµV/m)	20logD	Antenna gain (dBi)	Ground reflection	Limit
30 -88 MHz	Quasi-peak	100	40.0	9.54	2	4.7	-61.96
88 – 216 MHz	Quasi-peak	150	43.5	9.54	2	4.7	-58.44
216-960 MHz	Quasi-peak	200	46.0	9.54	2	4.7	-55.94
960 – 1000 MHz	Quasi-peak	500	54.0	9.54	2	4.7	-47.98
> 1 GHz	Average	500	54.0	9.54	2	0	-43.28
> 1 GHz	Peak	Average + 20dB	74.0	9.54	2	0	-23.26

Initial measurement of antenna port emissions were performed with a peak detector as per KDB 558074 section 12.2.4:

a) RBW = as specified in Table 1.
b) VBW ≥ 3 x RBW.
c) Detector = Peak.
d) Sweep time = auto.
e) Trace mode = max hold.
f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).
Where emissions above 1 GHz were close to the limit, these were re-measured using trace-averaging and RMS detector as per section 12.2.5.1:

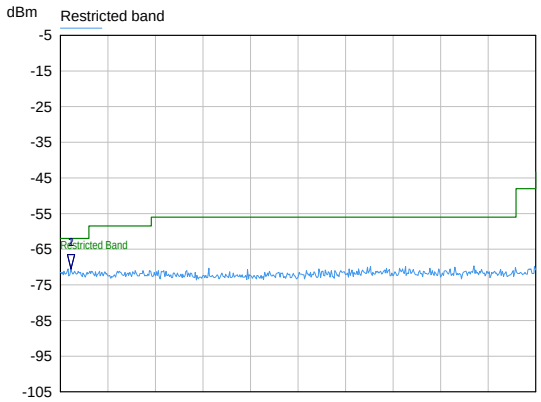
a) RBW = 1 MHz (unless otherwise specified).
b) VBW ≥ 3 x RBW.
c) Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak. (Note: 32001 measurement points used)
d) Averaging type = power (i.e., RMS).
1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces.

7.1.2 Emissions in restricted bands results

Maximum values for each frequency range are shown on the plots, and the worst case emissions for each channel were re-measured using RMS detector and are detailed in the table below:

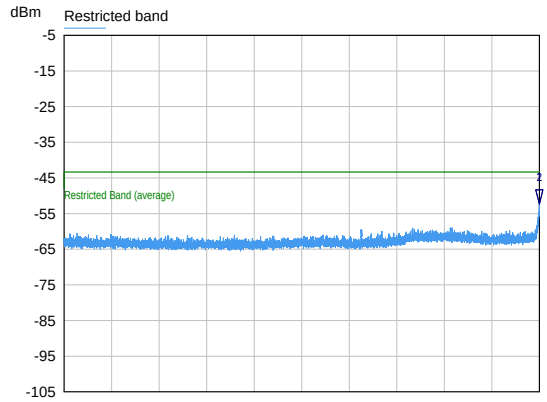
Channel	Frequency (MHz)	Detector	Level (dBm)	Maximum emission relative to peak limit (dB)	Maximum emission relative to average limit (dB)	Result
11	7204.4	Peak	-42.24	-18.96	N/A	Pass
		RMS	-55.97	N/A	-12.69	Pass
11	2188.6	Peak	-50.41	-27.13	-7.13	Pass
18	4881.1	Peak	-40.59	-17.31	N/A	Pass
		RMS	-50.27	N/A	-6.99	Pass
18	7312.6	Peak	-43.15	-19.87	N/A	Pass
		RMS	-54.97	N/A	-11.69	Pass
25	2483.6	Peak	-41.07	-17.79	N/A	Pass
		RMS	-49.43	N/A	-5.91	Pass
25	7420.8	Peak	-47.22	-23.94	N/A	Pass
		RMS	-58.79	N/A	-15.51	Pass

7.1.3 Emissions in restricted bands plots



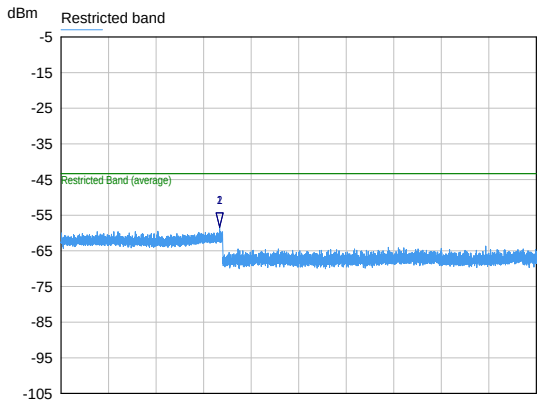
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	51.3400 MHz	-8.47 dBm	Relative to limit
2	Restricted band	51.3400 MHz	-70.43 dBm	Absolute

Ch 11: trace 1: 30 - 1000 MHz



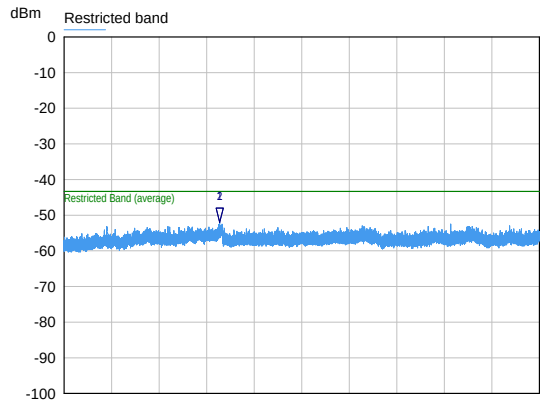
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.3897 GHz	-9.12 dBm	Relative to limit
2	Restricted band	2.3897 GHz	-52.40 dBm	Absolute

Ch 11: trace 2; 1000 - 2390 MHz



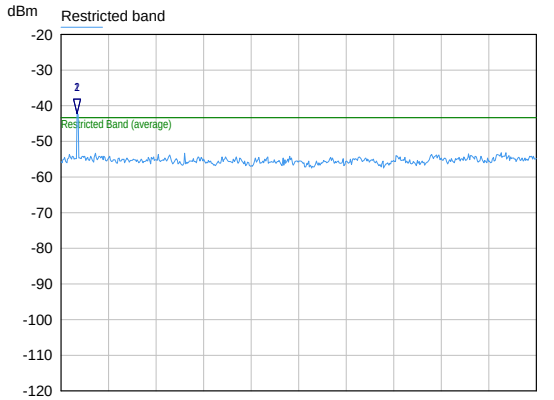
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.9893 GHz	-15.06 dBm	Relative to limit
2	Restricted band	2.9893 GHz	-58.34 dBm	Absolute

Ch 11: trace 3; 2483.5 – 4000 MHz



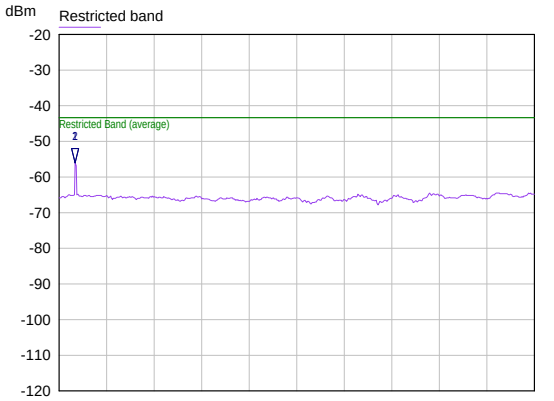
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	6.9495 GHz	-8.77 dBm	Relative to limit
2	Restricted band	6.9495 GHz	-52.05 dBm	Absolute

Ch 11: trace 4; 4000 – 7000 MHz



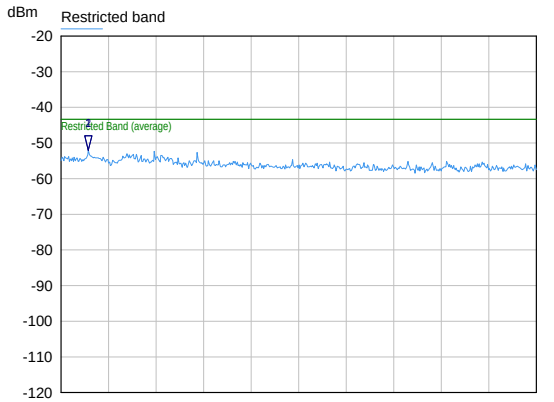
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.2044 GHz	1.04 dBm	Relative to limit
2	Restricted band	7.2044 GHz	-42.24 dBm	Absolute

Ch 11: 7 – 13 GHz peak



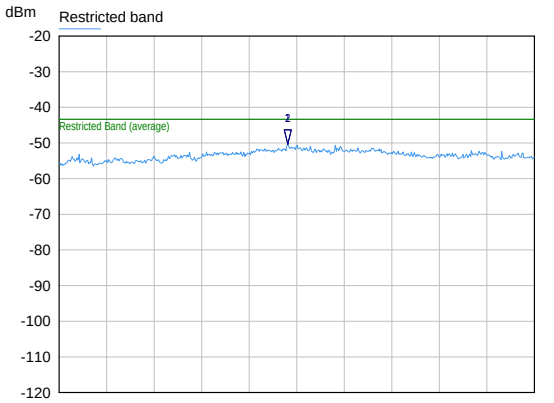
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.2044 GHz	-12.69 dBm	Relative to limit
2	Restricted band	7.2044 GHz	-55.97 dBm	Absolute

Ch 11: trace 5; 7 – 13 GHz (RMS)



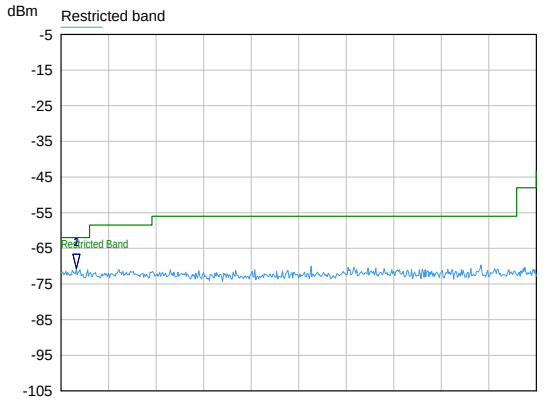
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	13.3487 GHz	-8.70 dBm	Relative to limit
2	Restricted band	13.3487 GHz	-51.98 dBm	Absolute

Ch 11: trace 5; 13 – 19 GHz



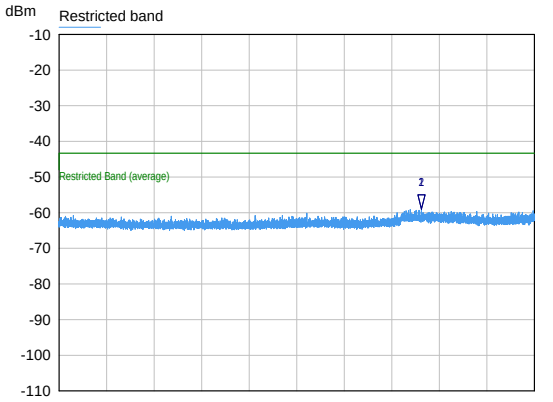
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	21.8858 GHz	-7.13 dBm	Relative to limit
2	Restricted band	21.8858 GHz	-50.41 dBm	Absolute

Ch 11: trace 6; 19 – 25 GHz



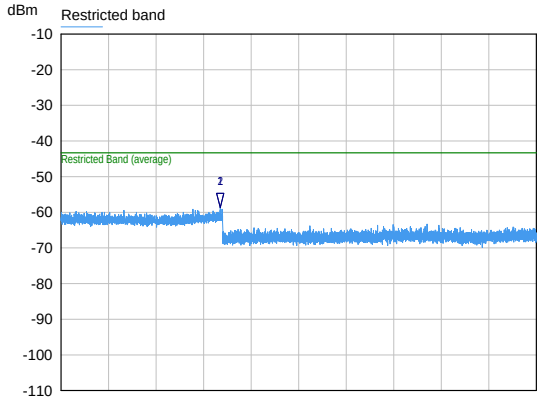
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	61.0400 MHz	-8.62 dBm	Relative to limit
2	Restricted band	61.0400 MHz	-70.58 dBm	Absolute

Ch 18: trace 1; 30 - 1000 MHz



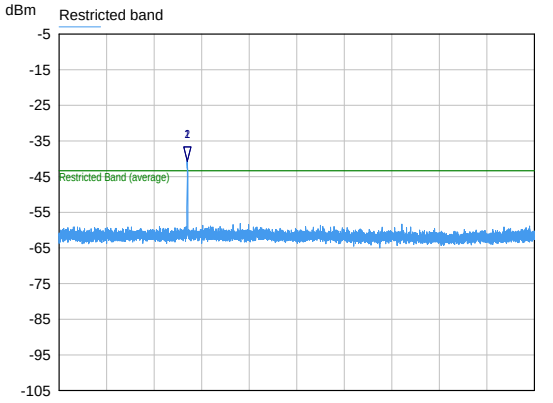
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.0599 GHz	-15.69 dBm	Relative to limit
2	Restricted band	2.0599 GHz	-58.97 dBm	Absolute

Ch 18: trace 2; 1000 – 2390 MHz



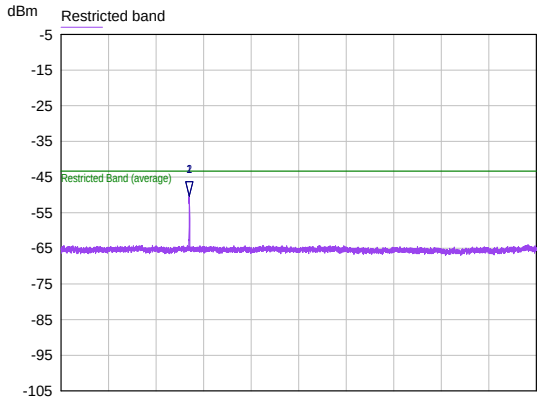
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.9913 GHz	-15.41 dBm	Relative to limit
2	Restricted band	2.9913 GHz	-58.69 dBm	Absolute

Ch 18: trace 3; 2483.5 – 4000 MHz



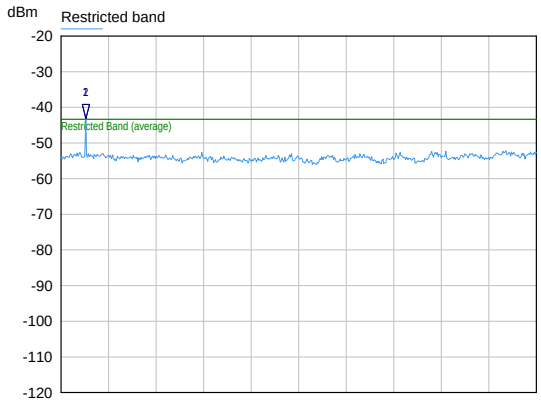
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	4.8111 GHz	2.69 dBm	Relative to limit
2	Restricted band	4.8111 GHz	-40.59 dBm	Absolute

Ch 18: trace 4; 4000 – 7000 MHz



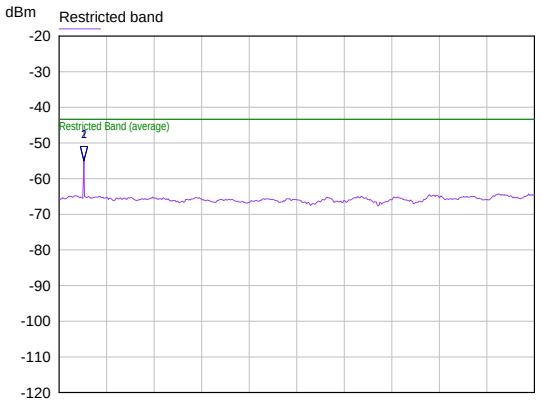
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	4.8111 GHz	-6.99 dBm	Relative to limit
2	Restricted band	4.8111 GHz	-50.27 dBm	Absolute

Ch 18: trace 5; 4000 – 7000 MHz (RMS)



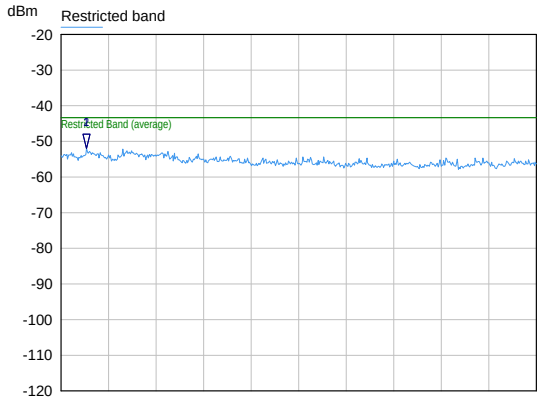
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.3126 GHz	0.13 dBm	Relative to limit
2	Restricted band	7.3126 GHz	-43.15 dBm	Absolute

Ch 18: 7 – 13 GHz peak



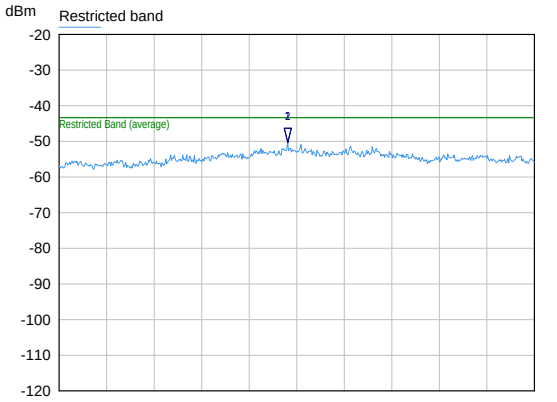
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.3126 GHz	-11.69 dBm	Relative to limit
2	Restricted band	7.3126 GHz	-54.97 dBm	Absolute

Ch 18: trace 5; 7 – 13 GHz (RMS)



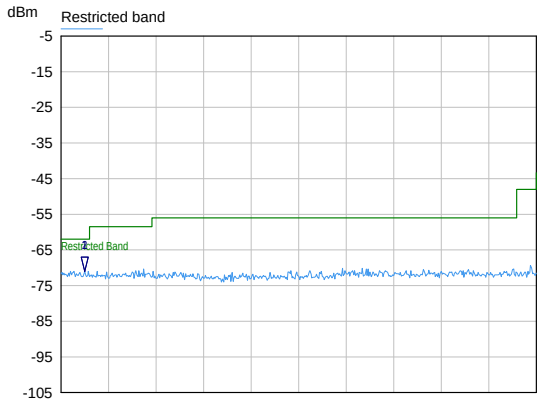
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	13.3246 GHz	-8.75 dBm	Relative to limit
2	Restricted band	13.3246 GHz	-52.03 dBm	Absolute

Ch 18: trace 5; 13 – 19 GHz



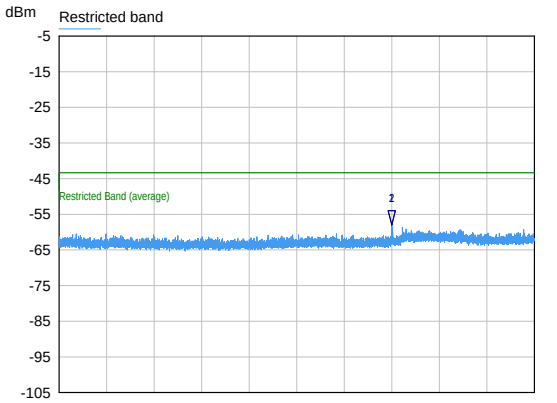
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	21.8858 GHz	-7.08 dBm	Relative to limit
2	Restricted band	21.8858 GHz	-50.36 dBm	Absolute

Ch 18: trace 6; 19 – 25 GHz



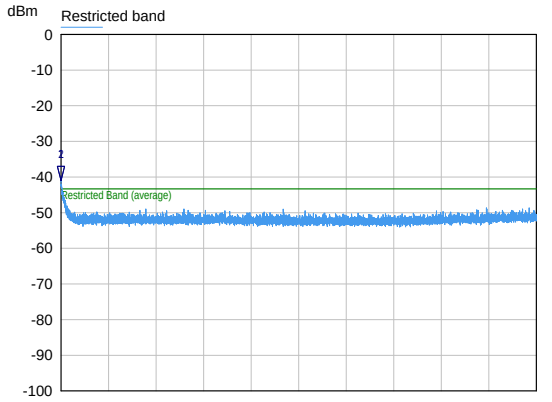
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	78.5000 MHz	-8.96 dBm	Relative to limit
2	Restricted band	78.5000 MHz	-70.92 dBm	Absolute

Ch 25: trace 1; 30 - 1000 MHz



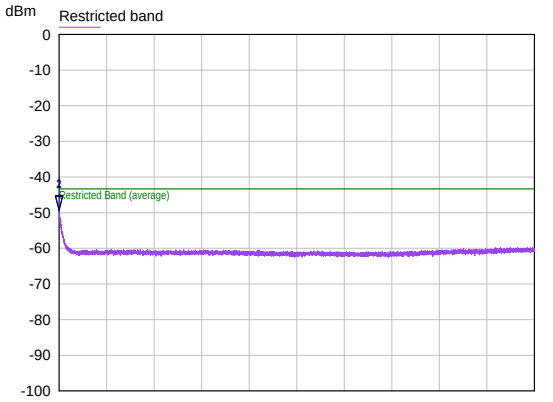
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	1.9737 GHz	-14.76 dBm	Relative to limit
2	Restricted band	1.9737 GHz	-58.04 dBm	Absolute

Ch 25: trace 2; 1000 – 2390 MHz



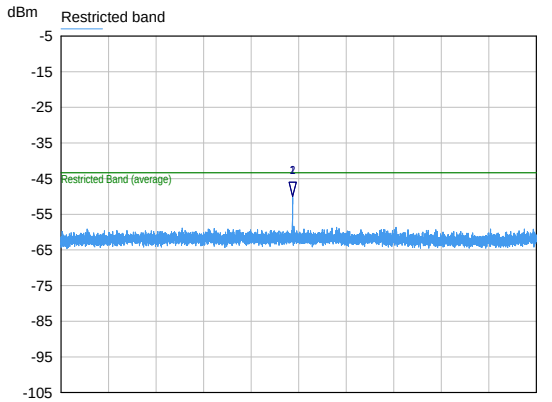
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.4836 GHz	2.21 dBm	Relative to limit
2	Restricted band	2.4836 GHz	-41.07 dBm	Absolute

Ch 25: trace 3; 2483.5 – 3000 MHz (Peak)



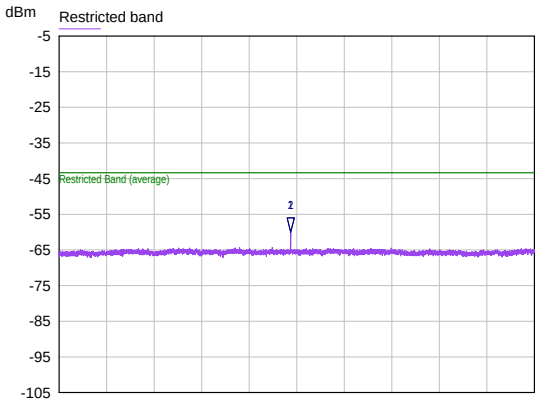
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	2.4835 GHz	-5.91 dBm	Relative to limit
2	Restricted band	2.4836 GHz	-49.43 dBm	Absolute

Ch 25: trace 3; 2483.5 – 3000 MHz (RMS)



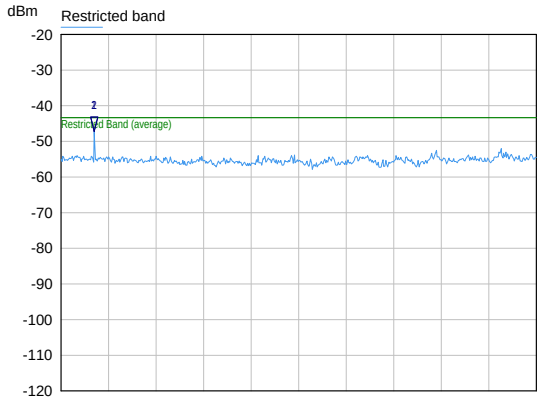
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	4.9510 GHz	-6.72 dBm	Relative to limit
2	Restricted band	4.9510 GHz	-50.00 dBm	Absolute

Ch 25: trace 5; 3000 – 7000 MHz (Peak)



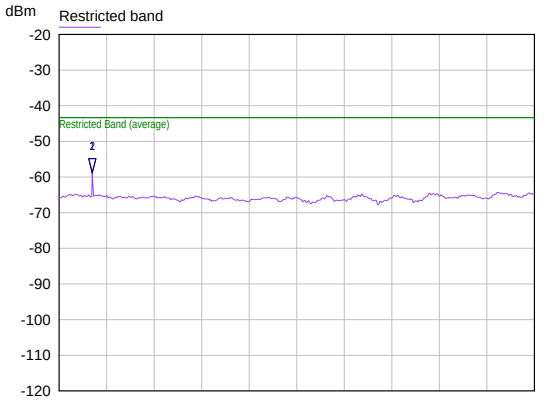
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	4.9490 GHz	-16.64 dBm	Relative to limit
2	Restricted band	4.9490 GHz	-59.92 dBm	Absolute

Ch 25: trace 5; 3000 – 7000 MHz (RMS)



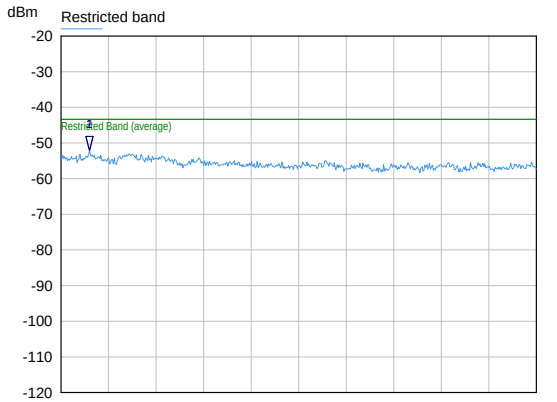
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.4208 GHz	-3.94 dBm	Relative to limit
2	Restricted band	7.4208 GHz	-47.22 dBm	Absolute

Ch 25: 7 – 13 GHz peak



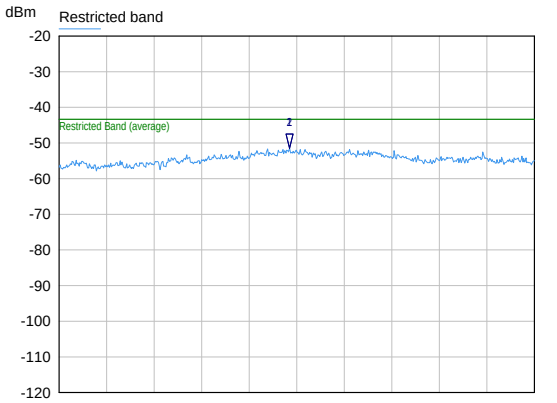
Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	7.4208 GHz	-15.51 dBm	Relative to limit
2	Restricted band	7.4208 GHz	-58.79 dBm	Absolute

Ch 25: trace 5; 7 – 13 GHz (RMS)



Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	13.3607 GHz	-8.81 dBm	Relative to limit
2	Restricted band	13.3607 GHz	-52.09 dBm	Absolute

Ch 25: trace 5; 13 – 19 GHz



Mkr	Trace	X-Axis	Value	Notes
1	Restricted band	21.9098 GHz	-8.27 dBm	Relative to limit
2	Restricted band	21.9098 GHz	-51.55 dBm	Absolute

Ch 25: trace 6; 19 – 25 GHz

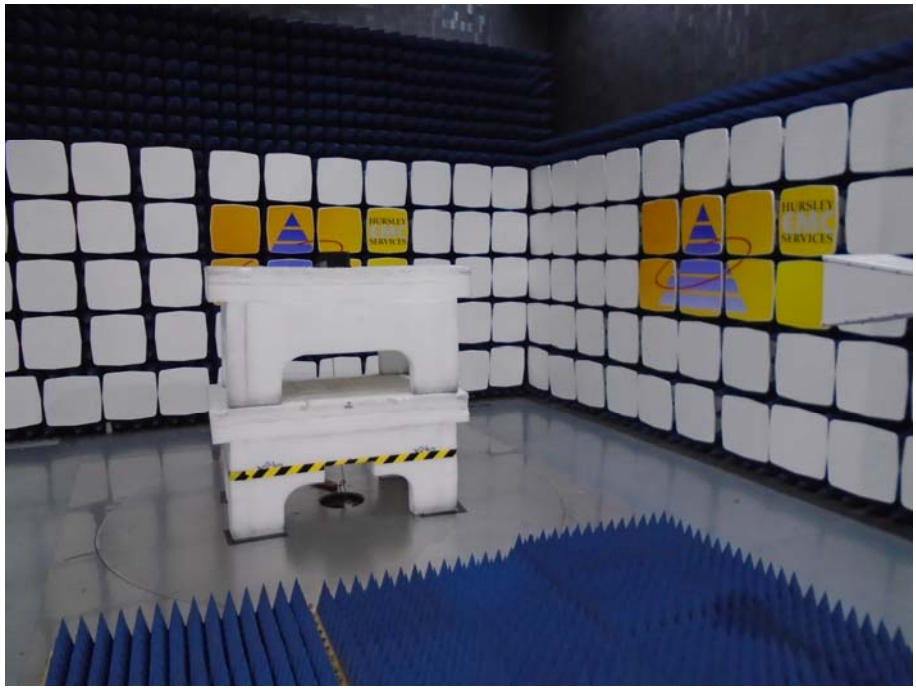
8.0 PHOTO LOG (EXAMPLES)

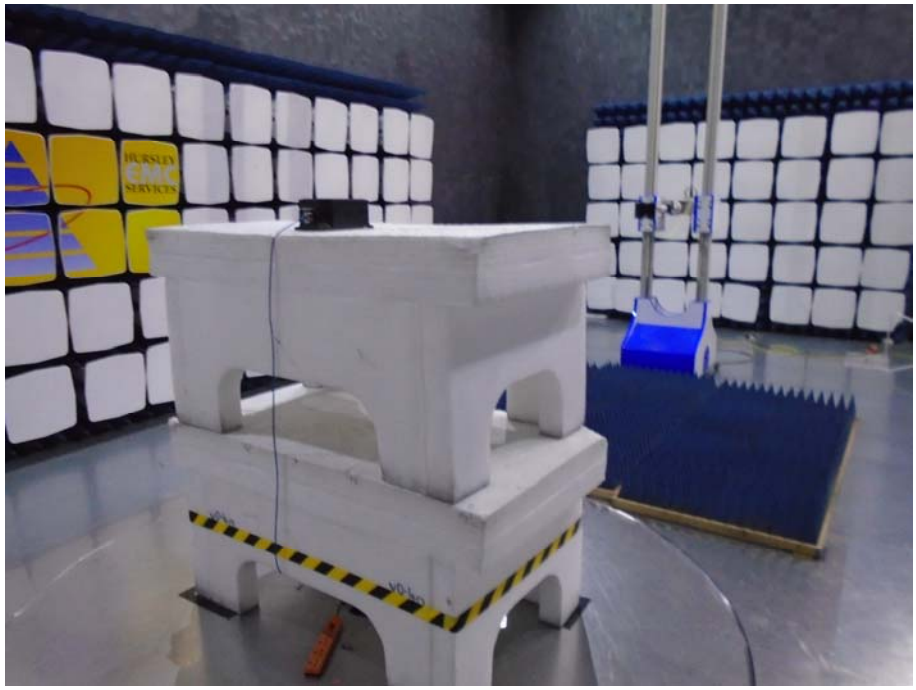
Emissions:

Radiated emissions; below 1.0 GHz

Photo Log (continued)

Radiated emissions; above 1.0 GHz





9.0 FCC SITE COMPLIANCE STATEMENT

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

February 13, 2006

Hursley EMC Services Ltd.
Unit 16
Brickfield Lane
Chandlers Ford - Hampshire, SO53 4DB
United Kingdom
Attention: R P St John James

Re: Accreditation of Hursley EMC Services Ltd.
Designation Number: UK0006

Dear Sir or Madam:

We have been notified by Department of Trade and Industry (DTI) that Hursley EMC Services Ltd. has been accredited as a Conformity Assessment Body (CAB).

At this time your organization is hereby designated to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Parts 15 and 18 of the Commission's Rules.

This designation will expire upon expiration of the accreditation or notification of withdrawal of designation.

Sincerely,

Thomas Phillips
Electronics Engineer

10.0 MEASUREMENT UNCERTAINTIES

Emissions tests

For all emissions tests, measurement uncertainties have been calculated in line with the requirements of CISPR 16-4-2 to give a confidence level of greater than 95%. In all cases the laboratories calculated uncertainty values (known as Ulab) are equal to or are less than the expected uncertainty values contained in CISPR 16-4-2 (known as Ucispr).

Below is a list of the laboratories calculated measurement uncertainties:

Conducted emissions:

Via AMN/LISN:	±3.3 dB (9 kHz – 150 kHz), ±3.3 dB (150 kHz – 30 MHz)
Via AAN/ISN:	±5.0 dB (150 kHz – 30 MHz)
Via CVP:	±3.5 dB (150 kHz – 30 MHz)
Via CP:	±2.7 dB (150 kHz – 30 MHz)
Via 100 Ω:	±2.7 dB (150 kHz – 30 MHz)
Clicks:	±2.8 dB (150 kHz – 30 MHz)
Harmonics:	±5.8 % (100 Hz – 2 kHz)
Flicker:	±3.8 % (worst case for all parameters)

Radiated emissions:

H-Field:	±2.7 dB (9 kHz – 3 MHz), ±2.9 dB (3 MHz – 30 MHz)
D = 3.0 m:	±2.8 dB (30 MHz – 200 MHz), ±2.9 dB (200 MHz – 1 GHz)
D = 3.0 m:	±4.5 dB (1 GHz – 6 GHz), ±4.4 dB (6 GHz – 40 GHz)
D = 10.0 m:	±4.4 dB (30 MHz – 200 MHz), ±4.8 dB (200 MHz – 1 GHz)

End of document