

EMCTEST.1133

EMC TEST LAB

EMC TEST Report

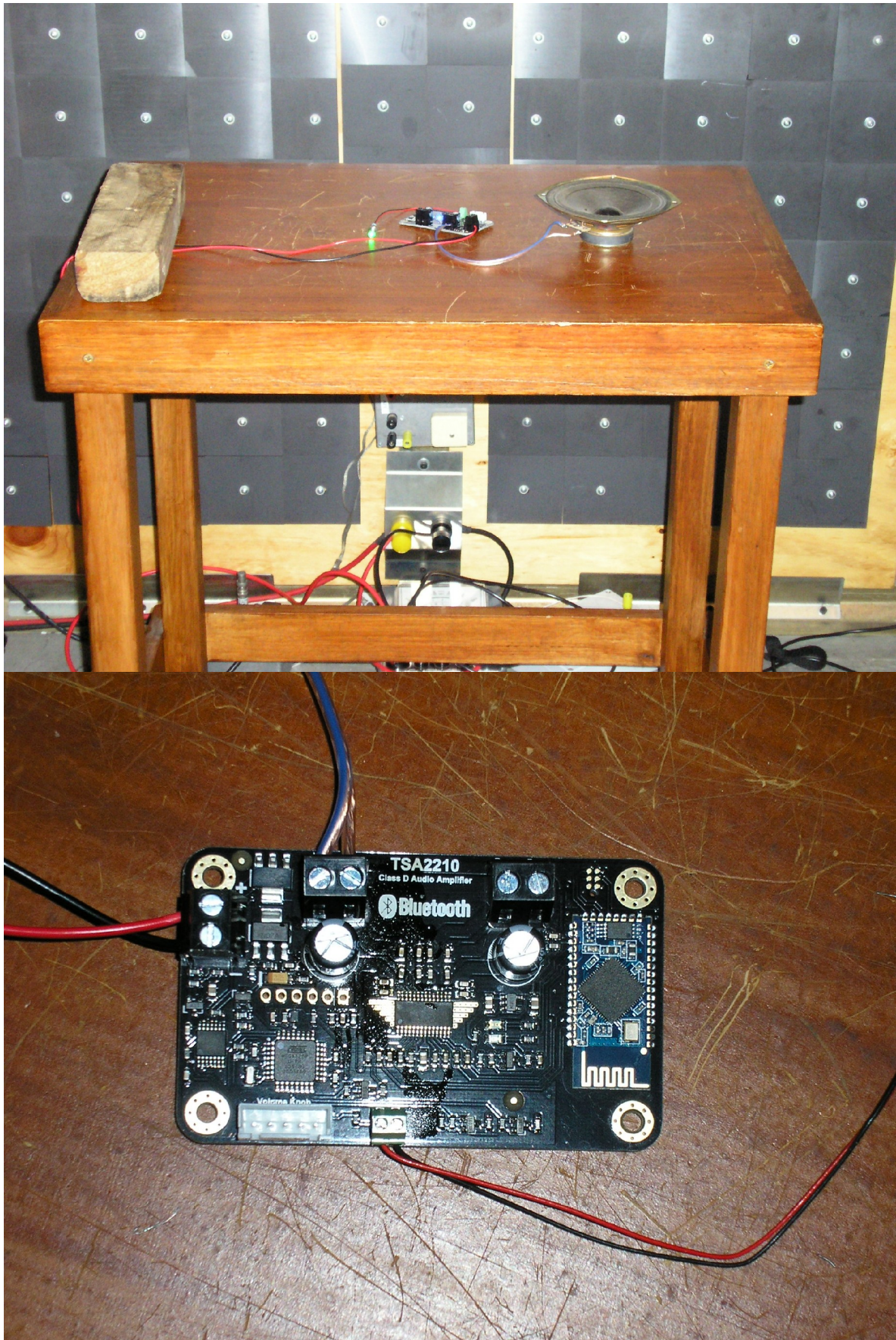
to

Built on Enthusiasm

For

Bluetooth Class D Audio Amplifier

TSA2210



EMC TEST LAB

A Division of Daley Electronics Pty. Ltd., A.C.N. 005 279 809

84 Keys Rd
Cheltenham Vic 3192
Ph: (03) 9555 5153
daleyelectronics.com.au

EMC Test Report

Report to: Built on Enthusiasm
18 Glenbrae Court
Bannockburn
Victoria 3331 Australia.

Subject: Bluetooth Class D Audio Amplifier TSA2210

Tested to:
AS/NZS CISPR 32:2013 “Electromagnetic compatibility of multimedia equipment- Emission requirements”

Report Date –21st July 2018

Result: PASS with no modification. Class A Limits.
See note below.

Per



M. Daley

Note: Class A Equipment shall have the following warning in the instructions for use:

Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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EMC TEST REPORT

Item Tested- Manufacturer- Built on Enthusiasm

Model: TSA2210

The item under test is a class D amplifier that receives input from a Bluetooth RF connection. The emissions related to the Bluetooth receiver/transmitter do not form part of this report. Power is from an external 12VDC supply. The load was a 4 ohm loud speaker. Test signal 1kHz. Sine wave.

Test Location- EMC Test Lab shielded room

Test Layout- Refer to photograph. Equipment on table 700mm above the floor.

Power supply- 12.0VDC at 0.10A.

Output – 1kHz. at normal listening level.

Date Tested: 19/7/18

Temperature: 18 deg. C.

Test Program-

Tests for AS/NZS CISPR 32

- 1) Radiated Emission 30 to 1000MHz.

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Tests Commence

1) **Radiated Emission – 30 to 1000MHz.**

Limits as per Table A.4. Tested at 12VDC.

Measured at 3 metres with biconical antenna and ER55CR receiver

**Refer graphs BUILT3 (Horizontal antenna) and BUILT4 (Vertical antenna).
Graphs Appended.**

**Result- PASS with a margin of 5.9dB at 55.38MHz. with a vertical antenna.
Class A limits.**

End of Tests.

Measurement Uncertainty

Calculated measurement Uncertainties-

- a) Conducted Emission- 3.9dB**
- b) Radiated Emission- Shielded Room to 1GHz- 8.0dB**
- c) Radiated Emission- Open Area Test Site to 1GHz.- 6.0dB**
- d) Frequency – 1 in 10 million.**

**Appendices: Testing Equipment
 Graphs**

EMC TESTING - EQUIPMENT

Calibration Equipment:

1. HP 436A
Power Meter- Power Reference NATA Calibration
Serial No. 1930A06084
2. Fluke 45 Multimeter NATA Calibration
Serial No. 6176008
- 2A. HP 8656B
Signal Generator
S/N 3334U14415 Traceable Calibration
- 2B LAPLACE Emission Reference Source S/N 1167 UKAS Calibration
- 2C 18GHz. Comb Generator (Daley Electronics) Traceable Calibration

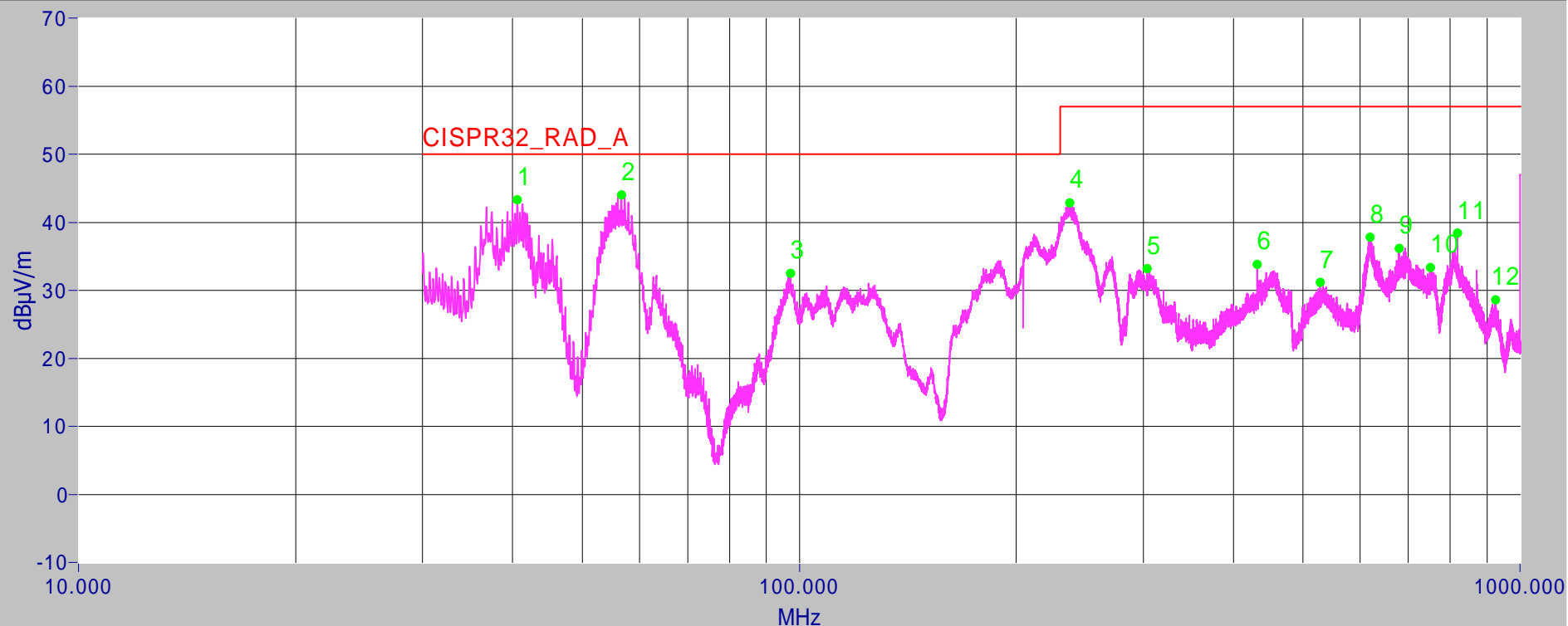
Test Instruments:

3. Electro-Metrics Interference Analyzer Model EMC-25 Mk III, Serial No 761
Plus CRM-25 CISPR detector
4. Rohde & Schwarz HMS-X Spectrum Analyzer
Serial Number 023823501
5. Rohde & Schwarz ESS EMC Receiver Serial Number 833776/003
6. Hewlett Packard 8447E Pre Amplifier
Serial No. 1937A01729
7. Line Impedance Stabilization Network
(Daley Electronics Pty. Ltd.)
8. Tektronix CT-2 Current Probe
9. Tektronix P6021 Current Probe
10. Seaward 247A91A Biconnical Antenna
(Manufacturer's calibration)
11. 2 metre Loop Antenna to Annex B of AS 4051 1998 plus 40dB amplifier HP 462a S/N 551-00831
12. Absorbing Clamp to Annex K of AS/NZS 1052.1:1995
13. HP 8593E Spectrum Analyzer Serial Number 3911A03983
14. Horn Antenna CE18000 S/N 1321
15. Hyperlog 7060 Antenna
16. AFJ ER55CR EMC Receiver S/N 55399831086

EMCEQUIP 10/5/18



AFJ ER55R 30MHz-1GHz EMI RECEIVER 7.11



AFJ ER55R 30MHz-1GHz EMI RECEIVER 7.11
Firmware Ver.7.07
Print Report of 07-19-2018 - 17:32:12

Operator: MIKE DALEY

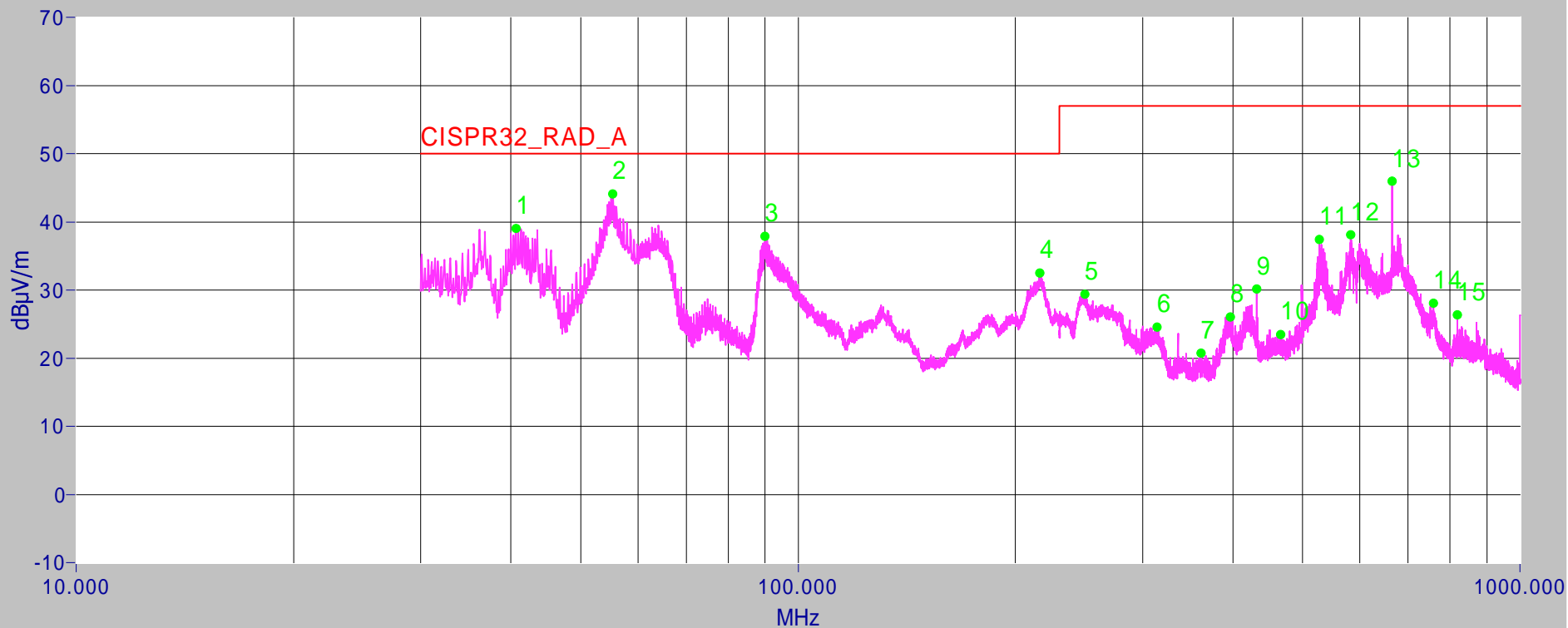
Title:
EMC TEST LAB - BUILT3

TSA2210 BLUETOOTH AMPLIFIER
RADIATED EMISSION
HORIZONTAL ANTENNA
12V 0.10A 1KHz.

SN.	:55399831086	SEARCH MAX-PEAK TABLE		
CORR.	:KFACT BICONICAL	N.	Freq. (MHz)	Level (dBuV/m)
CABLE	ROOM_H_30/8/13	1	40.62	43.29
EXTATT	8447E_FAR	2	56.64	44.02
INPUT	:0 dB	3	97.26	32.47
ATT.	:MAN 20 dB	4	237.12	42.87
DETECT	:PK+QP	5	303.96	33.23
DEM.	:NONE	6	432.00	33.82
LIM1	:CISPR32_RAD_A	7	527.94	31.14
LIM2	:	8	619.62	37.78
MODE	:PEAK+QPEAK CAL	9	679.38	36.17
SWEEP	:30.000-1000.000MHz	10	751.86	33.38
STEP	:60KHz	11	819.54	38.38
IFBw	:120KHz	12	925.26	28.58



AFJ ER55R 30MHz-1GHz EMI RECEIVER 7.11



AFJ ER55R 30MHz-1GHz EMI RECEIVER 7.11
Firmware Ver.7.07
Print Report of 07-19-2018 - 17:53:30

Operator: MIKE DALEY

Title:
EMC TEST LAB - BUILT4

TSA2210 BLUETOOTH AMPLIFIER
RADIATED EMISSION
VERTICAL ANTENNA
12V 0.10A 1KHz.

SN.	:55399831086	SEARCH MAX-PEAK TABLE	
CORR.	:KFACT BICONICAL	N.	Freq. (MHz) Level (dBuV/m)
CABLE	ROOM_V_11/6/13	1	40.68 38.99
EXTATT	8447E_FAR	2	55.38 44.08
INPUT	:0 dB	3	90.00 37.86
ATT.	:MAN 20 dB	4	216.12 32.50
DETECT	:PK+QP	5	249.48 29.40
DEM.	:NONE	6	314.28 24.59
LIM1	:CISPR32_RAD_A	7	361.80 20.70
LIM2	:	8	397.02 26.06
MODE	:PEAK+QPEAK CAL	9	432.00 30.15
SWEEP	:30.000-1000.000MHz	10	466.20 23.45
STEP	:60KHz	11	527.58 37.43
IFBW	:120KHz	12	583.02 38.06