EMC TEST REPORT	
TEST REPORT NUMBER	DOJ 1517TEL037-A1
TEST REPORT DATE	03rd June 2015
TEST REPORT VERSION	1.0
MANUFACTURER	Gemtek Electronics (ChangSHU) Co.
PRODUCT NAME	5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio
PRODUCT MODEL NO.	C058900P072A, C058900C072A, C058900P062A, C058900C062A
PART NO.	142000001193A
REV	0B
CONDITION OF EUT WHEN RECEIVED	GOOD and in working condition
ISSUED TO	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008. USA +1 888-863-5250
ISSUED BY	**TARANG Lab** Wipro Technologies, SJP2, Survey#70,77,78/8A, Dodda Kanelli, Sarjapur road, Bangalore. Karnataka. India - 560 035 Tel: +91-80-30292929 Fax: +91-80-30298200 Email: tarang.planet@wipro.com Web: www.wipro.com

AMENDMENT HISTORY

Amendment Number	Amendment Date	Author of Amendment	Previous Report Version	Previous Report Date
Amendment Details				

This report should always be reproduced in full. Any extracts of this report is invalid.

TABLE OF CONTENTS

1 TEST REPORT SUMMARY 8

2 GENERAL INFORMATION 10

2.1 TEST DETAILS 10
2.2 TEST FACILITY DETAILS 10
2.3 MEASUREMENT UNCERTAINTY 10

3 INSTRUMENTATION AND CALIBRATION 11

3.1 TEST AND MEASURING EQUIPMENT 11
3.2 EQUIPMENTS USED 11

4 PRODUCT INFORMATION 12

4.1 DESCRIPTION OF THE PRODUCT 12
4.2 SOFTWARE AND FIRMWARE DETAILS 12
4.3 LIST OF PRODUCT CABLES 14

5 TEST DETAILS 15

5.1 PRODUCT AND TEST SETUP 15
5.1.1 Product Configuration 15
5.1.2 Test Setup Details 15
5.1.3 Accessories 15
5.2 APPLICABLE TESTS 16
5.3 TEST RESULT 17
5.3.1 Conducted Emission 17
5.3.2 Radiated Emission 37

APPENDIX I – ACRONYMS 106

This report should always be reproduced in full. Any extracts of this report is invalid.

LIST OF FIGURES

Figure 1: Block Diagram of the EUT test setup during the tests 15
Figure 2: Typical test setup for conducted Emission test 18
Figure 3: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 19
Figure 4: CE graph from 150 kHz to 30MHz using Peak detector - Line 19
Figure 5: CE graph from 150 kHz to 30MHz using Average detector - Neutral 20
Figure 6: CE graph from 150 kHz to 30MHz using Average detector - Line 21
Figure 7: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 22
Figure 8: CE graph from 150 kHz to 30MHz using Peak detector - Line 22
Figure 9: CE graph from 150 kHz to 30MHz using Average detector - Neutral 23
Figure 10: CE graph from 150 kHz to 30MHz using Average detector - Line 24
Figure 11: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 25
Figure 12: CE graph from 150 kHz to 30MHz using Peak detector - Line 25
Figure 13: CE graph from 150 kHz to 30MHz using Average detector - Neutral 26
Figure 14: CE graph from 150 kHz to 30MHz using Average detector - Line 27
Figure 15: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 28
Figure 16: CE graph from 150 kHz to 30MHz using Peak detector - Line 28
Figure 17: CE graph from 150 kHz to 30MHz using Average detector - Neutral 29
Figure 18: CE graph from 150 kHz to 30MHz using Average detector - Line 30
Figure 19: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 31
Figure 20: CE graph from 150 kHz to 30MHz using Peak detector - Line 31
Figure 21: CE graph from 150 kHz to 30MHz using Average detector - Neutral 32
Figure 22: CE graph from 150 kHz to 30MHz using Average detector - Line 33
Figure 23: CE graph from 150 kHz to 30MHz using Peak detector - Neutral 34
Figure 24: CE graph from 150 kHz to 30MHz using Peak detector - Line 34
Figure 25: CE graph from 150 kHz to 30MHz using Average detector - Neutral 35
Figure 26: CE graph from 150 kHz to 30MHz using Average detector - Line 36
Figure 27: Typical test setup for Radiated Emission test 39
Figure 28: Average RE from 9 kHz to 90 kHz - Parallel 40
Figure 29: Average RE from 110 kHz to 490 kHz - Parallel 40
Figure 30: Peak RE from 9 kHz to 30MHz - Parallel 41
Figure 31: Average RE from 9 kHz to 90 kHz - Perpendicular 42
Figure 32: Average RE from 110 kHz to 490 kHz - Perpendicular 42
Figure 33: Peak RE from 9 kHz to 30MHz - Perpendicular 43
Figure 34: Peak RE from 30MHz to 1GHz - Horizontal polarization 44
Figure 35: Peak RE from 30MHz to 1GHz - Vertical polarization 44
Figure 36: Average RE from 1GHz to 18GHz - Horizontal polarization 45
Figure 37: Average RE from 1GHz to 18GHz - Vertical polarization 46
Figure 38: Peak RE from 1GHz to 18GHz - Horizontal polarization 46
Figure 39: Peak RE from 1GHz to 18GHz - Vertical polarization 47
Figure 40: Average RE from 18GHz to 26.5GHz - Horizontal polarization 47
Figure 41: Average RE from 18GHz to 26.5GHz - Vertical polarization 48
Figure 42: Peak RE from 18GHz to 26.5GHz - Horizontal polarization 48
Figure 43: Peak RE from 18GHz to 26.5GHz - Vertical polarization 49
Figure 44: Average RE from 26.5GHz to 40GHz - Horizontal polarization 49
Figure 45: Average RE from 26.5GHz to 40GHz - Vertical polarization 50
Figure 46: Peak RE from 26.5GHz to 40GHz - Horizontal polarization 50
Figure 47: Peak RE from 26.5GHz to 40GHz - Vertical polarization 51
Figure 48: Average RE from 9 kHz to 90 kHz - Parallel 51

This report should always be reproduced in full. Any extracts of this report is invalid.

Figure 49: Average RE from 110 kHz to 490 kHz – Parallel 52
Figure 50 : Peak RE from 9 kHz to 30MHz - Parallel 52
Figure 51 : Average RE from 9 kHz to 90 kHz - Perpendicular 53
Figure 52 : Average RE from 110 kHz to 490 kHz - Perpendicular 53
Figure 53 : Peak RE from 9 kHz to 30MHz - Perpendicular 54
Figure 54 : Peak RE from 30MHz to 1GHz - Horizontal polarization 55
Figure 55 : Peak RE from 30MHz to 1GHz - Vertical polarization 55
Figure 56 : Average RE from 1GHz to 18GHz - Horizontal polarization 56
Figure 57 : Average RE from 1GHz to 18GHz - Vertical polarization 57
Figure 58 : Peak RE from 1GHz to 18GHz - Horizontal polarization 57
Figure 59 : Peak RE from 1GHz to 18GHz - Vertical polarization 58
Figure 60 : Average RE from 18GHz to 26.5GHz - Horizontal polarization 58
Figure 61 : Average RE from 18GHz to 26.5GHz - Vertical polarization 59
Figure 62 : Peak RE from 18GHz to 26.5GHz - Horizontal polarization 59
Figure 63 : Peak RE from 18GHz to 26.5GHz - Vertical polarization 60
Figure 64 : Average RE from 26.5GHz to 40GHz - Horizontal polarization 60
Figure 65 : Average RE from 26.5GHz to 40GHz - Vertical polarization 61
Figure 66 : Peak RE from 26.5GHz to 40GHz - Horizontal polarization 61
Figure 67 : Peak RE from 26.5GHz to 40GHz - Vertical polarization 62
Figure 68 : Average RE from 9 kHz to 90 kHz - Parallel 62
Figure 69: Average RE from 110 kHz to 490 kHz – Parallel 63
Figure 70 : Peak RE from 9 kHz to 30MHz - Parallel 63
Figure 71 : Average RE from 9 kHz to 90 kHz - Perpendicular 64
Figure 72 : Average RE from 110 kHz to 490 kHz - Perpendicular 64
Figure 73 : Peak RE from 9 kHz to 30MHz - Perpendicular 65
Figure 74 : Peak RE from 30MHz to 1GHz - Horizontal polarization 65
Figure 75 : Peak RE from 30MHz to 1GHz - Vertical polarization 66
Figure 76: Average RE from 1GHz to 18GHz - Horizontal polarization 67
Figure 77: Average RE from 1GHz to 18GHz - Vertical polarization 67
Figure 78: Peak RE from 1GHz to 18GHz - Horizontal polarization 68
Figure 79: Peak RE from 1GHz to 18GHz - Vertical polarization 68
Figure 80: Average RE from 18GHz to 26.5GHz - Horizontal polarization 69
Figure 81: Average RE from 18GHz to 26.5GHz - Vertical polarization 69
Figure 82: Peak RE from 18GHz to 26.5GHz - Horizontal polarization 70
Figure 83: Peak RE from 18GHz to 26.5GHz - Vertical polarization 70
Figure 84 : Average RE from 26.5GHz to 40GHz - Horizontal polarization 71
Figure 85 : Average RE from 26.5GHz to 40GHz - Vertical polarization 71
Figure 86: Peak RE from 26.5GHz to 40GHz - Horizontal polarization 72
Figure 87 : Peak RE from 26.5GHz to 40GHz - Vertical polarization 72
Figure 88: Average RE from 9 kHz to 90 kHz - Parallel 73
Figure 89: Average RE from 110 kHz to 490 kHz - Parallel 73
Figure 90: Peak RE from 9 kHz to 30MHz - Parallel 74
Figure 91: Average RE from 9 kHz to 90 kHz - Perpendicular 74
Figure 92: Average RE from 110 kHz to 490 kHz - Perpendicular 75
Figure 93:Peak RE from 9 kHz to 30MHz - Perpendicular 75
Figure 94: Peak RE from 30MHz to 1GHz - Horizontal polarization 76
Figure 95: Peak RE from 30MHz to 1GHz - Vertical polarization 77
Figure 96: Average RE from 1GHz to 18GHz - Horizontal polarization 78
Figure 97: Average RE from 1GHz to 18GHz - Vertical polarization 78

This report should always be reproduced in full. Any extracts of this report is invalid.

Figure 98: Peak RE from 1GHz to 18GHz - Horizontal polarization 79
Figure 99 : Peak RE from 1GHz to 18GHz - Vertical polarization 79
Figure 100: Average RE from 18GHz to 26.5GHz - Horizontal polarization 80
Figure 101: Average RE from 18GHz to 26.5GHz - Vertical polarization 80
Figure 102: Peak RE from 18GHz to 26.5GHz - Horizontal polarization 81
Figure 103: Peak RE from 18GHz to 26.5GHz - Vertical polarization 81
Figure 104: Average RE from 26.5GHz to 40GHz - Horizontal polarization 82
Figure 105: Average RE from 26.5GHz to 40GHz - Vertical polarization 82
Figure 106: Peak RE from 26.5GHz to 40GHz - Horizontal polarization 83
Figure 107: Peak RE from 26.5GHz to 40GHz - Vertical polarization 83
Figure 108: Average RE from 9 kHz to 90 kHz - Parallel 84
Figure 109: Average RE from 110 kHz to 490 kHz - Parallel 84
Figure 110: Peak RE from 9 kHz to 30MHz - Parallel 85
Figure 111: Average RE from 9 kHz to 90 kHz - Perpendicular 85
Figure 112: Average RE from 110 kHz to 490 kHz - Perpendicular 86
Figure 113: Peak RE from 9 kHz to 30MHz-Perpendicular 86
Figure 114: Peak RE from 30MHz to 1GHz - Horizontal polarization 87
Figure 115: Peak RE from 30MHz to 1GHz - Vertical polarization 87
Figure 116: Average RE from 1GHz to 18GHz - Horizontal polarization 88
Figure 117: Average RE from 1GHz to 18GHz - Vertical polarization 88
Figure 118: Peak RE from 1GHz to 18GHz - Horizontal polarization 89
Figure 119: Peak RE from 1GHz to 18GHz - Vertical polarization 89
Figure 120: Average RE from 18GHz to 26.5GHz - Horizontal polarization 90
Figure 121: Average RE from 18GHz to 26.5GHz - Vertical polarization 90
Figure 122: Peak RE from 18GHz to 26.5GHz - Horizontal polarization 91
Figure 123: Peak RE from 18GHz to 26.5GHz - Vertical polarization 91
Figure 124: Average RE from 26.5GHz to 40GHz - Horizontal polarization 92
Figure 125: Average RE from 26.5GHz to 40GHz - Vertical polarization 92
Figure 126: Peak RE from 26.5GHz to 40GHz - Horizontal polarization 93
Figure 127: Peak RE from 26.5GHz to 40GHz - Vertical polarization 93
Figure 128: Average RE from 9 kHz to 90 kHz - Parallel 94
Figure 129: Average RE from 110 kHz to 490 kHz - Parallel 94
Figure 130: Peak RE from 9 kHz to 30MHz - Parallel 95
Figure 131: Average RE from 9 kHz to 90 kHz - Perpendicular 95
Figure 132: Average RE from 110 kHz to 490 kHz - Perpendicular 96
Figure 133: Peak RE from 9 kHz to 30MHz - Perpendicular 96
Figure 134: Peak RE from 30MHz to 1GHz - Horizontal polarization 97
Figure 135: Peak RE from 30MHz to 1GHz - Vertical polarization 97
Figure 136: Average RE from 1GHz to 18GHz - Horizontal polarization 99
Figure 137: Average RE from 1GHz to 18GHz - Vertical polarization 99
Figure 138: Peak RE from 1GHz to 18GHz - Horizontal polarization 100
Figure 139: Peak RE from 1GHz to 18GHz - Vertical polarization 100
Figure 140: Average RE from 18GHz to 26.5GHz - Horizontal polarization 101
Figure 141: Average RE from 18GHz to 26.5GHz - Vertical polarization 101
Figure 142: Peak RE from 18GHz to 26.5GHz - Horizontal polarization 102
Figure 143: Peak RE from 18GHz to 26.5GHz - Vertical polarization 102
Figure 144: Average RE from 26.5GHz to 40GHz - Horizontal polarization 103
Figure 145 : Average RE from 26.5GHz to 40GHz - Vertical polarization 103
Figure 146: Peak RE from 26.5GHz to 40GHz - Horizontal polarization 104

This report should always be reproduced in full. Any extracts of this report is invalid.

Figure 147: Peak RE from 26.5GHz to 40GHz - Vertical polarization 104

LIST OF TABLES

Table 1: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 20
Table 2: Average table for CE from 150 kHz to 30MHz – Line & Neutral 21
Table 3: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 23
Table 4: Average table for CE from 150 kHz to 30MHz – Line & Neutral 24
Table 5: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 26
Table 6: Average table for CE from 150 kHz to 30MHz – Line & Neutral 27
Table 7: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 29
Table 8: Average table for CE from 150 kHz to 30MHz – Line & Neutral 30
Table 9: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 32
Table 10: Average table for CE from 150 kHz to 30MHz – Line & Neutral 33
Table 11: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral 35
Table 12: Average table for CE from 150 kHz to 30MHz – Line & Neutral 36
Table 13: Quasi Peak table for RE from 9 kHz to 30MHz – Parallel 41
Table 14: Table 14: Quasi Peak table for RE from 9 kHz to 30MHz – Perpendicular 43
Table 15: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 45
Table 16: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel 52
Table 17: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular 54
Table 18: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 56
Table 19: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel 63
Table 20: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular 65
Table 21: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 66
Table 22: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel 74
Table 23: Quasi Peak table for RE from 9 kHz to 30MHz – Perpendicular 76
Table 24: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 77
Table 25: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel 85
Table 26: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular 86
Table 27: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 87
Table 28: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel 95
Table 29: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular 96
Table 30: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz 98

This report should always be reproduced in full. Any extracts of this report is invalid.

1 TEST REPORT SUMMARY

Applicant	Cambium Networks			
Manufacturer	Gemtek Electronics (ChangSHU) Co.			
Equipment Under Test	5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio			
Model	C058900P072A, C058900C072A, C058900P062A, C058900C062A			
Serial number	**Type of test**	**Serial no.**	**Wi-Fi MAC**	**Ethernet MAC**
	Radiated	AE50013121	000456F802AD	000456F802AC
	Conducted	AE50013121	000456F802AD	000456F802AC
Date of Submission	20th Apr 2015			
Date of Test	20th Apr 2015 to 12th May 2015			
Venue of Test	Tarang Lab			

Applicable Standard	**FCC Section**	**RSS Rule part**	**Description**	**Results**
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C; RSS-Gen, Issue 4, Nov 2014	§15.207	RSS-Gen, 8.8	Conducted Emission test	PASS
	§15.205, §15.209	RSS-Gen, 8.1, RSS-Gen, 7.1.2	Radiated Emissions test	PASS

This report should always be reproduced in full. Any extracts of this report is invalid.

5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio was tested by Tarang Lab as per the standards that are listed in the table above. Based on the observations during the test and interpretations by Tarang lab, results have been indicated. The test results produced in this report shall apply only to the above sample that have been tested under the specific conditions and modes of testing as described in the report. Other similar equipment may not necessarily reproduce same result due to production tolerances and measurement uncertainties. Any measurement uncertainties listed in this report are for information purpose only.

The results shall stand invalid, in case there are any modifications / additions / removals to the hardware or software or end use atmosphere to the product tested. This report shall not be modified or in any way revised unless it is expressly permitted and endorsed by Tarang lab, through a duly authorized representative. Particulars on Manufacturer / Supplier / Product configuration / performance criteria, given in this report, are based on the information given by the customer, along with test request. Tarang does not assume any responsibility for the correctness of such information for the above mentioned equipment under test.

Customer acknowledges that this is a test report and not a certificate to gain market access for the product. To gain market access, Customer needs appropriate clearance from the Government or authorized agency for the target market. For markets that allow self-declaration, customer needs to follow the procedure defined by the target market.

Prepared by	Reviewed by	Approved by
Harsha K S	Subhendu	Rajneesh R
Test Engineer	Test Engineer	Functional Head

2 GENERAL INFORMATION

2.1 TEST DETAILS

The tests documented in this report are performed according to the following standards:

- ANSI C63.4-2014
- 47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C
- RSS-Gen, Issue 4, Nov 2014

2.2 TEST FACILITY DETAILS

All the tests were carried out at Tarang – Product Qualification and Compliance Planet located at Wipro Limited, SJP2, Dodda Kanelli, Sarjapur road, Bangalore, Karnataka, India. 560035.

Following are the accreditation and listing details for Tarang.

Accreditation / Listing body	Registration / Company / Certificate Number
ISO 17025 Accreditation	Certificate Number :T-1533 and T-1534(NABL) http://www.nabl-india.org/
FCC (Federal Communications Commission)	Registration Number: 799247 http://www.fcc.gov/
IC (Industry Canada)	Company Number: 9023A http://www.ic.gc.ca
TEC Approval	Certificate Number: TEC/MRA/CAB/IND-D/3 CAB Identification: IND003
DGAQA Approval	1415/F-15/DGAQA/Aircraft
CEMILAC approval	Certificate Number: F-07-22 Reference Number: CEMILAC/6042/TH-13/TC & S

2.3 MEASUREMENT UNCERTAINTY

The following measurement uncertainties are applicable to the relevant tests that are mentioned below:

Test performed	Measurement Uncertainty
Radiated Emission from 9 kHz to 30MHz at 3meter	± 3.968 dB
Radiated Emission from 30MHz to 1GHz at 3meter	± 5.173 dB
Radiated Emission from 1 GHz to 18 GHz at 3meter	± 4.112 dB
Radiated Emission from 18 GHz to 40 GHz at 3meter	± 4.878 dB
Conducted Emission from 150 kHz to 30MHz	± 2.194 dB

3 INSTRUMENTATION AND CALIBRATION

3.1 TEST AND MEASURING EQUIPMENT

The list of following measuring equipment used for this testing conforms to the applicable standards. Performance of all test and measuring equipment including any accessories are checked periodically to ensure accuracy.

3.2 EQUIPMENTS USED

Name of Equipment	Manufacturer	Model No	Serial No	Calibration Due
EMI Test Receiver	R&S	ESU8	100324	10th Mar 2016
EMI Test Receiver	R&S	ESIB40	100306	07th Oct 2015
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130334	25th Jul 2015
Pre-Amplifier	SONOMA	310	270817	31st May 2015
V-LISN	SME	NNLK 8128	8128-243	08th Aug 2015
Pulse Limiter	Impuls-Bergrelzer	ESH3-Z2	101260	26th Mar 2016
Double Ridged BB Horn	SME	BBHA 9120D	9120D 688	05th Aug 2015
Broadband Horn Antenna	SME	BBHA 9170	9170 336	11th Nov 2015
Preamplifier	TDK RF solutions	PA 02	100008	31st May 2015
Preamplifier	TDK RF solutions	Preamp	2007331	10th Nov 2015
Preamplifier	TDK RF solutions	Preamp	2007332	10th Nov 2015
Active Loop Antenna	ETS Lindgren	6507	00104711	22nd Apr 2015
Tunable Band reject/Notch filter	Wainwright Instruments GmbH	WTRCJV8-5150-5850-40-160-50SSK	01	NA

This report should always be reproduced in full. Any extracts of this report is invalid.

4 PRODUCT INFORMATION

4.1 DESCRIPTION OF THE PRODUCT

EUT is a Point to point & Point to Multipoint Fixed outdoor Transceiver.

Product Category / Type of Equipment	TEL (Telecom)
EUT Operating AC Voltage	120V AC
Max EUT AC Operating Current	0.5A
Max EUT AC Power Rating	60W
EUT Operating DC Voltage	30V DC
Max EUT DC Operating Current	0.5A
Max EUT DC Power Rating	12W

4.2 SOFTWARE AND FIRMWARE DETAILS

The 5GHz ePMP Integrated Radio and 5GHz ePMP Connectorized Radio was configured with test software and configured to have the following settings during the course of testing:

- 40MHz modulation bandwidth for low Channel (CH 0)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 86 for 2.15dBi antenna configuration

- 40MHz modulation bandwidth for low Channel (CH 1)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 90 for 2.15dBi antenna configuration

- 40MHz modulation bandwidth for Mid Channel (CH 0)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 103 for 2.15dBi antenna configuration

- 40MHz modulation bandwidth for Mid Channel (CH 1)
  - Rate - HT40,
  - 54Mbps OFDM, MCS15:270Mbps
  - Interframe spacing is tx100
  - Tx gain is 108 for 2.15dBi antenna configuration

This report should always be reproduced in full. Any extracts of this report is invalid.

- 40MHz modulation bandwidth for High Channel (CH 0)
    - Rate - HT40,
    - 54Mbps OFDM, MCS15:270Mbps
    - Interframe spacing is tx100
    - Tx gain is 79 for 2.15dBi antenna configuration

- 40MHz modulation bandwidth for High Channel (CH 1)
    - Rate - HT40,
    - 54Mbps OFDM, MCS15:270Mbps
    - Interframe spacing is tx100
    - Tx gain is 80 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for low Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 94 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for low Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 98 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for Mid Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 108 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for Mid Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 110 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for High Channel (CH 0)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 53 for 2.15dBi antenna configuration

This report should always be reproduced in full. Any extracts of this report is invalid.

- 5MHz modulation bandwidth for High Channel (CH 1)
    - Rate – HT20,
    - 54Mbps OFDM, MCS15:130Mbps
    - Interframe spacing is tx100
    - Tx gain is 62 for 2.15dBi antenna configuration

The unit was continuously monitored for transmission using an auxiliary antenna during the radiated tests.

4.3 LIST OF PRODUCT CABLES

Cable No.	Cable Name	Cable Length	Power / Interconnection cable	Shielded / Unshielded
Cable - 1	Cat. 5E_Ethernet cable	0.5 meter	Interconnection	Unshielded
Cable - 2	Cat. 5E_Ethernet cable	2 meter	Interconnection	Unshielded
Cable - 3	RF cable (50 Ω)	0.125 meter	Interconnection	Shielded
Cable - 4	Power Cord	0.8 meter	Power	Unshielded

This report should always be reproduced in full. Any extracts of this report is invalid.

5 TEST DETAILS

5.1 PRODUCT AND TEST SETUP

5.1.1 PRODUCT CONFIGURATION

The EUT was powered through AC power supply (120V AC / 60Hz). The EUT was connected to Ethernet switch by using RJ45 cable. Figure 1 shows the product configuration during the tests. Following power supply module was used during the test to power ON the EUT.

Name of the Equipment	Manufacturer	Model Number	Serial Number
Switching Power Supply Gigabit Compatible	PHIHONG	PSA15M-300 (AP)	N000900L001A

During Radiated Emissions & Conducted Emissions test, RF ports of EUT were terminated using 50Ω terminations. And EUT was configured to radiate at highest operating power. During Radiated Emissions, a tunable Band reject filter offering an attenuation of approximately 40dB was used to attenuate the intentional band during the testing.

5.1.2 TEST SETUP DETAILS

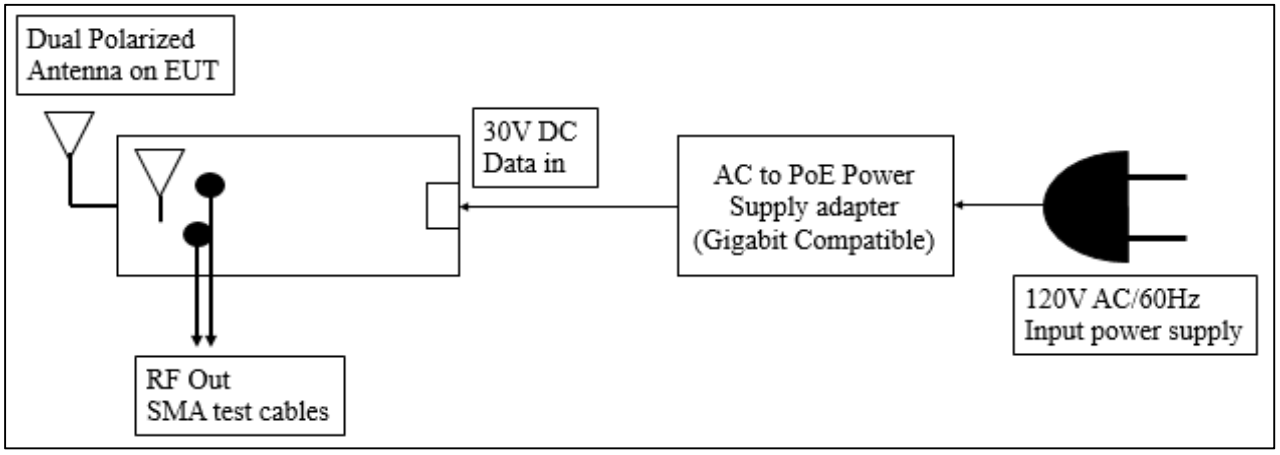

Figure 1: Block Diagram of the EUT test setup during the tests

5.1.3 ACCESSORIES

Name of the Equipment	Manufacturer	Model Number	Serial Number
Laptop	Wipro Technologies Ltd	WLG7E1100	1221

5.2 APPLICABLE TESTS

Applicable Standard	Description	Test level / Test Voltage	Applicability
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C;	Conducted Emission test	150 kHz to 30MHz	Power lines
RSS-Gen, Issue 4, Nov 2014	Radiated Emissions test	9kHz to 40GHz	Enclosure

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3 TEST RESULT

5.3.1 CONDUCTED EMISSION

5.3.1.1 TEST SPECIFICATION

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014
Test Procedure	ANSI C63.4-2014
Type of Cable (Shielded/Unshielded)	Unshielded
Frequency Range	150 kHz to 30MHz
Resolution Bandwidth	9 kHz
Video Bandwidth	30 kHz
Step size	4 kHz
Pre Scan Measurement Time	20ms
Final Measurement Time	1 s
Attenuation	10 dB
Detector	Peak, Quasi peak and Average
Input Voltage	120V AC
Input Frequency	60 Hz
Temperature	22.0 ºC
Humidity	53.0 %
Tested By	Subhendu
Test Date	08th May 2015

5.3.1.2 LIMITS

5.3.1.2.1 LIMITS FOR POWER LINES

Standard	**Reference section**	**Frequency range**	**Quasi Peak Limit (dBµV/m)**	**Average Limit (dBµV/m)**
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	§15.207 8.8	150 kHz to 500 kHz 500 kHz to 5 MHz 5 MHz to 30 MHz	66 to 56* 56 60	56 to 46* 46 50

*Note: * Decreases with the logarithm of the frequency*

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.1.3 TEST SETUP

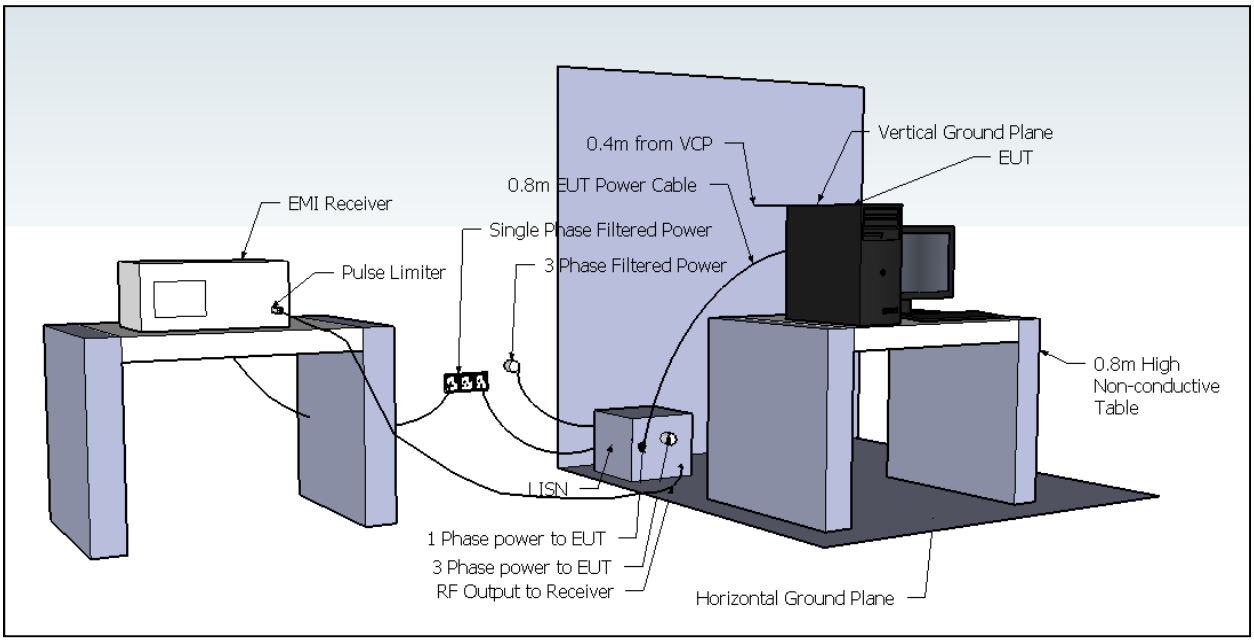

Figure 2: Typical test setup for conducted Emission test

5.3.1.4 TEST PROCEDURE

The test procedure is in accordance with ANSI C63.4-2014.

The Conducted Emission test was performed in the test site with a horizontal ground reference plane and a vertical ground reference plane bonded together. The EUT was placed on a 0.8m height non-metallic wooden table. The Power supply to the EUT was feed through a LISN (50Ω/50µH). The conducted emission measurement test system was configured through software as per standard. The EUT was powered through power adapter connected to LISN and getting charged by 120 V / 60Hz AC supply and made operational

5.3.1.5 RESULT (SUPPORTING GRAPHS / DATA) FOR 40 MHZ MODULATION BANDWIDTH

5.3.1.5.1 LOW CHANNEL_5180 MHZ

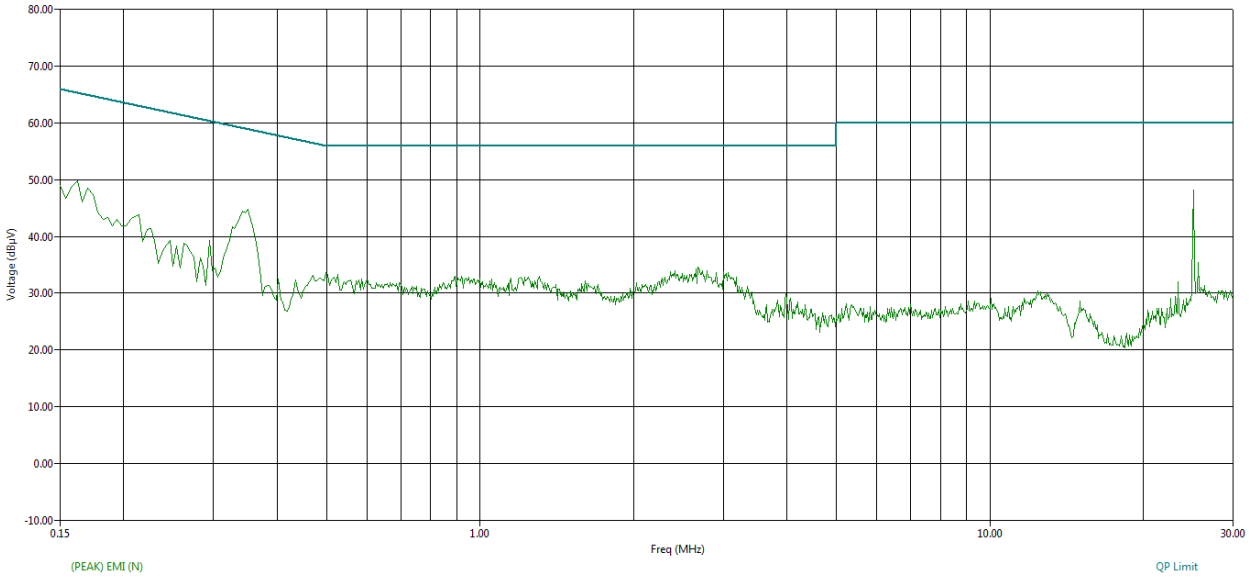

Figure 3: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

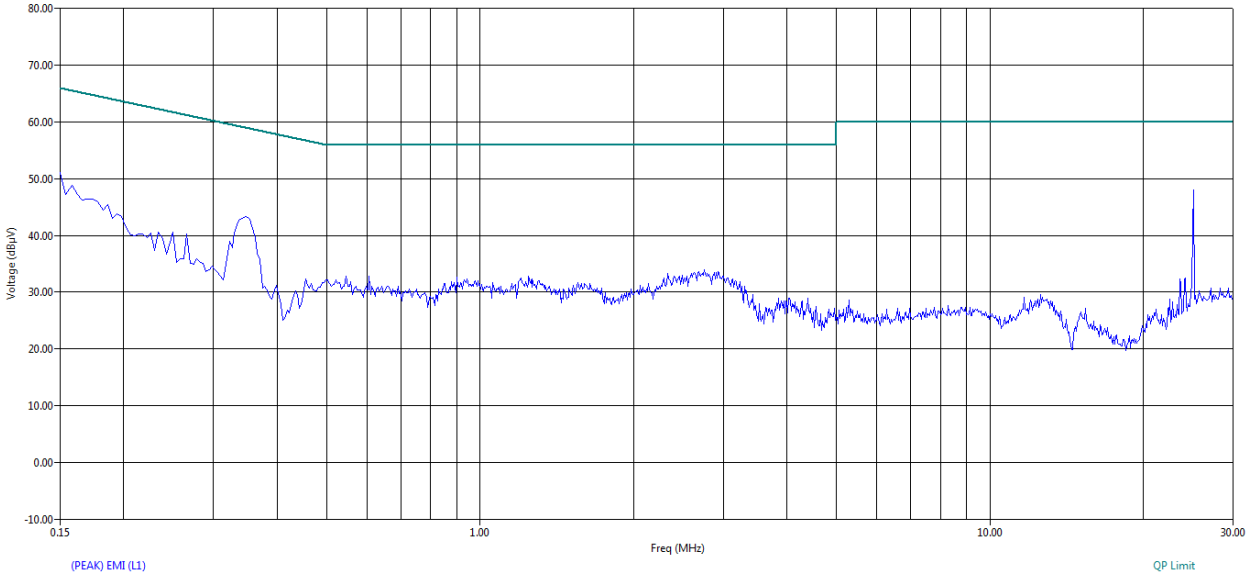

Figure 4: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.154	0.150	N	37.48	10.11	0.10	0.00	47.69	65.98	-18.29
0.154	0.152	L1	37.08	10.11	0.00	0.07	47.25	65.91	-18.66
0.350	0.351	L1	31.21	10.10	0.00	0.06	41.38	58.94	-17.57
3.102	3.107	L1	24.45	10.11	0.00	0.10	34.66	56.00	-21.34
3.230	3.236	N	22.10	10.11	0.14	0.00	32.35	56.00	-23.65
17.694	17.694	N	28.54	10.37	0.34	0.00	39.26	60.00	-20.74
17.694	17.693	L1	27.87	10.37	0.00	0.30	38.54	60.00	-21.46
18.242	18.244	N	31.52	10.38	0.35	0.00	42.25	60.00	-17.75
18.242	18.243	L1	30.65	10.38	0.00	0.30	41.33	60.00	-18.67
19.710	19.709	N	31.15	10.40	0.37	0.00	41.91	60.00	-18.09
19.710	19.710	L1	29.72	10.40	0.00	0.32	40.44	60.00	-19.56
20.258	20.258	N	29.33	10.41	0.37	0.00	40.11	60.00	-19.89
20.258	20.258	L1	28.17	10.41	0.00	0.32	38.90	60.00	-21.10
23.130	23.129	N	31.94	10.48	0.38	0.00	42.80	60.00	-17.20
23.130	23.128	L1	31.49	10.48	0.00	0.35	42.32	60.00	-17.68

Table 1: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

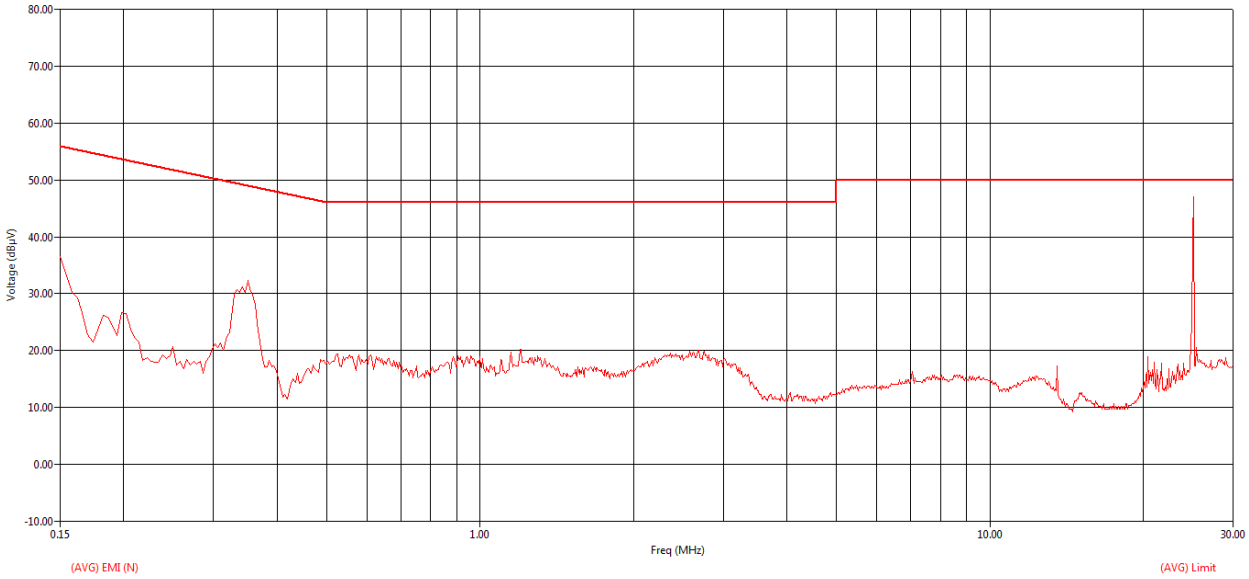

Figure 5: CE graph from 150 kHz to 30MHz using Average detector - Neutral

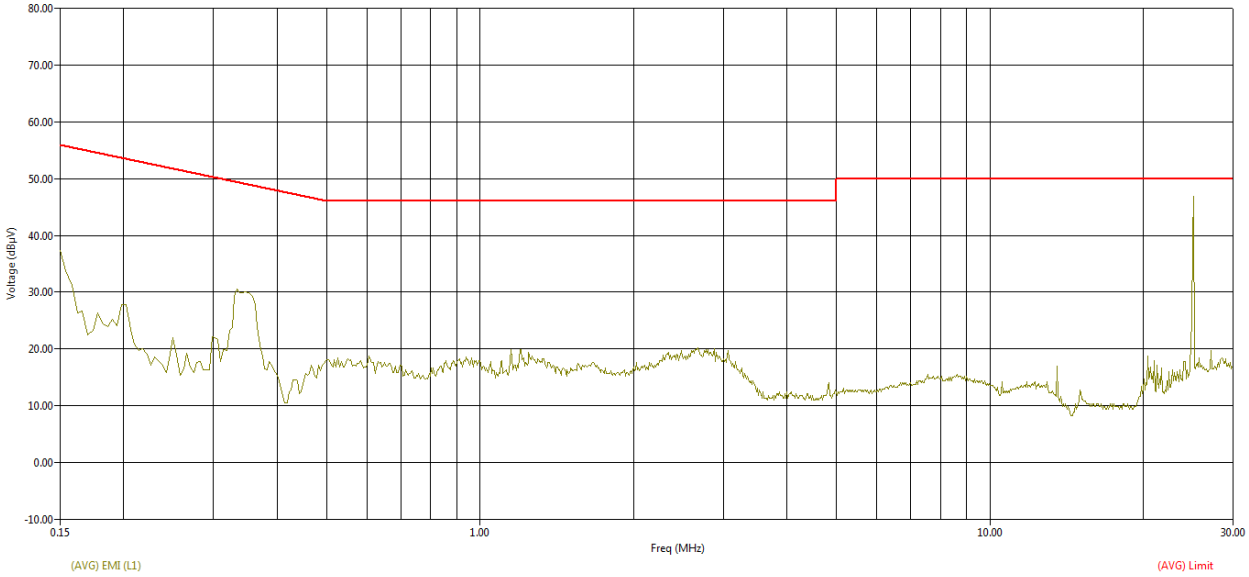

Figure 6: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.154	0.150	N	27.92	10.11	0.10	0.00	38.13	55.98	-17.85
0.154	0.152	L1	27.32	10.11	0.00	0.07	37.50	55.91	-18.41
0.350	0.351	L1	25.22	10.10	0.00	0.06	35.38	48.94	-13.56
3.102	3.107	L1	16.16	10.11	0.00	0.10	26.38	46.00	-19.62
3.230	3.236	N	14.10	10.11	0.14	0.00	24.35	46.00	-21.65
17.694	17.694	N	25.22	10.37	0.34	0.00	35.94	50.00	-14.06
17.694	17.693	L1	24.65	10.37	0.00	0.30	35.32	50.00	-14.68
18.242	18.244	N	27.74	10.38	0.35	0.00	38.47	50.00	-11.53
18.242	18.243	L1	27.00	10.38	0.00	0.30	37.69	50.00	-12.31
19.710	19.709	N	26.86	10.40	0.37	0.00	37.62	50.00	-12.38
19.710	19.710	L1	25.54	10.40	0.00	0.32	36.26	50.00	-13.74
20.258	20.258	N	25.46	10.41	0.37	0.00	36.24	50.00	-13.76
20.258	20.258	L1	24.57	10.41	0.00	0.32	35.30	50.00	-14.70
23.130	23.129	N	29.38	10.48	0.38	0.00	40.24	50.00	-9.76
23.130	23.128	L1	28.88	10.48	0.00	0.35	39.71	50.00	-10.29

Table 2: Average table for CE from 150 kHz to 30MHz – Line & Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.1.5.2 MID CHANNEL_5200 MHz

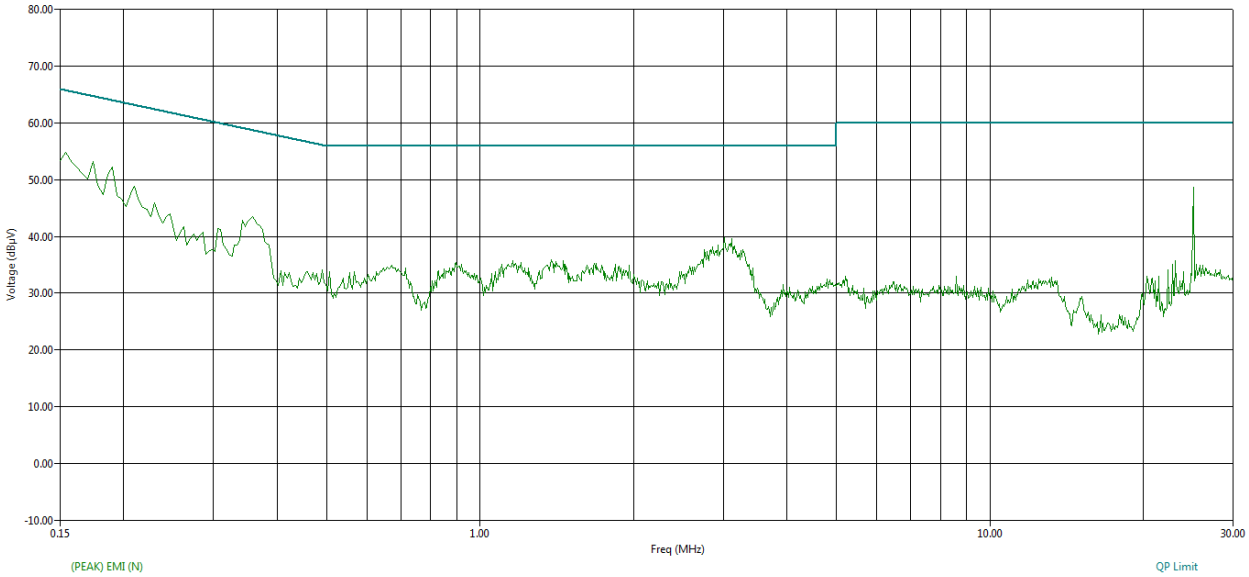

Figure 7: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

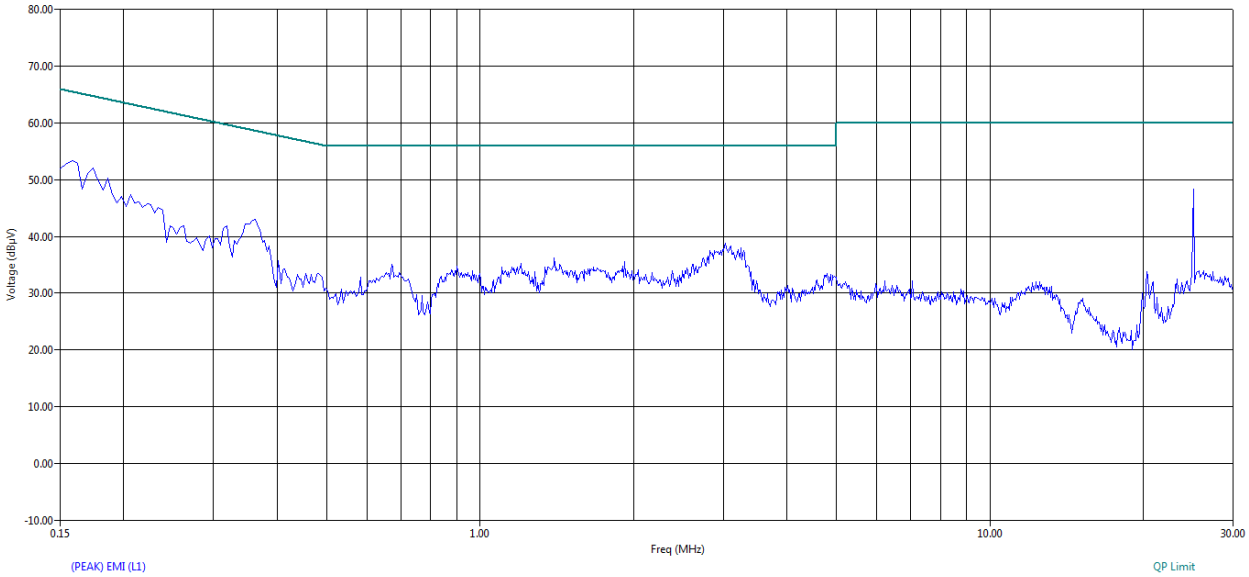

Figure 8: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.154	0.152	N	37.46	10.11	0.10	0.00	47.67	65.91	-18.24
0.158	0.153	L1	37.55	10.11	0.00	0.07	47.73	65.82	-18.09
0.350	0.349	L1	30.64	10.10	0.00	0.06	40.81	58.98	-18.18
3.018	3.022	N	24.05	10.11	0.13	0.00	34.29	56.00	-21.71
3.026	3.029	L1	24.05	10.11	0.00	0.10	34.26	56.00	-21.74
4.790	4.794	L1	17.21	10.11	0.00	0.13	27.45	56.00	-28.55
12.526	12.523	L1	14.67	10.27	0.00	0.24	25.18	60.00	-34.82
15.190	15.186	L1	11.42	10.34	0.00	0.27	22.04	60.00	-37.96
20.362	20.370	L1	18.93	10.41	0.00	0.32	29.66	60.00	-30.34
22.366	22.381	N	9.87	10.46	0.38	0.00	20.71	60.00	-39.29
22.402	22.394	N	9.72	10.46	0.38	0.00	20.56	60.00	-39.44
22.826	22.819	N	11.32	10.47	0.38	0.00	22.17	60.00	-37.83
23.098	23.090	N	11.07	10.48	0.38	0.00	21.93	60.00	-38.07
25.058	25.059	N	36.71	10.52	0.39	0.00	47.62	60.00	-12.38
25.058	25.060	L1	36.90	10.52	0.00	0.37	47.79	60.00	-12.21

Table 3: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

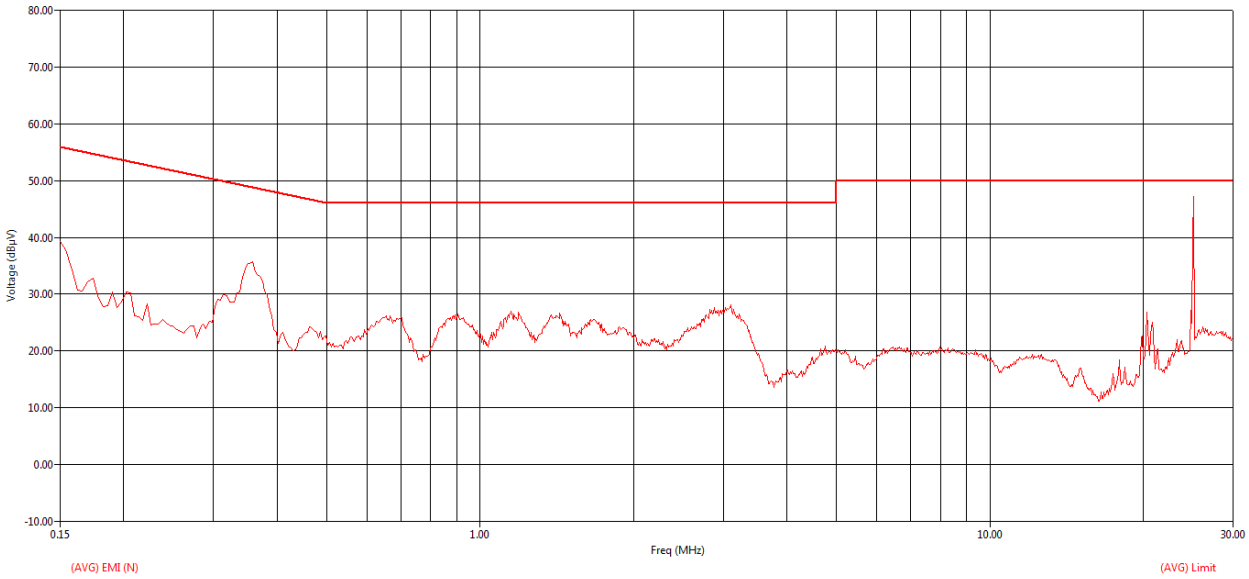

Figure 9: CE graph from 150 kHz to 30MHz using Average detector - Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

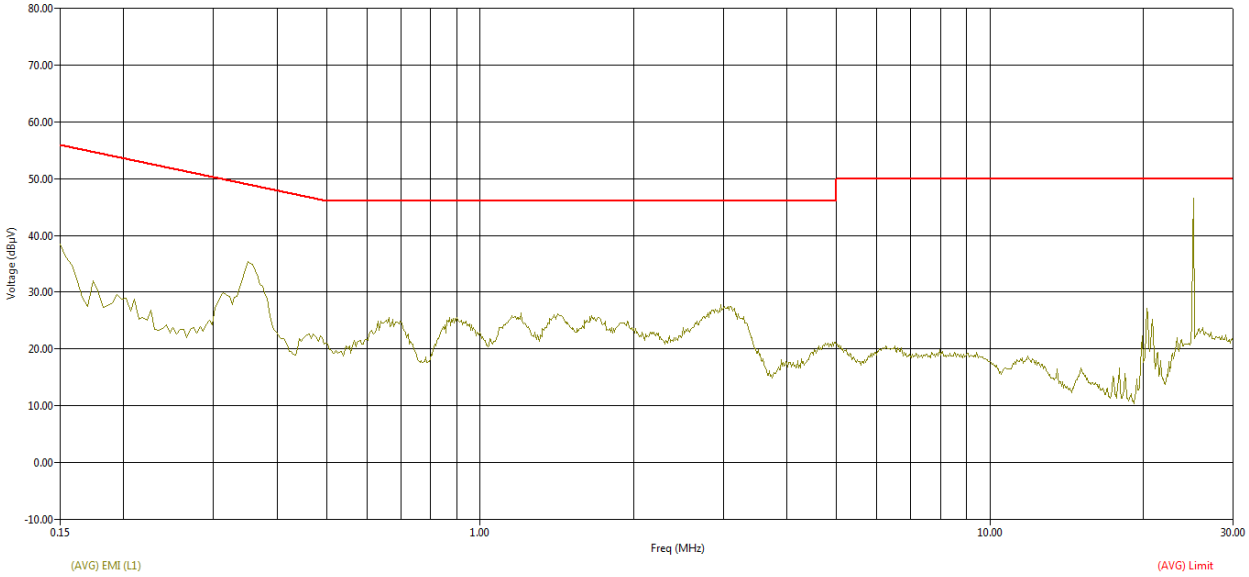

Figure 10: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.154	0.152	N	27.55	10.11	0.10	0.00	37.76	55.91	-18.15
0.158	0.153	L1	25.92	10.11	0.00	0.07	36.10	55.82	-19.72
0.350	0.349	L1	25.09	10.10	0.00	0.06	35.26	48.98	-13.73
3.018	3.022	N	16.48	10.11	0.13	0.00	26.72	46.00	-19.28
3.026	3.029	L1	16.36	10.11	0.00	0.10	26.57	46.00	-19.43
4.790	4.794	L1	9.93	10.11	0.00	0.13	20.17	46.00	-25.83
12.526	12.523	L1	4.81	10.27	0.00	0.24	15.32	50.00	-34.68
15.190	15.186	L1	3.51	10.34	0.00	0.27	14.13	50.00	-35.87
20.362	20.370	L1	14.45	10.41	0.00	0.32	25.18	50.00	-24.82
22.366	22.381	N	3.51	10.46	0.38	0.00	14.34	50.00	-35.66
22.402	22.394	N	3.53	10.46	0.38	0.00	14.37	50.00	-35.63
22.826	22.819	N	5.28	10.47	0.38	0.00	16.13	50.00	-33.87
23.098	23.090	N	5.04	10.48	0.38	0.00	15.90	50.00	-34.10
25.058	25.059	N	36.08	10.52	0.39	0.00	46.99	50.00	-3.01
25.058	25.060	L1	36.29	10.52	0.00	0.37	47.18	50.00	-2.82

Table 4: Average table for CE from 150 kHz to 30MHz – Line & Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.1.5.3 HIGH CHANNEL_5220 MHZ

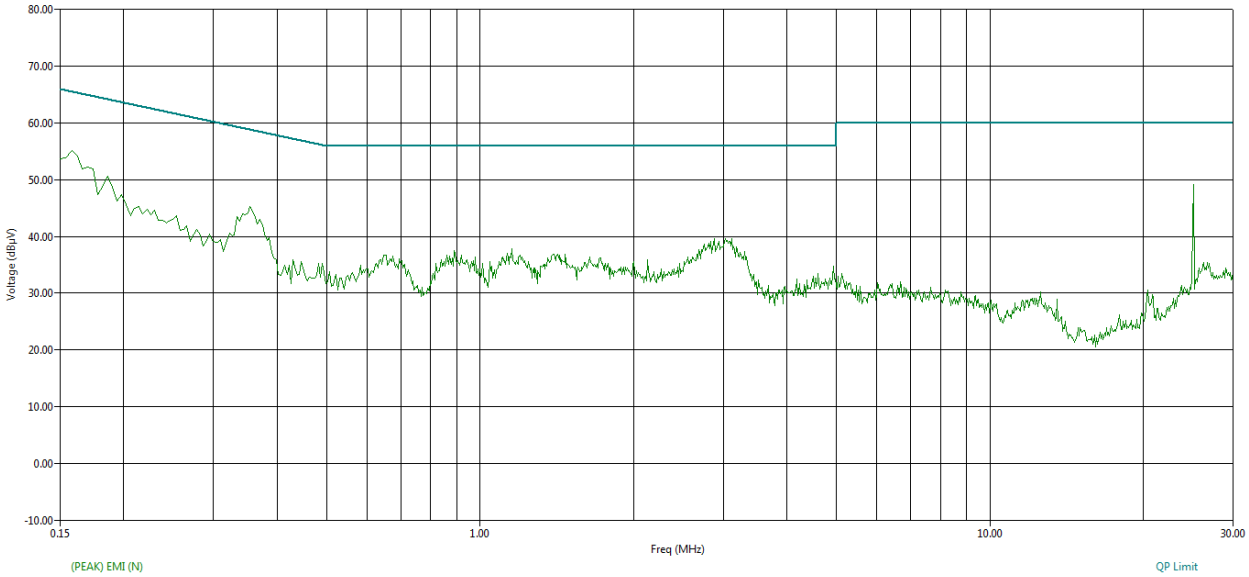

Figure 11: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

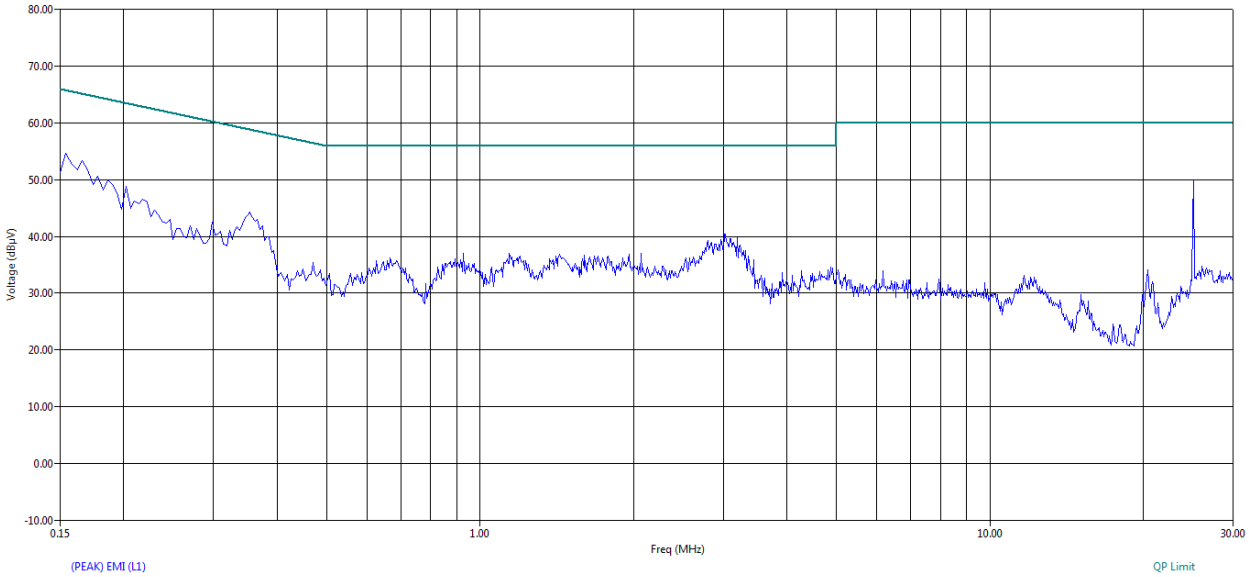

Figure 12: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.150	0.151	L1	36.89	10.11	0.00	0.07	47.07	65.94	-18.87
0.162	0.159	N	35.48	10.11	0.10	0.00	45.69	65.50	-19.81
0.346	0.350	L1	31.25	10.10	0.00	0.06	41.41	58.97	-17.56
0.350	0.351	N	31.82	10.10	0.09	0.00	42.01	58.95	-16.93
2.754	2.749	L1	23.01	10.11	0.00	0.10	33.22	56.00	-22.78
3.974	3.976	N	14.93	10.11	0.15	0.00	25.19	56.00	-30.81
4.390	4.389	L1	16.41	10.11	0.00	0.12	26.64	56.00	-29.36
23.402	23.402	N	12.65	10.48	0.38	0.00	23.51	60.00	-36.49
23.570	23.565	L1	10.90	10.49	0.00	0.36	21.75	60.00	-38.25
24.210	24.214	L1	13.20	10.50	0.00	0.36	24.06	60.00	-35.94
25.058	25.059	N	37.89	10.52	0.39	0.00	48.80	60.00	-11.20
25.058	25.059	L1	38.14	10.52	0.00	0.37	49.03	60.00	-10.97
25.226	25.234	N	16.07	10.52	0.39	0.00	26.98	60.00	-33.02
25.618	25.615	N	16.79	10.52	0.39	0.00	27.70	60.00	-32.30

Table 5: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

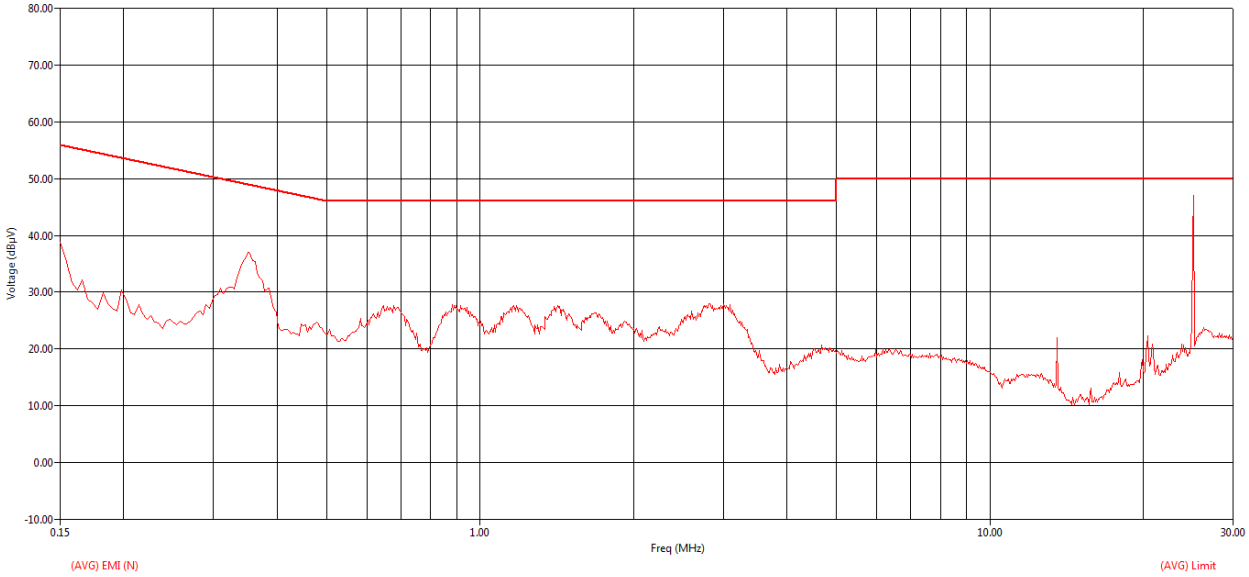

Figure 13: CE graph from 150 kHz to 30MHz using Average detector - Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

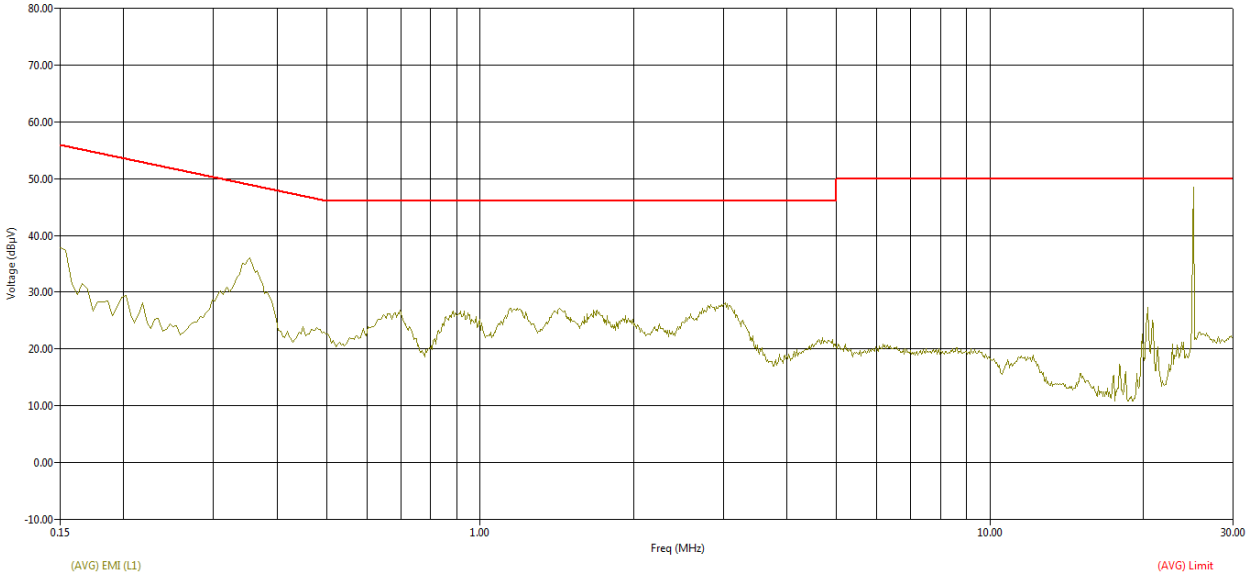

Figure 14: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.150	0.151	L1	27.45	10.11	0.00	0.07	37.63	55.94	-18.31
0.162	0.159	N	20.94	10.11	0.10	0.00	31.15	55.50	-24.35
0.346	0.350	L1	25.45	10.10	0.00	0.06	35.61	48.97	-13.36
0.350	0.351	N	26.14	10.10	0.09	0.00	36.33	48.95	-12.62
2.754	2.749	L1	16.08	10.11	0.00	0.10	26.28	46.00	-19.72
3.974	3.976	N	5.51	10.11	0.15	0.00	15.77	46.00	-30.23
4.390	4.389	L1	8.97	10.11	0.00	0.12	19.20	46.00	-26.80
23.402	23.402	N	6.49	10.48	0.38	0.00	17.36	50.00	-32.64
23.570	23.565	L1	5.49	10.49	0.00	0.36	16.33	50.00	-33.67
24.210	24.214	L1	7.02	10.50	0.00	0.36	17.89	50.00	-32.11
25.058	25.059	N	37.24	10.52	0.39	0.00	48.14	50.00	-1.86
25.058	25.059	L1	37.55	10.52	0.00	0.37	48.44	50.00	-1.56
25.226	25.234	N	10.18	10.52	0.39	0.00	21.09	50.00	-28.91
25.618	25.615	N	10.56	10.52	0.39	0.00	21.47	50.00	-28.53

Table 6: Average table for CE from 150 kHz to 30MHz – Line & Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.1.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 5 MHZ MODULATION BANDWIDTH

5.3.1.6.1 LOW CHANNEL_5155 MHZ

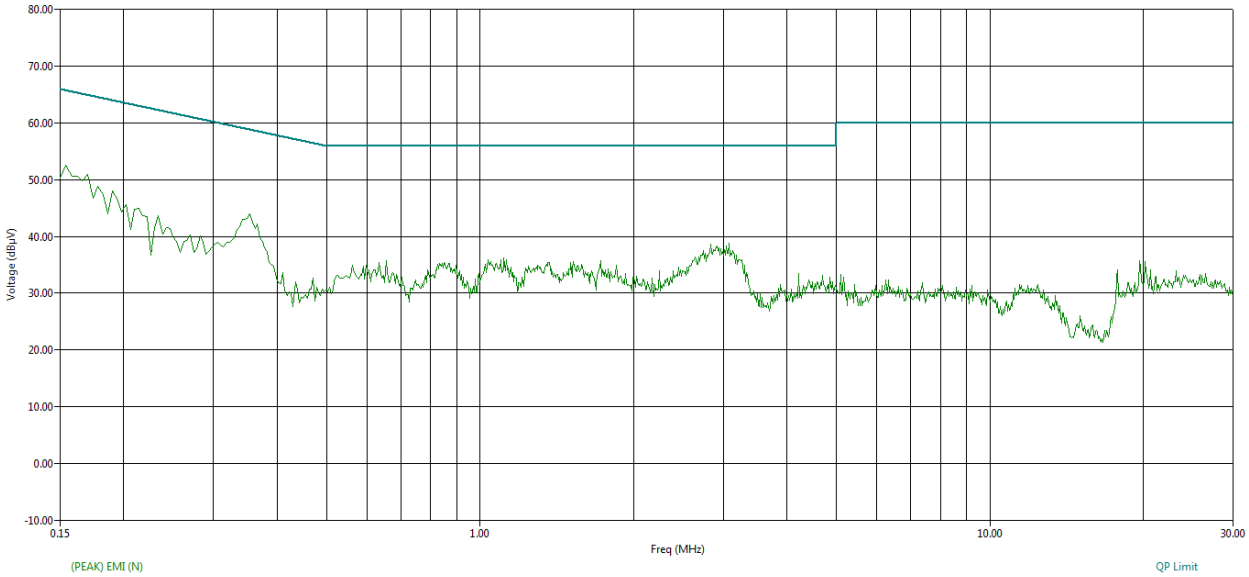

Figure 15: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

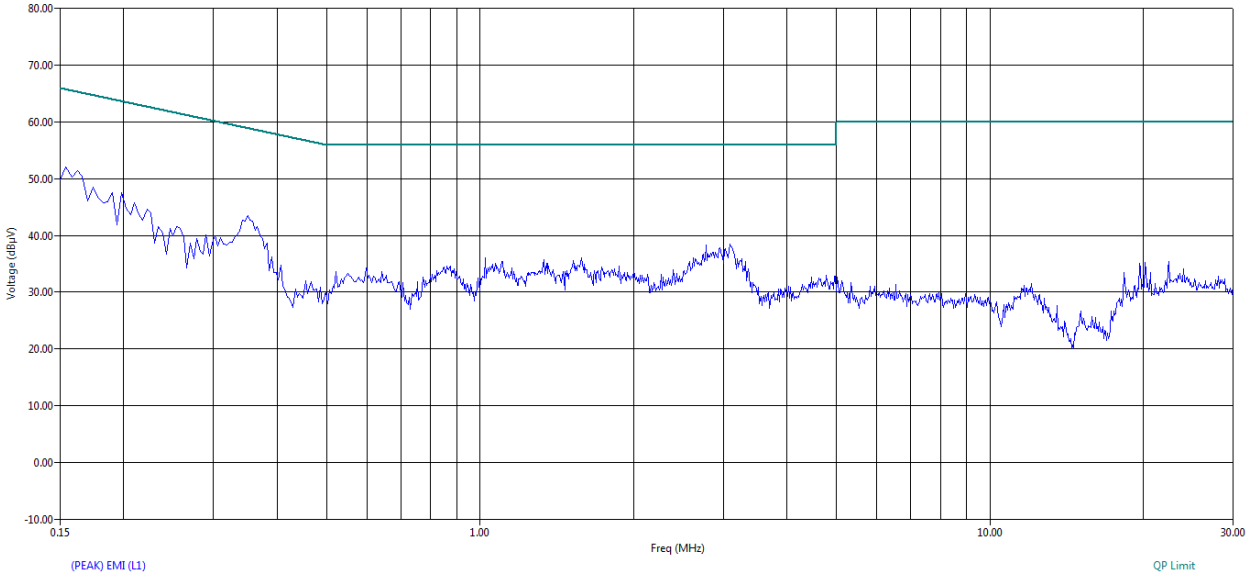

Figure 16: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulse limiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	41.18	10.11	0.10	0.00	51.38	65.75	-14.37
0.15	0.15	L1	42.04	10.11	0.00	0.07	52.22	65.84	-13.62
0.35	0.34	L1	33.20	10.10	0.00	0.06	43.36	59.12	-15.76
3.07	3.07	N	27.90	10.11	0.13	0.00	38.14	56.00	-17.86
3.09	3.08	L1	26.89	10.11	0.00	0.10	37.10	56.00	-18.90
4.21	4.22	N	19.14	10.11	0.15	0.00	29.40	56.00	-26.60
11.43	11.43	N	18.50	10.23	0.26	0.00	29.00	60.00	-31.00
17.77	17.77	N	18.38	10.38	0.35	0.00	29.10	60.00	-30.90
18.29	18.29	L1	18.94	10.38	0.00	0.30	29.63	60.00	-30.37
19.68	19.68	N	25.59	10.40	0.37	0.00	36.36	60.00	-23.64
19.68	19.68	L1	25.18	10.40	0.00	0.32	35.89	60.00	-24.11
20.16	20.16	L1	25.19	10.40	0.00	0.32	35.91	60.00	-24.09
20.16	20.16	N	25.12	10.40	0.37	0.00	35.89	60.00	-24.11
22.41	22.41	L1	18.44	10.46	0.00	0.35	29.24	60.00	-30.76

Table 7: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

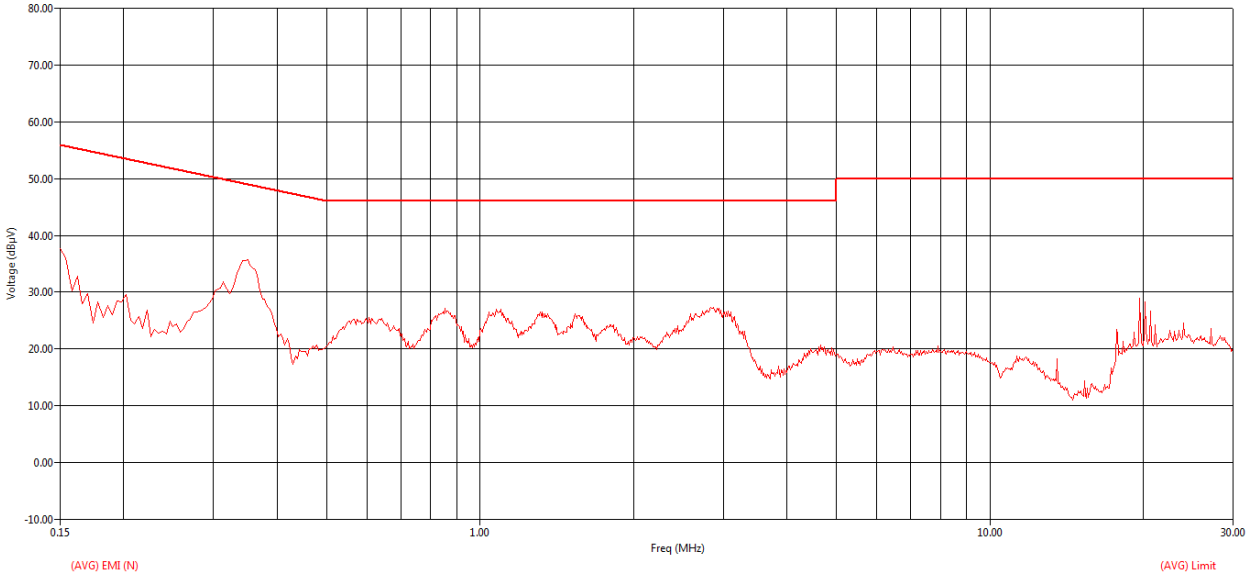

Figure 17: CE graph from 150 kHz to 30MHz using Average detector - Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

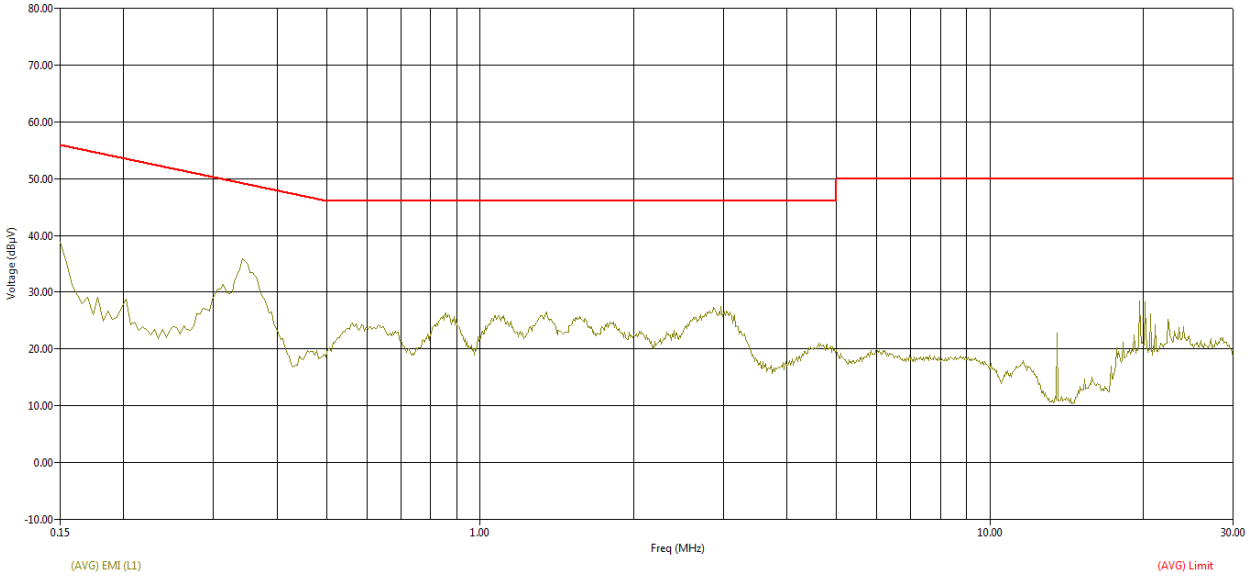

Figure 18: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulse limiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	24.99	10.11	0.10	0.00	35.20	55.75	-20.55
0.15	0.15	L1	26.48	10.11	0.00	0.07	36.66	55.84	-19.18
0.35	0.34	L1	24.84	10.10	0.00	0.06	35.00	49.12	-14.12
3.07	3.07	N	15.06	10.11	0.13	0.00	25.31	46.00	-20.69
3.09	3.08	L1	15.27	10.11	0.00	0.10	25.48	46.00	-20.52
4.21	4.22	N	7.45	10.11	0.15	0.00	17.71	46.00	-28.29
11.43	11.43	N	6.72	10.23	0.26	0.00	17.22	50.00	-32.78
17.77	17.77	N	9.55	10.38	0.35	0.00	20.27	50.00	-29.73
18.29	18.29	L1	8.05	10.38	0.00	0.30	18.74	50.00	-31.26
19.68	19.68	N	18.22	10.40	0.37	0.00	28.98	50.00	-21.02
19.68	19.68	L1	17.55	10.40	0.00	0.32	28.26	50.00	-21.74
20.16	20.16	L1	17.92	10.40	0.00	0.32	28.65	50.00	-21.35
20.16	20.16	N	17.41	10.40	0.37	0.00	28.19	50.00	-21.81
22.41	22.41	L1	9.71	10.46	0.00	0.35	20.52	50.00	-29.48

Table 8: Average table for CE from 150 kHz to 30MHz – Line & Neutral

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.1.6.2 MID CHANNEL_5200 MHz

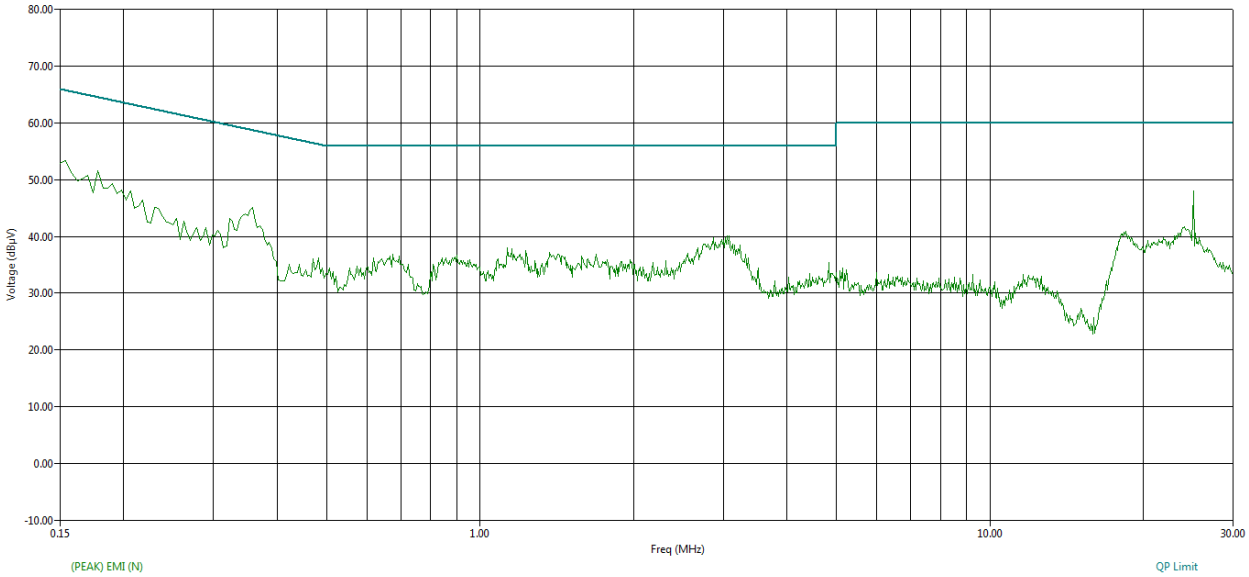

Figure 19: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

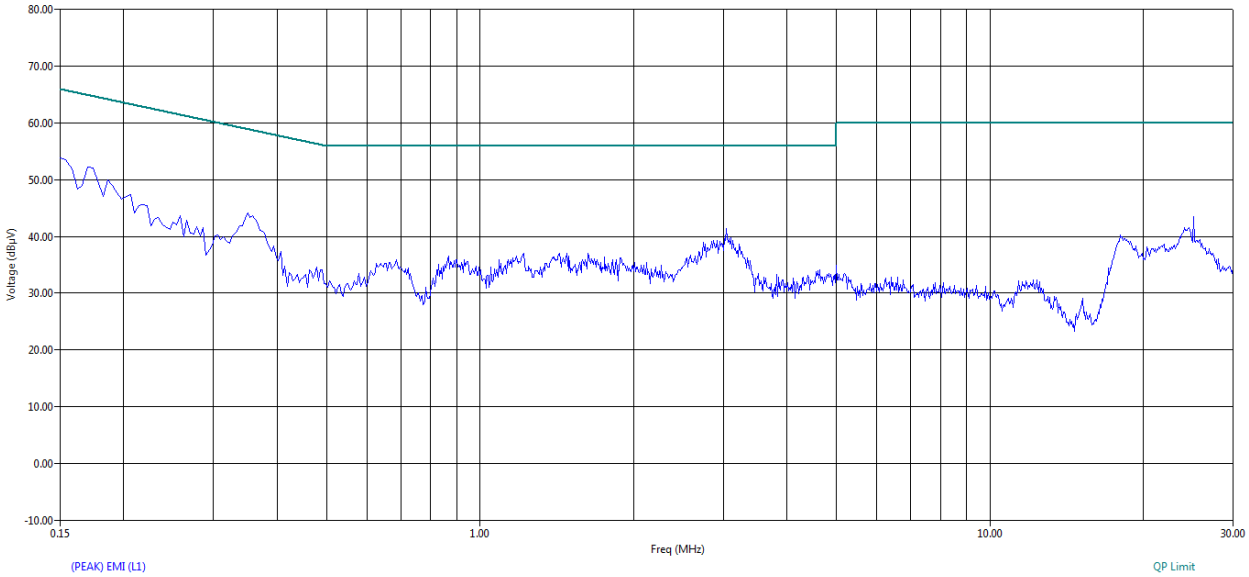

Figure 20: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.150	0.152	L1	36.72	10.11	0.00	0.07	46.90	65.90	-19.01
0.154	0.152	N	36.58	10.11	0.10	0.00	46.79	65.87	-19.08
0.350	0.351	L1	31.16	10.10	0.00	0.06	41.32	58.94	-17.62
3.042	3.035	L1	24.42	10.11	0.00	0.10	34.64	56.00	-21.36
3.082	3.082	N	24.45	10.11	0.13	0.00	34.69	56.00	-21.31
4.834	4.828	N	16.98	10.11	0.16	0.00	27.25	56.00	-28.75
11.618	11.614	N	15.19	10.24	0.27	0.00	25.70	60.00	-34.30
12.186	12.191	L1	14.89	10.26	0.00	0.23	25.38	60.00	-34.62
15.190	15.185	L1	10.42	10.34	0.00	0.27	21.04	60.00	-38.96
25.058	25.059	N	32.28	10.52	0.39	0.00	43.19	60.00	-16.81
25.058	25.057	L1	30.00	10.52	0.00	0.37	40.89	60.00	-19.11

Table 9: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

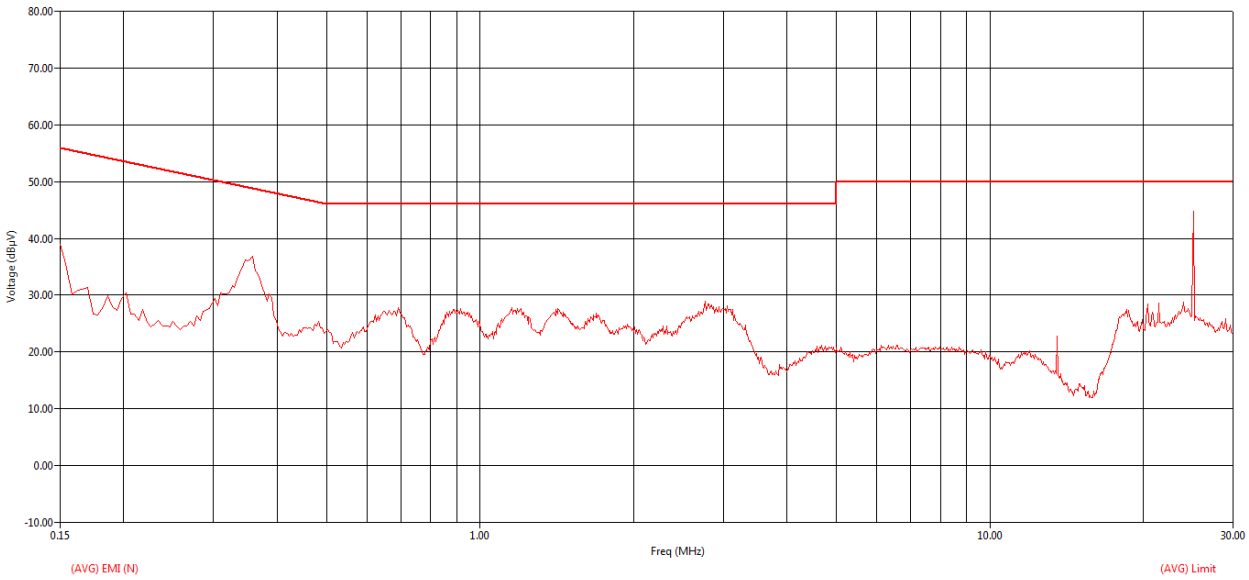

Figure 21: CE graph from 150 kHz to 30MHz using Average detector - Neutral

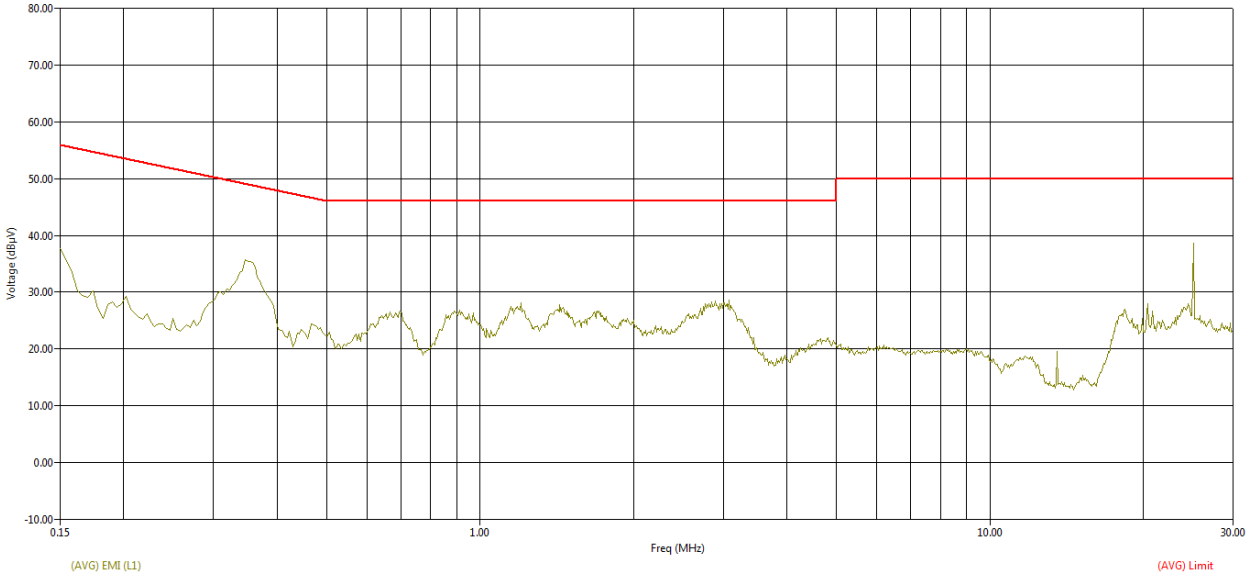

Figure 22: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.150	0.152	L1	27.03	10.11	0.00	0.07	37.20	55.90	-18.70
0.154	0.152	N	26.53	10.11	0.10	0.00	36.74	55.87	-19.13
0.350	0.351	L1	25.42	10.10	0.00	0.06	35.59	48.94	-13.35
3.042	3.035	L1	16.66	10.11	0.00	0.10	26.87	46.00	-19.13
3.082	3.082	N	16.40	10.11	0.13	0.00	26.65	46.00	-19.35
4.834	4.828	N	9.26	10.11	0.16	0.00	19.52	46.00	-26.48
11.618	11.614	N	7.41	10.24	0.27	0.00	17.92	50.00	-32.08
12.186	12.191	L1	5.54	10.26	0.00	0.23	16.04	50.00	-33.96
15.190	15.185	L1	2.70	10.34	0.00	0.27	13.32	50.00	-36.68
25.058	25.059	N	30.75	10.52	0.39	0.00	41.66	50.00	-8.34
25.058	25.057	L1	27.82	10.52	0.00	0.37	38.71	50.00	-11.29

Table 10: Average table for CE from 150 kHz to 30MHz – Line & Neutral

5.3.1.6.3 HIGH CHANNEL_5245 MHZ

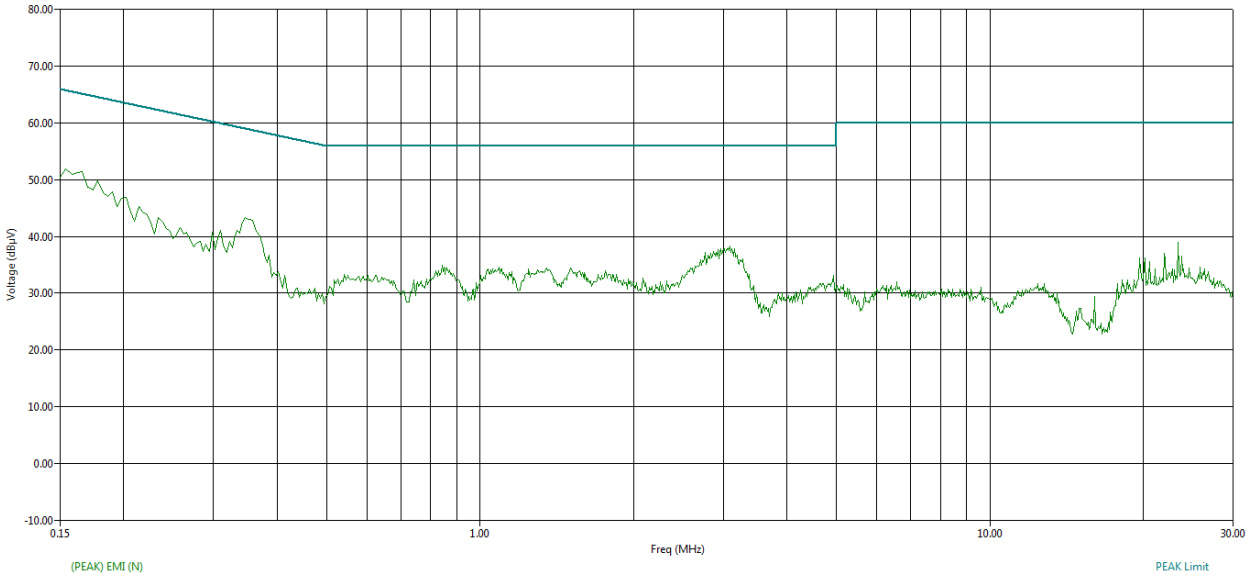

Figure 23: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

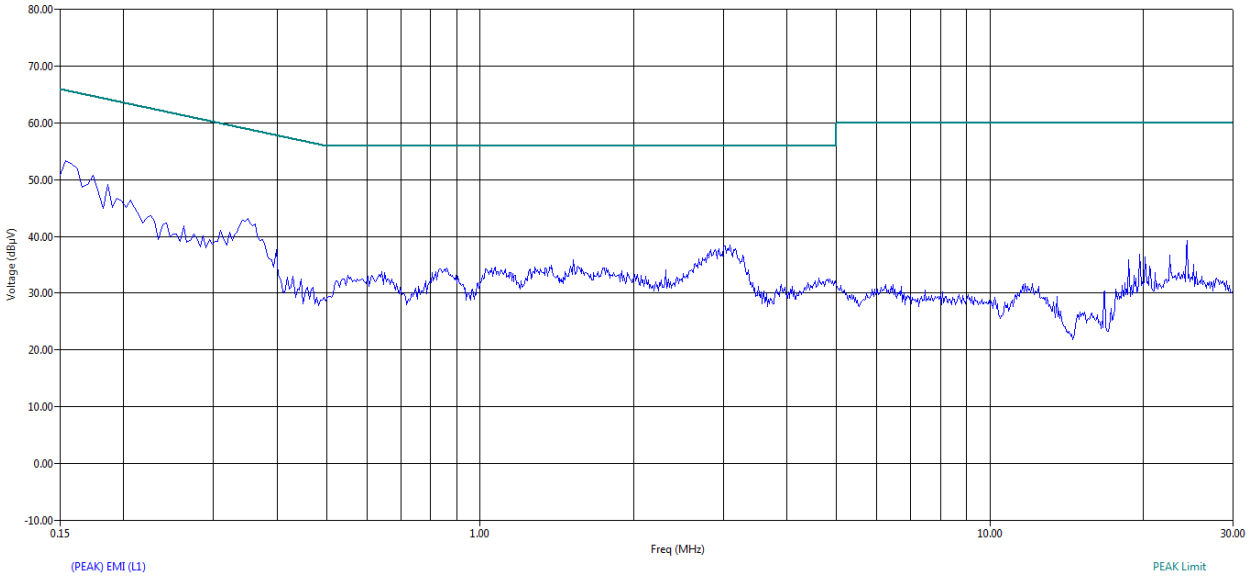

Figure 24: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + PL (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	36.15	10.11	0.10	0.00	46.36	65.95	-19.59
0.15	0.15	L1	35.89	10.11	0.00	0.07	46.07	65.86	-19.79
3.09	3.09	L1	22.70	10.11	0.00	0.10	32.91	56.00	-23.09
3.10	3.09	N	22.63	10.11	0.13	0.00	32.88	56.00	-23.12
4.94	4.94	N	15.56	10.11	0.16	0.00	25.83	56.00	-30.17
12.10	12.10	L1	13.95	10.26	0.00	0.23	24.44	60.00	-35.56
12.79	12.78	N	13.16	10.28	0.28	0.00	23.72	60.00	-36.28
16.07	16.06	N	7.59	10.35	0.32	0.00	18.27	60.00	-41.73
18.69	18.68	L1	14.94	10.39	0.00	0.31	25.63	60.00	-34.37
19.64	19.64	N	16.78	10.40	0.37	0.00	27.54	60.00	-32.46
19.66	19.67	L1	22.57	10.40	0.00	0.32	33.28	60.00	-26.72
20.13	20.15	L1	21.06	10.40	0.00	0.32	31.78	60.00	-28.22
23.40	23.40	N	16.04	10.48	0.38	0.00	26.91	60.00	-33.09
24.39	24.41	L1	17.79	10.51	0.00	0.36	28.66	60.00	-31.34

Table 11: Quasi peak table for CE from 150 kHz to 30MHz – Line & Neutral

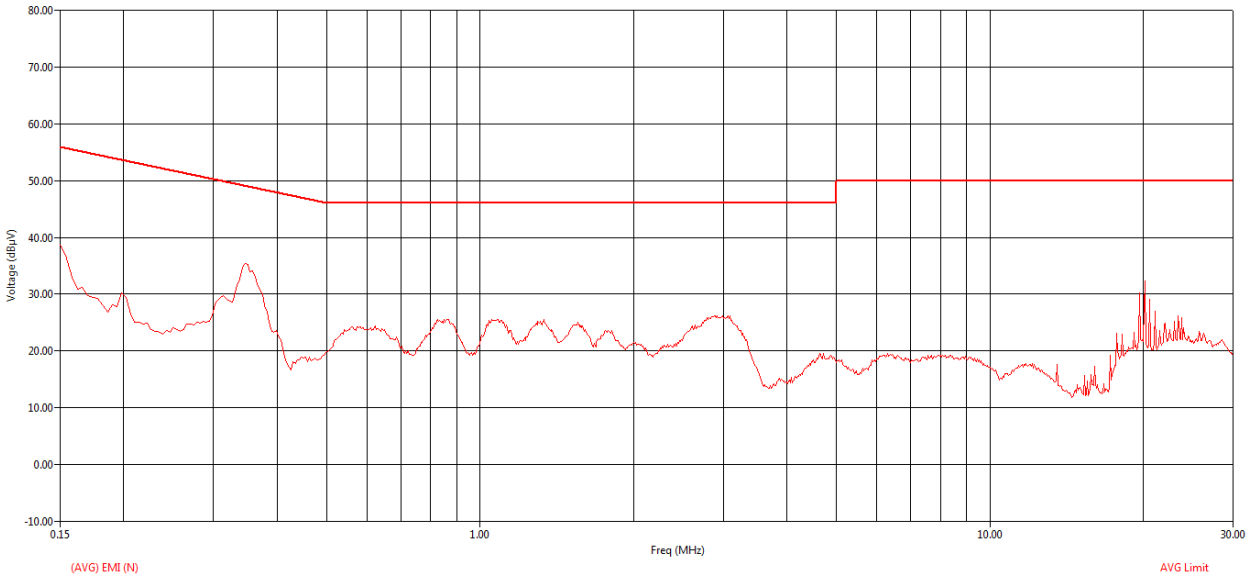

Figure 25: CE graph from 150 kHz to 30MHz using Average detector - Neutral

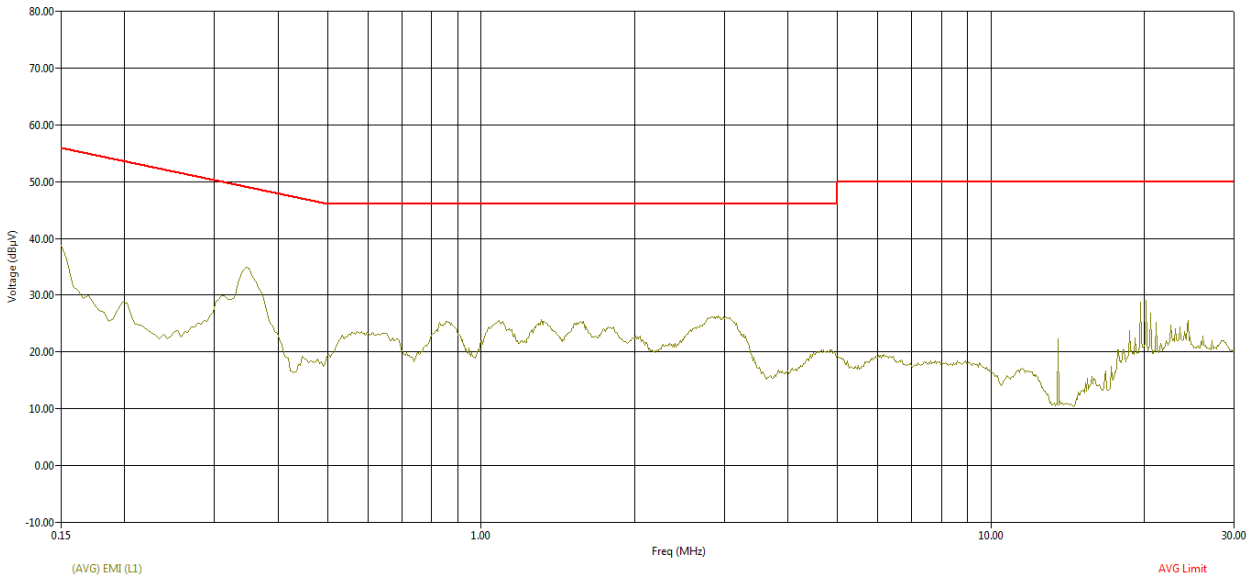

Figure 26: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + PL (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	28.06	10.11	0.10	0.00	38.27	55.95	-17.68
0.15	0.15	L1	26.86	10.11	0.00	0.07	37.04	55.86	-18.82
3.09	3.09	L1	15.07	10.11	0.00	0.10	25.29	46.00	-20.71
3.10	3.09	N	14.92	10.11	0.13	0.00	25.16	46.00	-20.84
4.94	4.94	N	8.01	10.11	0.16	0.00	18.28	46.00	-27.72
12.10	12.10	L1	4.75	10.26	0.00	0.23	15.24	50.00	-34.76
12.79	12.78	N	4.02	10.28	0.28	0.00	14.58	50.00	-35.42
16.07	16.06	N	1.61	10.35	0.32	0.00	12.29	50.00	-37.71
18.69	18.68	L1	9.11	10.39	0.00	0.31	19.80	50.00	-30.20
19.64	19.64	N	10.57	10.40	0.37	0.00	21.34	50.00	-28.66
19.66	19.67	L1	16.90	10.40	0.00	0.32	27.61	50.00	-22.39
20.13	20.15	L1	13.55	10.40	0.00	0.32	24.28	50.00	-25.72
23.40	23.40	N	10.27	10.48	0.38	0.00	21.13	50.00	-28.87
24.39	24.41	L1	10.07	10.51	0.00	0.36	20.94	50.00	-29.06

Table 12: Average table for CE from 150 kHz to 30MHz – Line & Neutral

Note:
(QP) EMI (dBµV) = (QP) Trace (dBµV) + {Cable + Pulse limiter} (dB) + Transducer(N/L1) (dB)
QP Margin (dB) = (QP) EMI (dBµV) – (QP) Limit (dBµV)
(AVG) EMI (dBµV) = (AVG) Trace (dBµV) + {Cable + Pulse limiter} (dB) + Transducer(N/L1) (dB)
AVG Margin (dB) = (AVG) EMI (dBµV) – (AVG) Limit (dBµV)

5.3.1.7 RESULT

Conducted Emissions from the EUT are within the specified Limit line.

5.3.2 RADIATED EMISSION

5.3.2.1 TEST SPECIFICATION for 40 MHz Modulation Bandwidth

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014					
Test Procedure	ANSI C63.4-2014					
Frequency Range	9 kHz to 150 kHz	150 kHz to 30 MHz	30 MHz to 1 GHz	1 GHz to 18 GHz	18 GHz to 26.5 GHz	26.5 GHz to 40 GHz
Resolution Bandwidth	1 kHz	10 kHz	120 kHz	1MHz	1MHz	1MHz
Video Bandwidth	3 kHz	30 kHz	300 kHz	3MHz	3MHz	3MHz
Step size	400Hz	4 kHz	40 kHz	400 kHz	400 kHz	400 kHz
Pre Scan Measurement Time	50ms	50ms	20ms	5ms	5ms	5ms
Final Measurement Time	1 s	1 s	1 s	1 s	1 s	1 s
Attenuation	10 dB	10 dB	10 dB	4 dB	4 dB	4 dB
Test Distance	3 m	3 m	3 m	3 m	3 m	3 m
Polarization	Parallel & Perpendicular		Horizontal and Vertical			
Detector	Peak, Average & Quasi Peak			Peak & Average		
Input Voltage	120V AC					
Input Frequency	60Hz					
Temperature	22.1ºC	22.1ºC	23.6ºC	23.3ºC 24.8ºC	22.6ºC	23.5ºC
Humidity	51.6%	51.6%	55.3%	59.2% 56.8%	57.4%	55.2%
Tested By	Subhendu	Subhendu	Subhendu	Subhendu	Subhendu	Subhendu
Test Date	21/04/2015	21/04/2015	23/04/2015	24/04/2015 25/04/2015	1/05/2015	12/05/2015

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.2.2 TEST SPECIFICATION for 5 MHz Modulation Bandwidth

Test Standard	47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014					
Test Procedure	ANSI C63.4-2014					
Frequency Range	9 kHz to 150 kHz	150 kHz to 30 MHz	30 MHz to 1 GHz	1 GHz to 18 GHz	18 GHz to 26.5 GHz	26.5 GHz to 40 GHz
Resolution Bandwidth	1 kHz	10 kHz	120 kHz	1MHz	1MHz	1MHz
Video Bandwidth	3 kHz	30 kHz	300 kHz	3MHz	3MHz	3MHz
Step size	400Hz	4 kHz	40 kHz	400 kHz	400 kHz	400 kHz
Pre Scan Measurement Time	50ms	50ms	20ms	5ms	5ms	5ms
Final Measurement Time	1 s	1 s	1 s	1 s	1 s	1 s
Attenuation	10 dB	10 dB	10 dB	4 dB	4 dB	4 dB
Test Distance	3 m	3 m	3 m	3 m	3 m	3 m
Polarization	Parallel & Perpendicular		Horizontal and Vertical			
Detector	Quasi Peak and Peak			Peak & Average		
Input Voltage	120V AC					
Input Frequency	60Hz					
Temperature	22.1ºC	22.1ºC	23.3ºC	24.6ºC	23.6ºC	23.9ºC
Humidity	51.6%	51.6%	54.3%	58.5%	56.5%	55.0%
Tested By	Subhendu	Subhendu	Subhendu	Subhendu	Subhendu	Subhendu
Test Date	21/04/2015	21/04/2015	23/04/2015	24/04/2015	1/05/2015	12/05/2015

5.3.2.3 LIMITS

Standard	Reference section	Frequency range	Limit (dBµV/m) at 3 meter
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C	§15.205, §15.209	9 kHz to 490 kHz 490 kHz to 1.705 MHz 1.705 MHz to 30 MHz	128.5194 to 93.8003* 73.8003 to 62.9697* 69.5429

*Note: * Decreases with the logarithm of the frequency*

Standard	Reference section	Frequency range	Limit (dBµV/m) at 3 meter
47 CFR Ch. I (10–1–14 Ed), Part 15, Subpart C RSS-Gen, Issue 4, Nov 2014	§15.205, §15.209 7.1.2	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 40 GHz	40 43.52 46.02 53.98

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.2.4 TEST SETUP

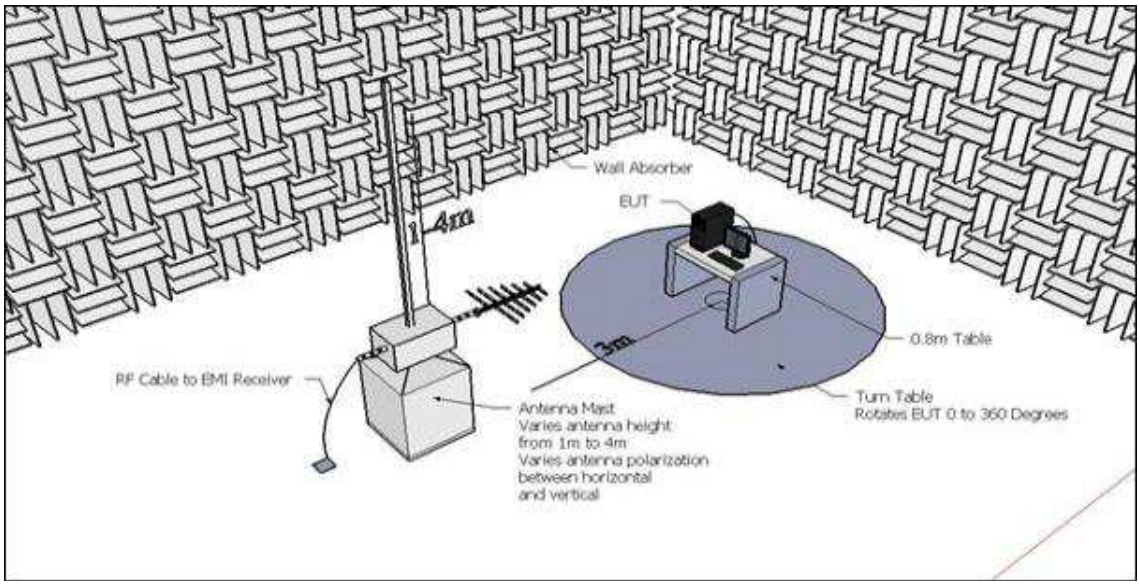

Figure 27: Typical test setup for Radiated Emission test

5.3.2.5 TEST PROCEDURE

The test procedure is in accordance with ANSI C63.4-2014.

The Radiated Emission test was performed inside a Semi-Anechoic chamber. The EUT was placed on a 0.8m height non-metallic table as specified in the standard. The test setup was placed on a rotating turn table to enable 0 to 360 degree rotation.

The EUT was placed 3 meter away from the receiving antenna for the radiated emission measurement in the frequency range 9 kHz to 40 GHz. The receiving antenna was mounted on an antenna mast to enable height variation from 1 to 4 meter above the ground plane for the frequency range 30MHz to 1GHz & 1 to 2 meter for frequency range 1 GHz to 40 GHz. A tunable Band reject filter offering an attenuation of approximately 40dB was used to attenuate the intentional band during the testing.

The radiated emission measurement test system was configured through software as per standard. Pre-scan (Peak) was taken at different angles of EUT at 22.5 degree step, by rotating the turn table from 0 to 360 degree and by varying the antenna height from 1 to 4 meter in both vertical and horizontal polarization from 30 MHz to 1 GHz & 1 to 2 meter for 1 GHz to 40 GHz and in parallel & perpendicular orientation for 9 kHz to 30 MHz (using a loop antenna) with fixed height of 1 meter. The measurement was carried out in max hold mode and maximum amplitude of radiated emissions from the EUT was plotted in Graph. The predominant peaks at various frequencies, which are closer to limit line were identified using peak search option and listed. The Quasi-peak measurement was carried out for the listed frequencies and compared with the limit specified in standard. The average measurement was carried out for the listed frequency in the range of 1 GHz to 40 GHz.

5.3.2.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 40 MHZ MODULATION BANDWIDTH

5.3.2.6.1 LOW CHANNEL_5180MHZ

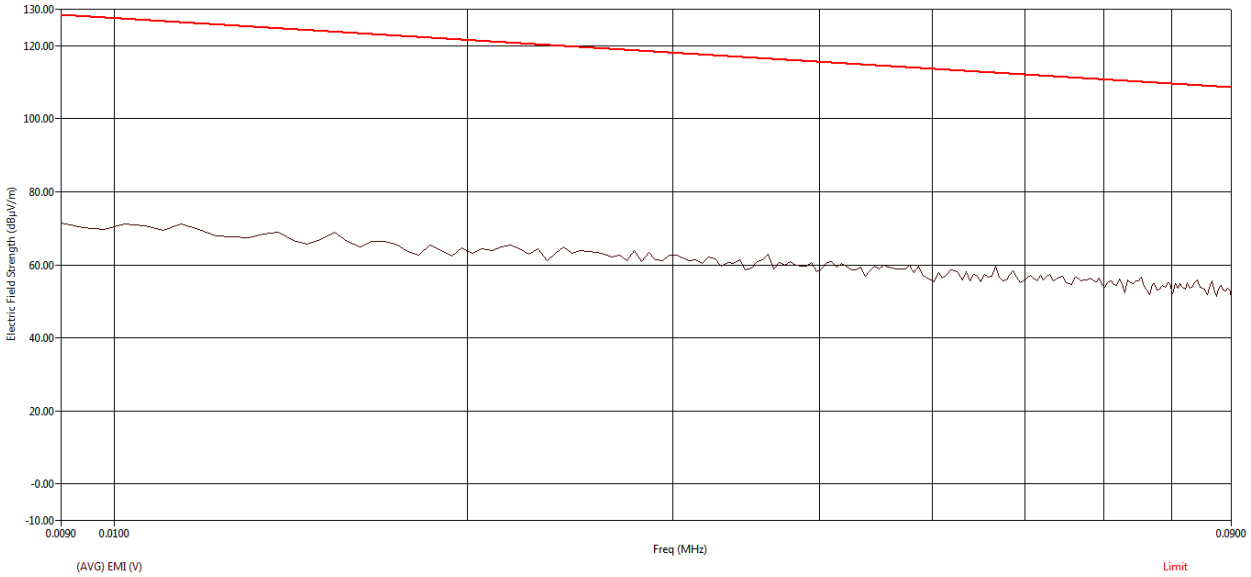

Figure 28: Average RE from 9 kHz to 90 kHz - Parallel

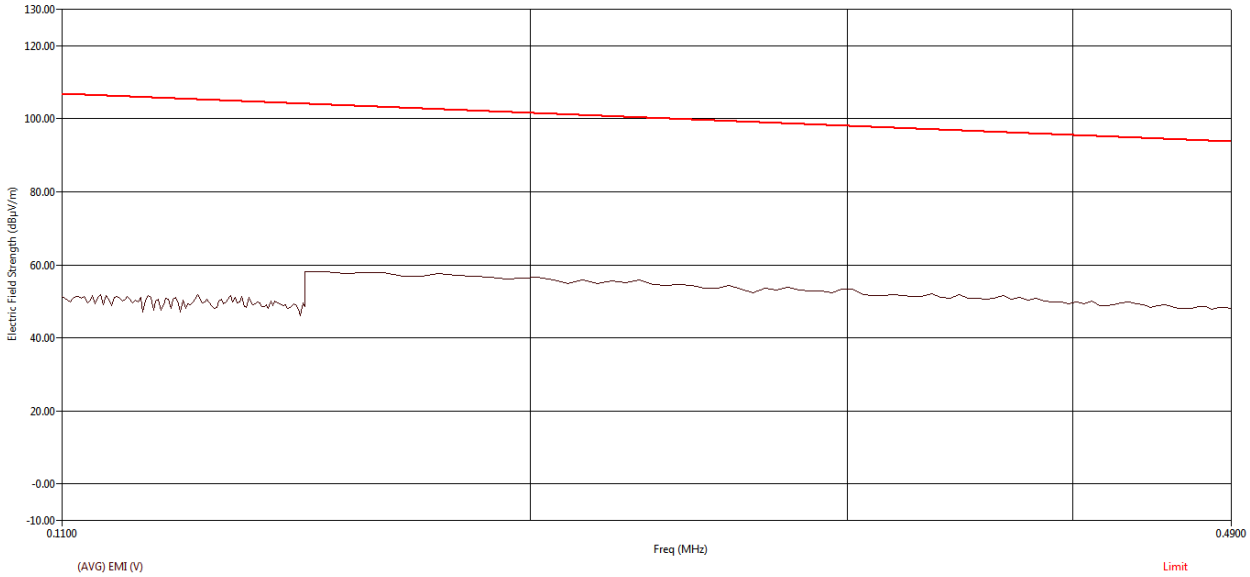

Figure 29: Average RE from 110 kHz to 490 kHz - Parallel

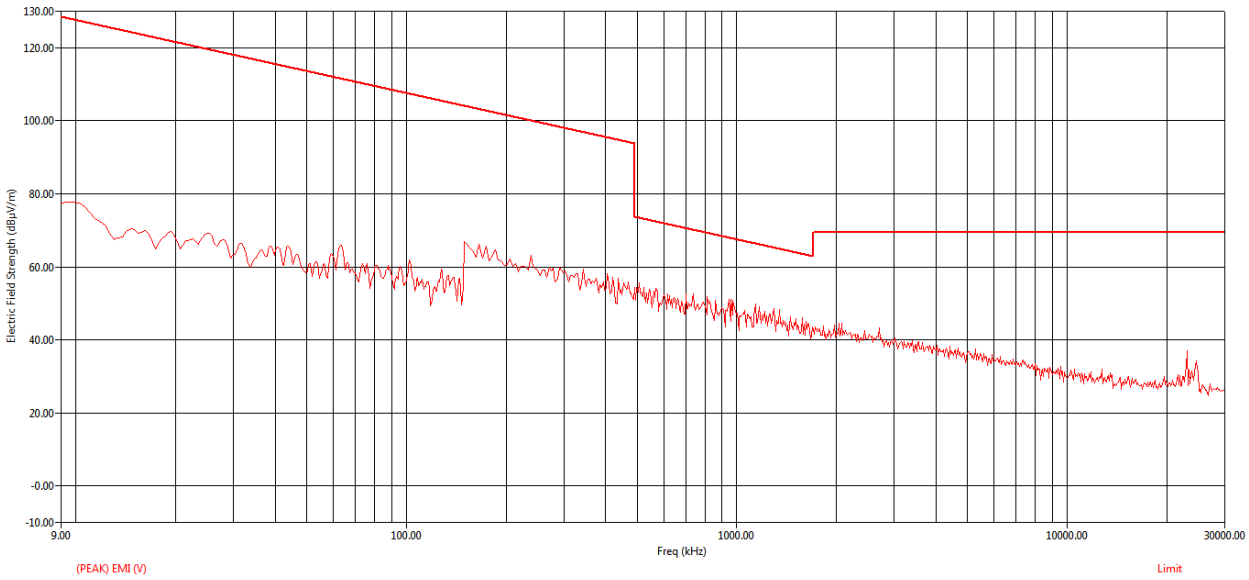

Figure 30: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	11.78	1.68	16.81	30.27	69.54	-39.27
24.55	24.41	V	10.14	1.72	16.73	28.60	69.54	-40.95

Table 13: Quasi Peak table for RE from 9 kHz to 30MHz – Parallel

This report should always be reproduced in full. Any extracts of this report is invalid.

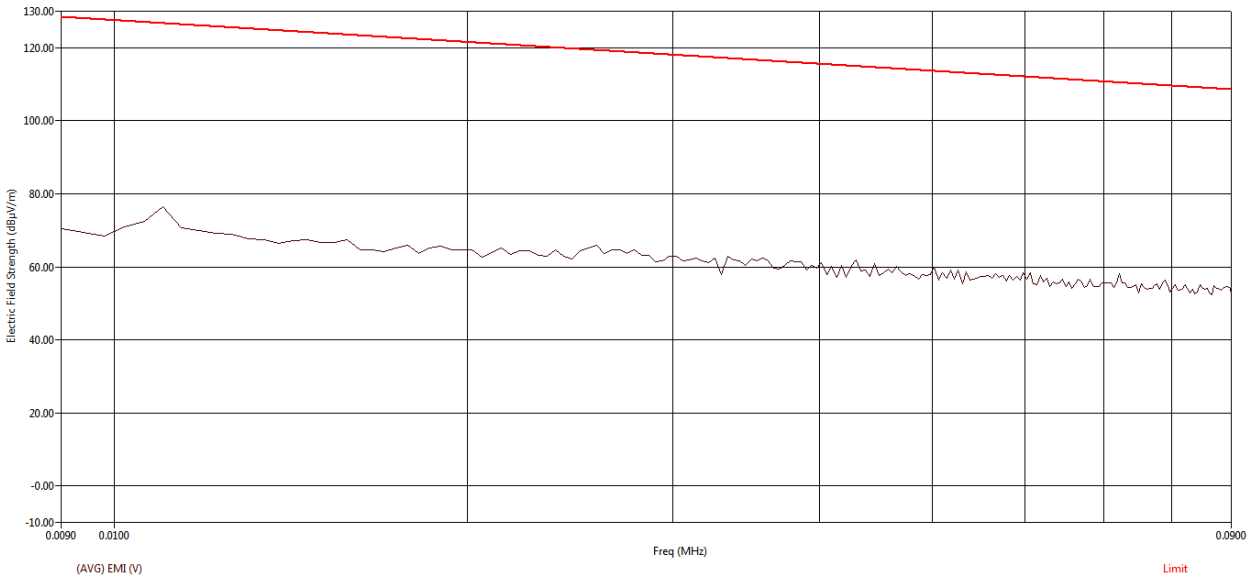

Figure 31: Average RE from 9 kHz to 90 kHz - Perpendicular

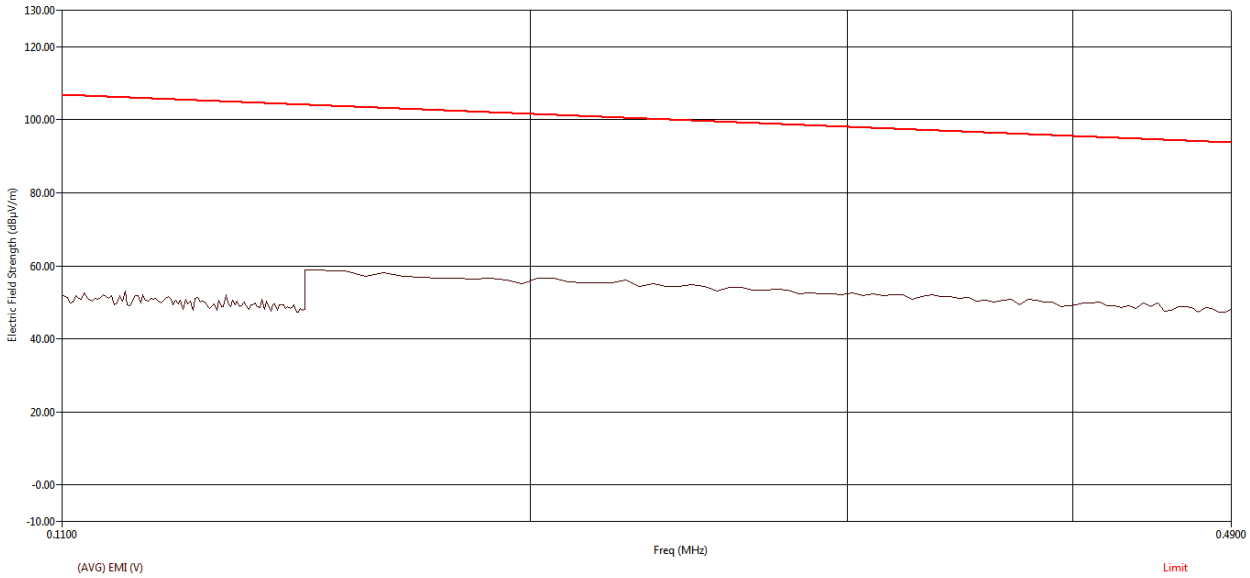

Figure 32: Average RE from 110 kHz to 490 kHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

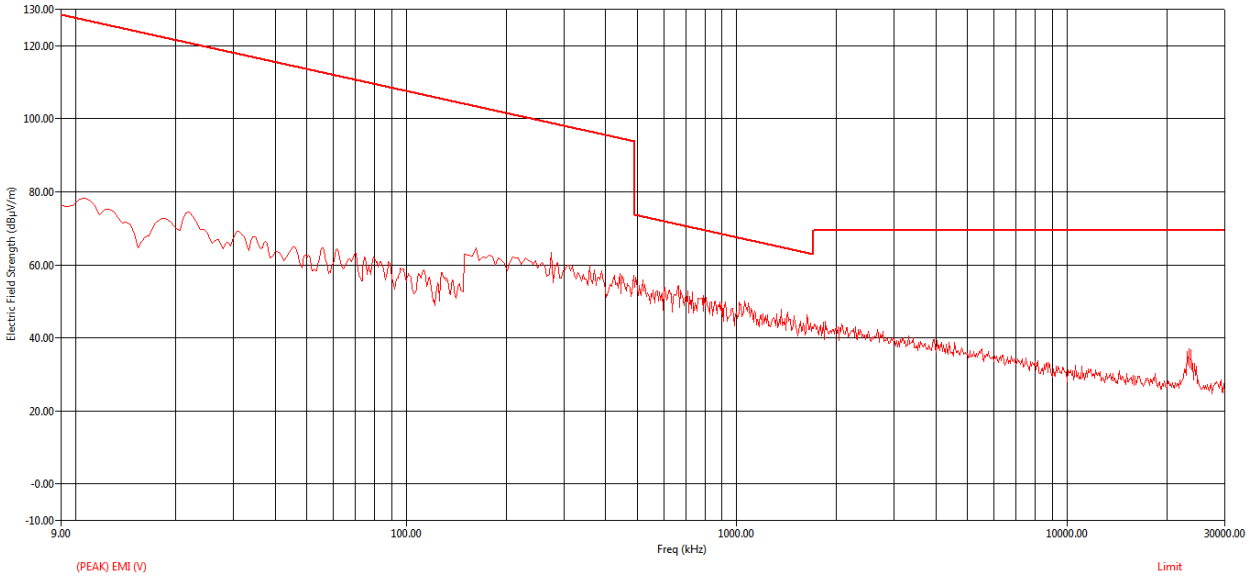

Figure 33: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	10.28	1.68	16.81	28.77	69.54	-40.78
24.40	24.41	V	7.08	1.72	16.73	25.54	69.54	-44.00

Table 14: Table 14: Quasi Peak table for RE from 9 kHz to 30MHz – Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

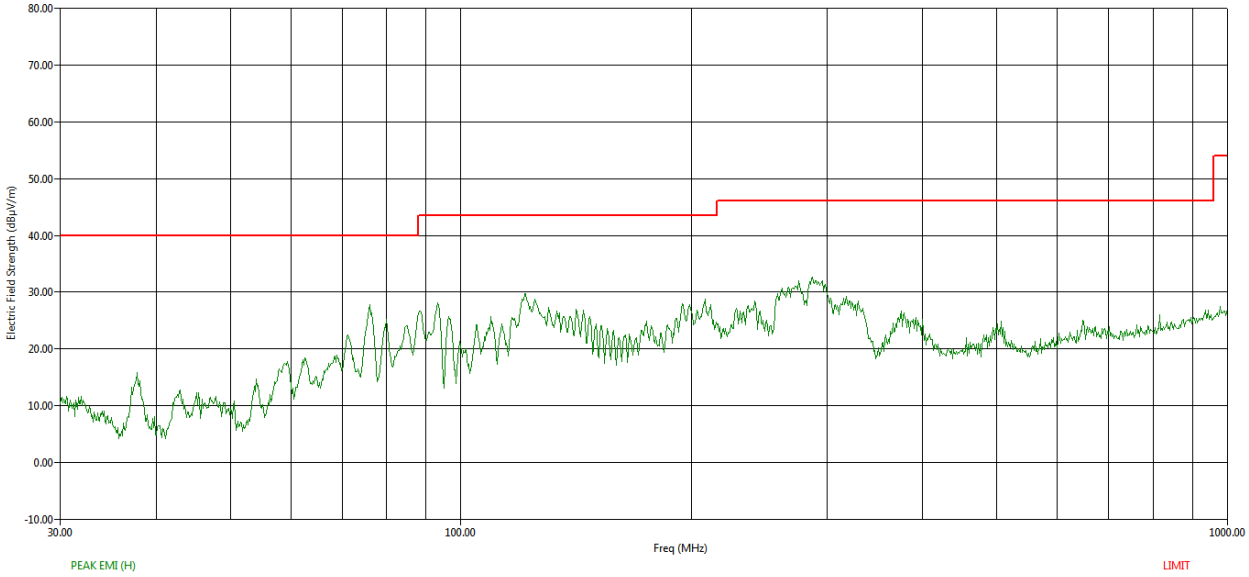

Figure 34: Peak RE from 30MHz to 1GHz - Horizontal polarization

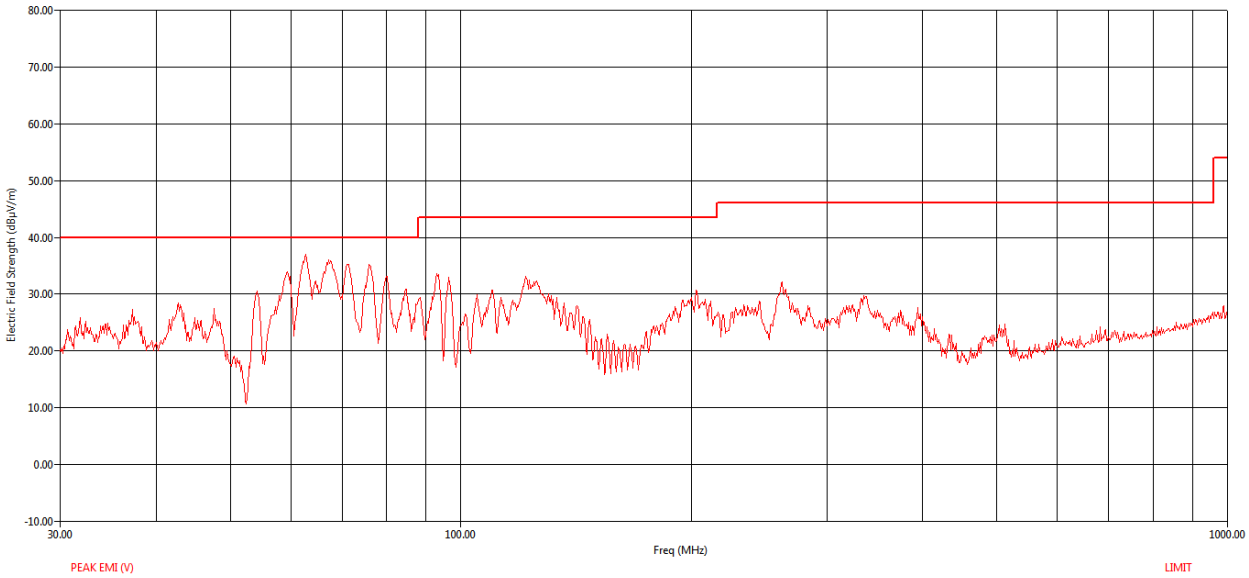

Figure 35: Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
59.44	59.38	V	180.10	102.00	55.18	1.75	9.48	32.18	34.23	40.00	-5.77
62.68	62.61	V	325.10	103.00	53.06	1.83	9.44	32.17	32.17	40.00	-7.83
67.20	67.11	V	320.30	106.00	55.10	1.90	9.49	32.16	34.33	40.00	-5.67
75.88	75.98	V	318.70	176.00	53.72	2.00	9.18	32.14	32.76	40.00	-7.24
80.04	79.92	V	311.20	100.00	53.29	2.05	8.98	32.13	32.19	40.00	-7.81
121.20	121.21	H	199.40	186.00	36.95	2.50	11.44	32.07	18.81	43.52	-24.71
287.64	287.74	H	226.40	100.00	43.75	3.76	13.91	31.91	29.50	46.02	-16.52

Table 15: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

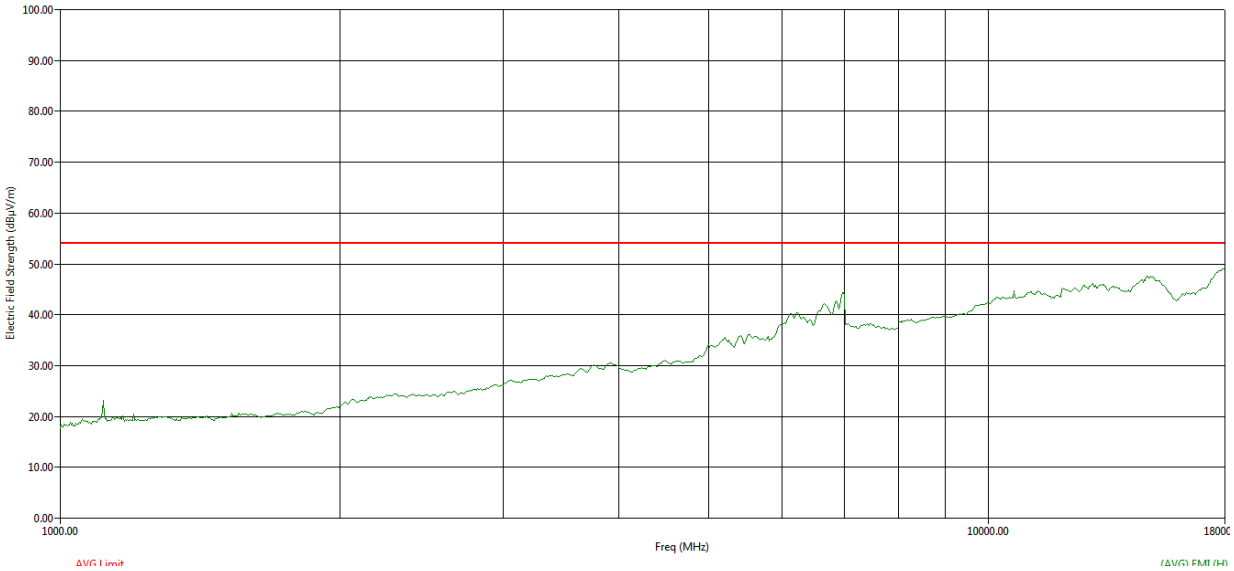

Figure 36: Average RE from 1GHz to 18GHz - Horizontal polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

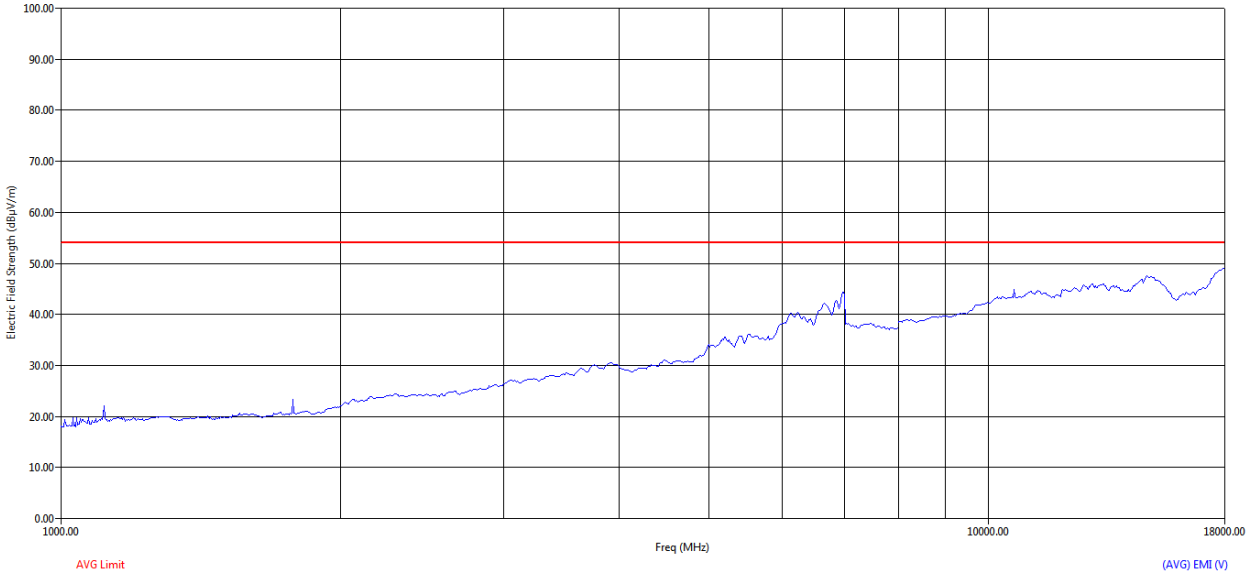

Figure 37: Average RE from 1GHz to 18GHz - Vertical polarization

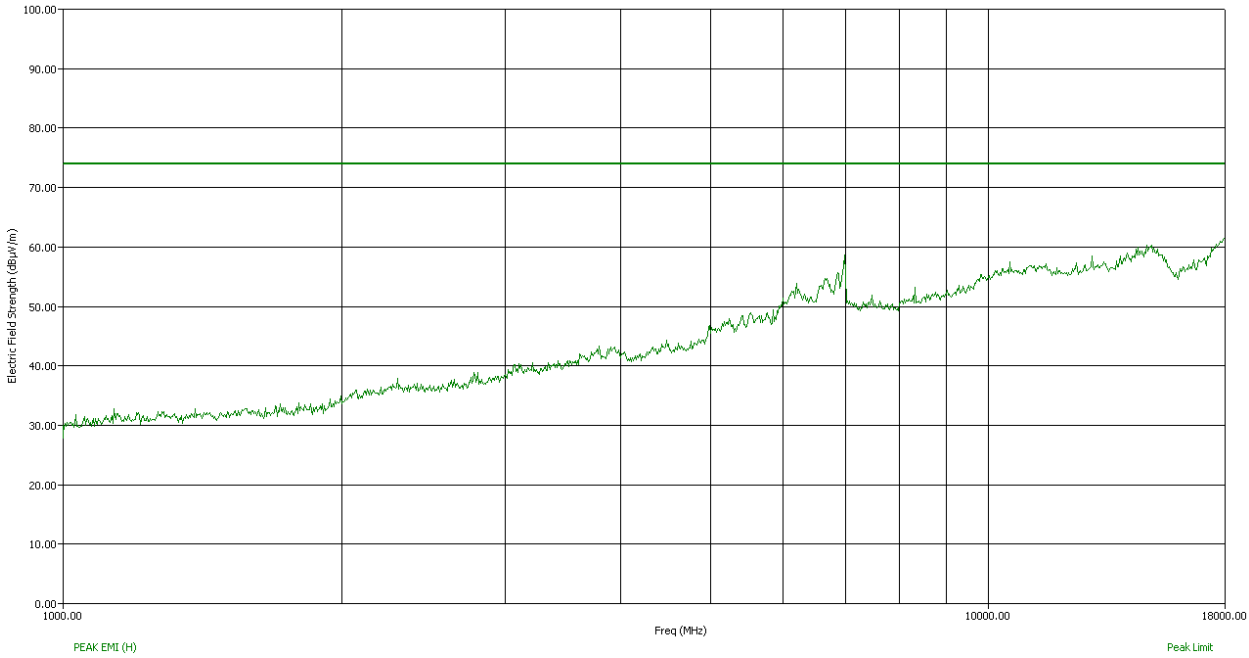

Figure 38: Peak RE from 1GHz to 18GHz - Horizontal polarization

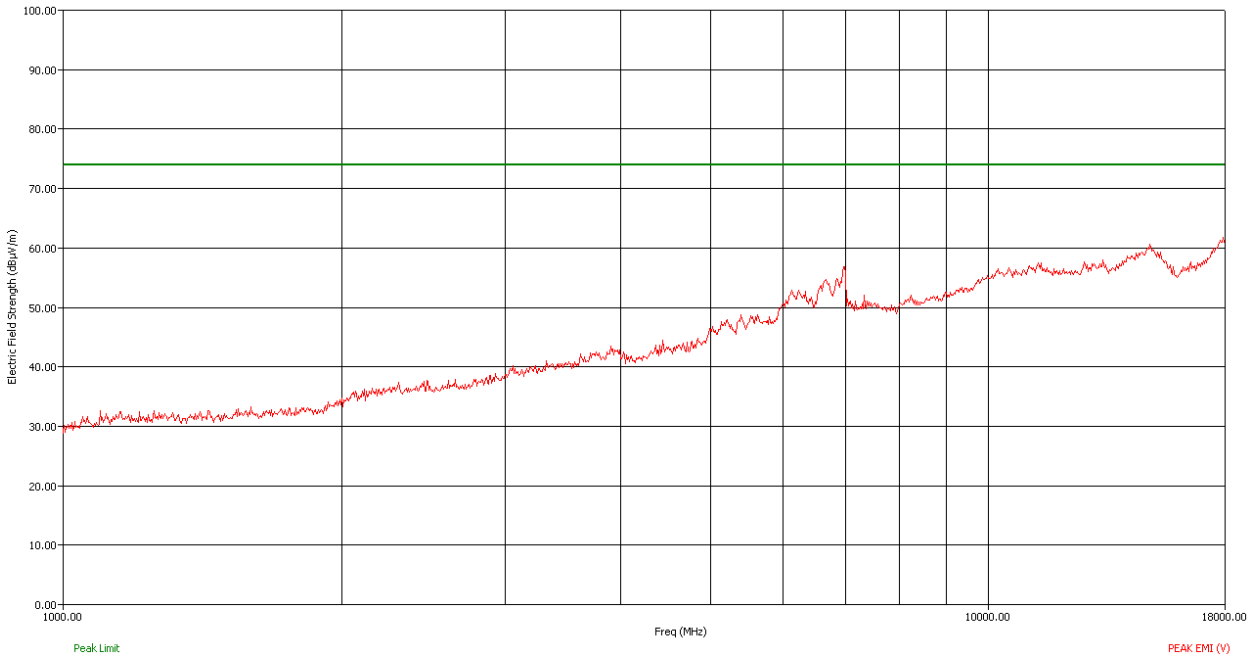

Figure 39: Peak RE from 1GHz to 18GHz - Vertical polarization

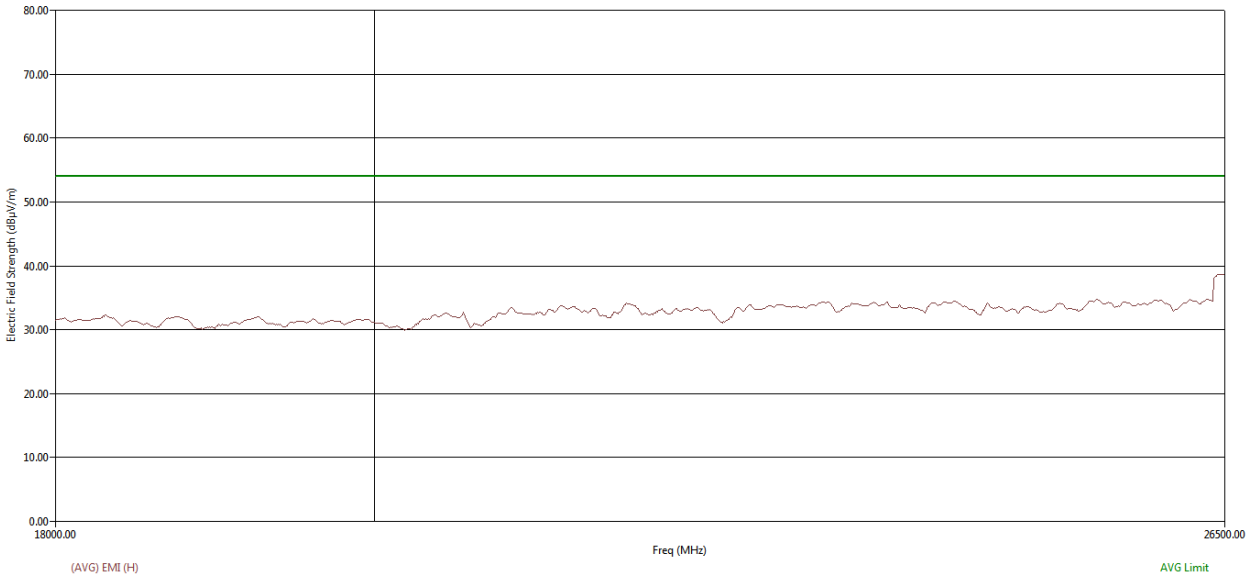

Figure 40: Average RE from 18GHz to 26.5GHz - Horizontal polarization

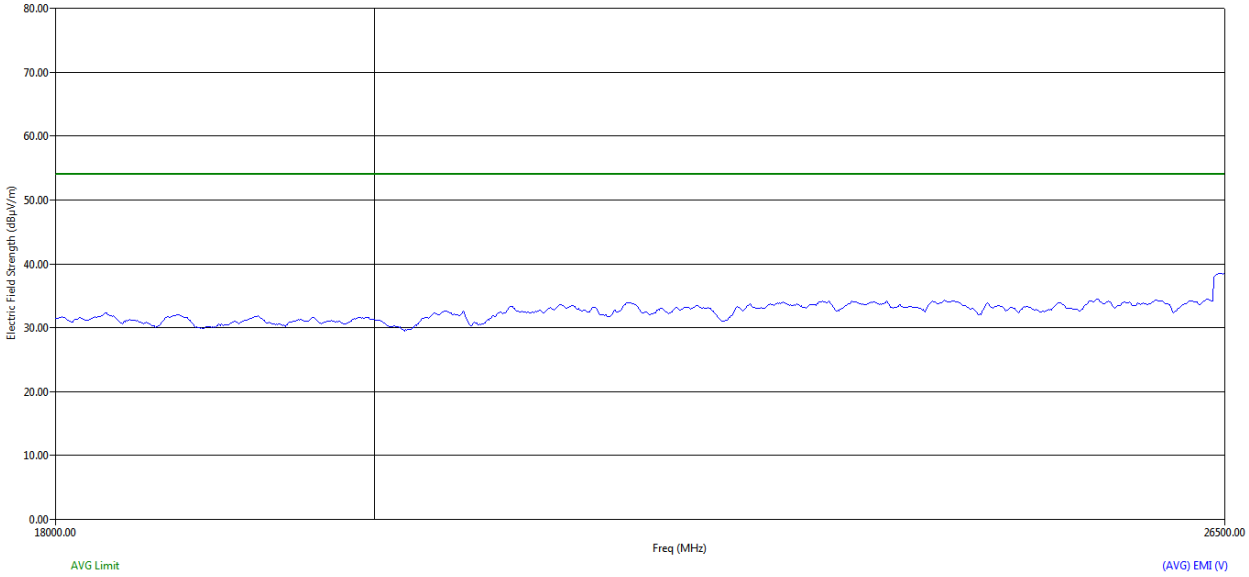

Figure 41: Average RE from 18GHz to 26.5GHz - Vertical polarization

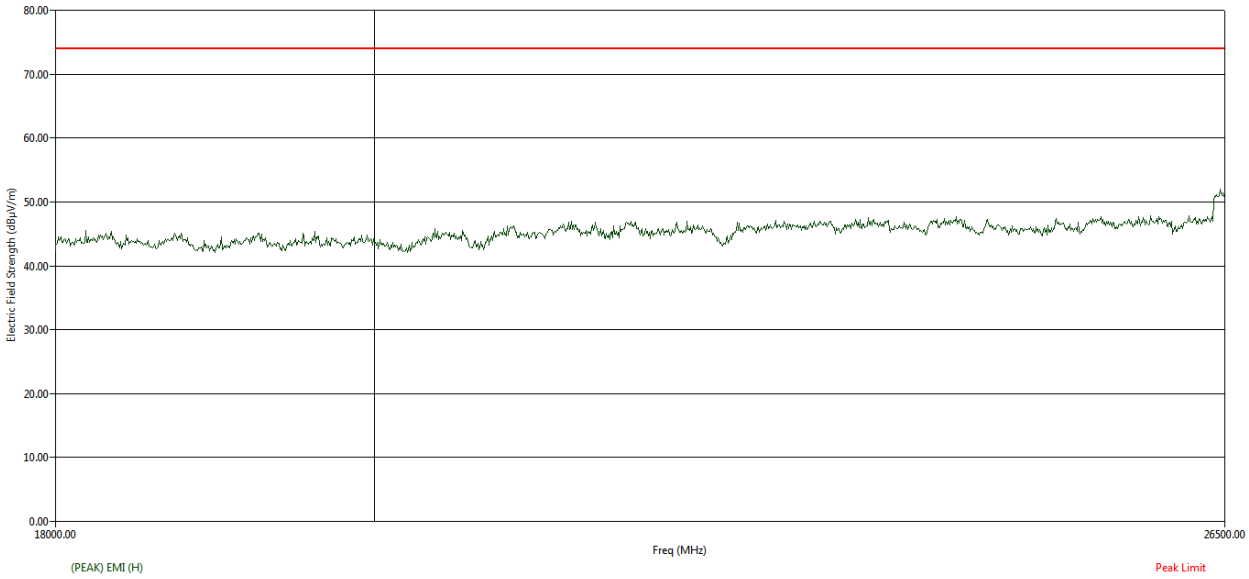

Figure 42: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

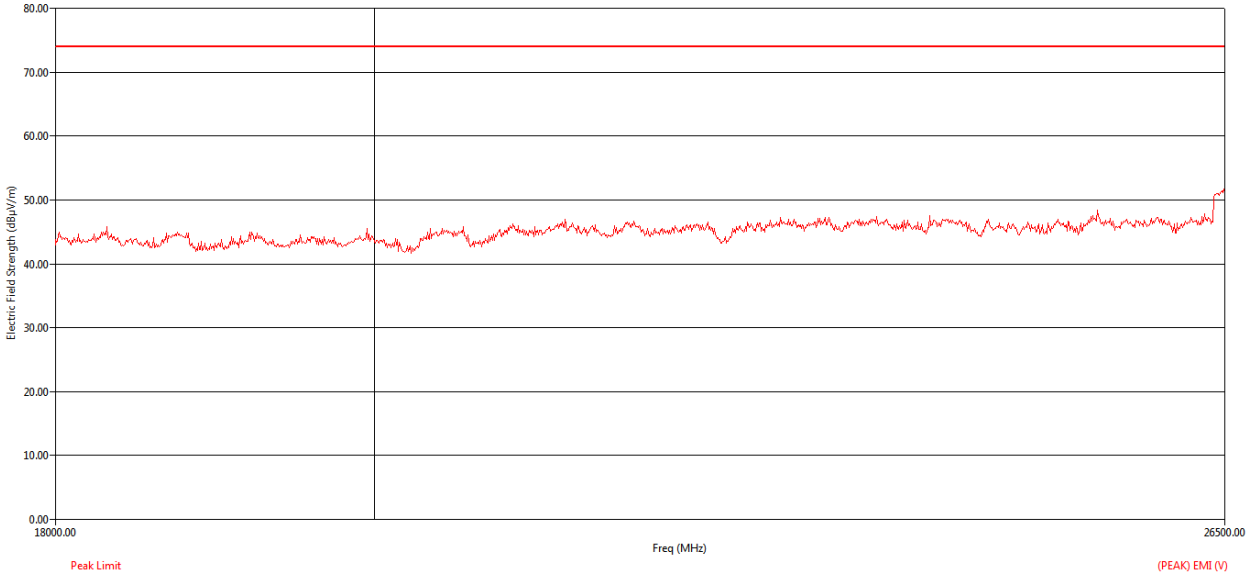

Figure 43: Peak RE from 18GHz to 26.5GHz - Vertical polarization

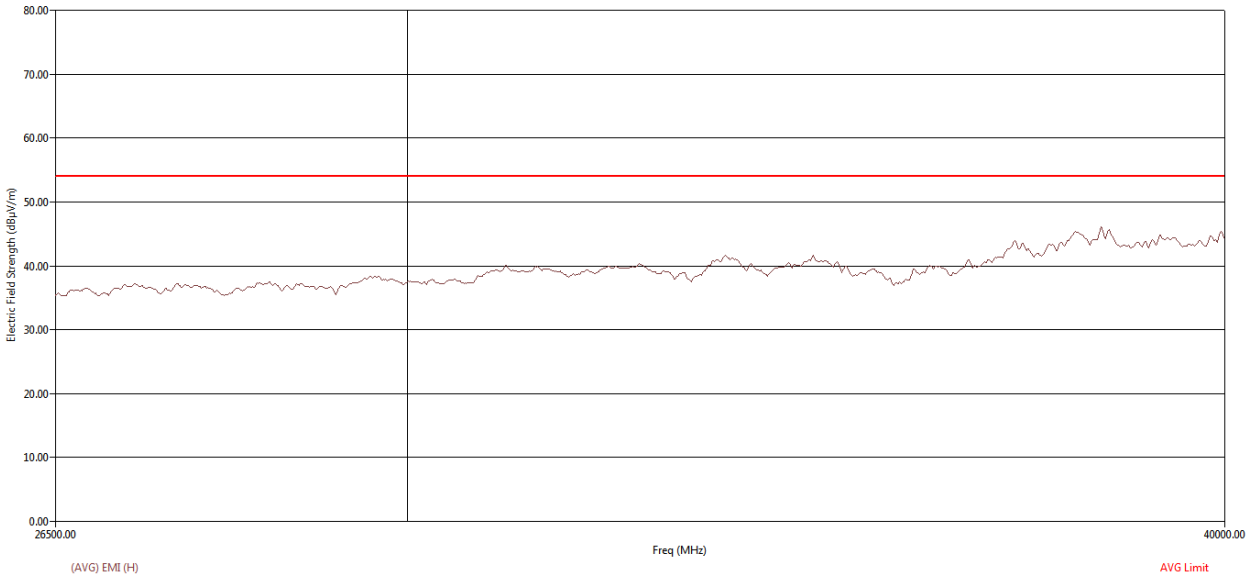

Figure 44: Average RE from 26.5GHz to 40GHz - Horizontal polarization

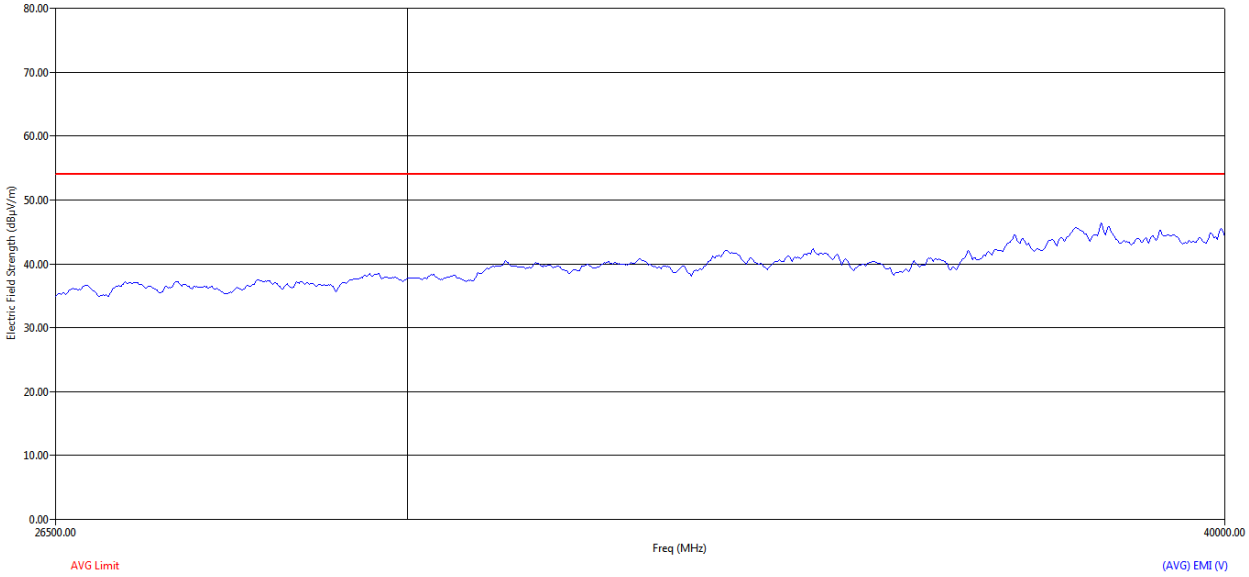

Figure 45: Average RE from 26.5GHz to 40GHz - Vertical polarization

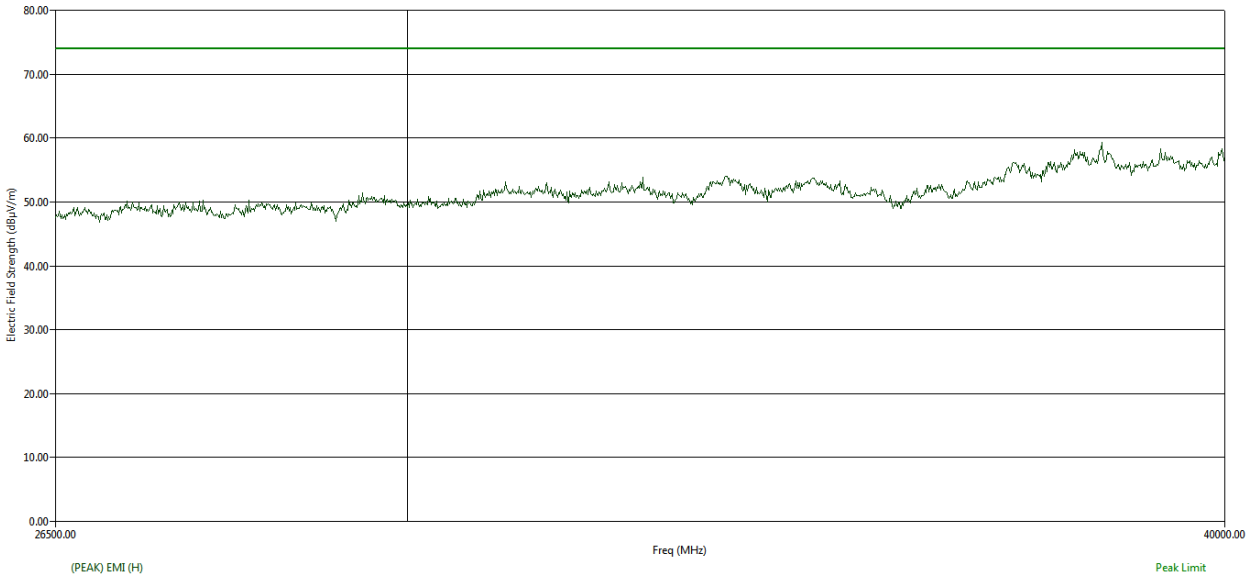

Figure 46: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

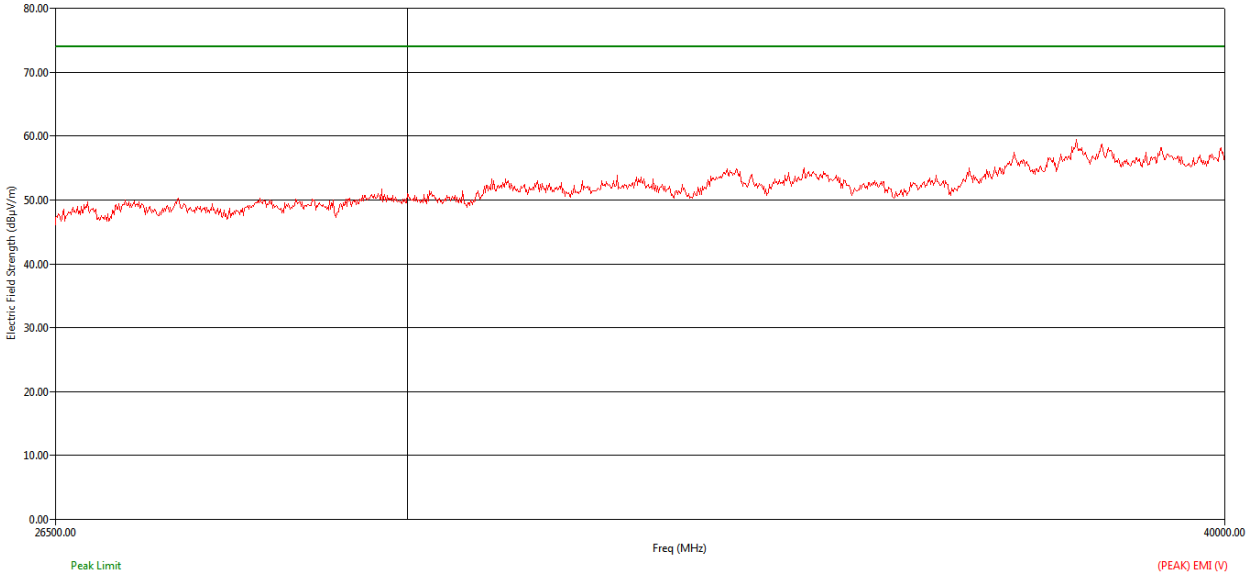

Figure 47: Peak RE from 26.5GHz to 40GHz - Vertical polarization

5.3.2.6.2 MID CHANNEL_5200MHZ

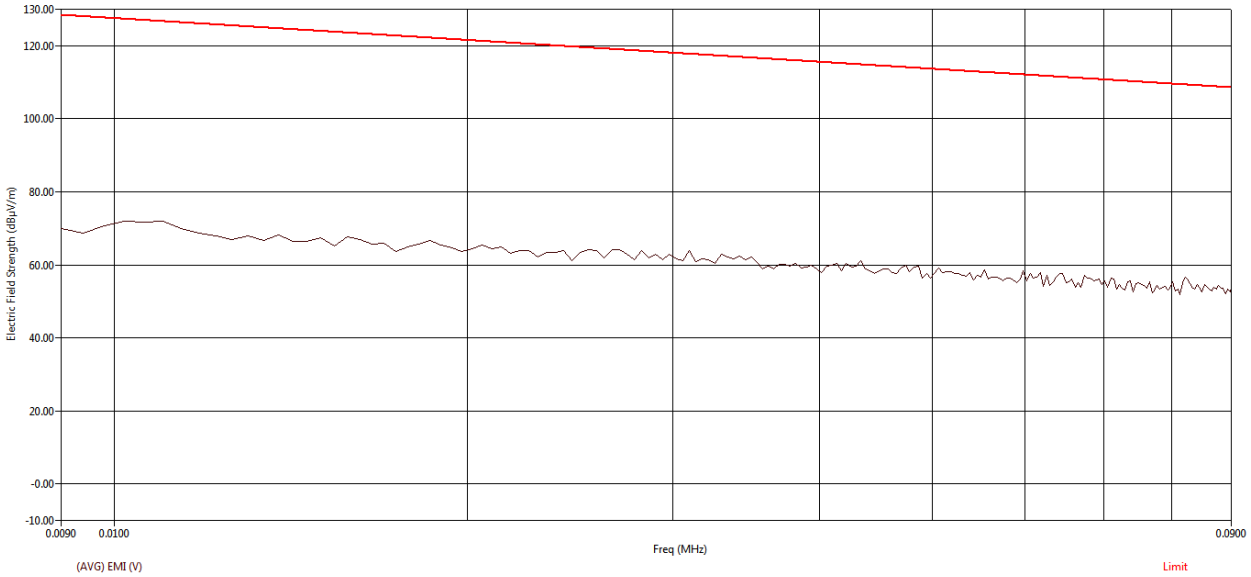

Figure 48: Average RE from 9 kHz to 90 kHz - Parallel

This report should always be reproduced in full. Any extracts of this report is invalid.

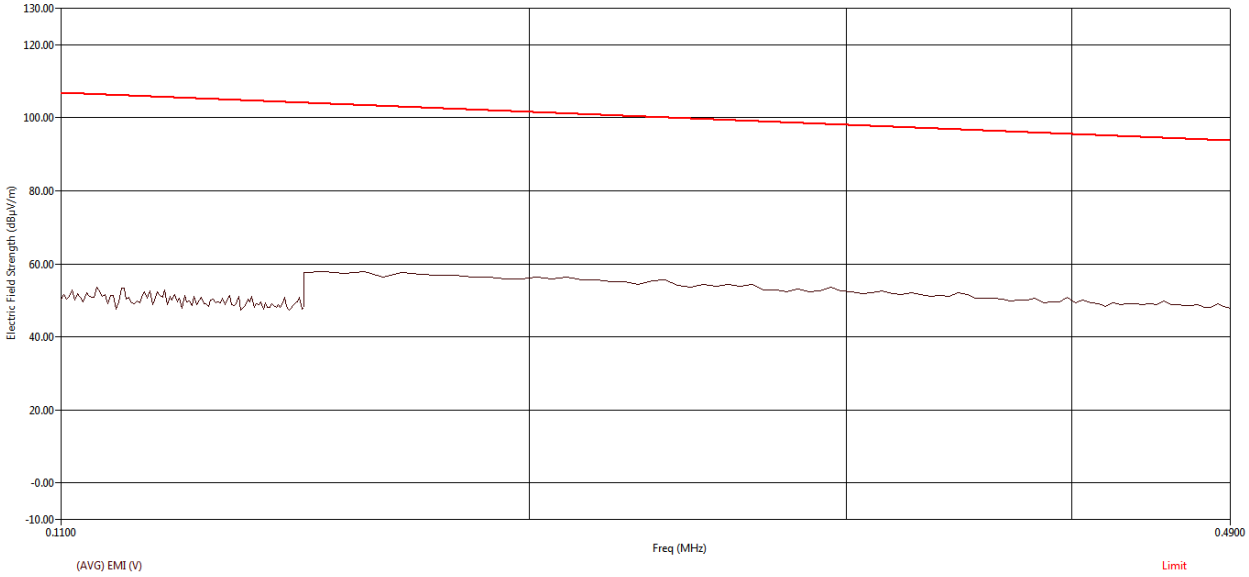

Figure 49: Average RE from 110 kHz to 490 kHz – Parallel

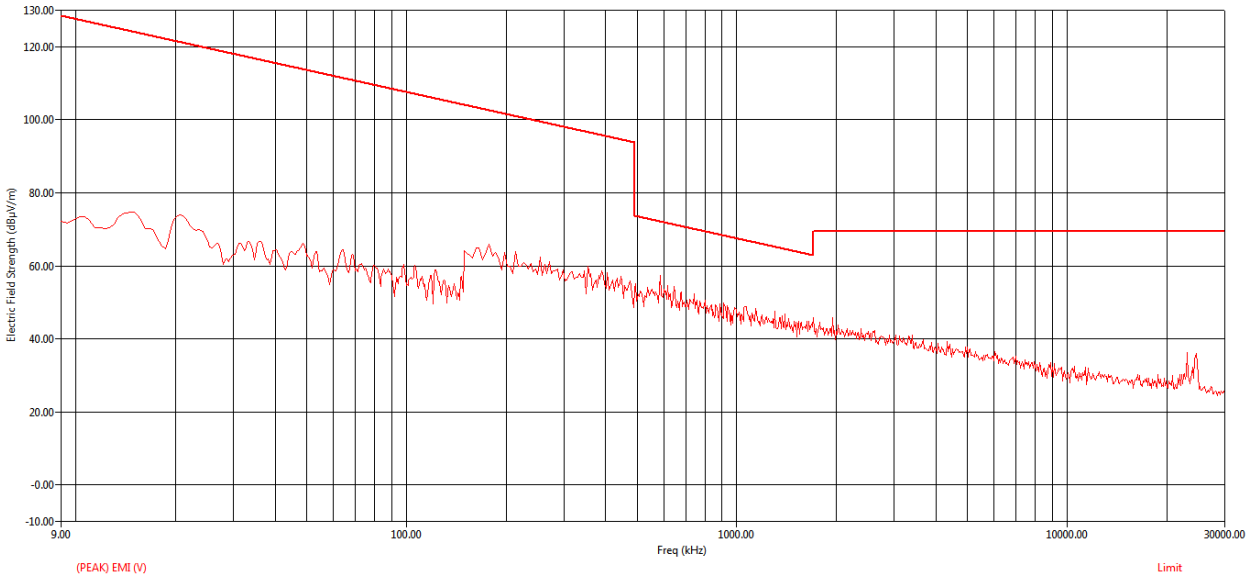

Figure 50 : Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	9.78	1.68	16.81	28.27	69.54	-41.27
24.40	24.41	V	11.14	1.72	16.73	29.60	69.54	-39.95

Table 16: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

This report should always be reproduced in full. Any extracts of this report is invalid.

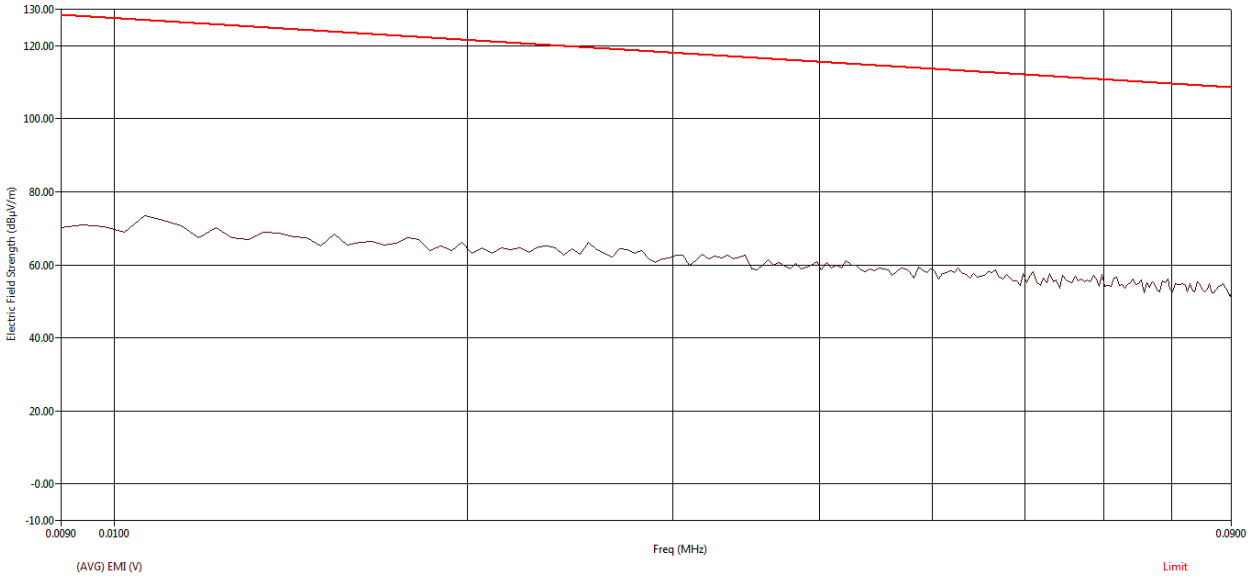

Figure 51 : Average RE from 9 kHz to 90 kHz - Perpendicular

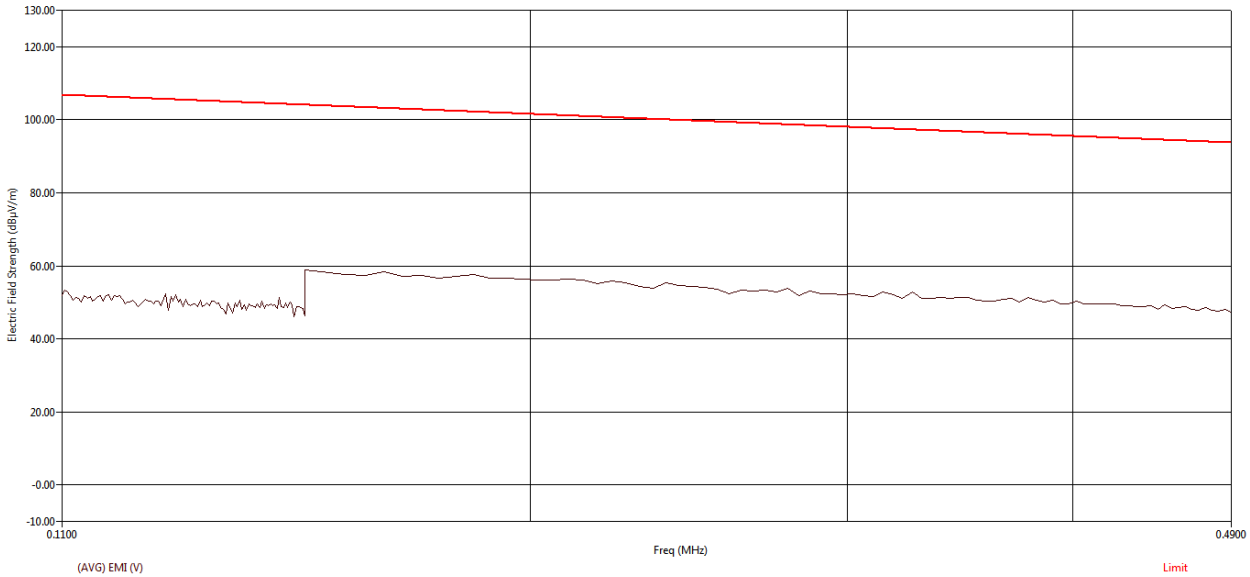

Figure 52 : Average RE from 110 kHz to 490 kHz - Perpendicular

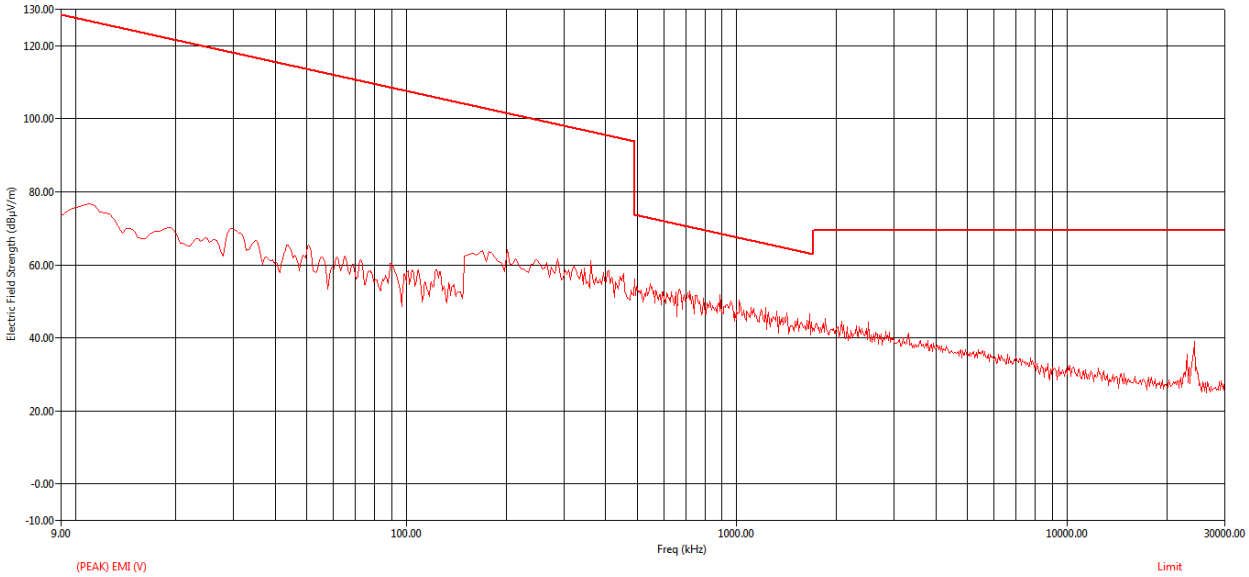

Figure 53 : Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.95	23.81	V	10.13	1.68	16.81	28.62	69.54	-40.92
24.40	24.39	V	7.56	1.72	16.73	26.02	69.54	-43.53

Table 17: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

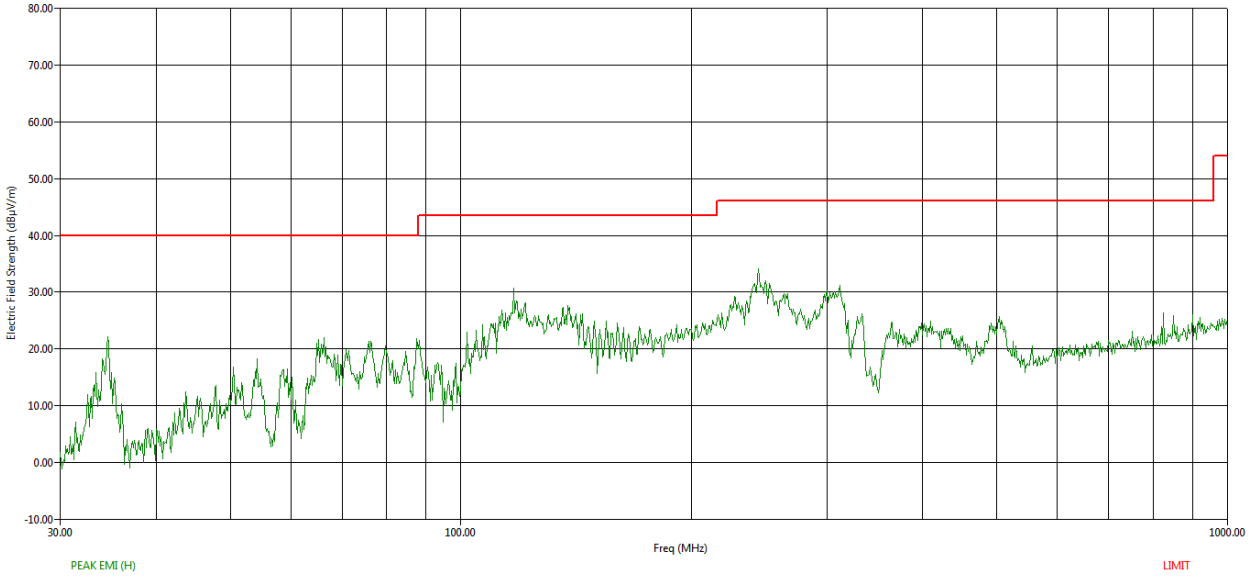

Figure 54 : Peak RE from 30MHz to 1GHz - Horizontal polarization

23

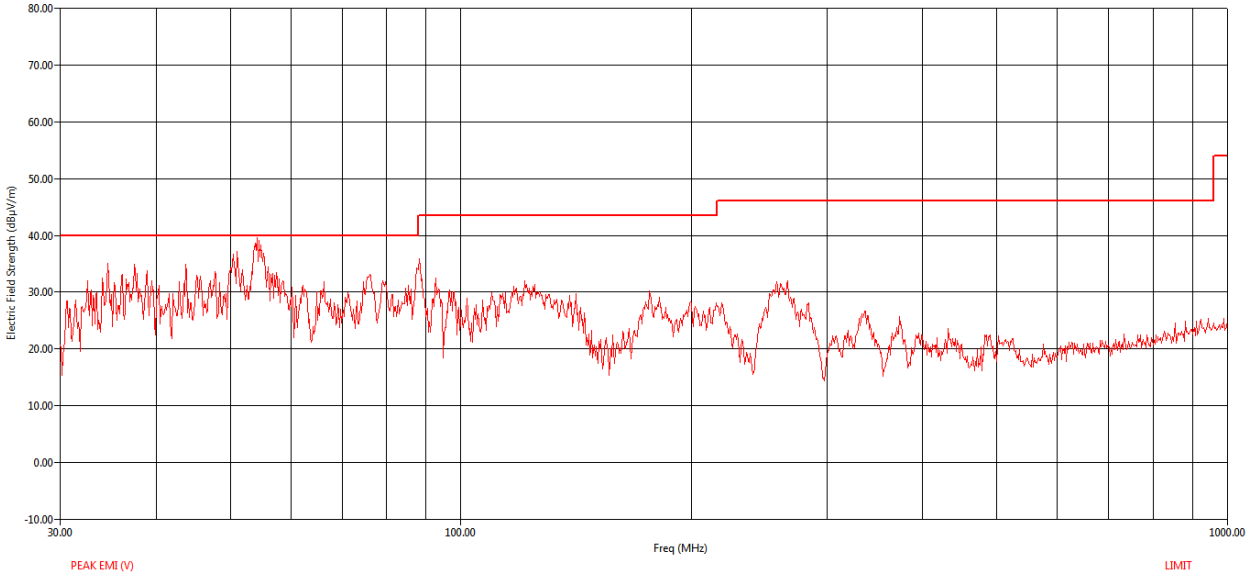

Figure 55 : Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
36.16	36.14	V	16.40	392.00	45.82	1.42	10.38	32.20	25.42	40.00	-14.58
50.44	50.43	V	40.80	110.00	59.93	1.66	10.45	32.20	39.83	40.00	-0.17
53.96	53.92	V	220.00	103.00	58.88	1.70	10.05	32.19	38.45	40.00	-1.55
56.00	55.88	V	133.60	399.00	42.11	1.71	9.84	32.18	21.47	40.00	-18.53
58.72	58.74	V	237.70	339.00	53.39	1.75	9.55	32.18	32.51	40.00	-7.49
66.32	66.28	V	254.90	100.00	59.03	1.89	9.48	32.16	38.23	40.00	-1.77
87.85	87.95	V	114.90	210.00	55.05	2.12	9.04	32.12	34.09	40.00	-5.91

Table 18: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

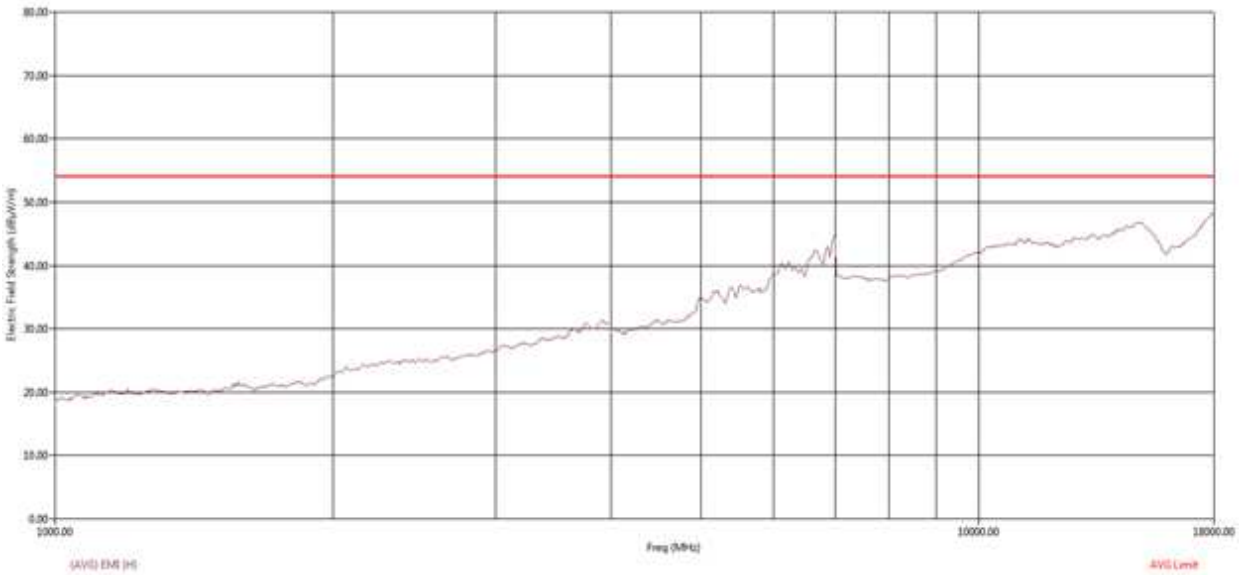

Figure 56 : Average RE from 1GHz to 18GHz - Horizontal polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

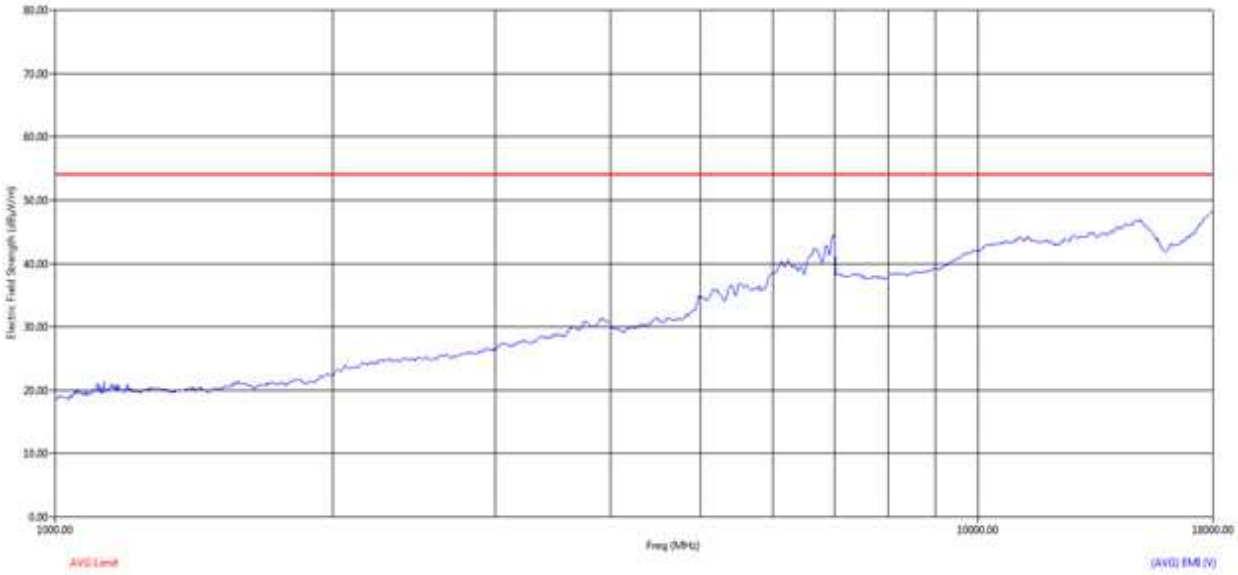

Figure 57 : Average RE from 1GHz to 18GHz - Vertical polarization

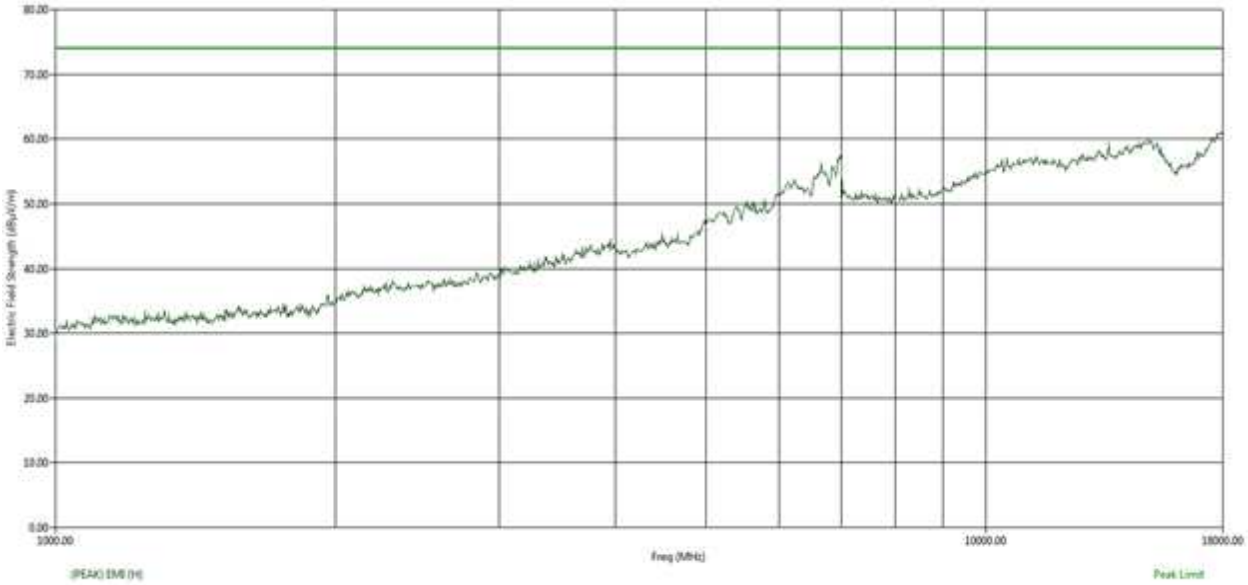

Figure 58 : Peak RE from 1GHz to 18GHz - Horizontal polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

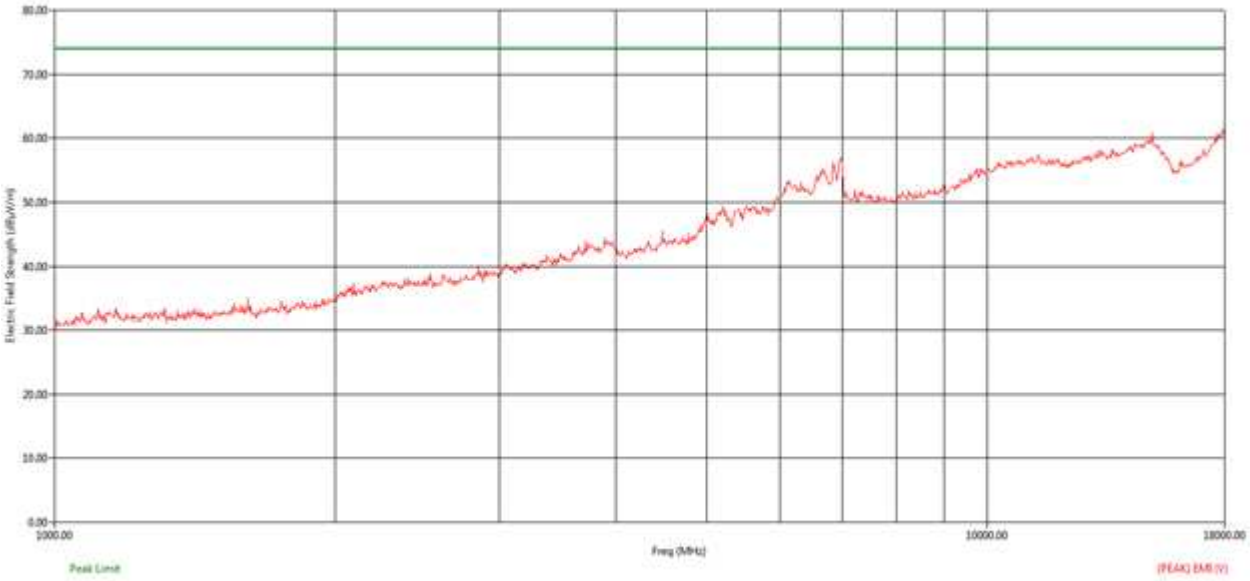

Figure 59 : Peak RE from 1GHz to 18GHz - Vertical polarization

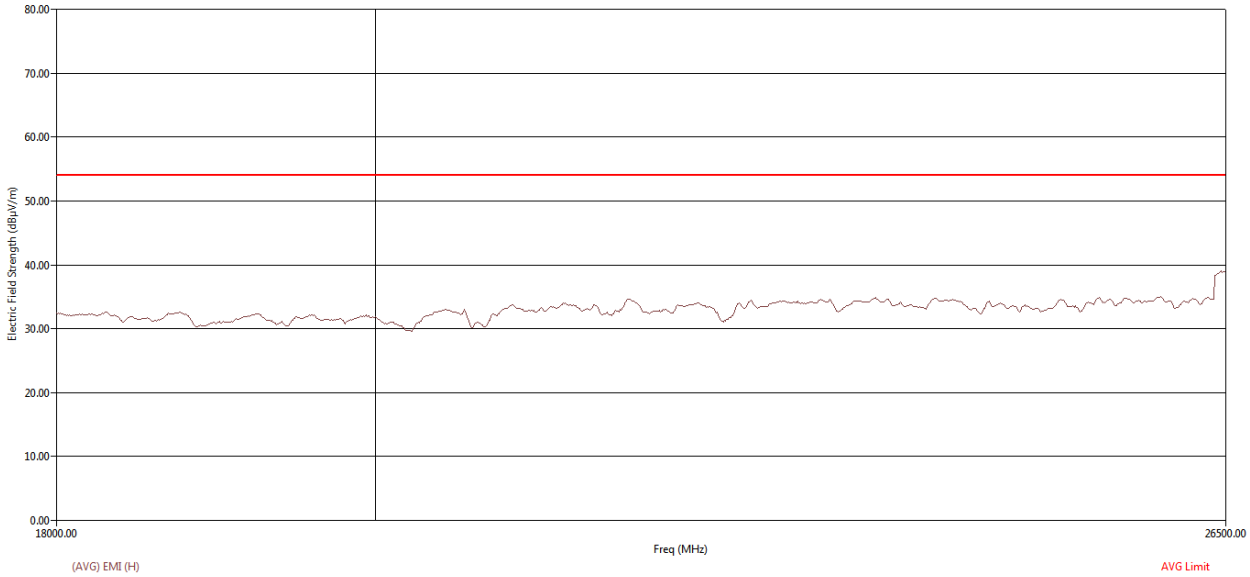

Figure 60 : Average RE from 18GHz to 26.5GHz - Horizontal polarization

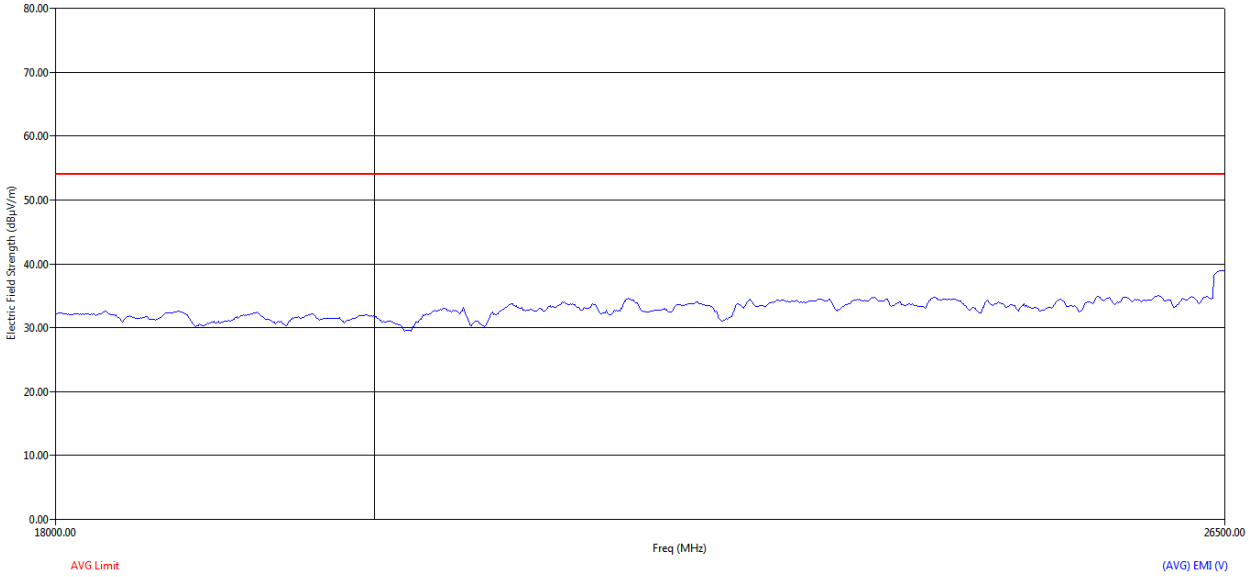

Figure 61 : Average RE from 18GHz to 26.5GHz - Vertical polarization

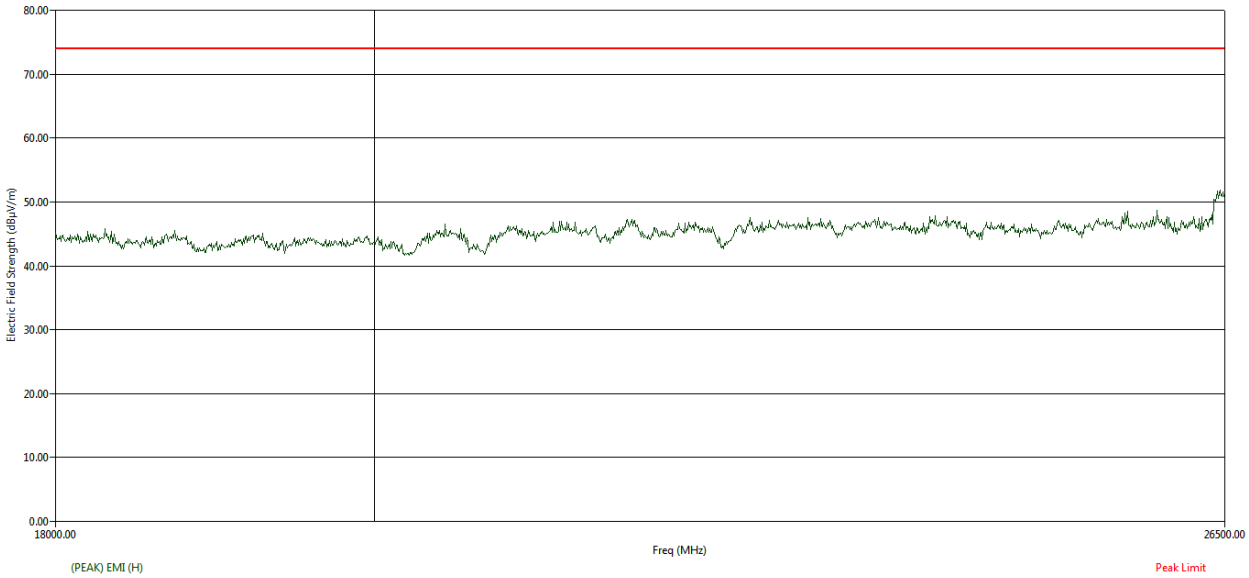

Figure 62 : Peak RE from 18GHz to 26.5GHz - Horizontal polarization

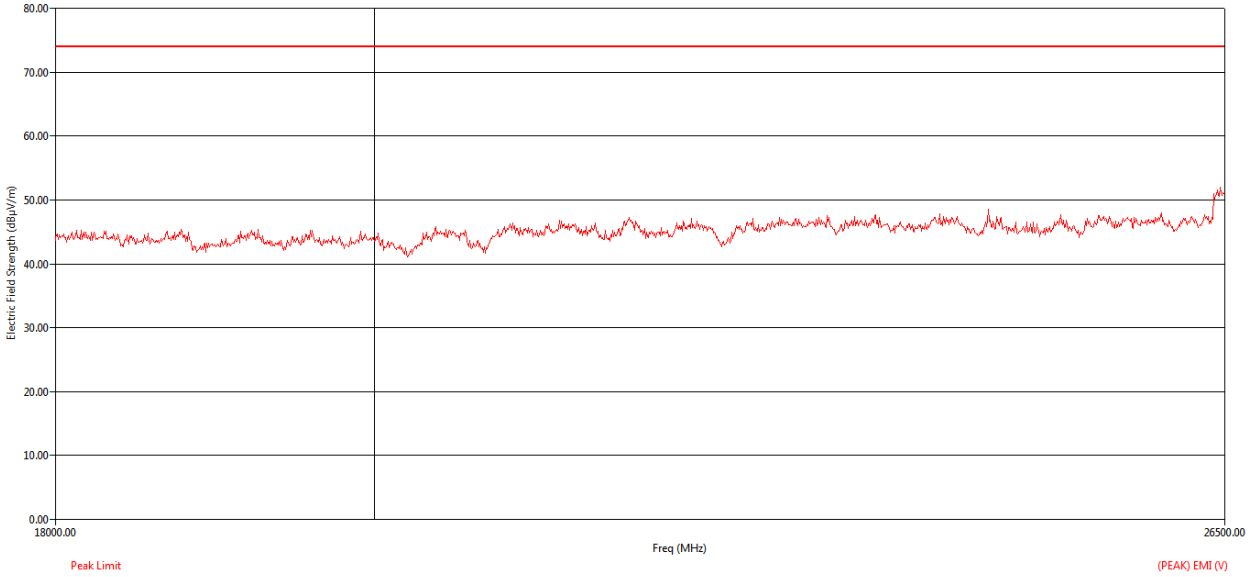

Figure 63 : Peak RE from 18GHz to 26.5GHz - Vertical polarization

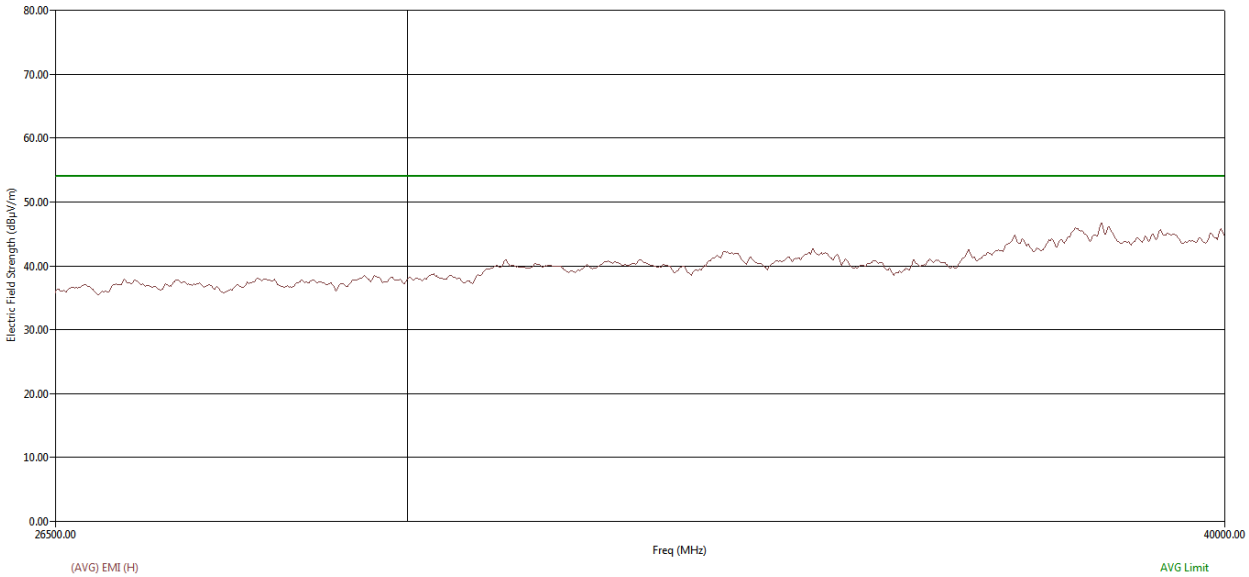

Figure 64 : Average RE from 26.5GHz to 40GHz - Horizontal polarization

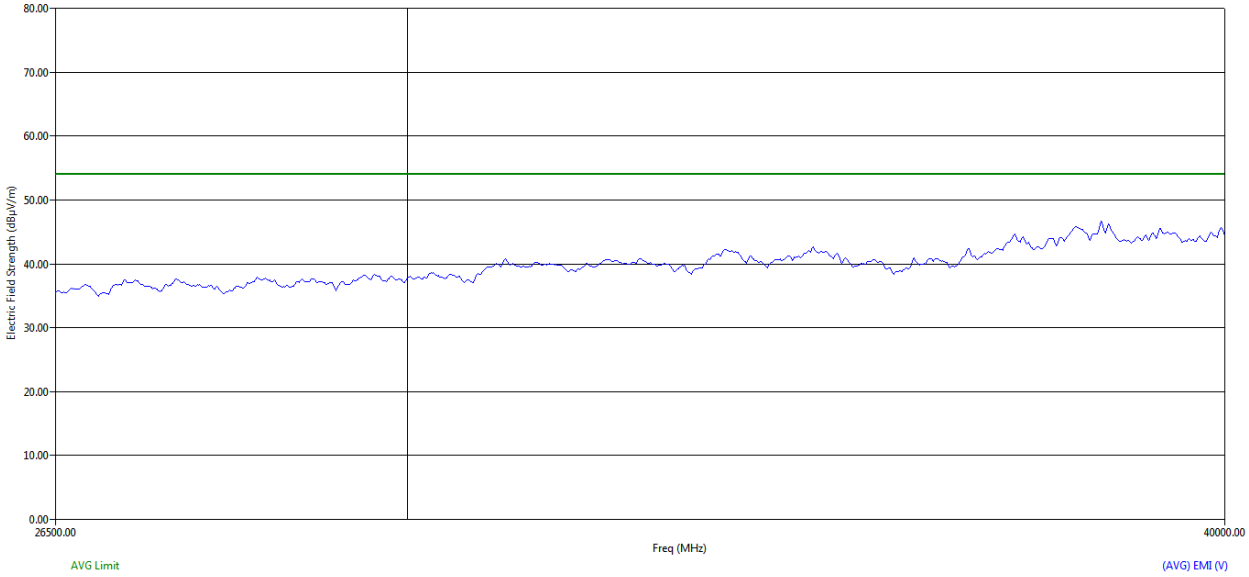

Figure 65 : Average RE from 26.5GHz to 40GHz - Vertical polarization

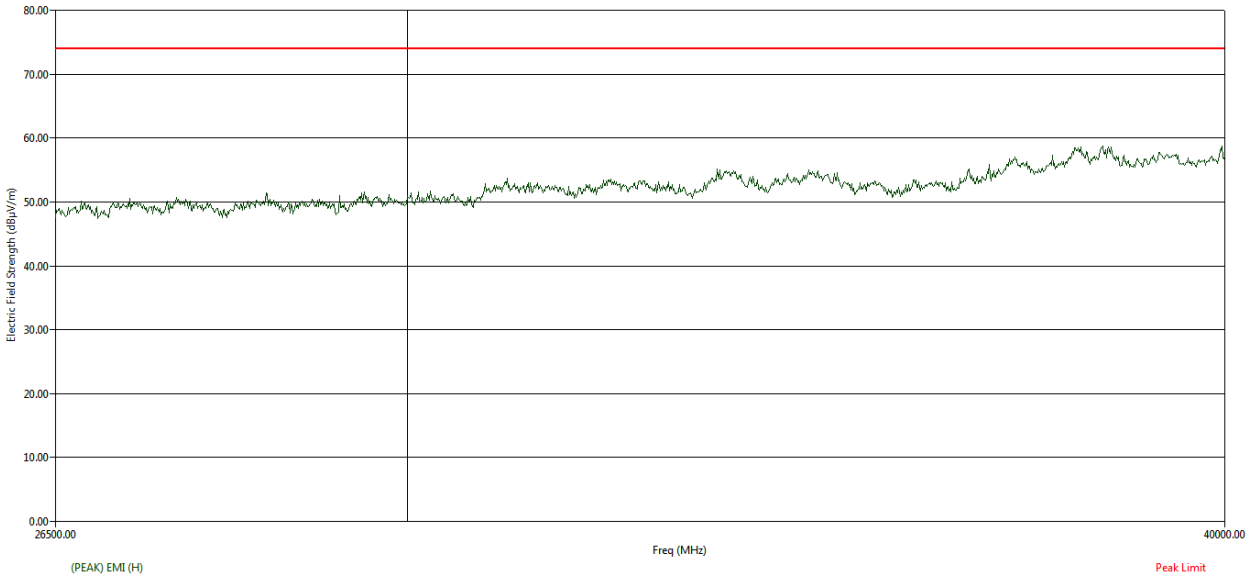

Figure 66 : Peak RE from 26.5GHz to 40GHz - Horizontal polarization

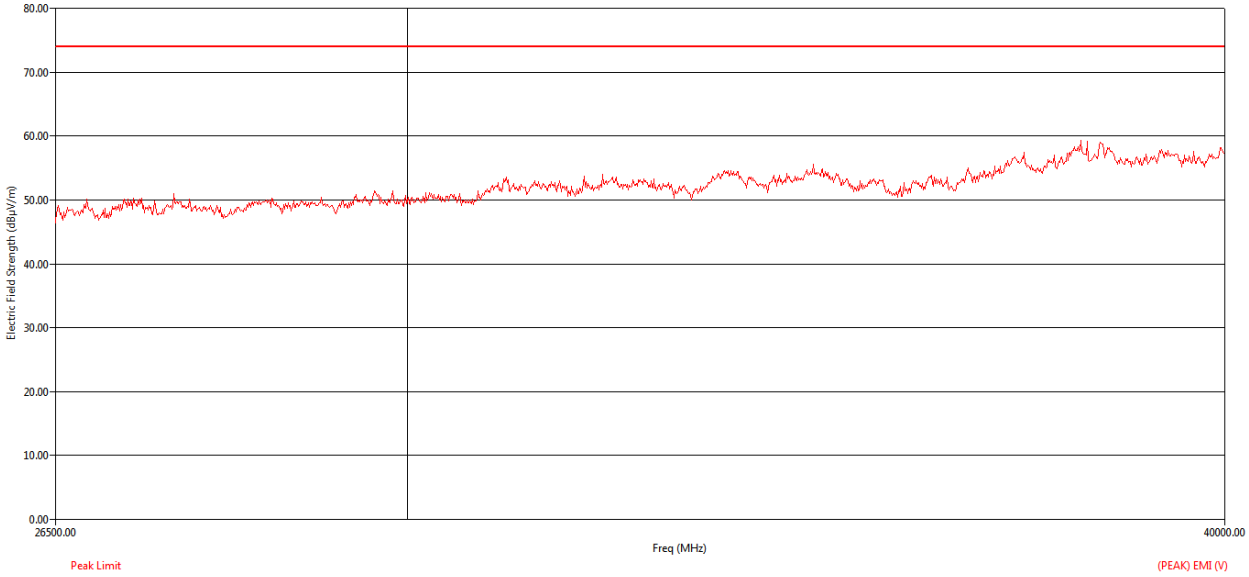

Figure 67 : Peak RE from 26.5GHz to 40GHz - Vertical polarization

5.3.2.6.3 HIGH CHANNEL_5220MHZ

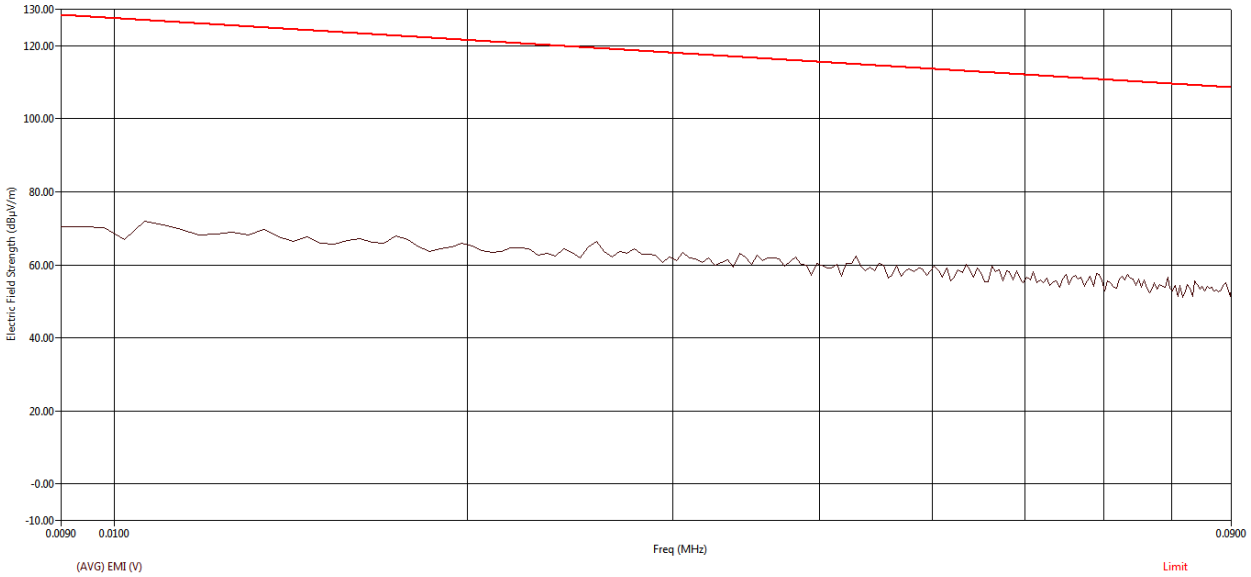

Figure 68 : Average RE from 9 kHz to 90 kHz - Parallel

This report should always be reproduced in full. Any extracts of this report is invalid.

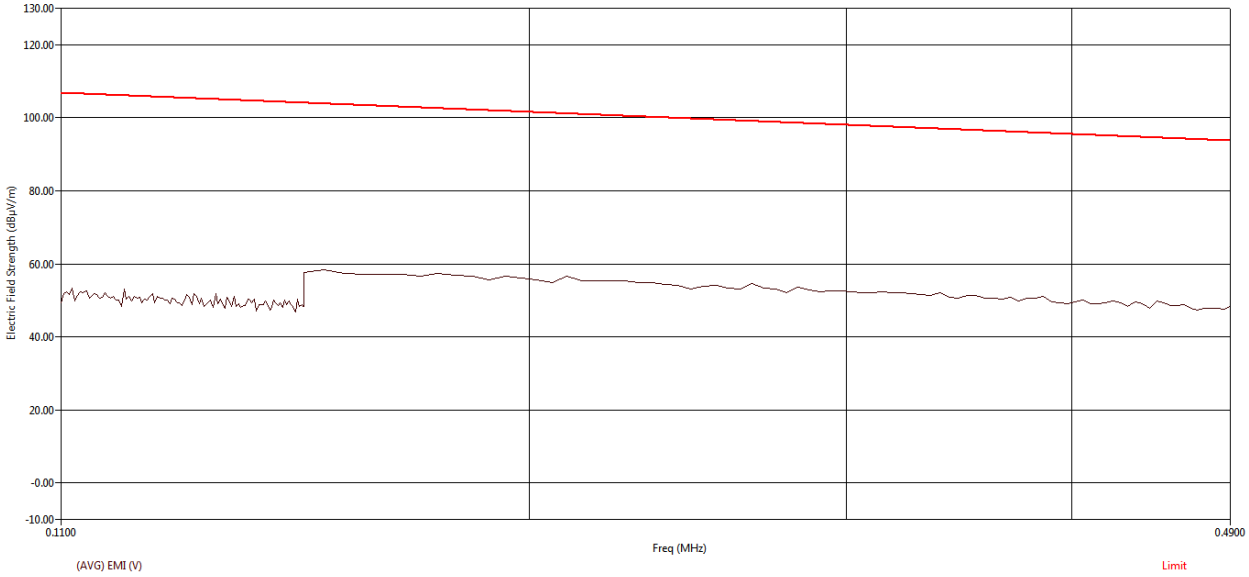

Figure 69: Average RE from 110 kHz to 490 kHz – Parallel

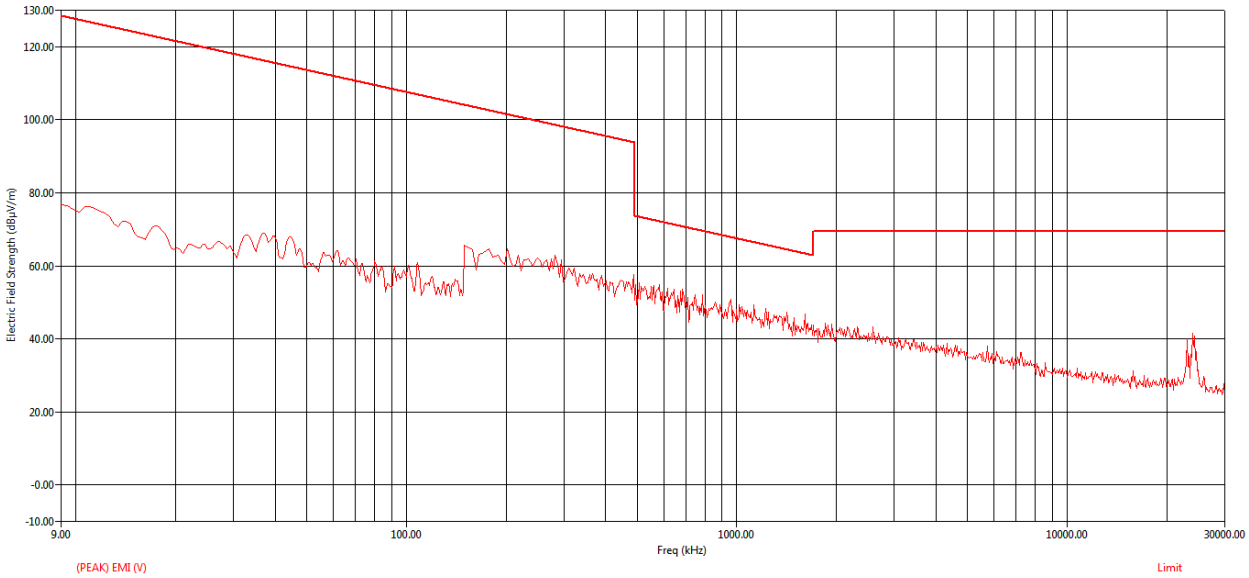

Figure 70 : Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	9.19	1.68	16.81	27.68	69.54	-41.86
24.10	24.11	V	9.91	1.71	16.75	28.37	69.54	-41.17

Table 19: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

This report should always be reproduced in full. Any extracts of this report is invalid.

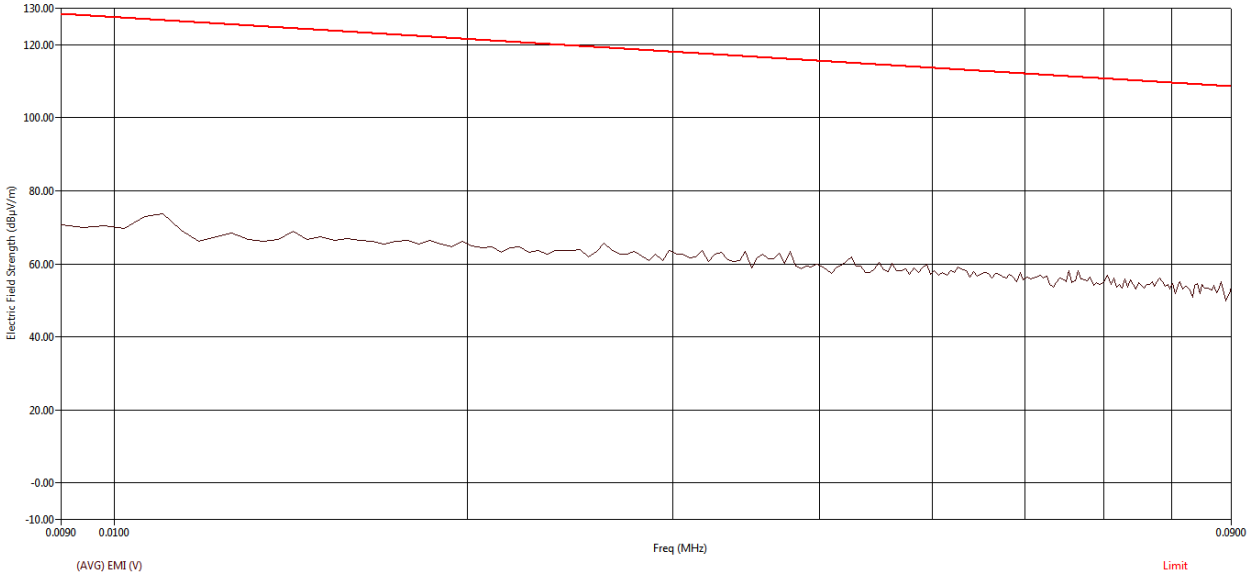

Figure 71 : Average RE from 9 kHz to 90 kHz - Perpendicular

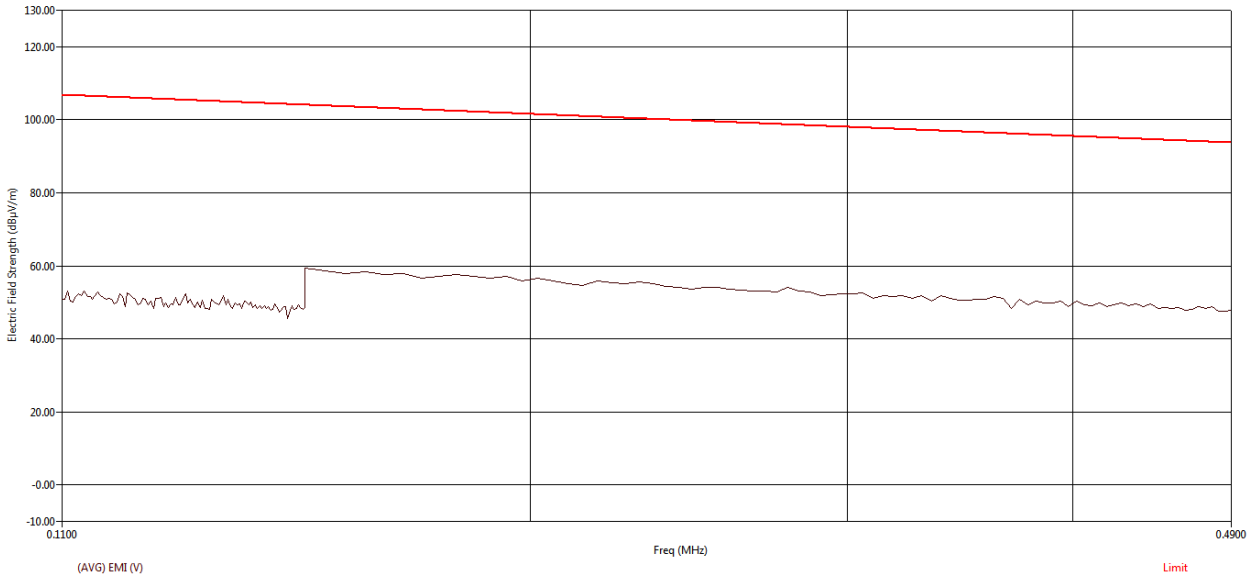

Figure 72 : Average RE from 110 kHz to 490 kHz - Perpendicular

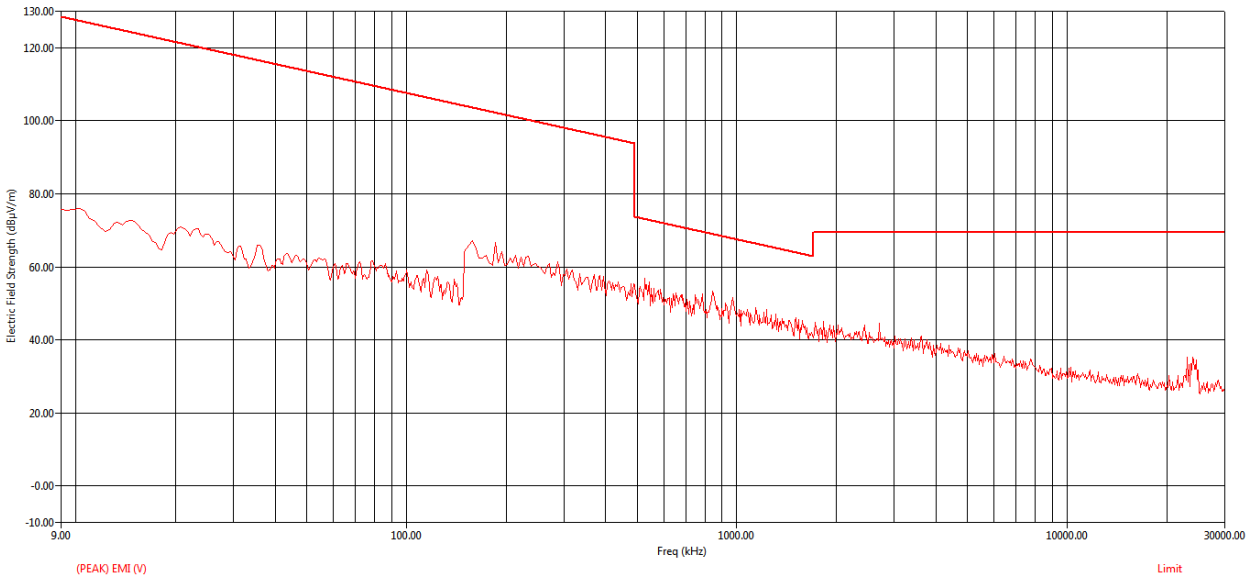

Figure 73 : Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	11.50	1.68	16.81	30.01	69.54	-39.00
24.10	24.10	V	9.14	1.72	16.73	27.60	69.54	-41.95

Table 20: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

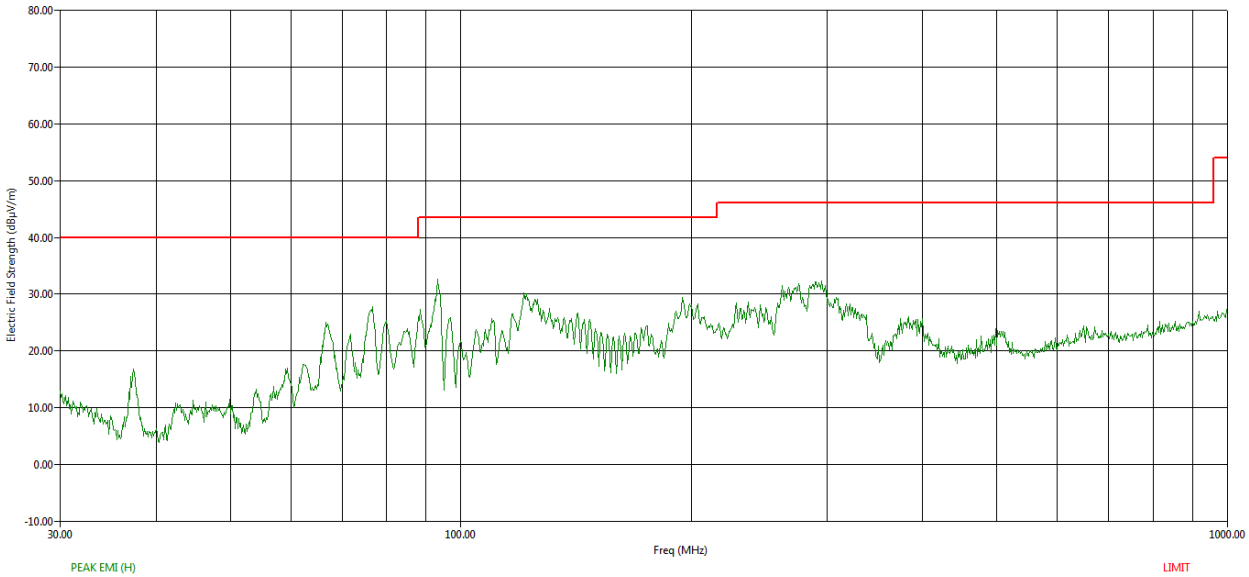

Figure 74 : Peak RE from 30MHz to 1GHz - Horizontal polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

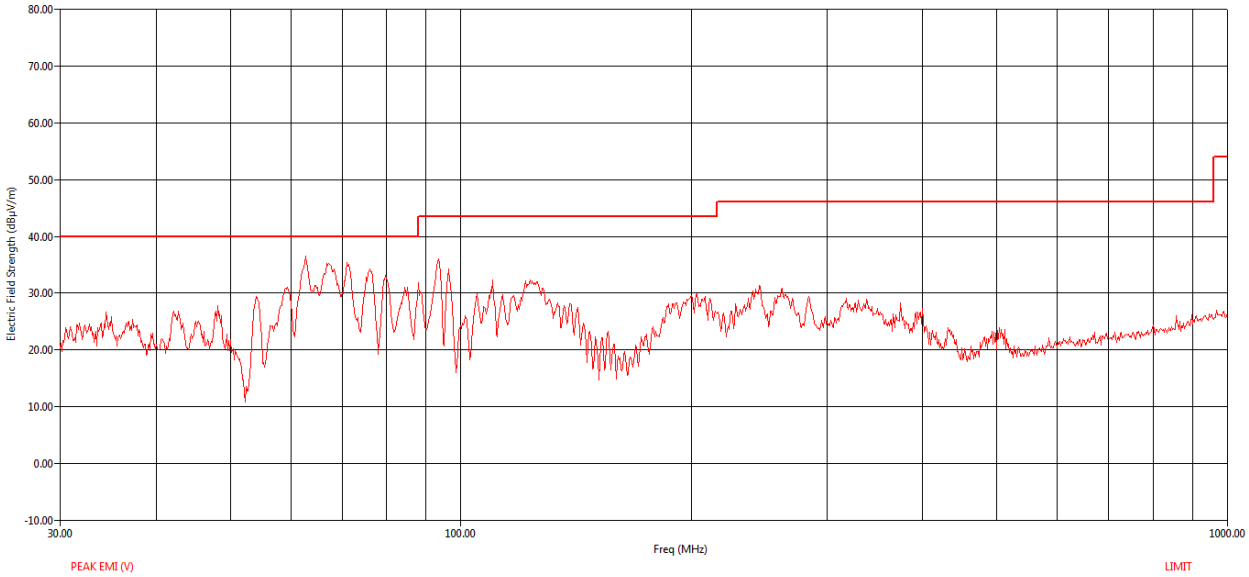

Figure 75 : Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
62.80	62.68	V	317.30	100.00	55.14	1.84	9.45	32.17	34.25	40.00	-5.75
71.04	71.13	V	333.30	134.00	54.93	1.96	9.45	32.15	34.19	40.00	-5.81
76.08	76.10	V	300.70	185.00	55.79	1.99	9.18	32.14	34.82	40.00	-5.18
93.28	93.30	H	90.90	167.00	46.48	2.22	9.06	32.11	25.65	43.52	-17.87
93.48	93.39	V	14.40	163.00	53.93	2.22	9.06	32.11	33.10	43.52	-10.42
120.88	120.91	H	304.00	154.00	48.25	2.48	11.44	32.07	30.10	43.52	-13.42
295.80	295.79	H	270.40	100.00	44.41	3.80	14.30	31.90	30.60	46.02	-15.42

Table 21: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

This report should always be reproduced in full. Any extracts of this report is invalid.

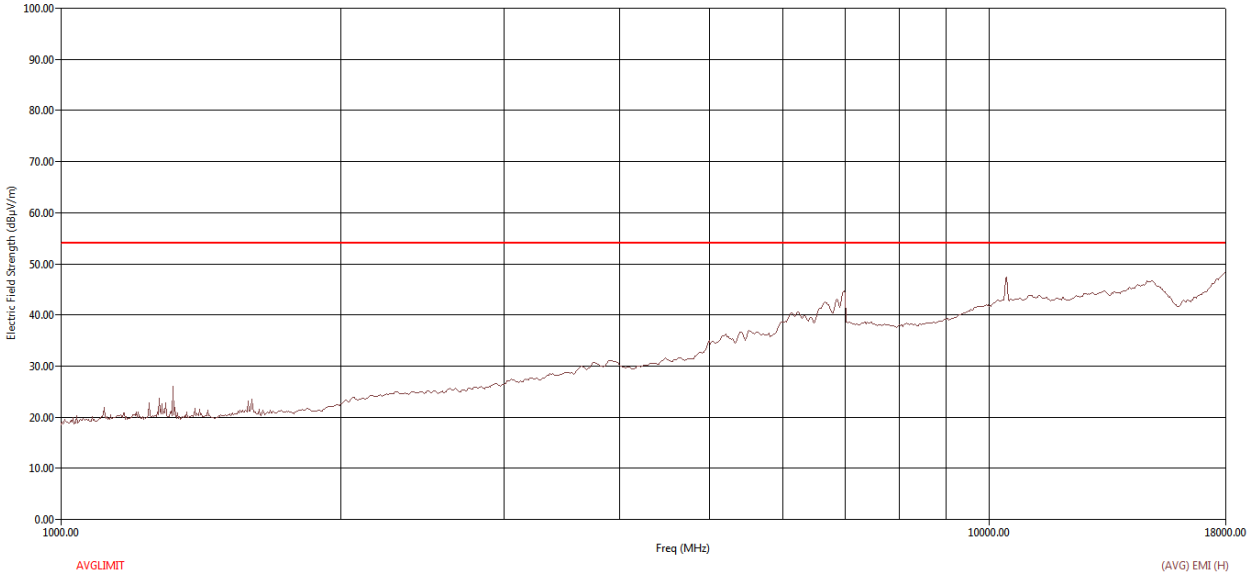

Figure 76: Average RE from 1GHz to 18GHz - Horizontal polarization

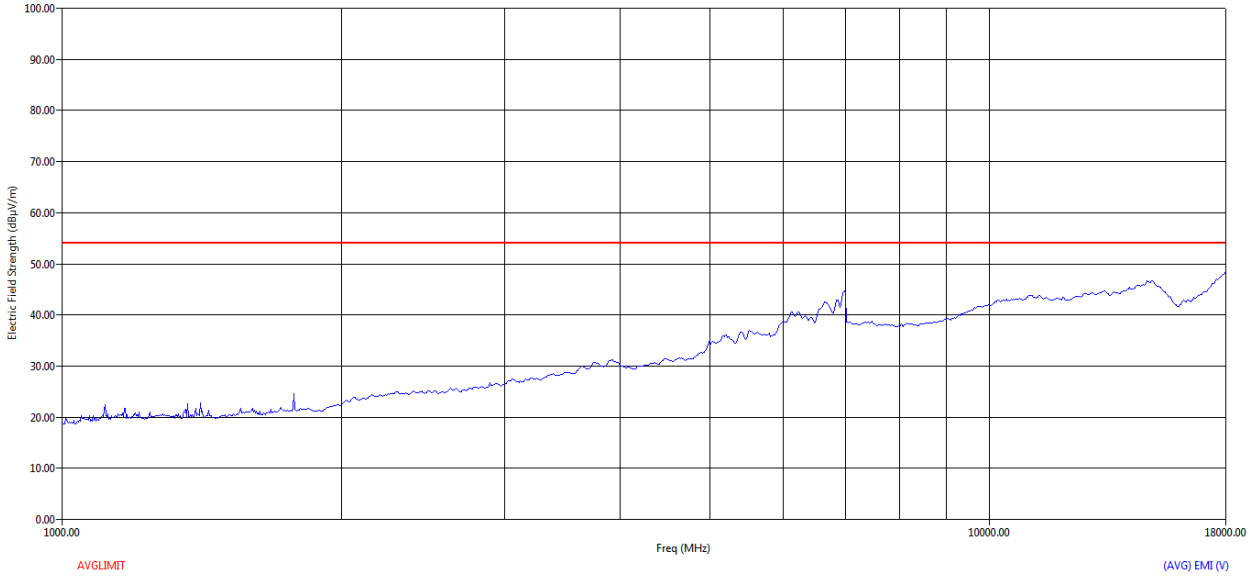

Figure 77: Average RE from 1GHz to 18GHz - Vertical polarization

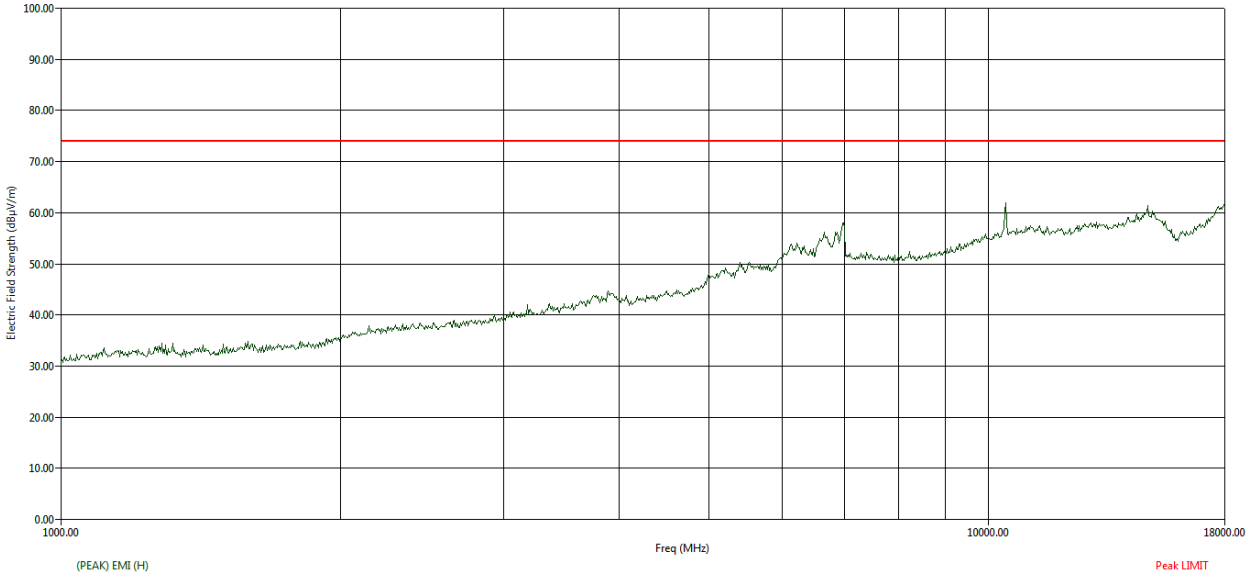

Figure 78: Peak RE from 1GHz to 18GHz - Horizontal polarization

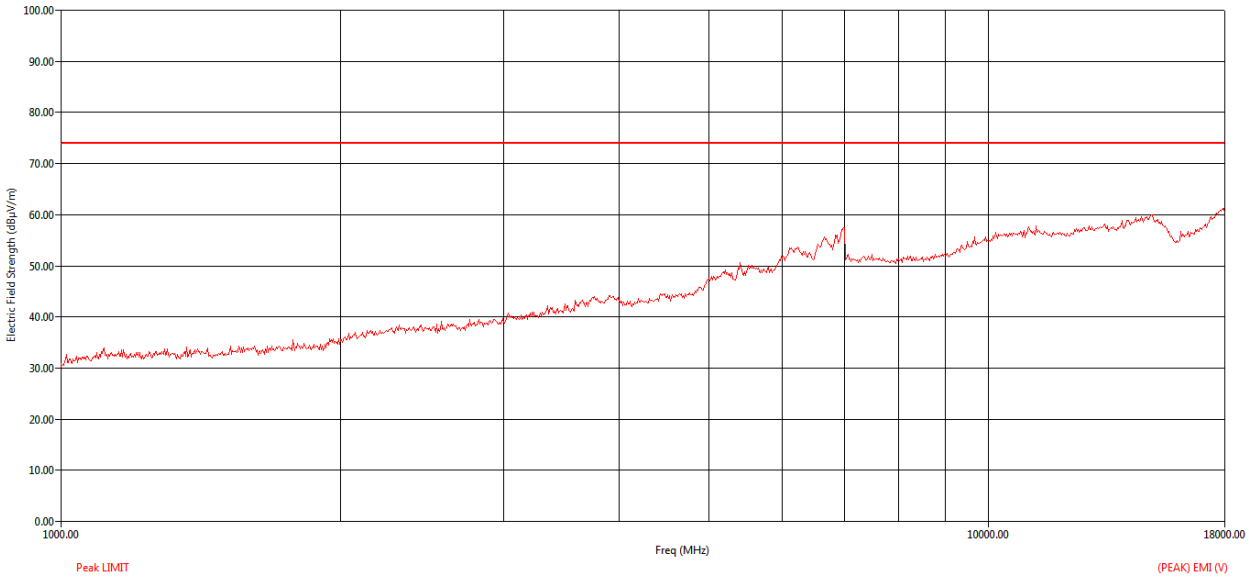

Figure 79: Peak RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

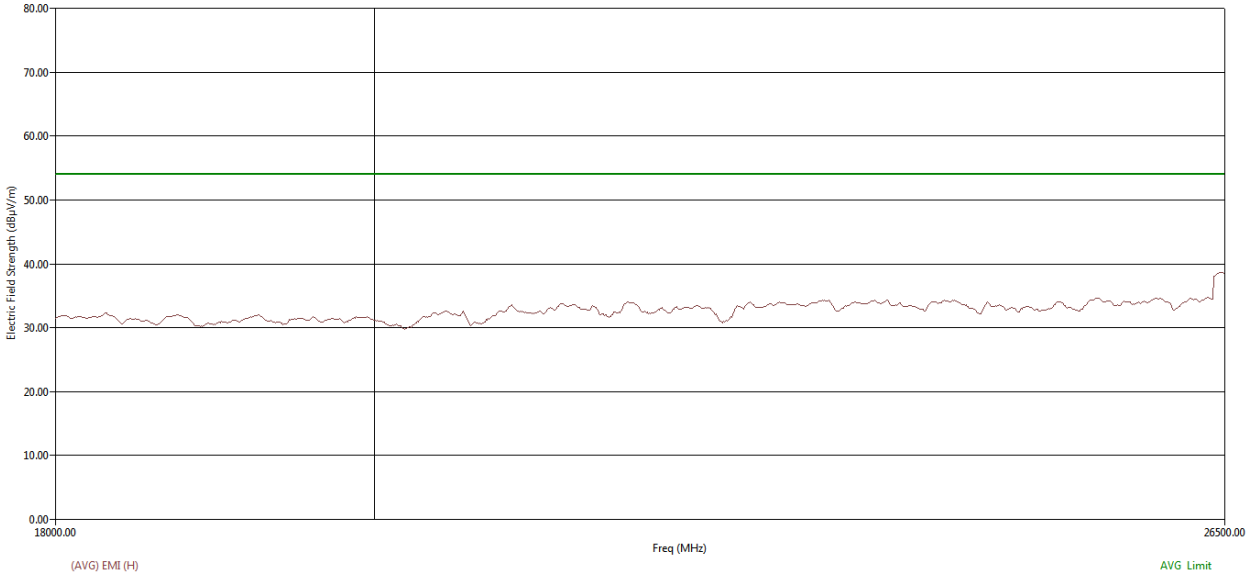

Figure 80: Average RE from 18GHz to 26.5GHz - Horizontal polarization

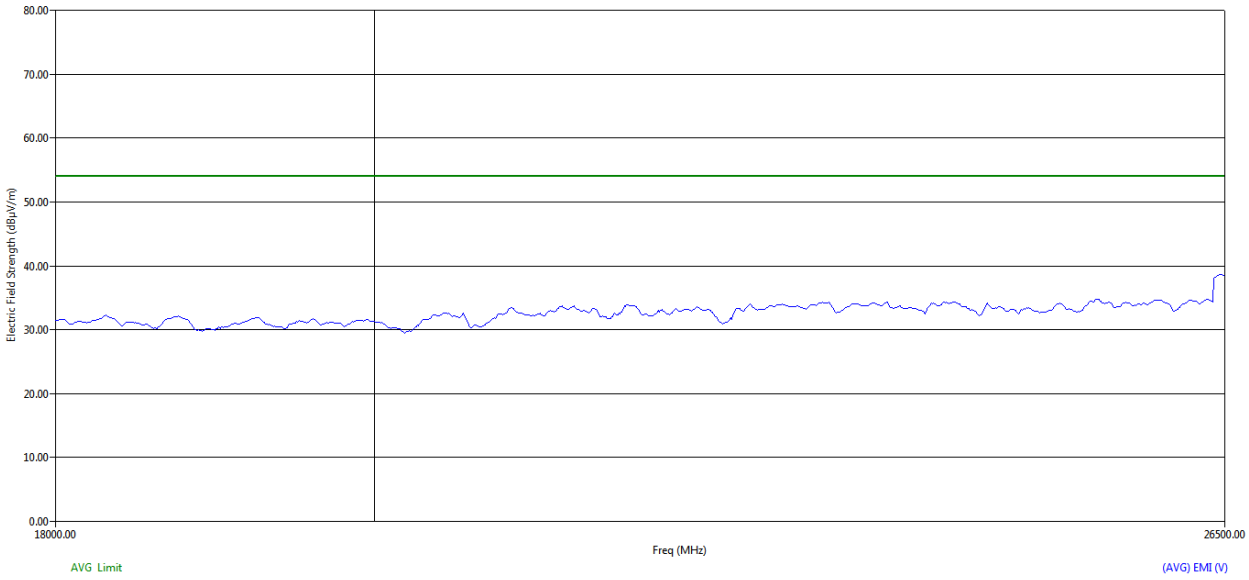

Figure 81: Average RE from 18GHz to 26.5GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

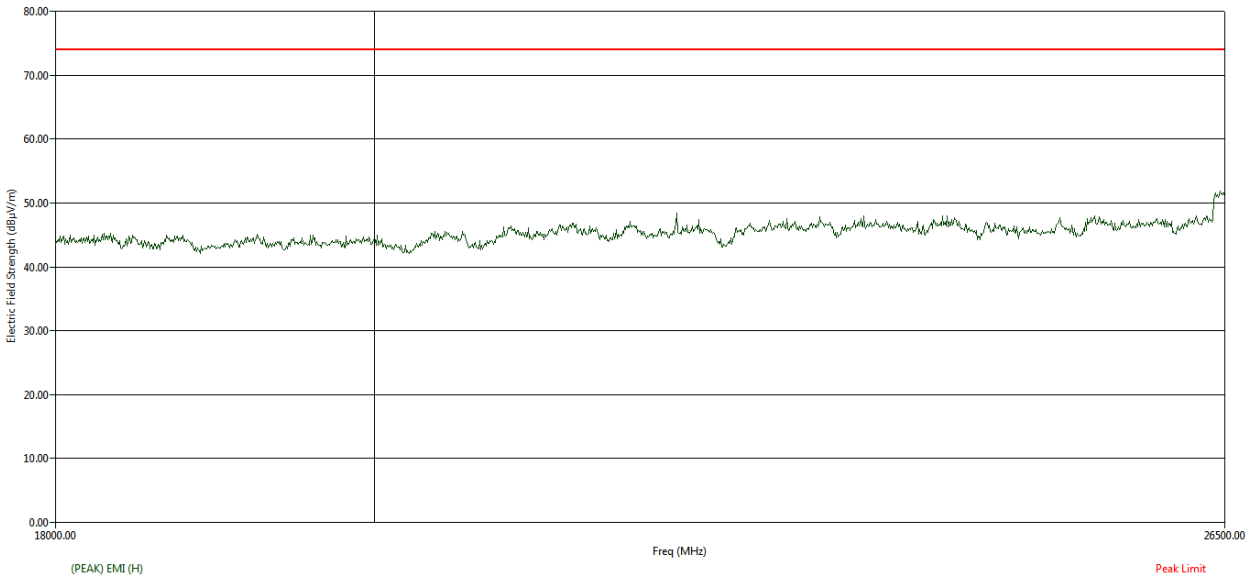

Figure 82: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

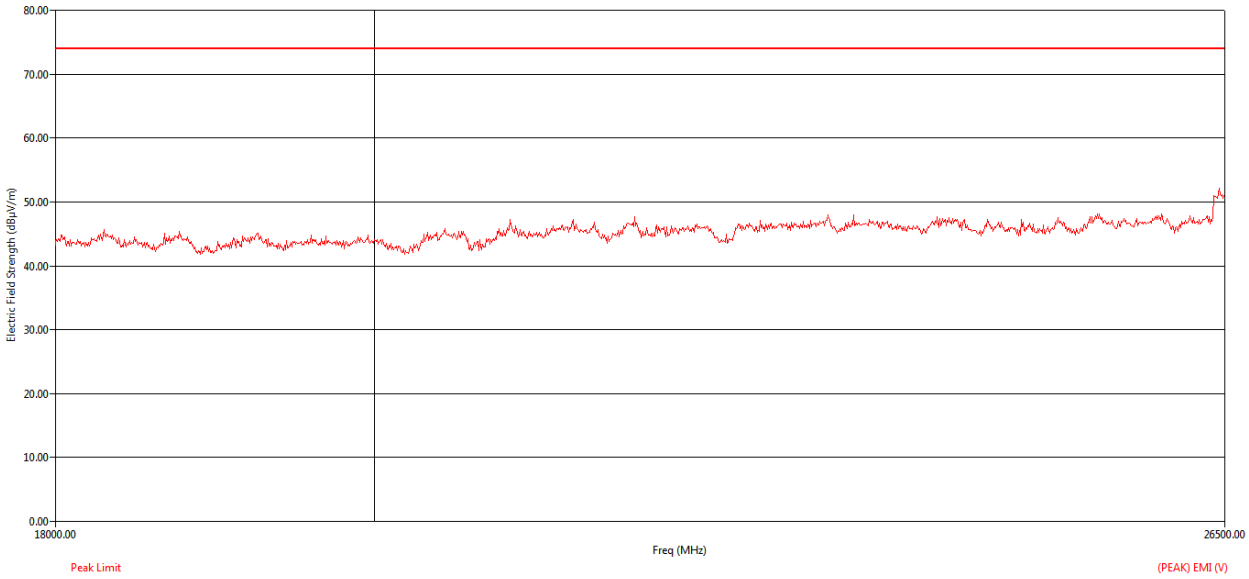

Figure 83: Peak RE from 18GHz to 26.5GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

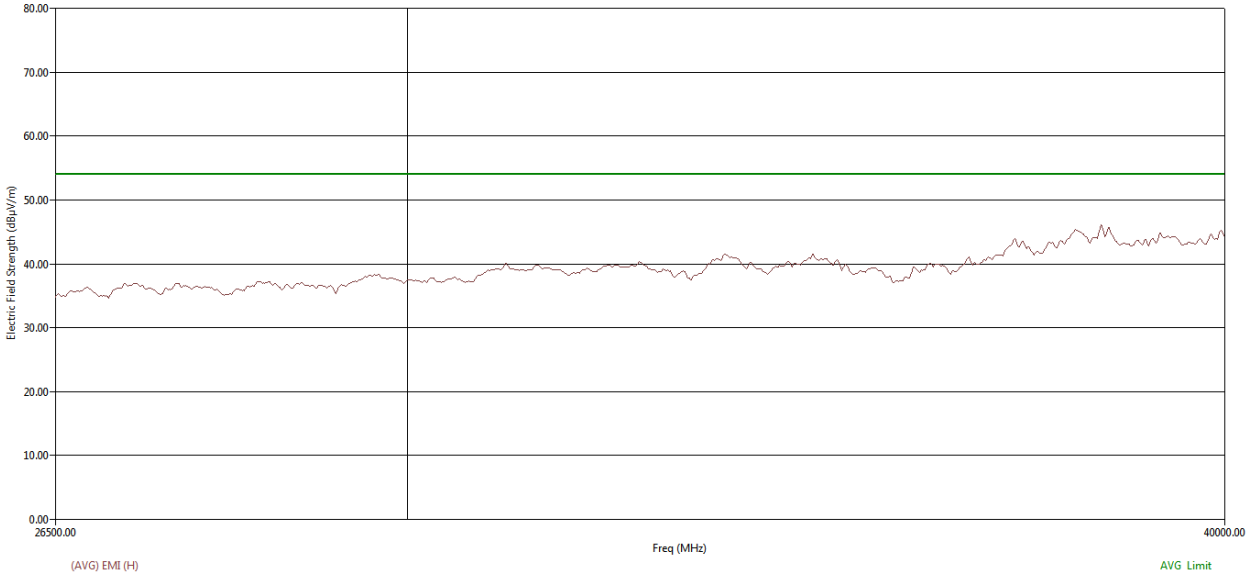

Figure 84 : Average RE from 26.5GHz to 40GHz - Horizontal polarization

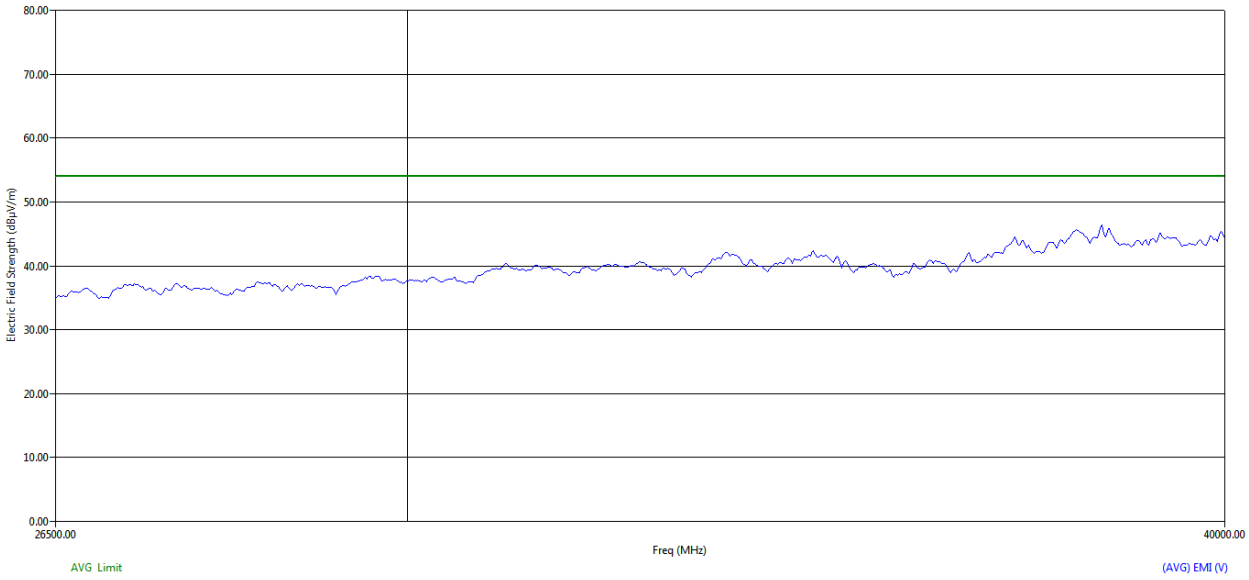

Figure 85 : Average RE from 26.5GHz to 40GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

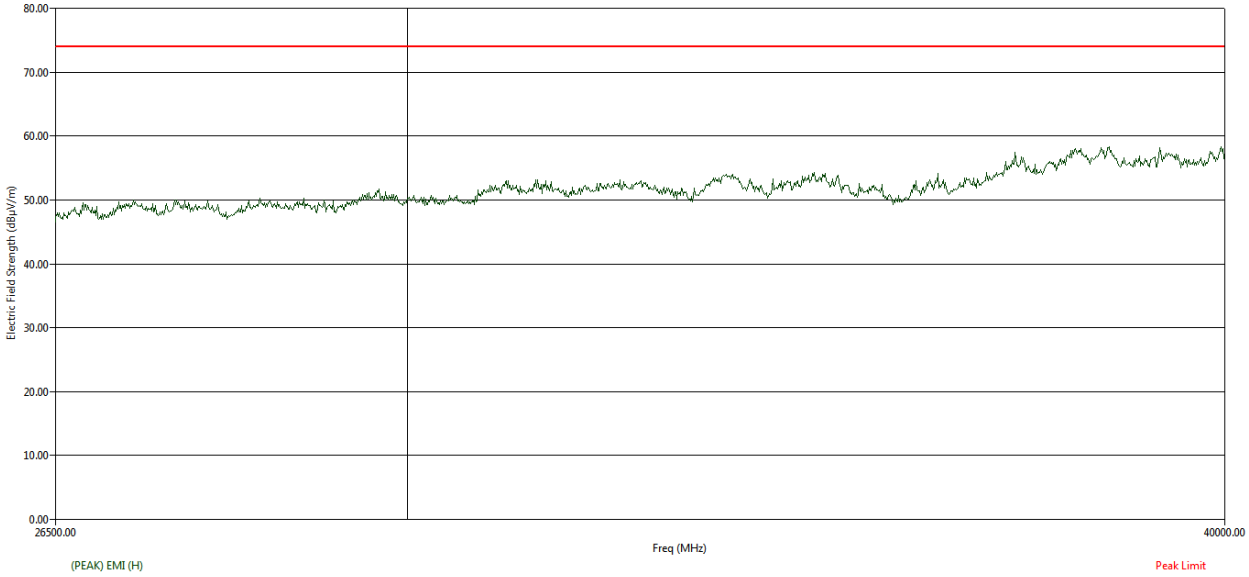

Figure 86: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

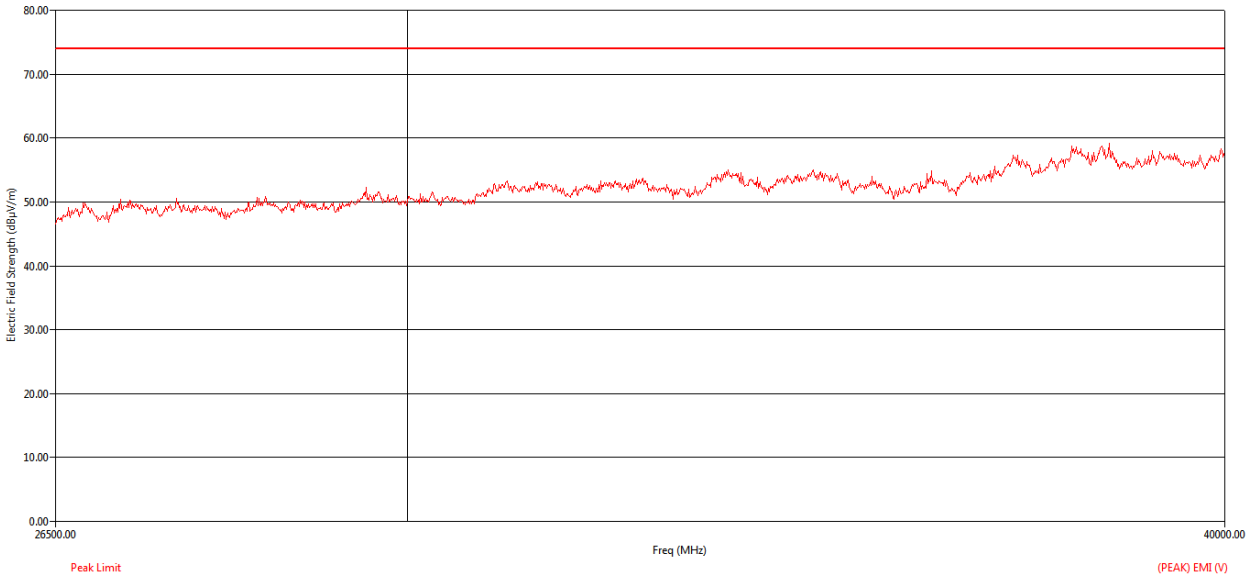

Figure 87 : Peak RE from 26.5GHz to 40GHz - Vertical polarization

5.3.2.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 5 MHZ MODULATION BANDWIDTH

5.3.2.7.1 LOW CHANNEL_5155 MHZ

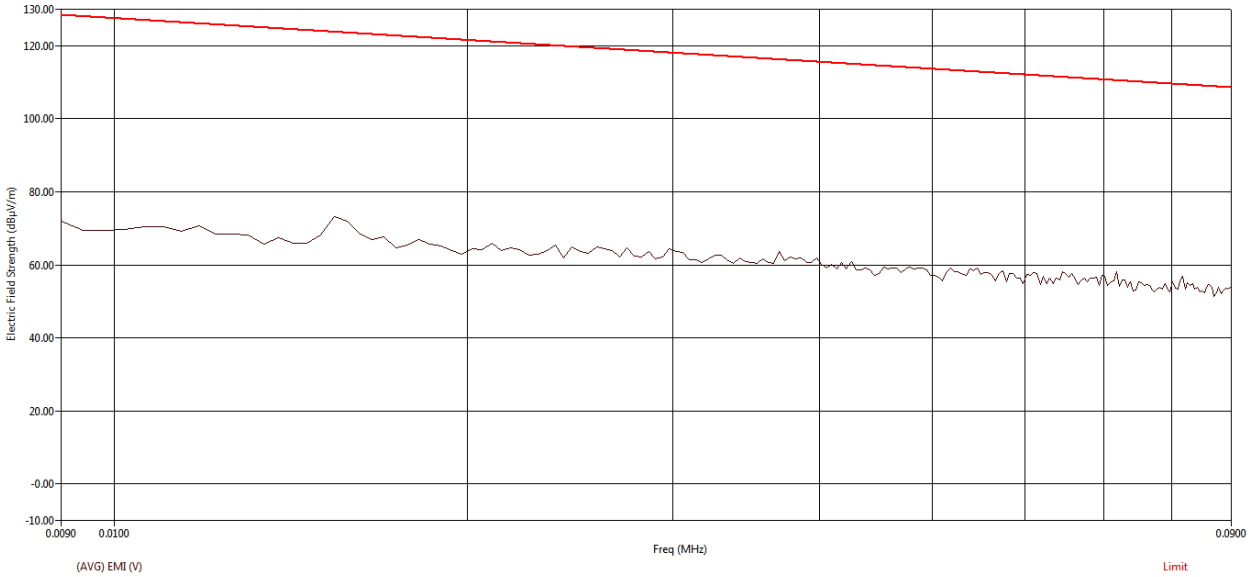

Figure 88: Average RE from 9 kHz to 90 kHz - Parallel

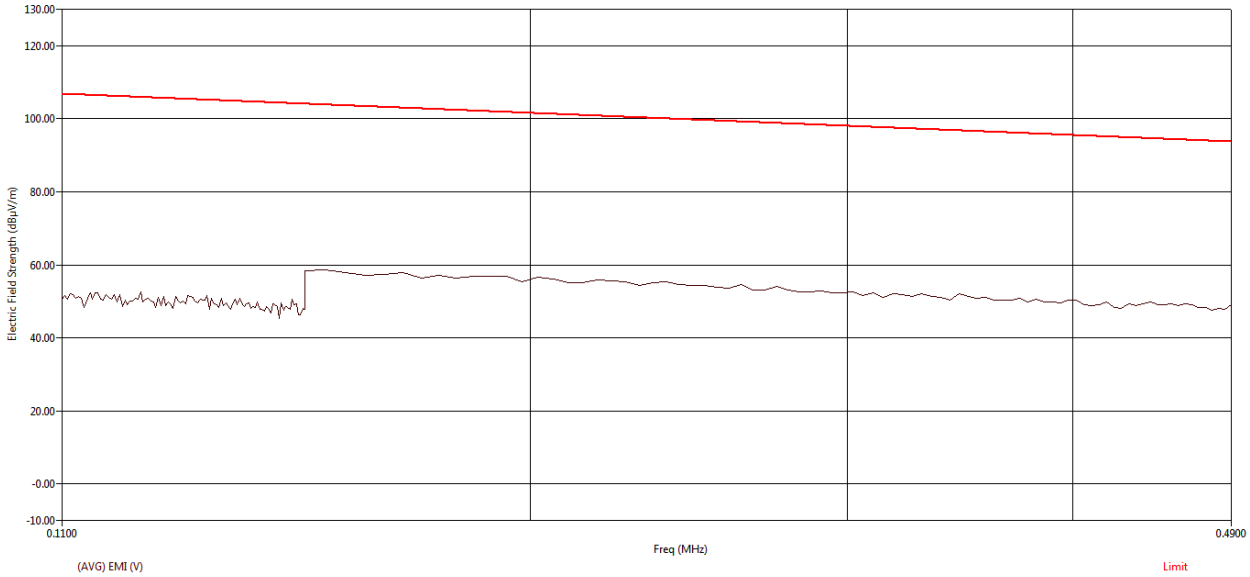

Figure 89: Average RE from 110 kHz to 490 kHz - Parallel

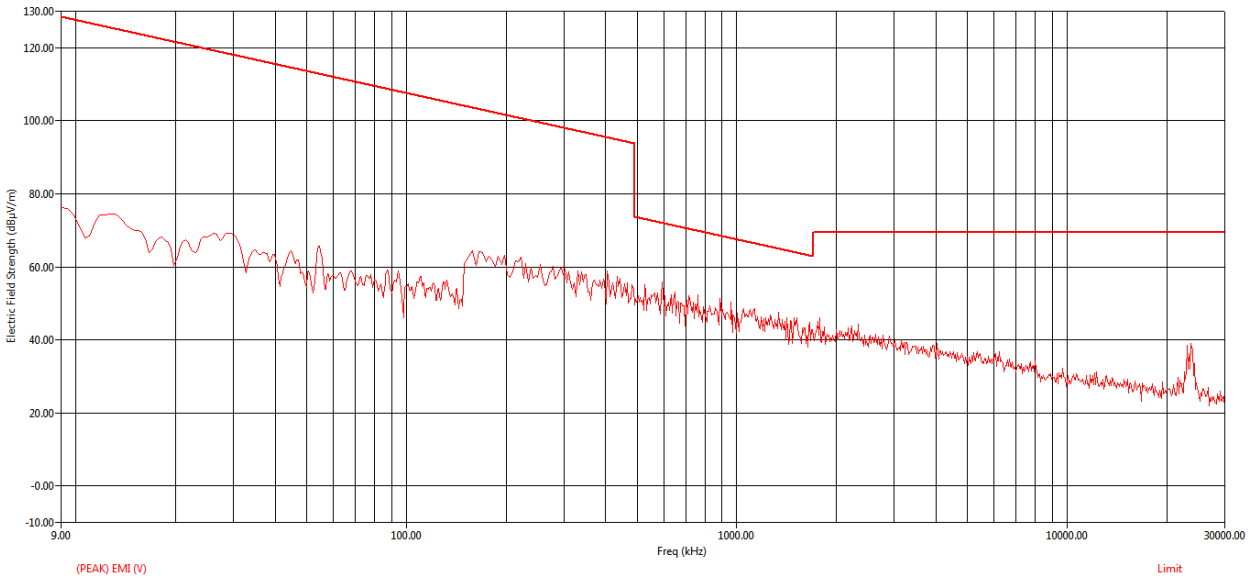

Figure 90: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	12.65	1.68	16.81	31.14	69.54	-38.40
23.50	23.48	V	10.11	1.71	16.78	28.58	69.54	-40.97

Table 22: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

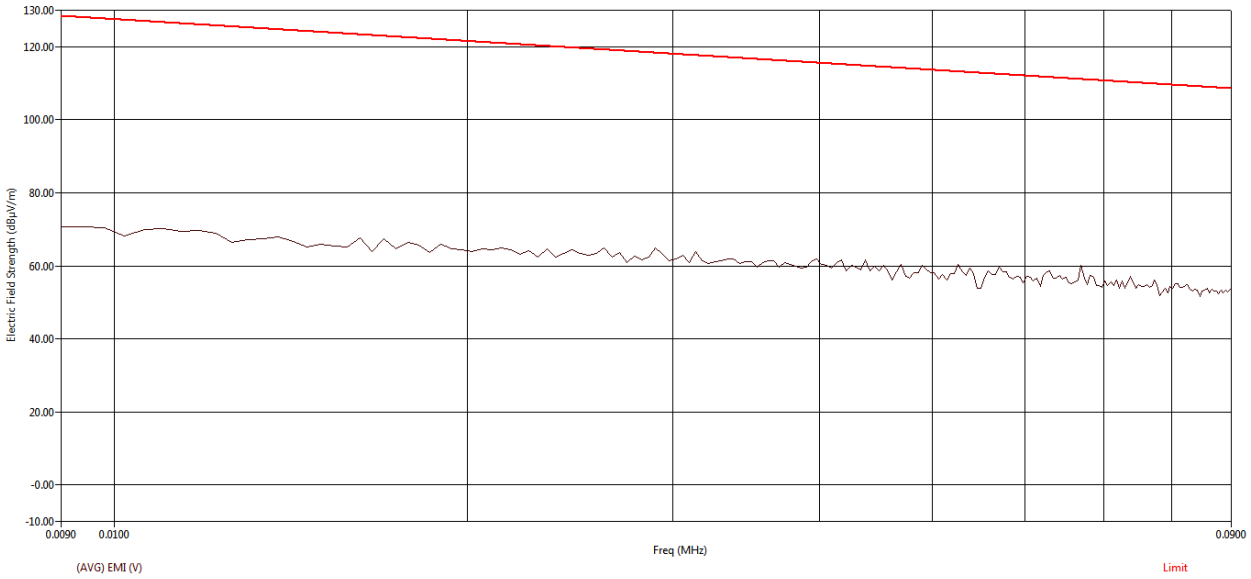

Figure 91: Average RE from 9 kHz to 90 kHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

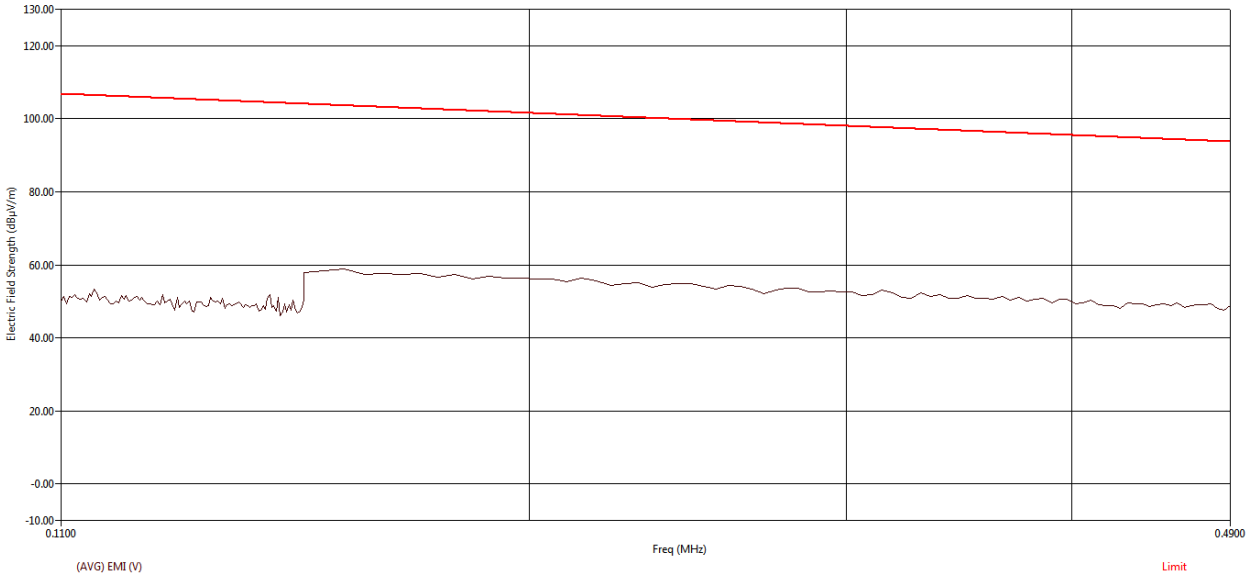

Figure 92: Average RE from 110 kHz to 490 kHz - Perpendicular

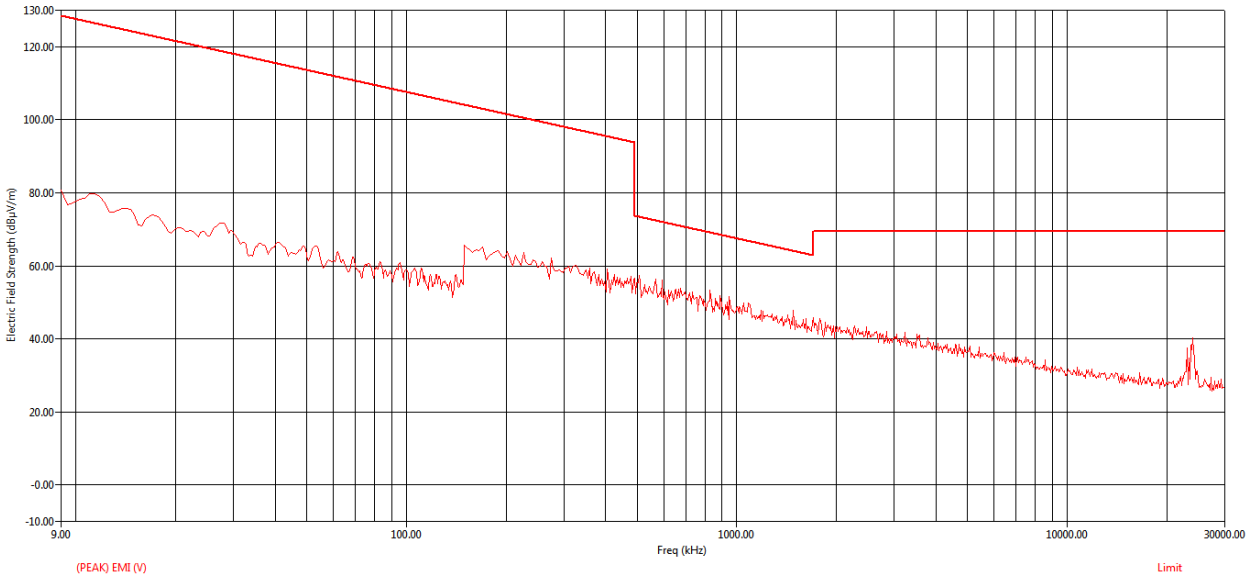

Figure 93:Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.80	23.80	V	10.65	1.68	16.81	29.14	69.54	-40.40
24.10	24.10	V	11.11	1.71	16.75	29.58	69.54	-39.97

Table 23: Quasi Peak table for RE from 9 kHz to 30MHz – Perpendicular

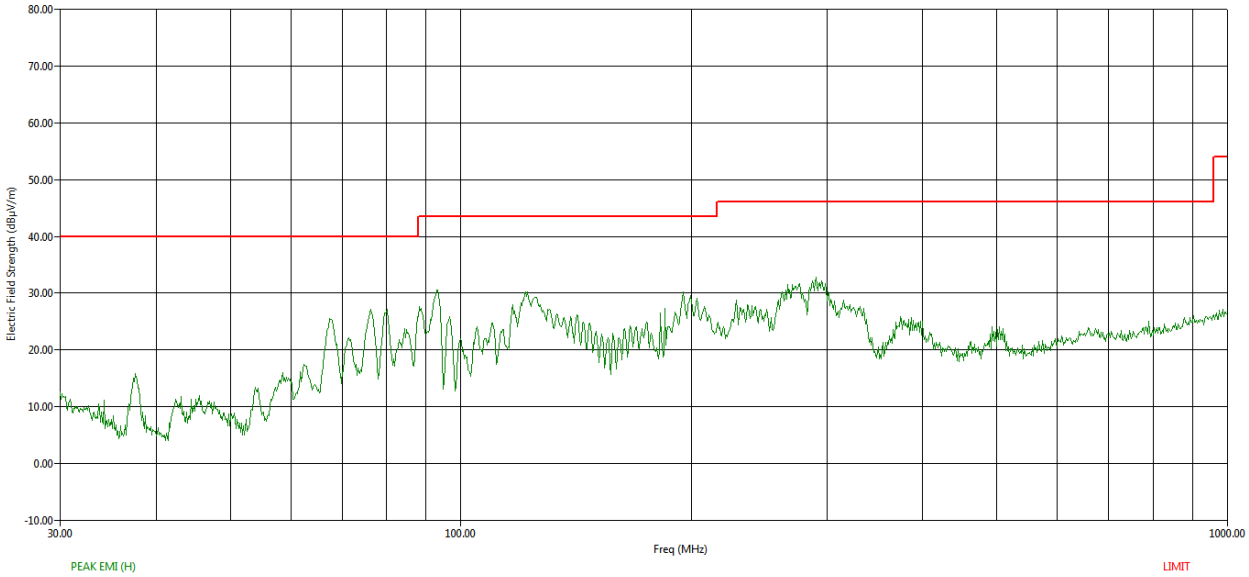

Figure 94: Peak RE from 30MHz to 1GHz - Horizontal polarization

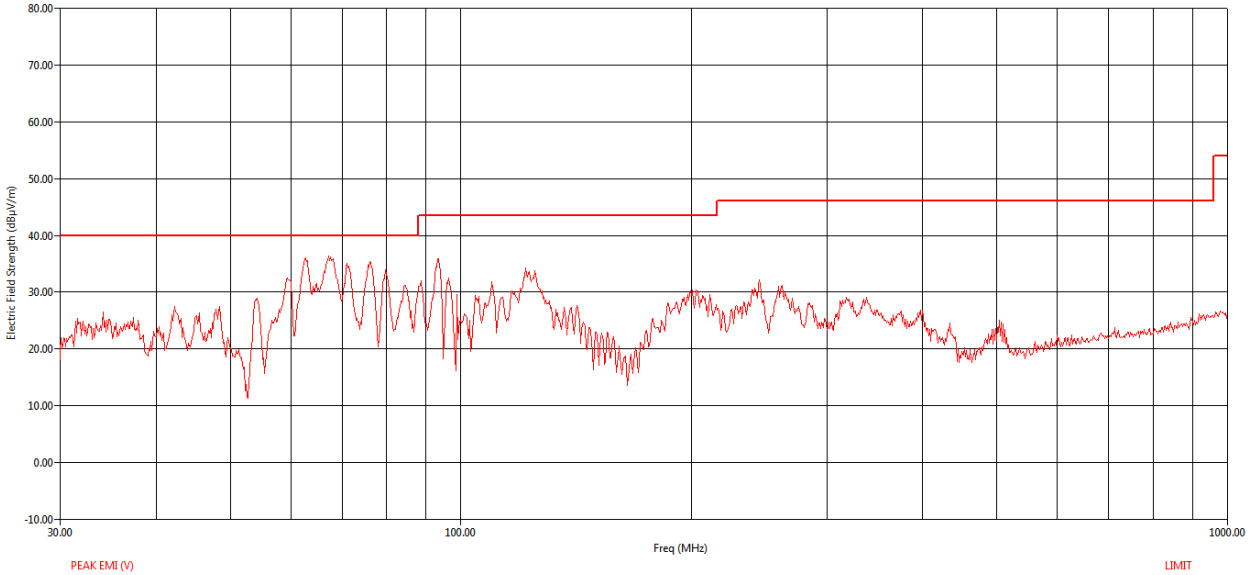

Figure 95: Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
59.32	59.38	V	180.00	273.00	42.01	1.75	9.48	32.18	21.07	40.00	-18.93
67.20	67.28	V	333.30	102.00	53.76	1.91	9.49	32.16	32.99	40.00	-7.01
76.16	76.08	V	301.40	175.00	55.84	1.99	9.18	32.14	34.88	40.00	-5.12
79.80	79.84	V	300.70	358.00	50.83	2.05	8.99	32.13	29.74	40.00	-10.26
93.24	93.31	H	98.30	140.00	48.04	2.22	9.06	32.11	27.21	43.52	-16.31
121.56	121.60	H	312.30	161.00	48.65	2.50	11.45	32.07	30.53	43.52	-12.99
290.36	290.26	H	179.90	100.00	40.67	3.80	14.03	31.91	26.59	46.02	-19.43

Table 24: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

This report should always be reproduced in full. Any extracts of this report is invalid.

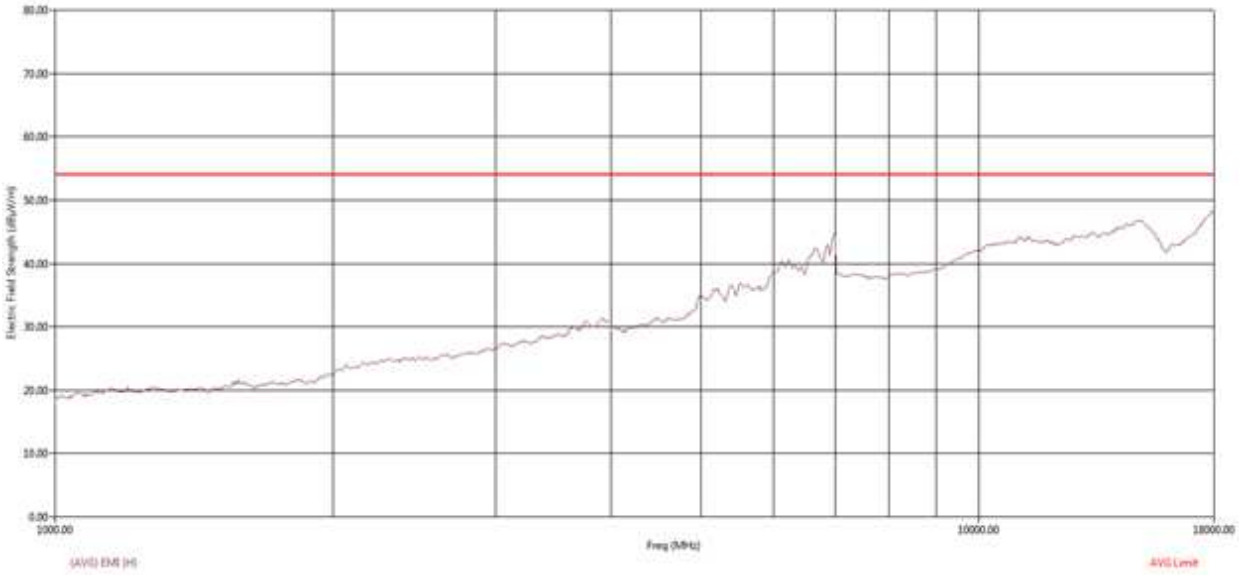

Figure 96: Average RE from 1GHz to 18GHz - Horizontal polarization

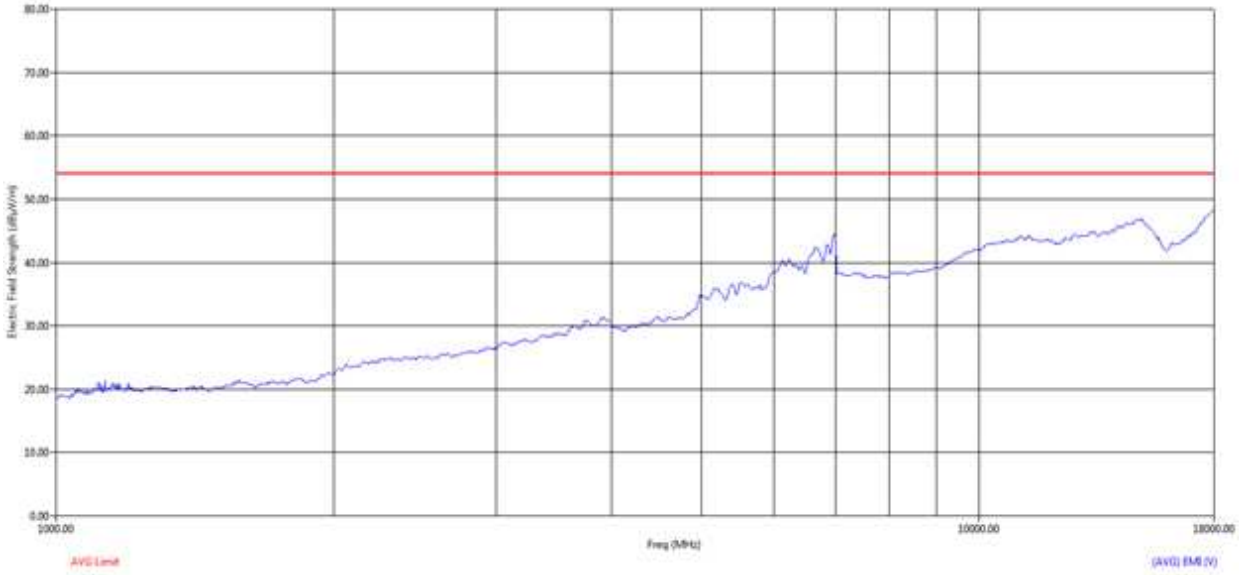

Figure 97: Average RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

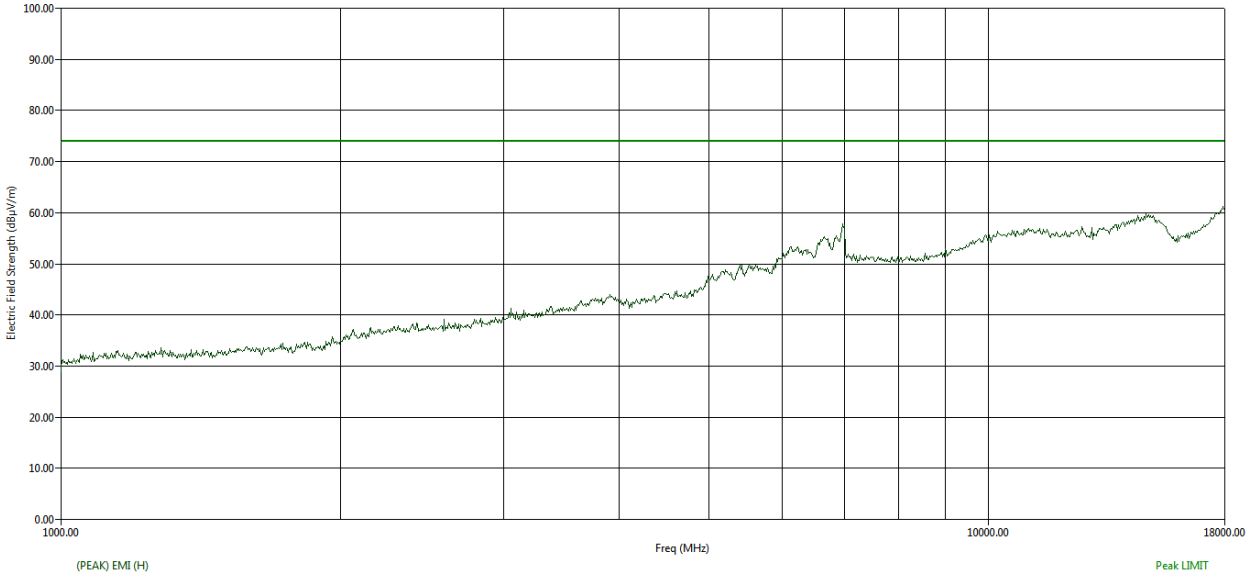

Figure 98: Peak RE from 1GHz to 18GHz - Horizontal polarization

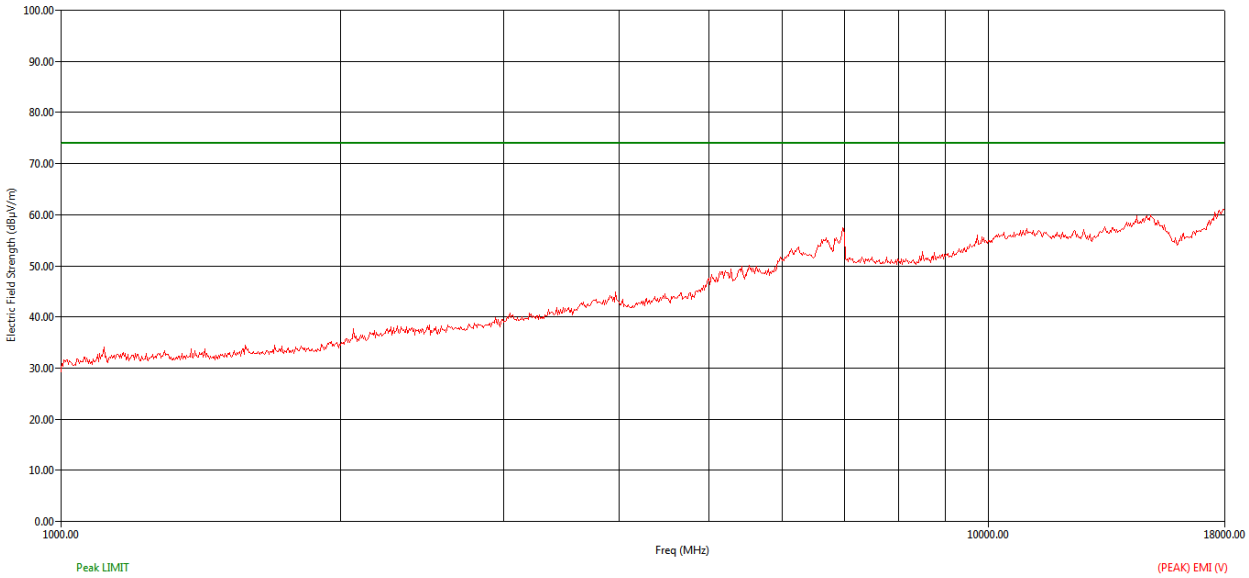

Figure 99 : Peak RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

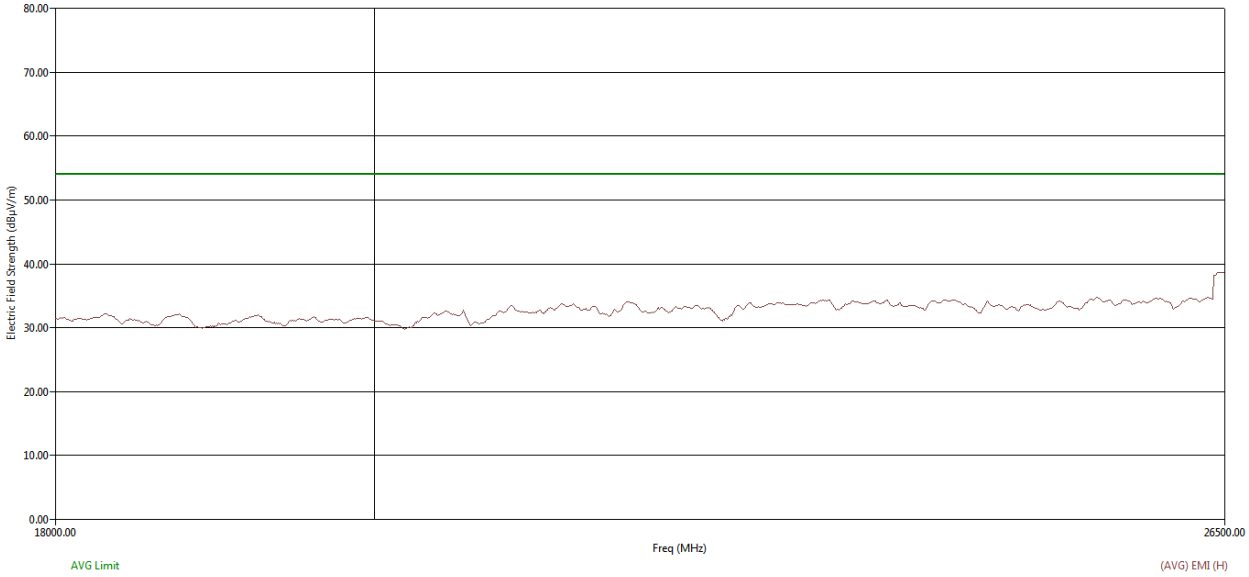

Figure 100: Average RE from 18GHz to 26.5GHz - Horizontal polarization

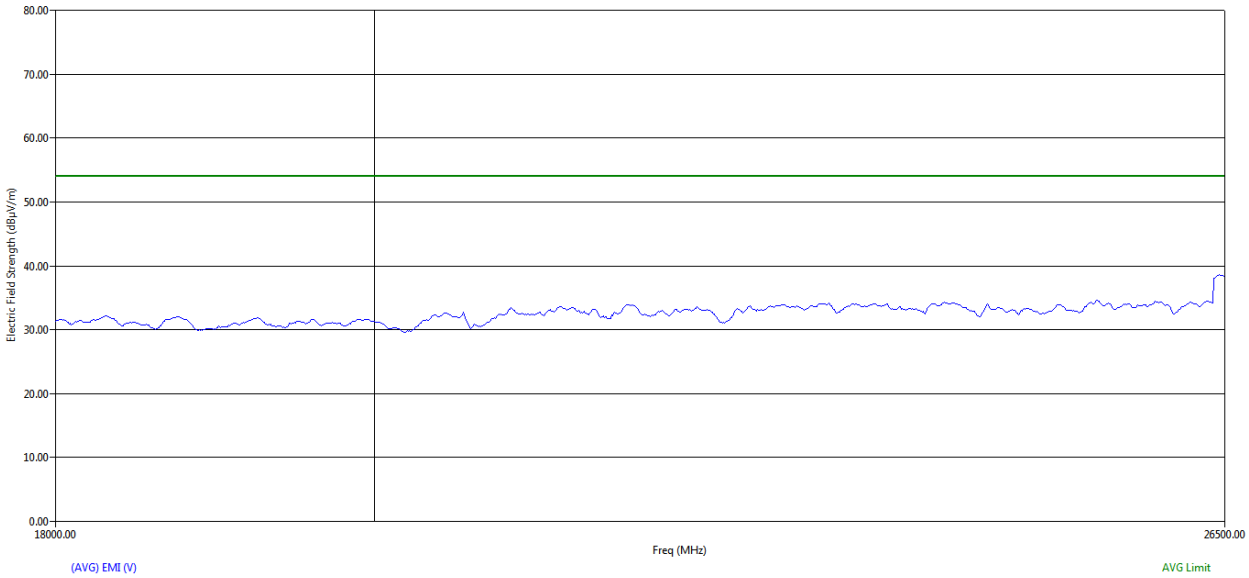

Figure 101: Average RE from 18GHz to 26.5GHz - Vertical polarization

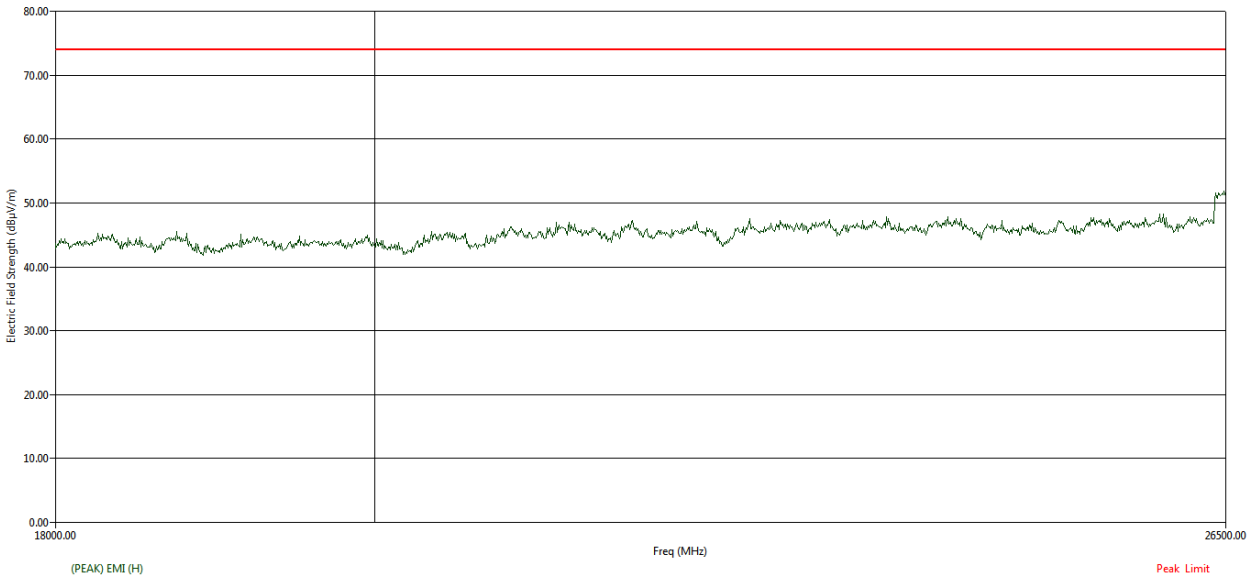

Figure 102: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

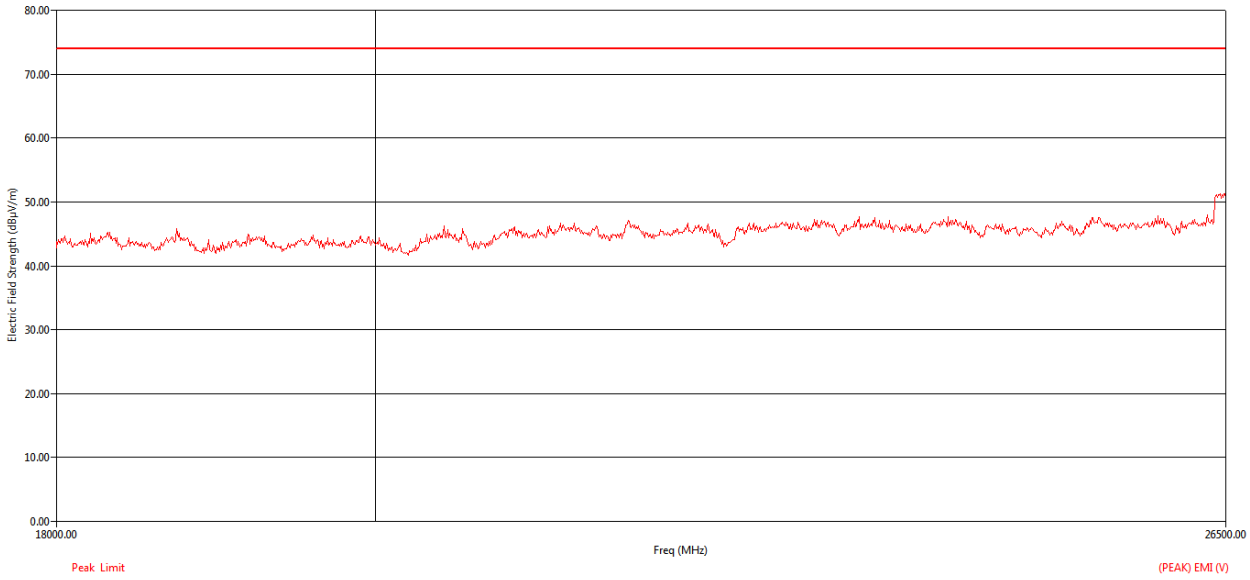

Figure 103: Peak RE from 18GHz to 26.5GHz - Vertical polarization

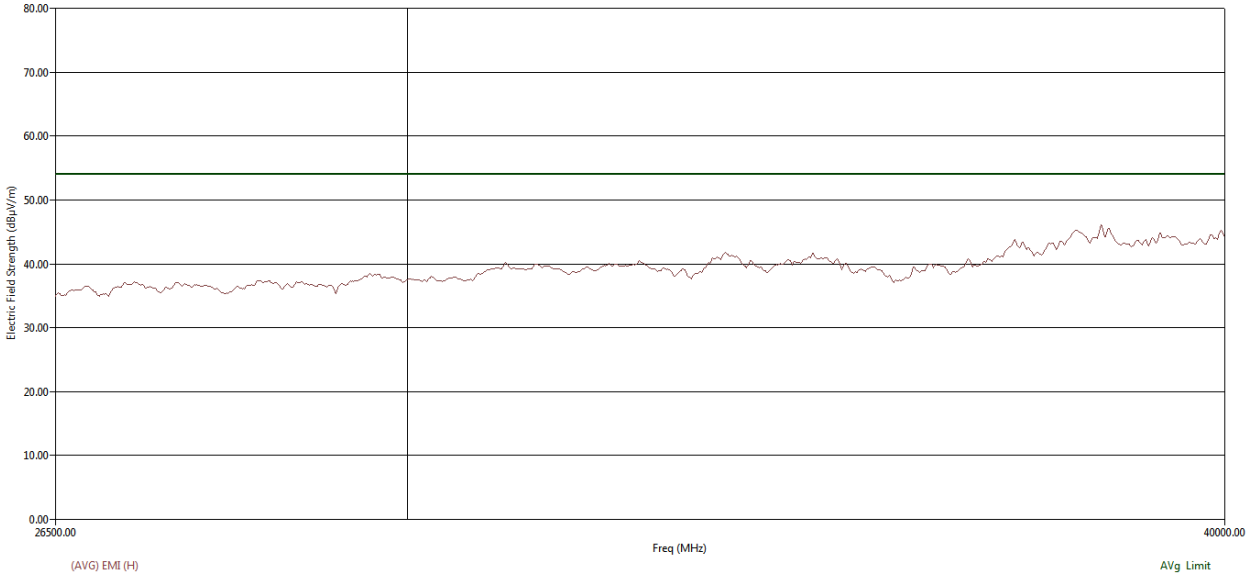

Figure 104: Average RE from 26.5GHz to 40GHz - Horizontal polarization

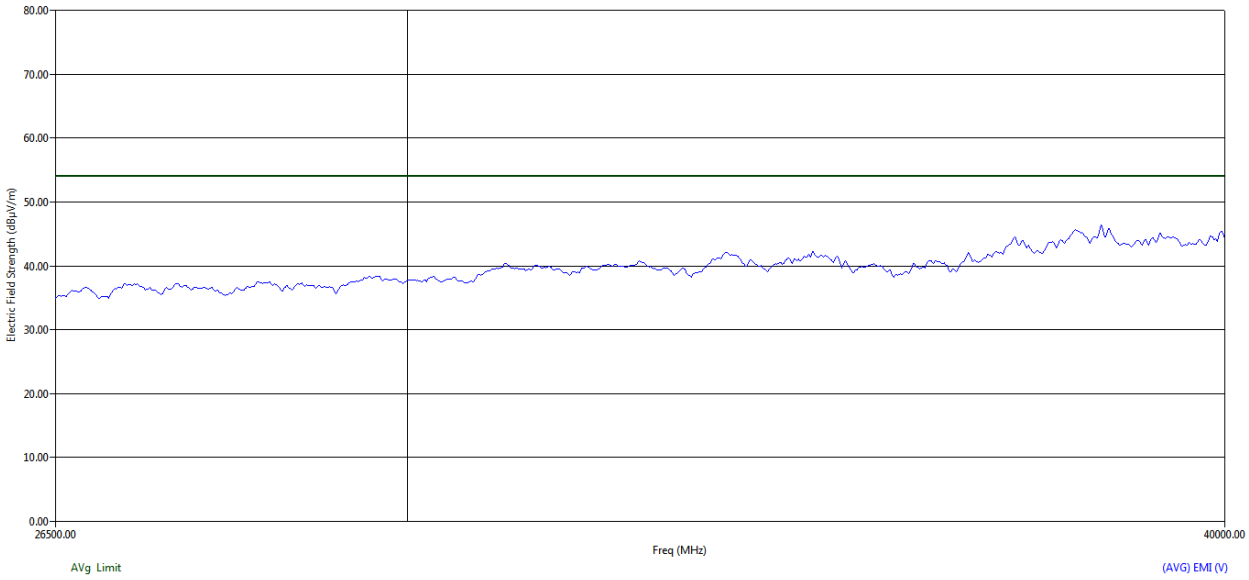

Figure 105: Average RE from 26.5GHz to 40GHz - Vertical polarization

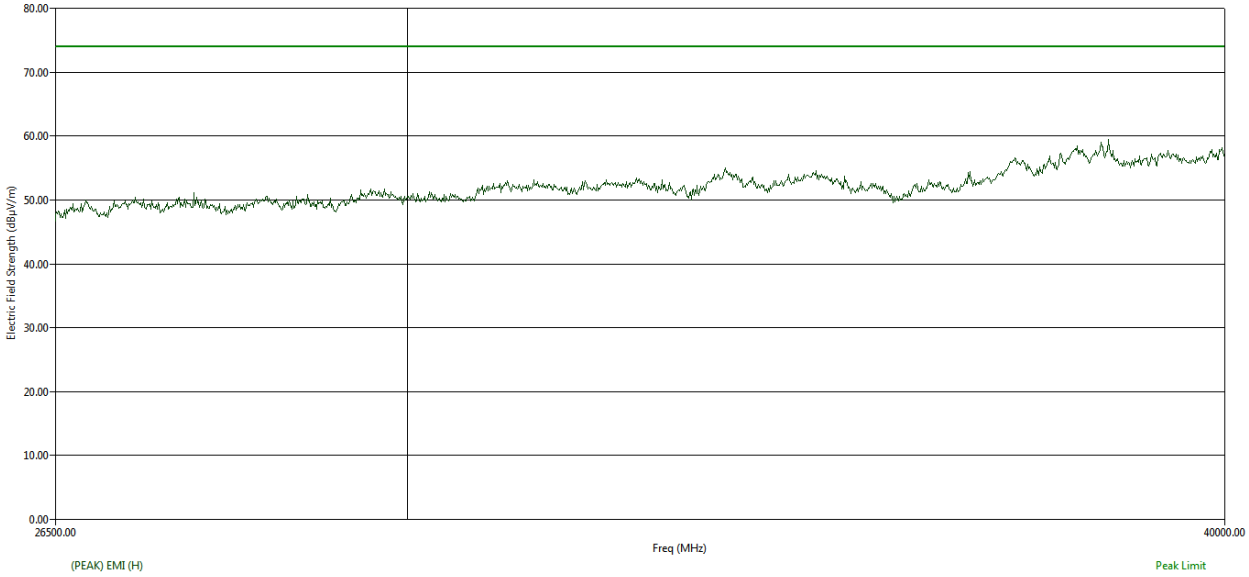

Figure 106: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

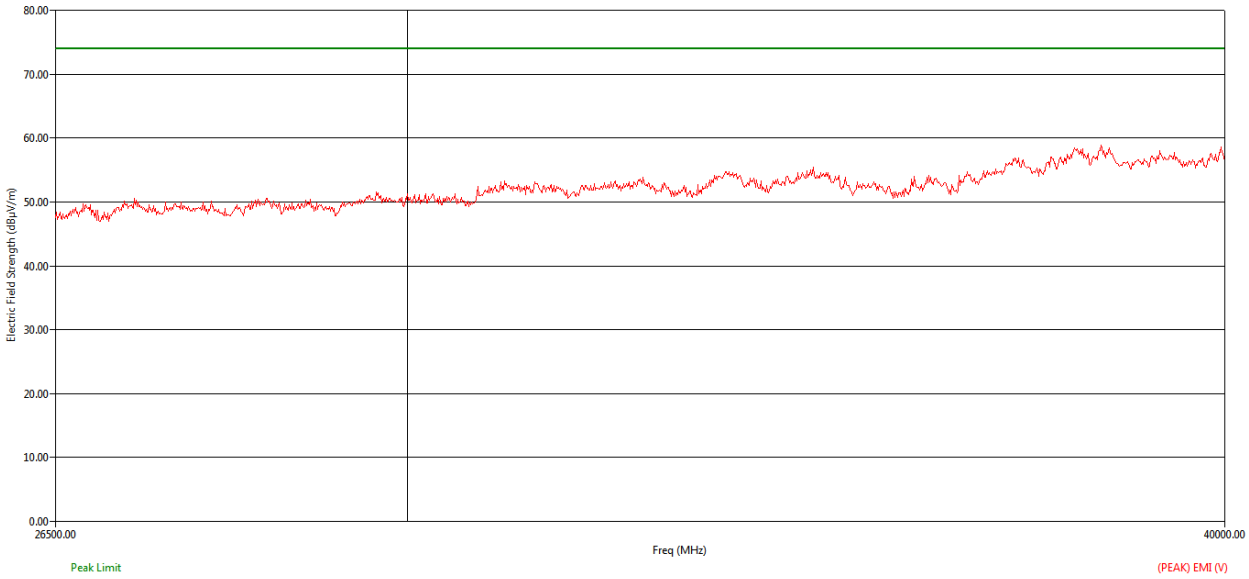

Figure 107: Peak RE from 26.5GHz to 40GHz - Vertical polarization

5.3.2.7.2 MID CHANNEL_5200 MHZ

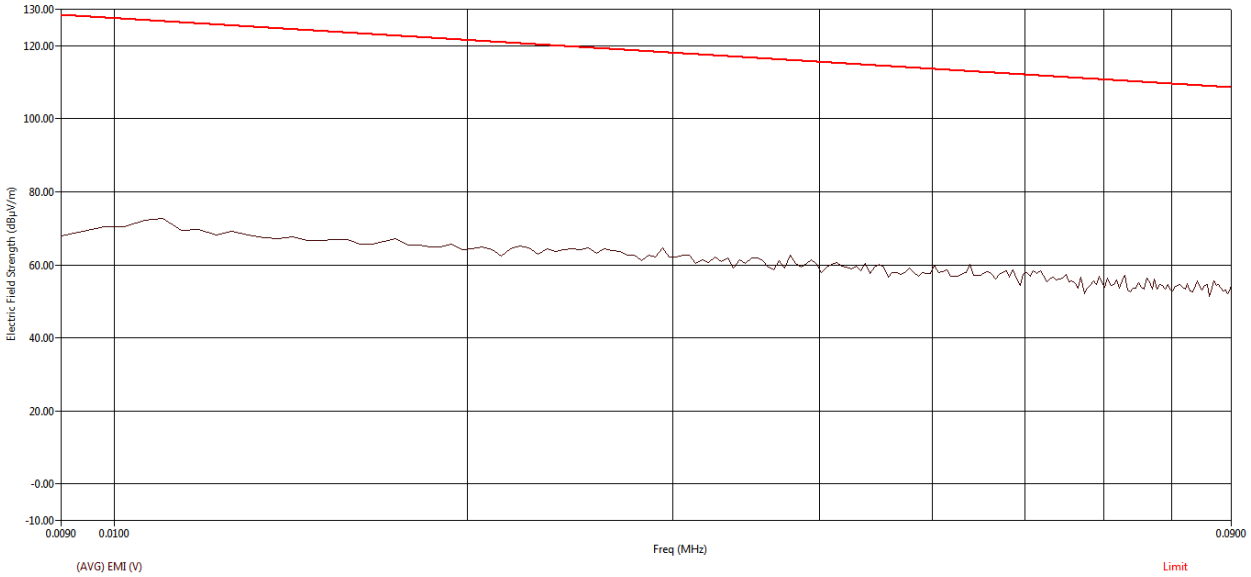

Figure 108: Average RE from 9 kHz to 90 kHz - Parallel

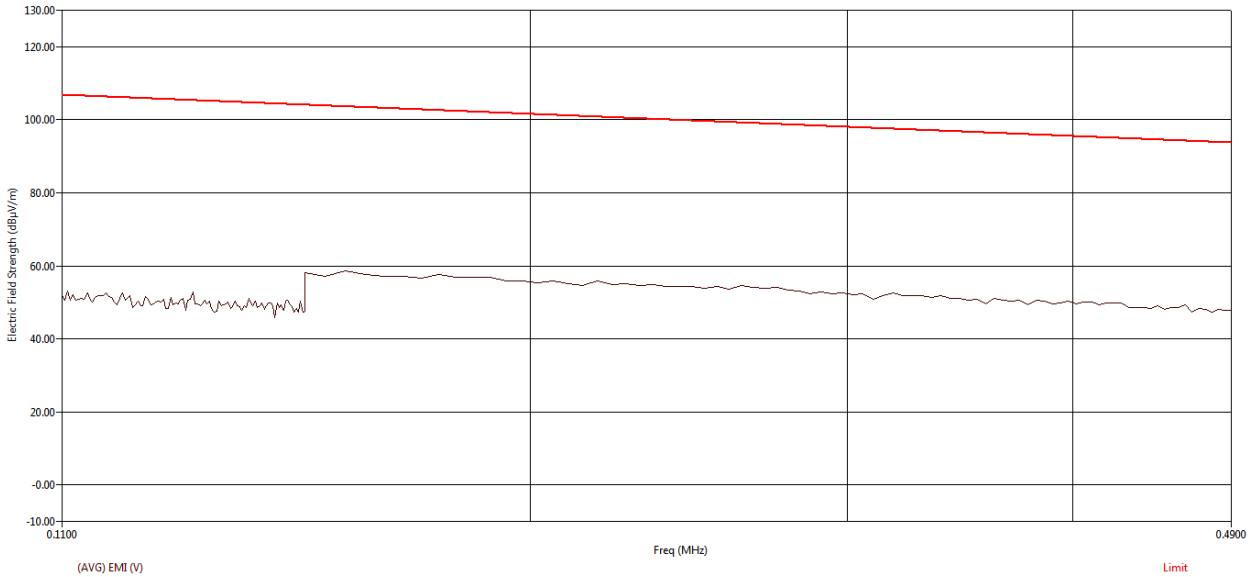

Figure 109: Average RE from 110 kHz to 490 kHz - Parallel

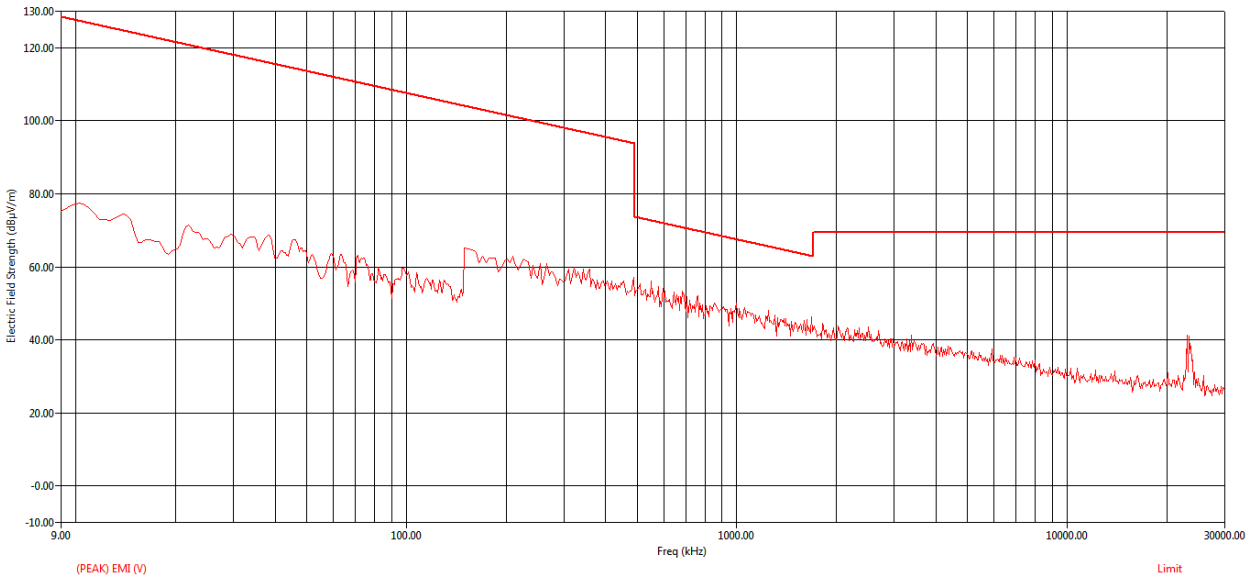

Figure 110: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.25	23.23	V	9.28	1.68	16.81	27.77	69.54	-39.78
23.95	23.80	V	8.08	1.72	16.73	26.54	69.54	-43.00

Table 25: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

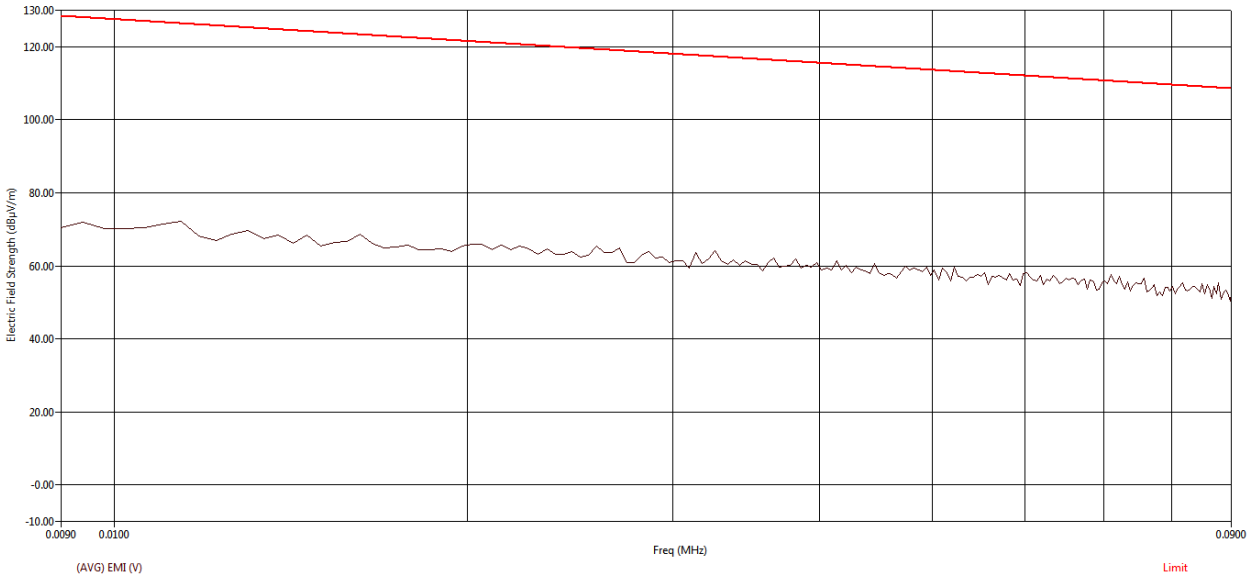

Figure 111: Average RE from 9 kHz to 90 kHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

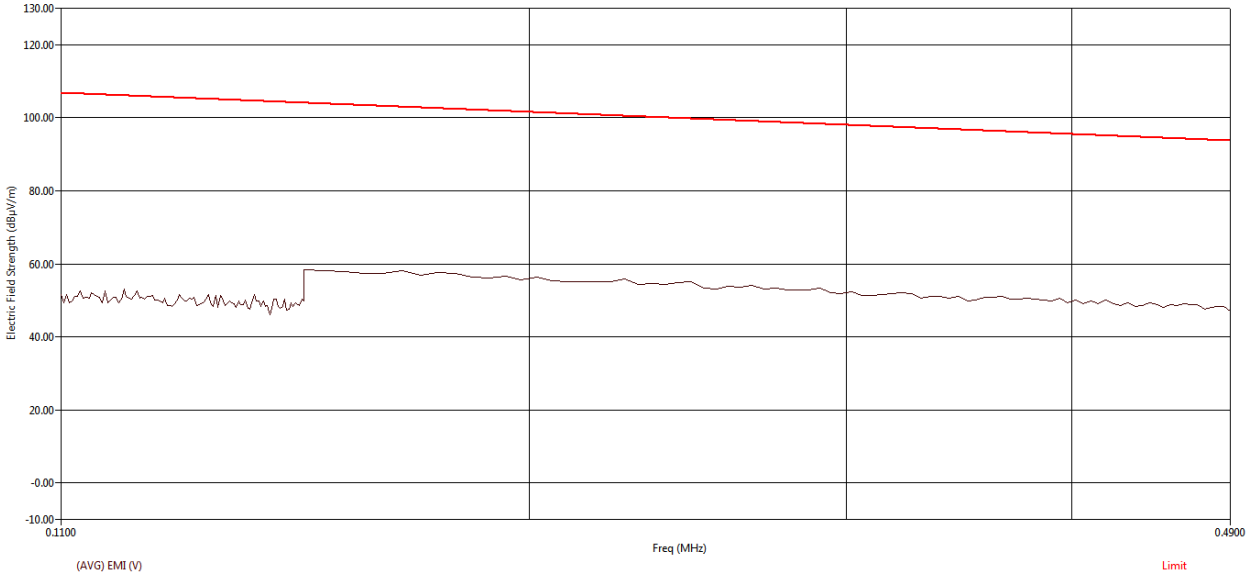

Figure 112: Average RE from 110 kHz to 490 kHz - Perpendicular

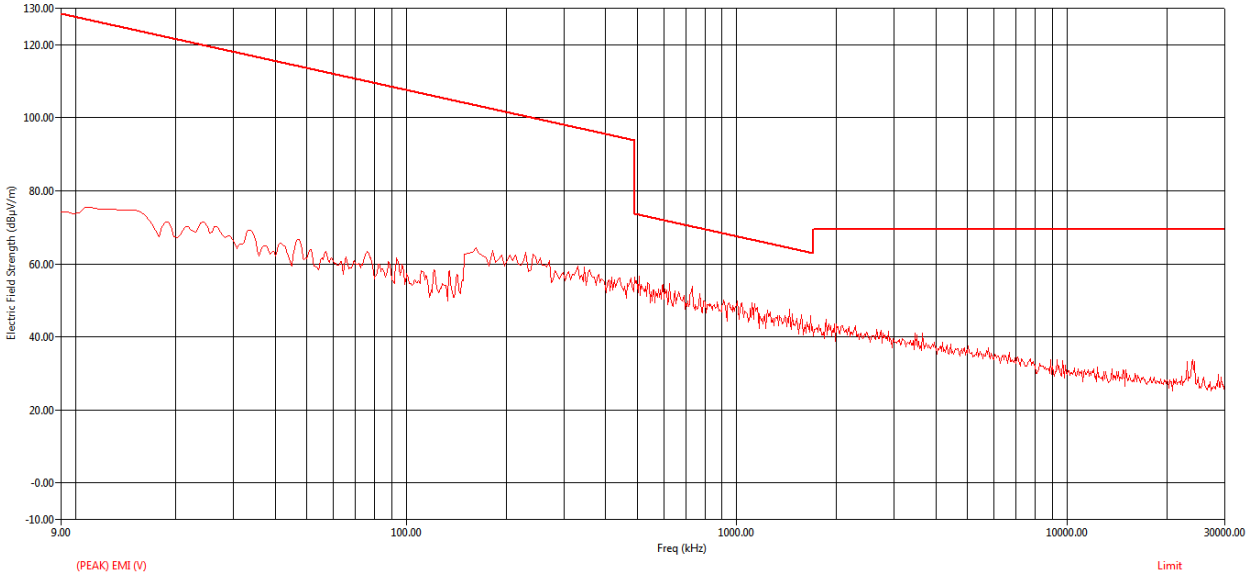

Figure 113: Peak RE from 9 kHz to 30MHz-Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	12.41	1.68	16.81	30.90	69.54	-38.64
23.80	23.80	V	10.18	1.63	16.89	28.70	69.54	-40.85

Table 26: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

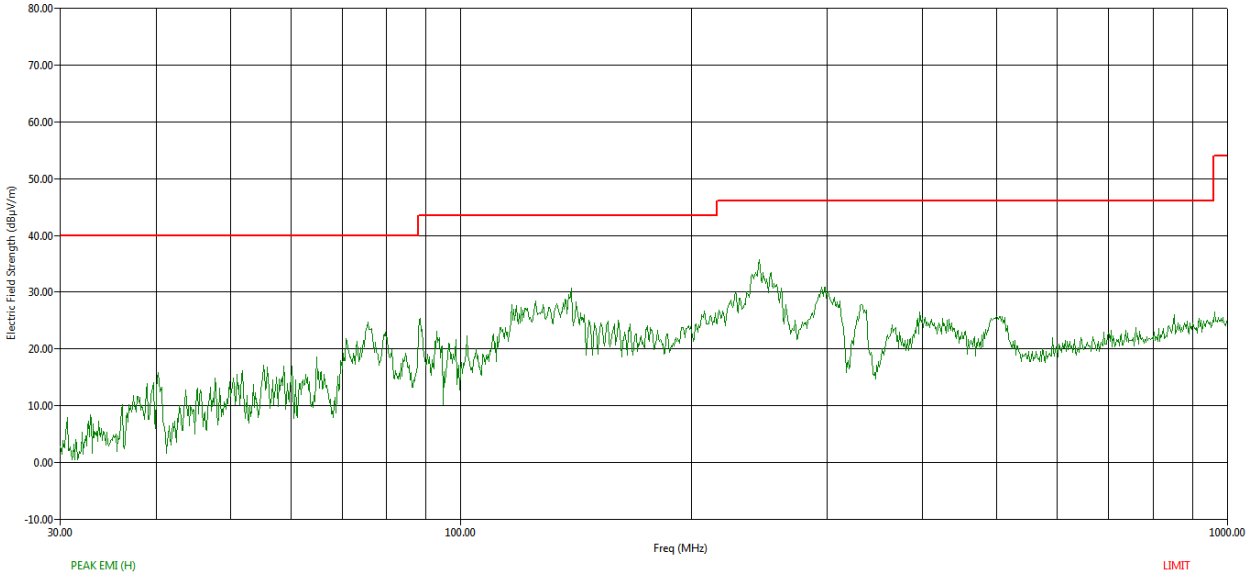

Figure 114: Peak RE from 30MHz to 1GHz - Horizontal polarization

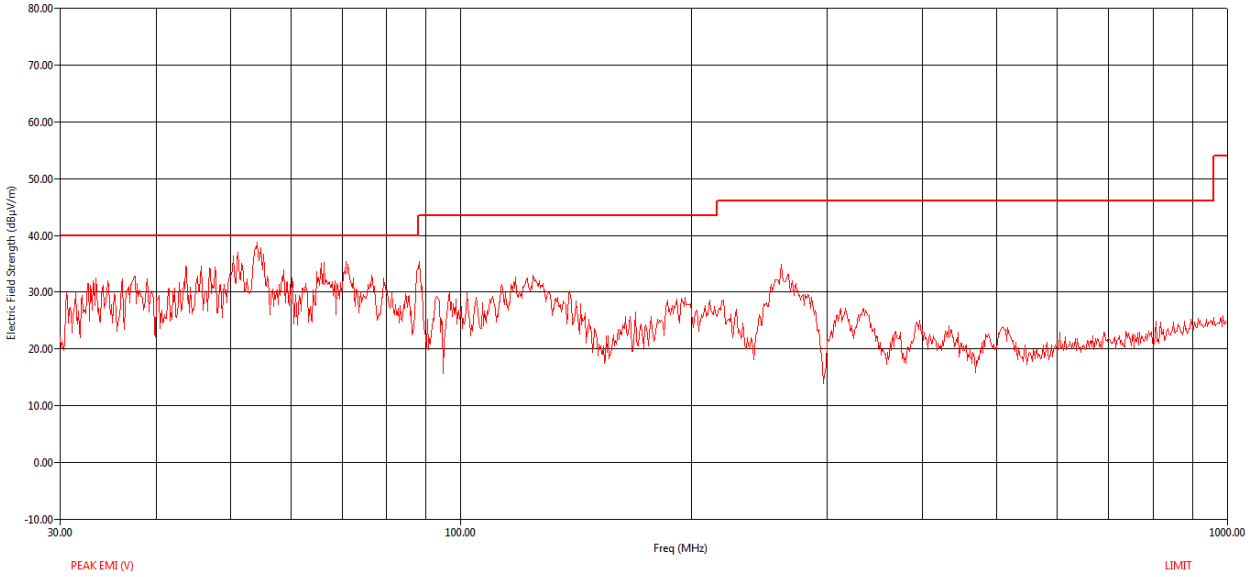

Figure 115: Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
50.48	50.43	V	48.10	100.00	58.34	1.66	10.45	32.20	38.24	40.00	-1.76
54.20	54.20	V	255.70	100.00	44.45	1.71	10.02	32.19	24.46	40.00	-15.54
55.28	55.20	V	243.50	101.00	52.62	1.71	9.91	32.19	32.06	40.00	-7.94
58.76	58.72	V	249.90	101.00	59.91	1.75	9.55	32.18	39.04	40.00	-0.96

Table 27: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

This report should always be reproduced in full. Any extracts of this report is invalid.

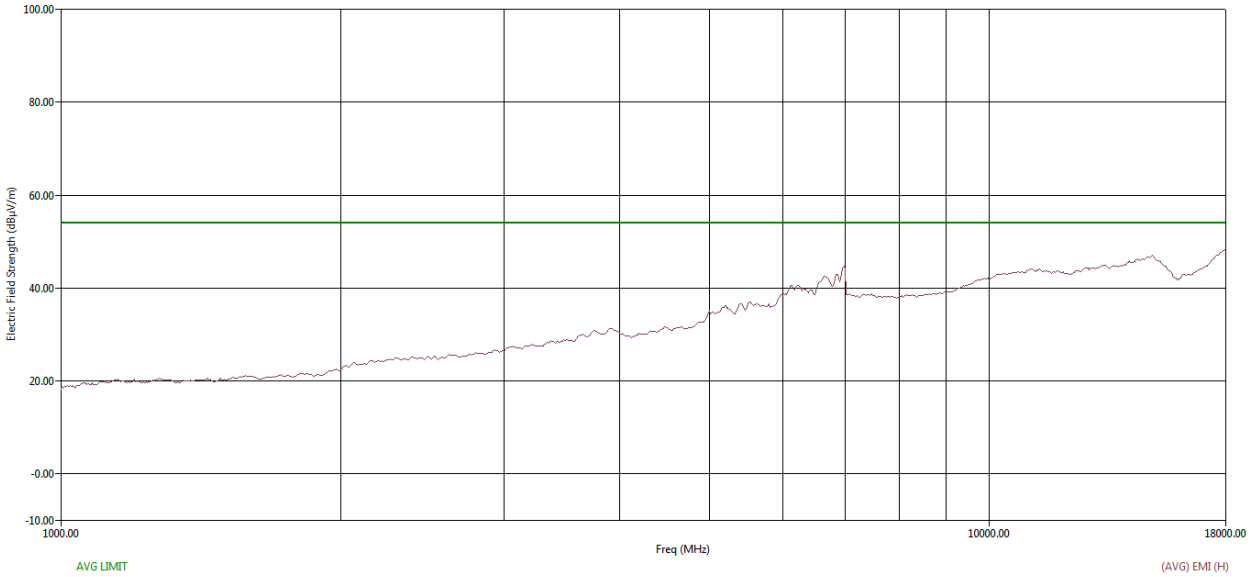

Figure 116: Average RE from 1GHz to 18GHz - Horizontal polarization

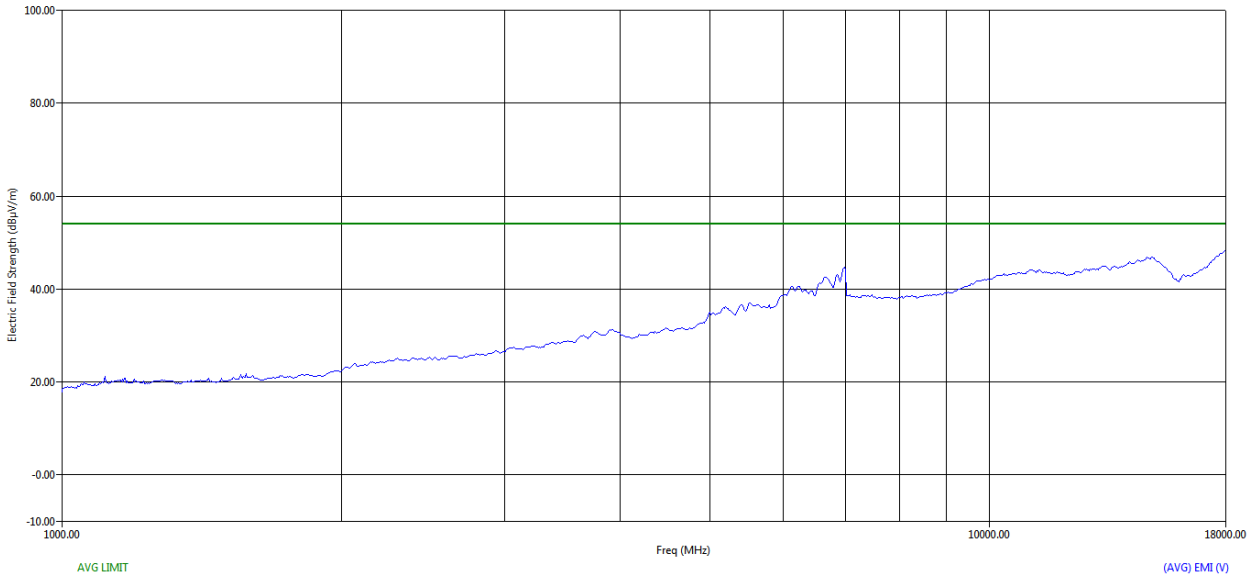

Figure 117: Average RE from 1GHz to 18GHz - Vertical polarization

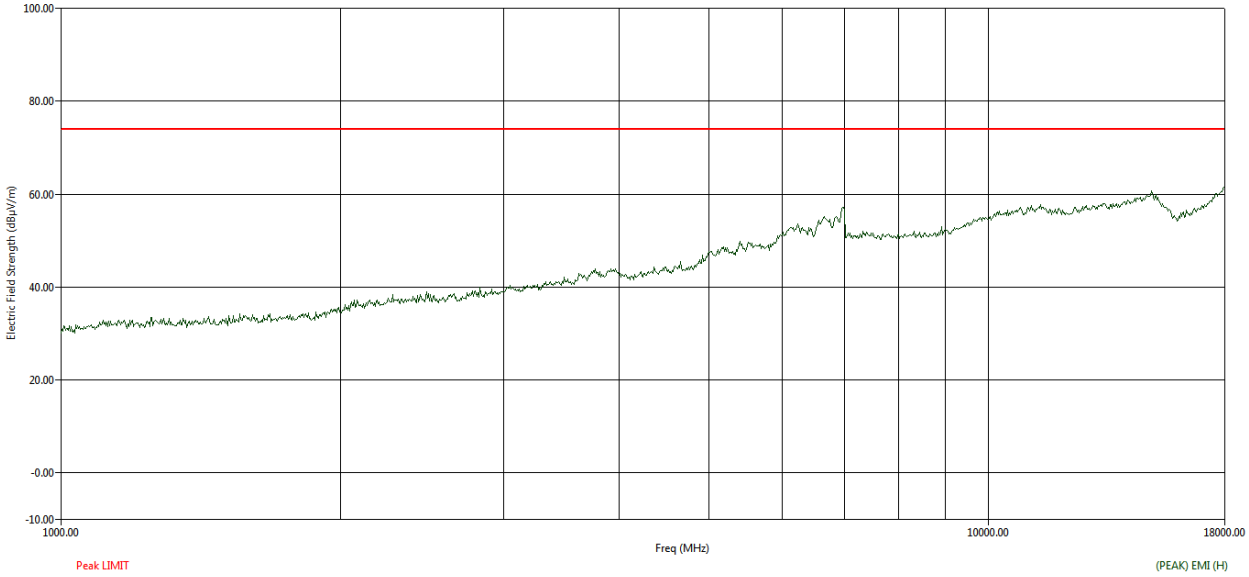

Figure 118: Peak RE from 1GHz to 18GHz - Horizontal polarization

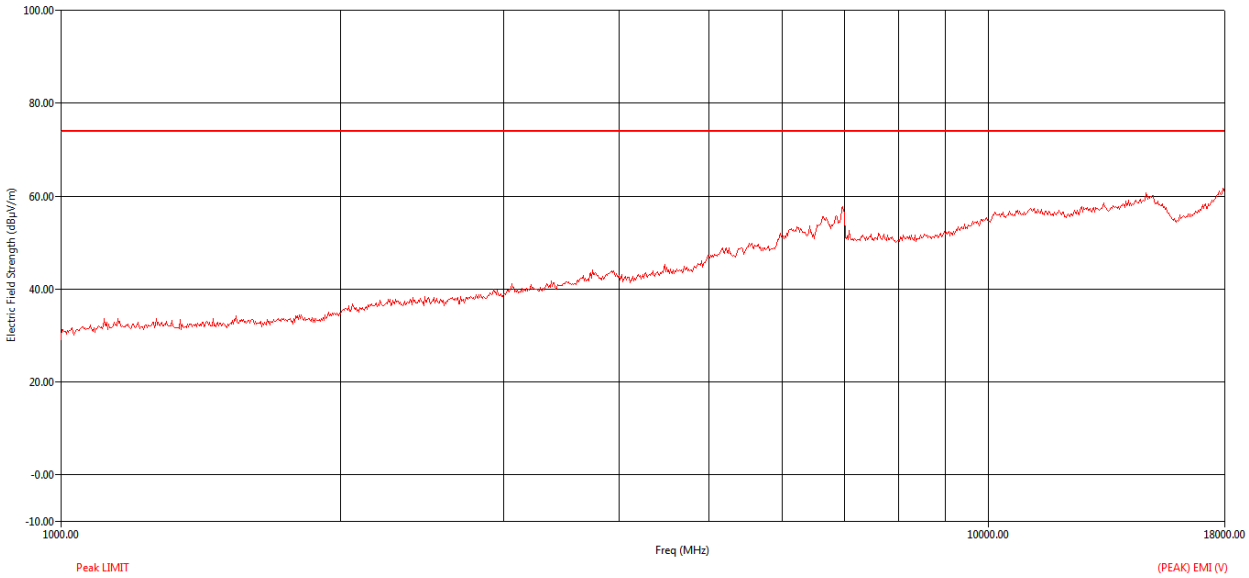

Figure 119: Peak RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

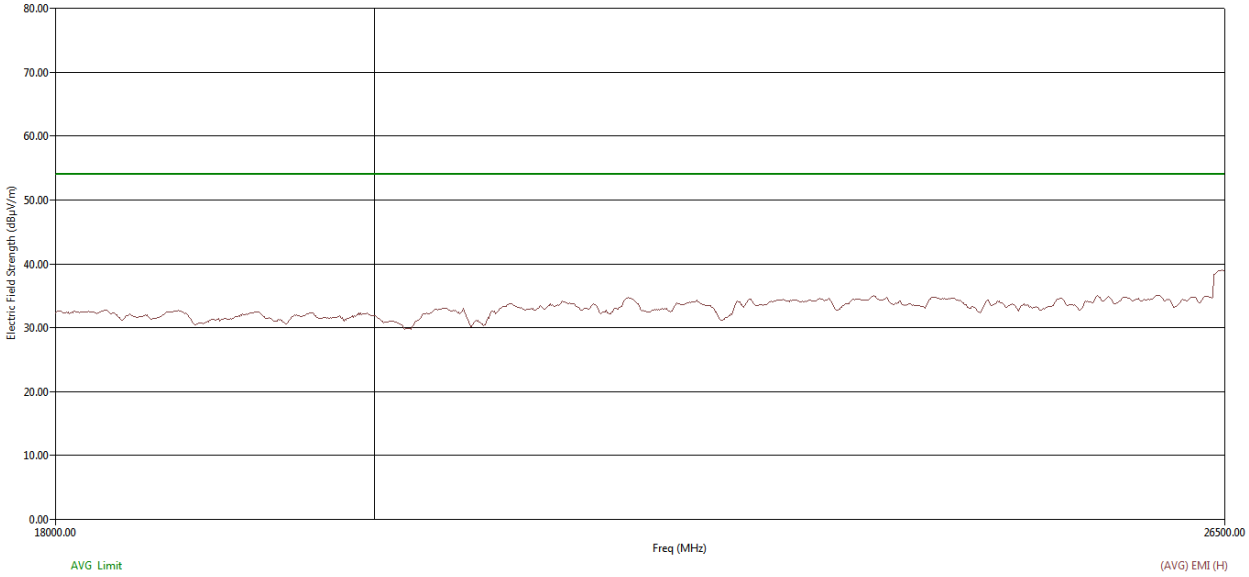

Figure 120: Average RE from 18GHz to 26.5GHz - Horizontal polarization

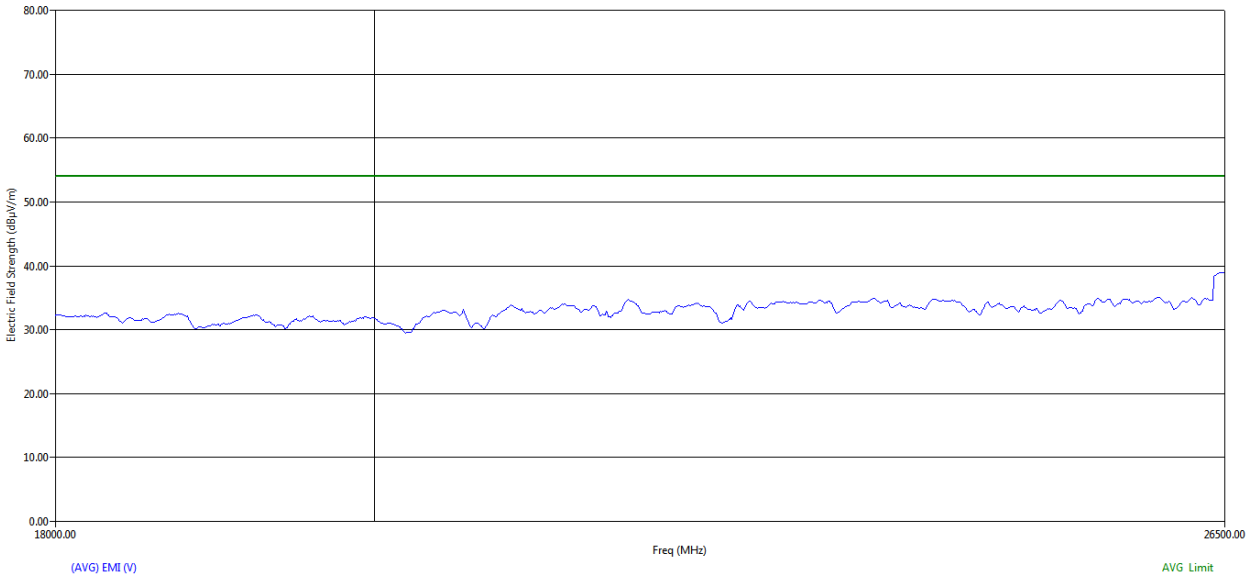

Figure 121: Average RE from 18GHz to 26.5GHz - Vertical polarization

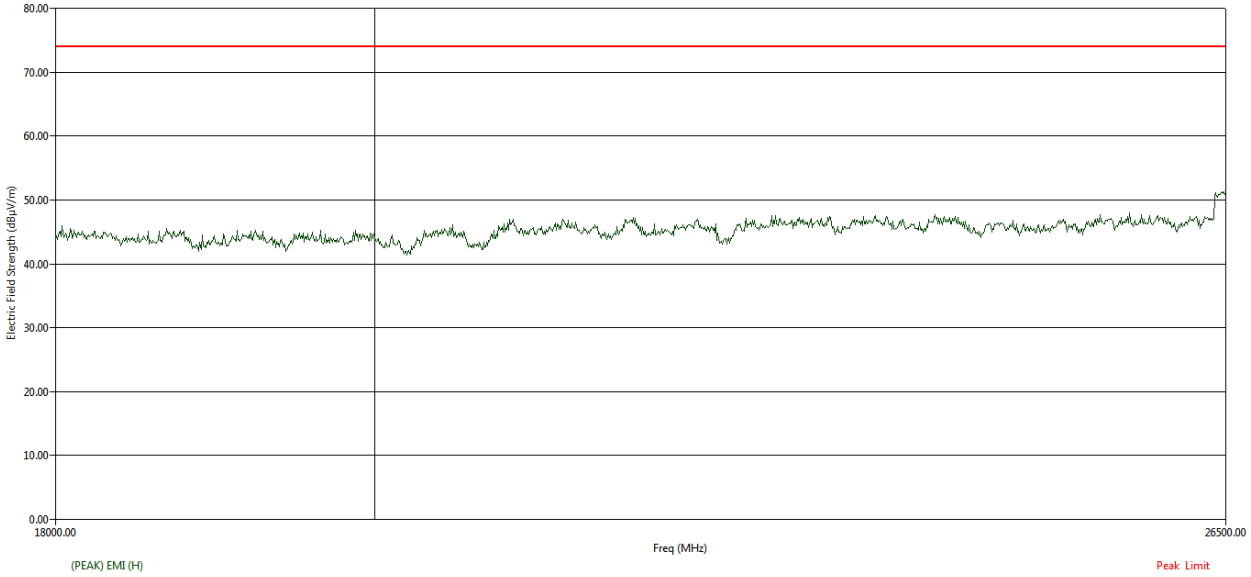

Figure 122: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

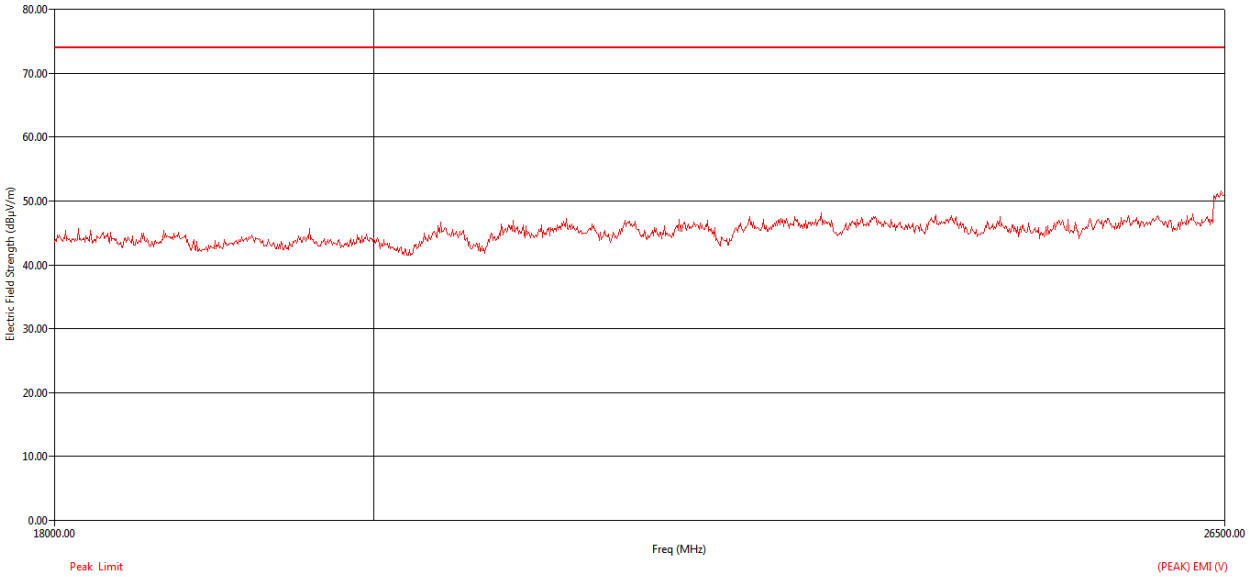

Figure 123: Peak RE from 18GHz to 26.5GHz - Vertical polarization

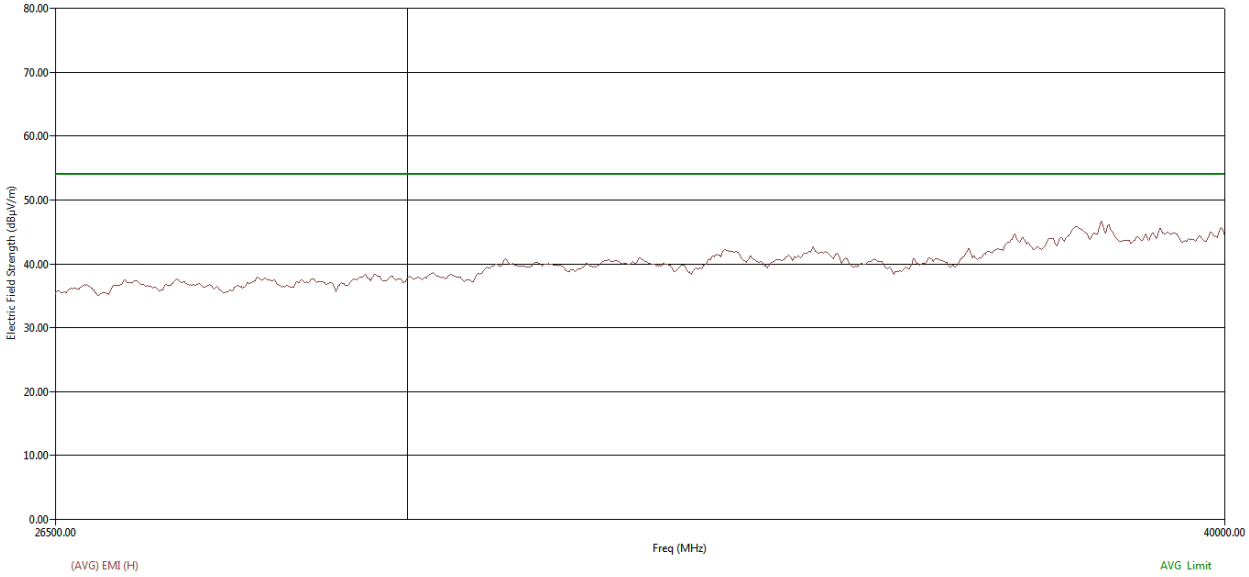

Figure 124: Average RE from 26.5GHz to 40GHz - Horizontal polarization

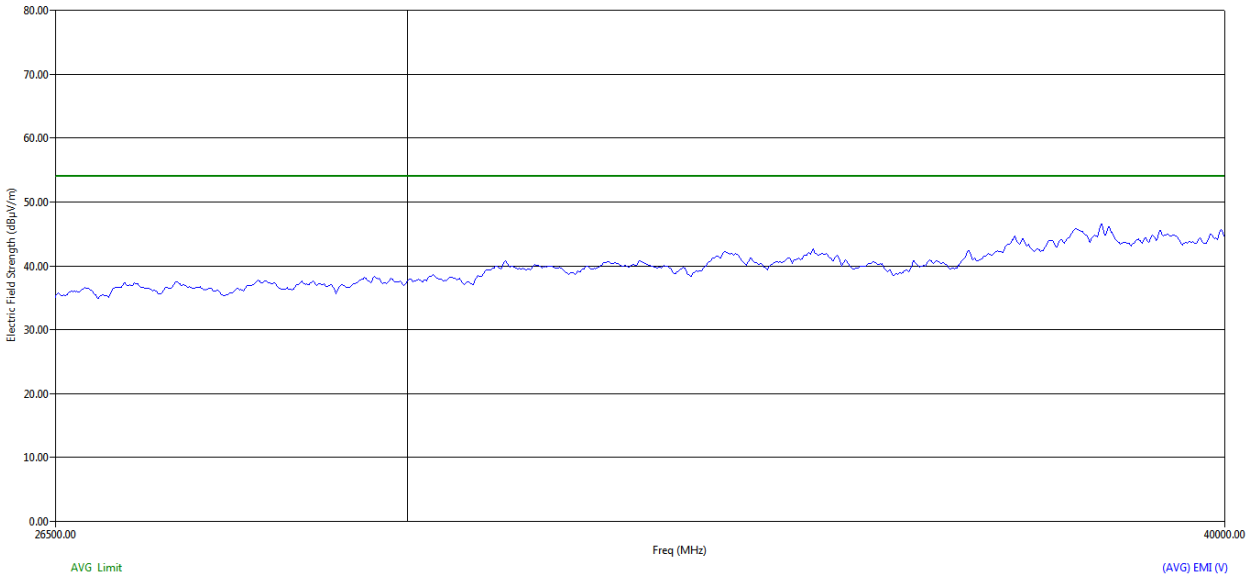

Figure 125: Average RE from 26.5GHz to 40GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

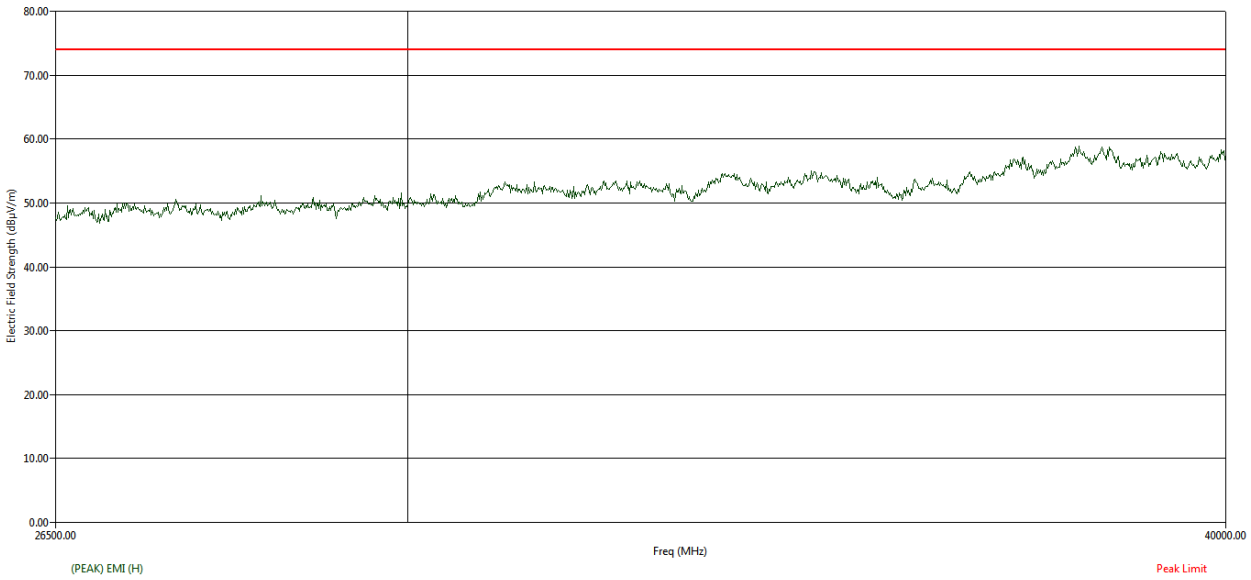

Figure 126: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

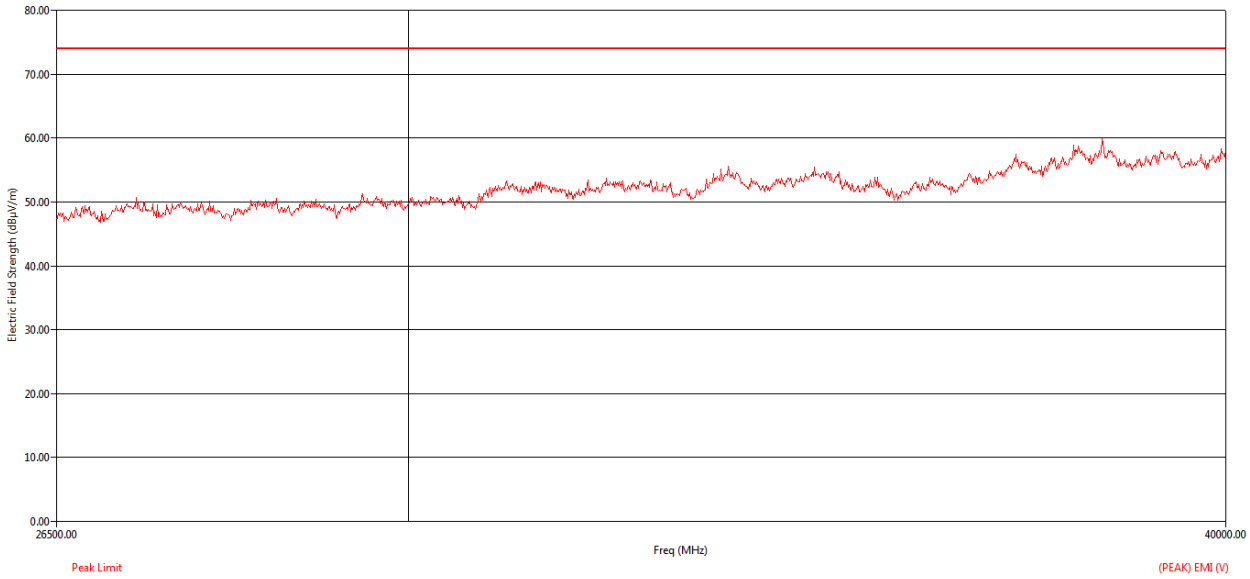

Figure 127: Peak RE from 26.5GHz to 40GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

5.3.2.7.3 HIGH CHANNEL_5245 MHZ

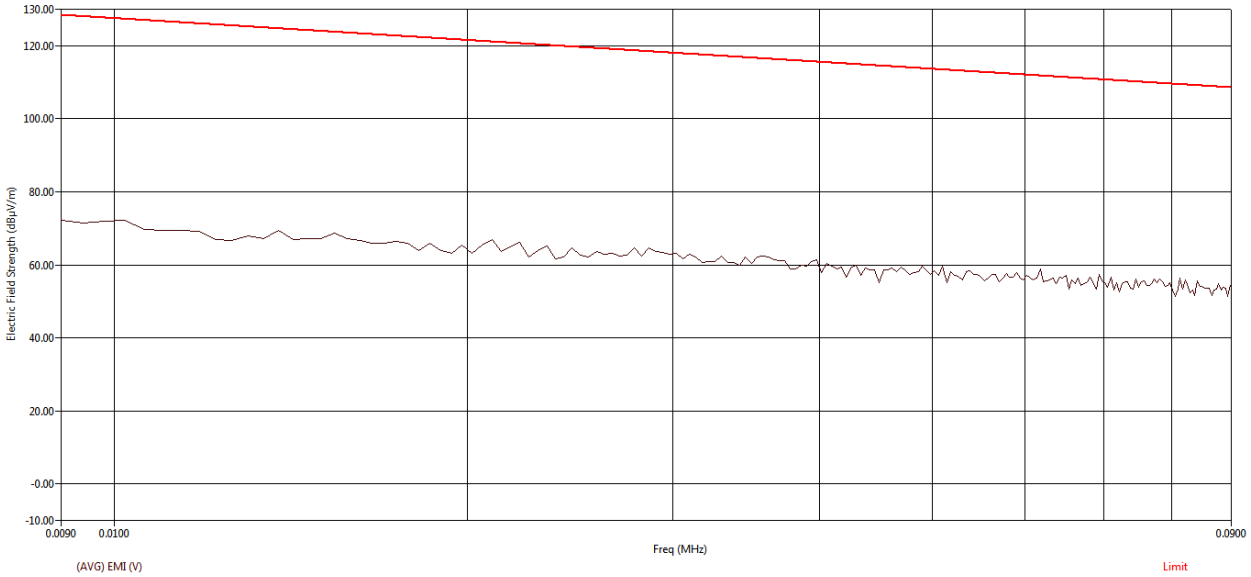

Figure 128: Average RE from 9 kHz to 90 kHz - Parallel

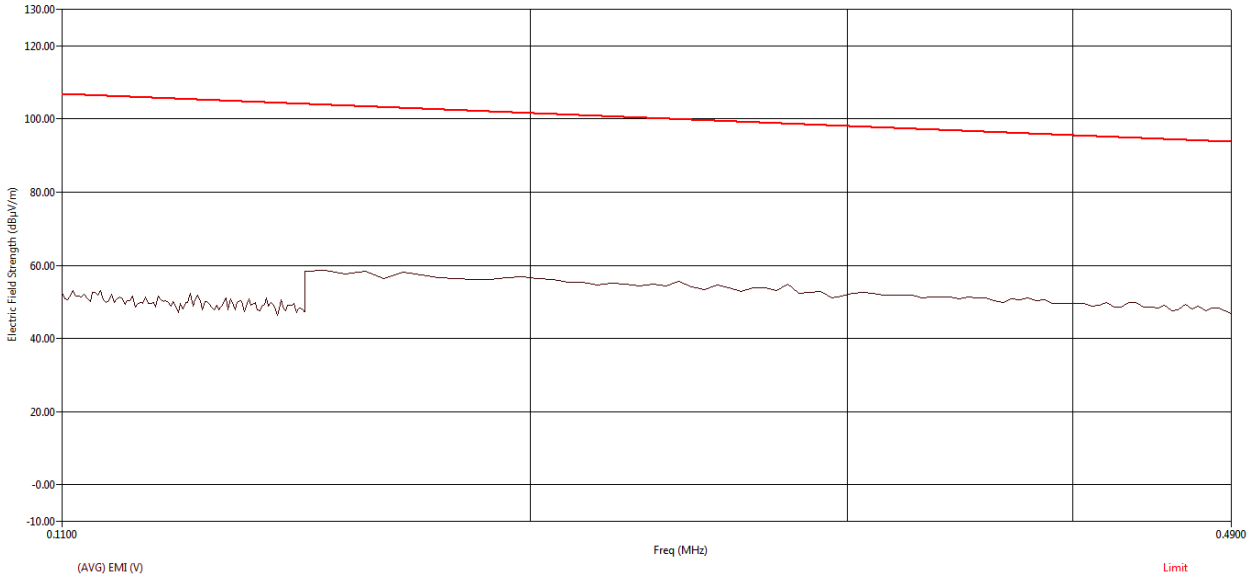

Figure 129: Average RE from 110 kHz to 490 kHz - Parallel

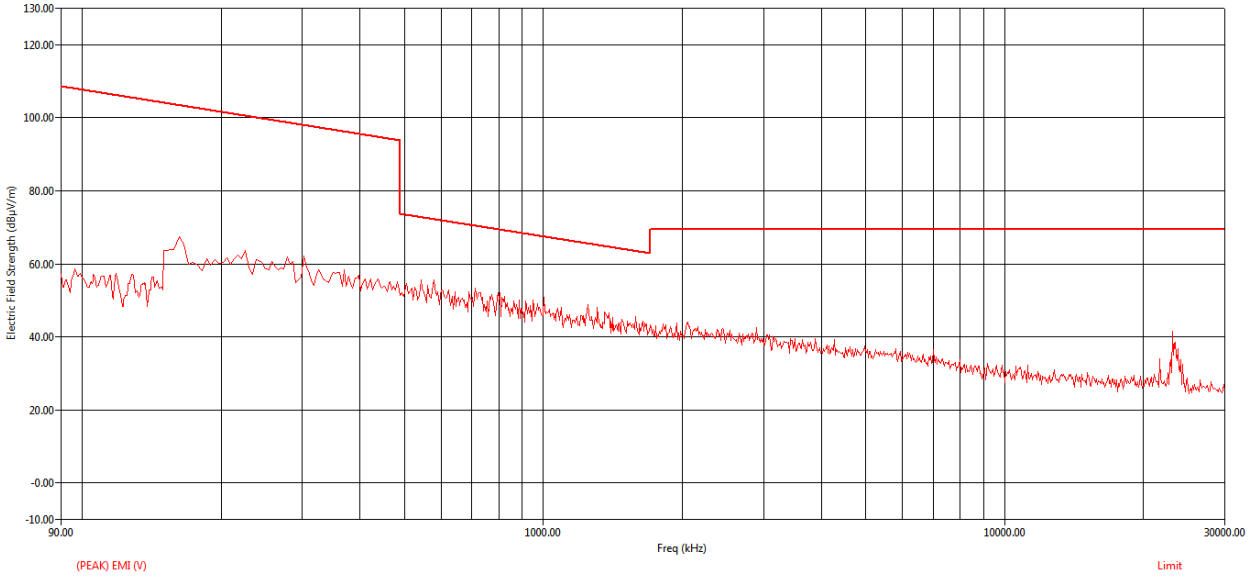

Figure 130: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
21.66	21.66	V	11.82	1.63	16.89	30.34	69.54	-39.20
23.06	23.07	V	12.47	1.68	16.81	30.96	69.54	-38.58

Table 28: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

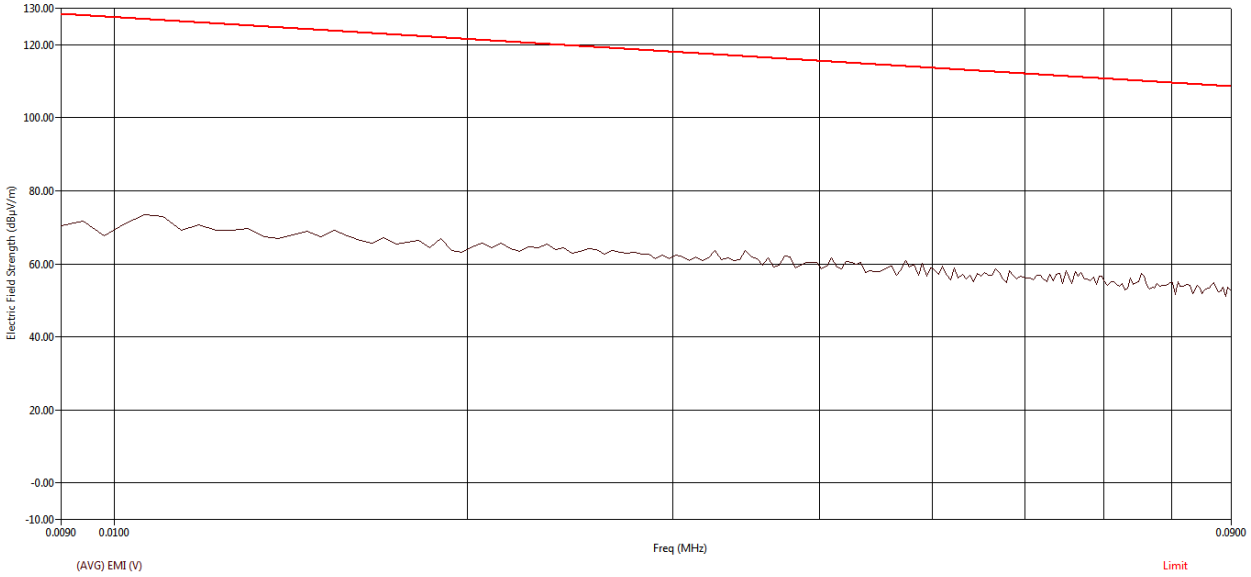

Figure 131: Average RE from 9 kHz to 90 kHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

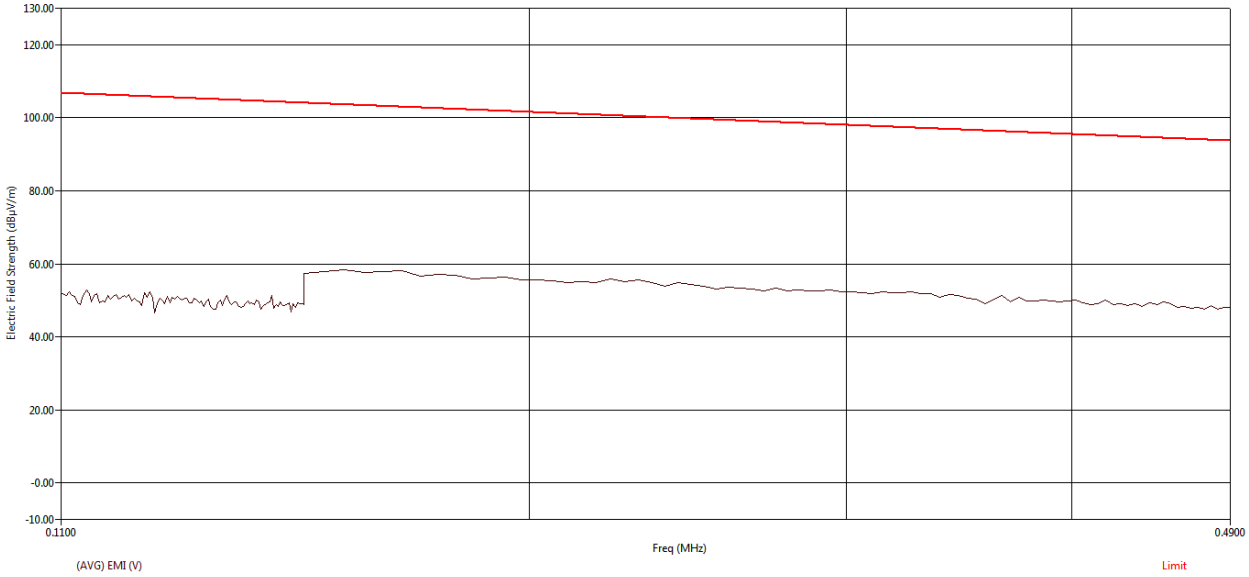

Figure 132: Average RE from 110 kHz to 490 kHz - Perpendicular

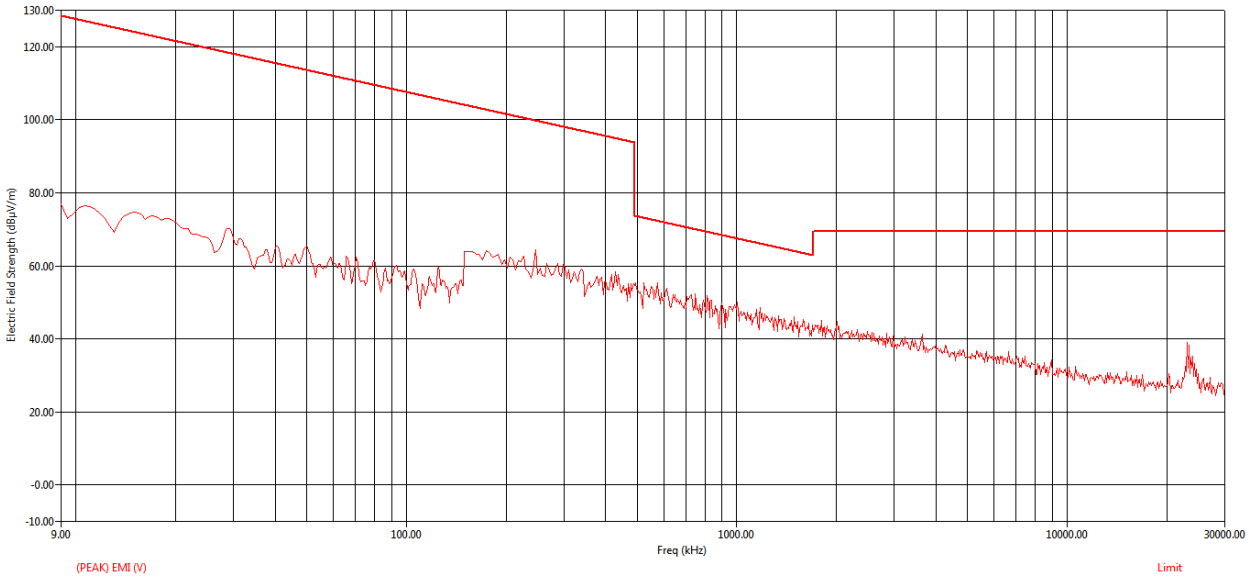

Figure 133: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	9.13	1.68	16.81	27.62	69.54	-41.92
23.50	23.49	V	8.56	1.72	16.78	27.02	69.54	-41.53

Table 29: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

This report should always be reproduced in full. Any extracts of this report is invalid.

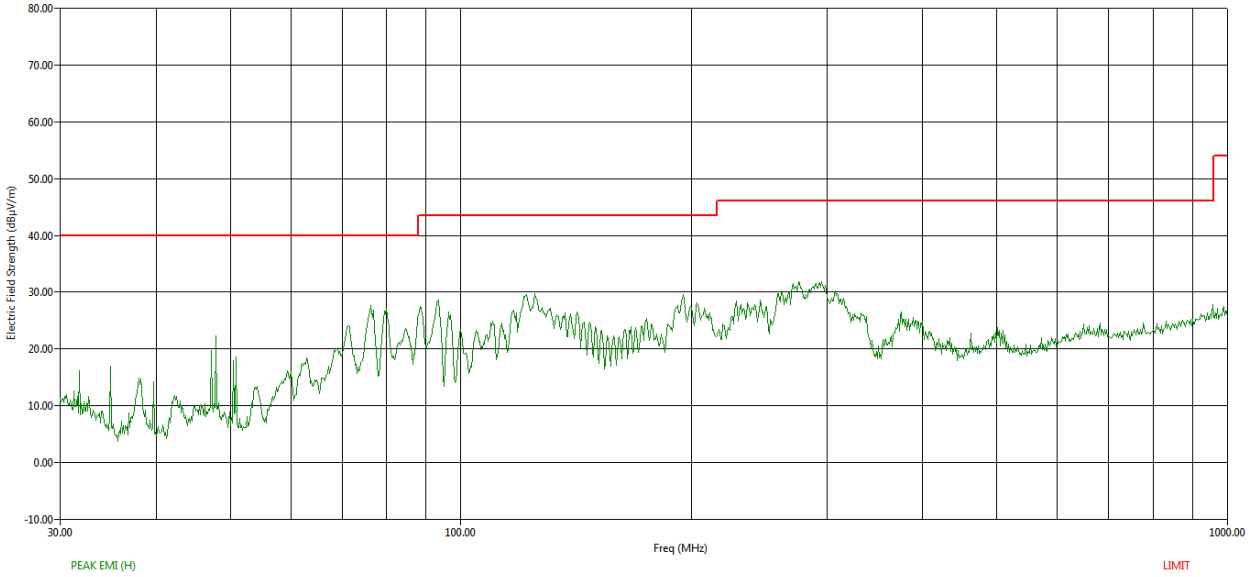

Figure 134: Peak RE from 30MHz to 1GHz - Horizontal polarization

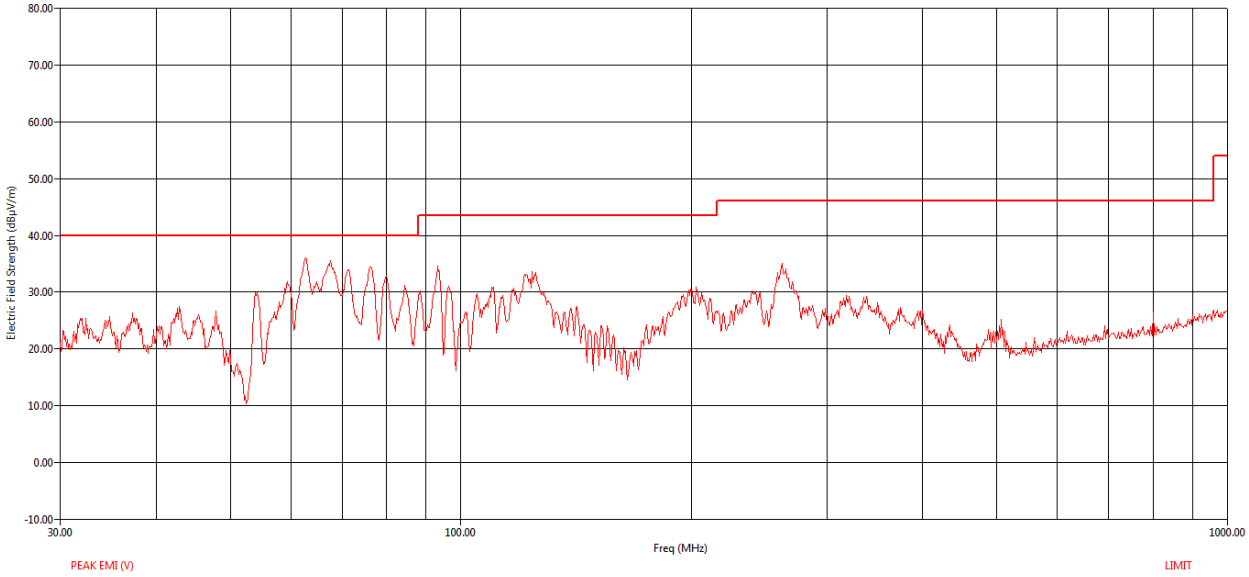

Figure 135: Peak RE from 30MHz to 1GHz - Vertical polarization

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
59.40	59.49	V	95.20	139.00	50.27	1.75	9.47	32.17	29.31	40.00	-10.69
62.76	62.69	V	278.00	102.00	53.67	1.84	9.45	32.17	32.78	40.00	-7.22
76.16	76.14	V	315.40	144.00	56.35	1.99	9.18	32.14	35.38	40.00	-4.62
84.48	84.60	V	251.00	101.00	50.97	2.10	9.02	32.12	29.96	40.00	-10.04
195.20	195.17	H	270.50	147.00	43.24	3.12	13.93	32.00	28.28	43.52	-15.24
275.96	275.94	H	117.80	101.00	42.39	3.68	13.31	31.92	27.46	46.02	-18.56

Table 30: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

This report should always be reproduced in full. Any extracts of this report is invalid.

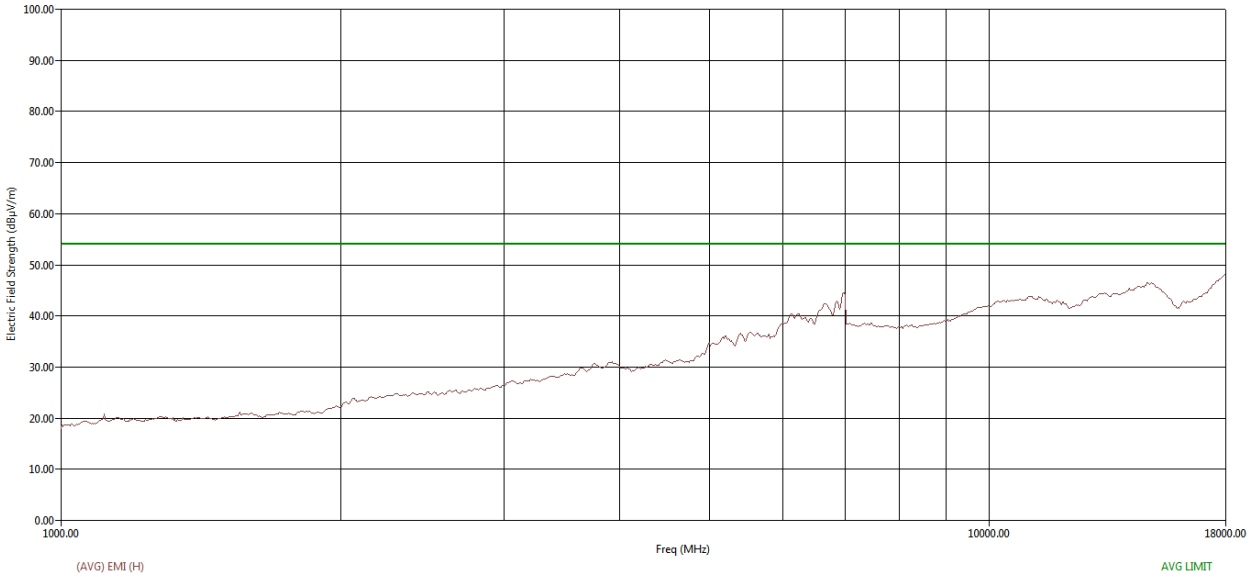

Figure 136: Average RE from 1GHz to 18GHz - Horizontal polarization

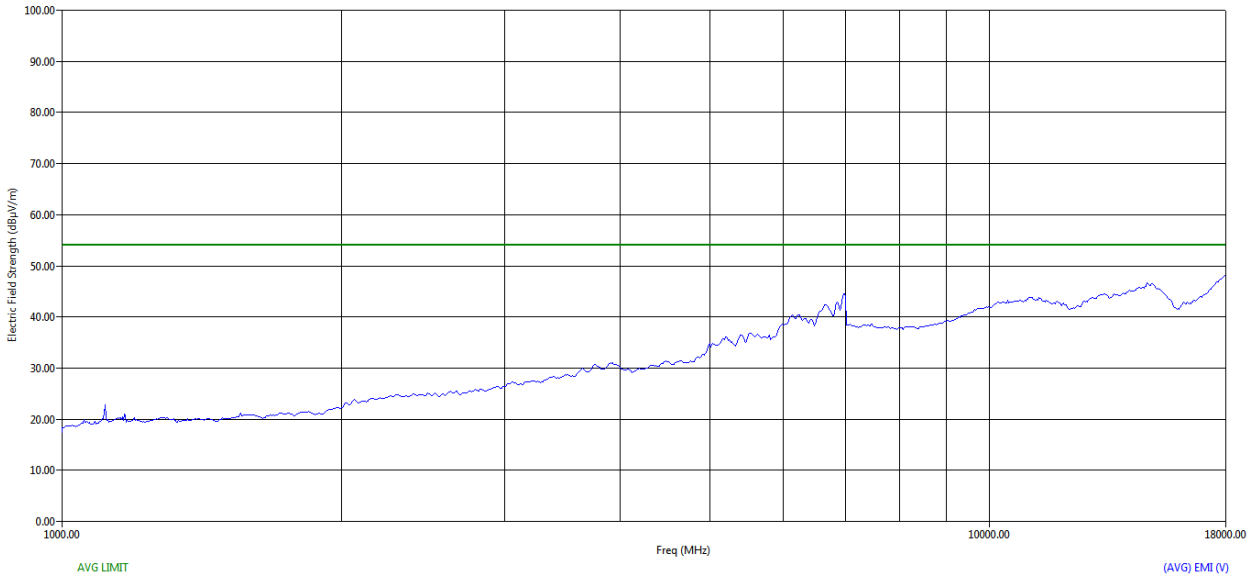

Figure 137: Average RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

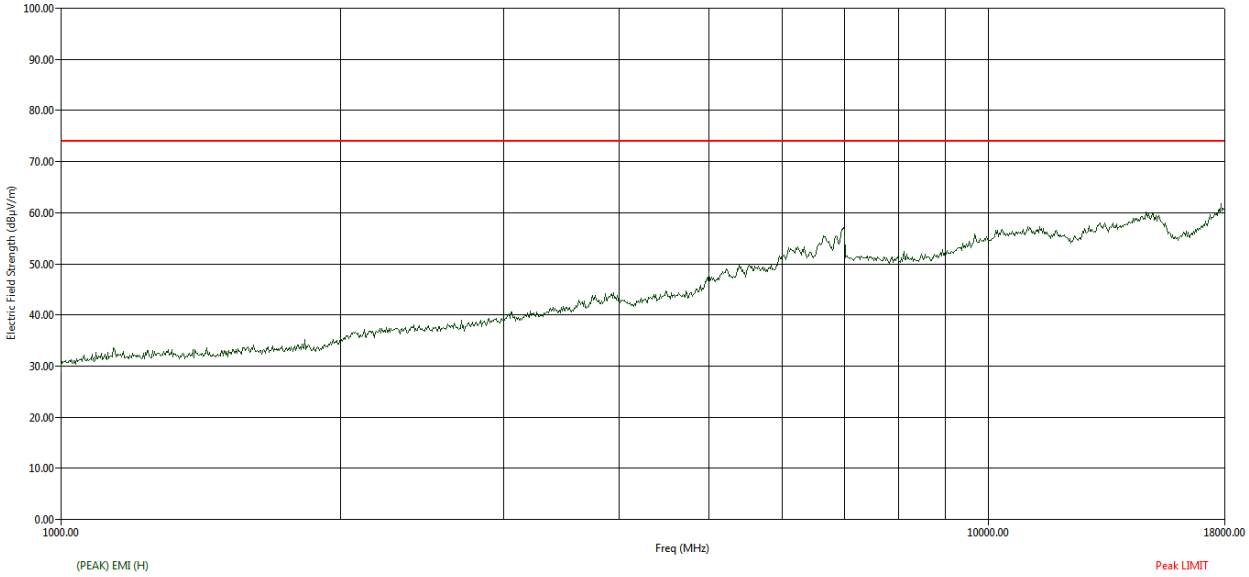

Figure 138: Peak RE from 1GHz to 18GHz - Horizontal polarization

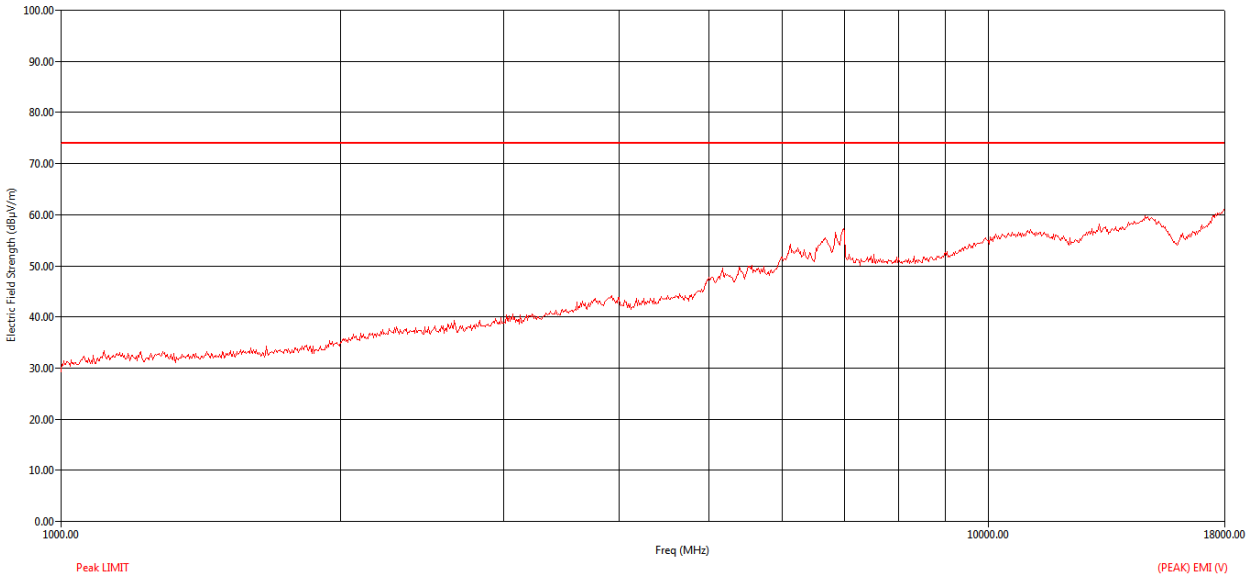

Figure 139: Peak RE from 1GHz to 18GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

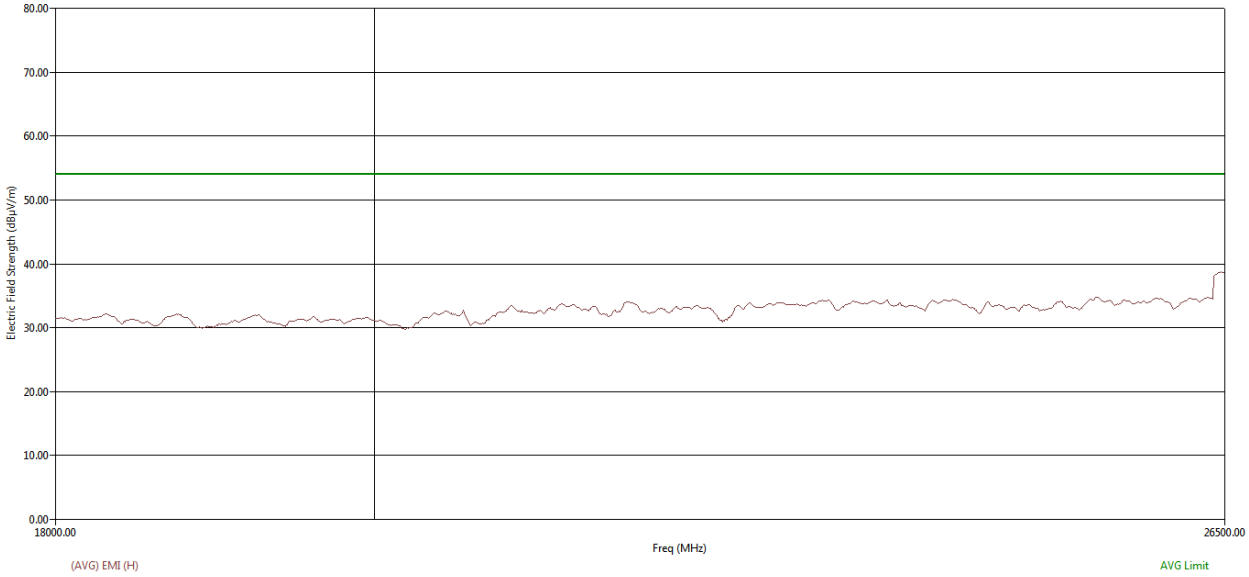

Figure 140: Average RE from 18GHz to 26.5GHz - Horizontal polarization

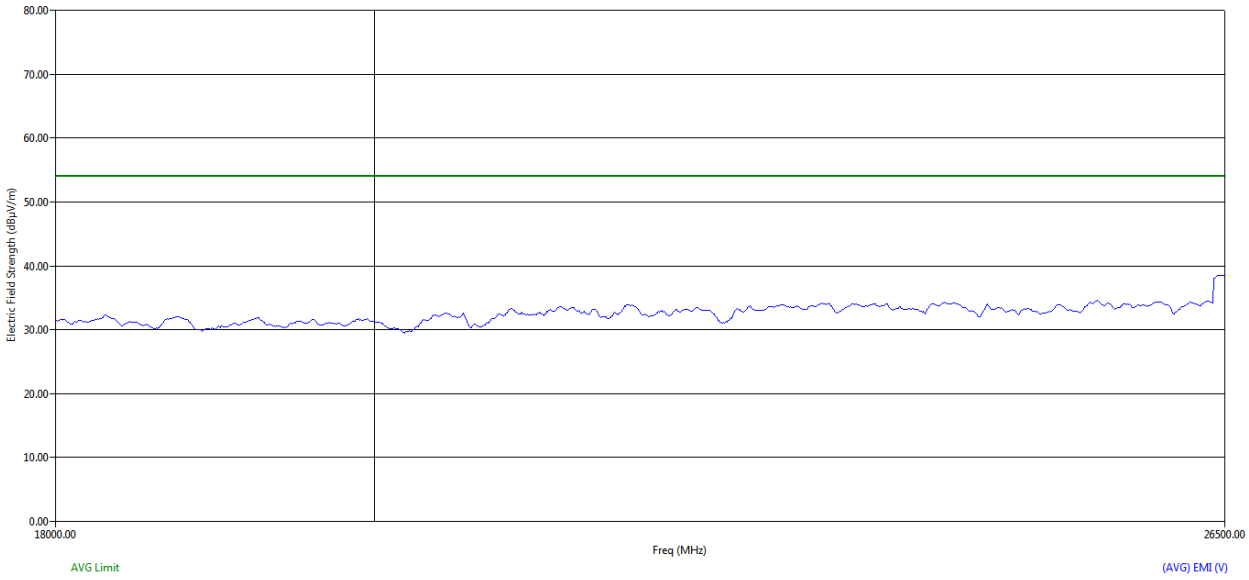

Figure 141: Average RE from 18GHz to 26.5GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

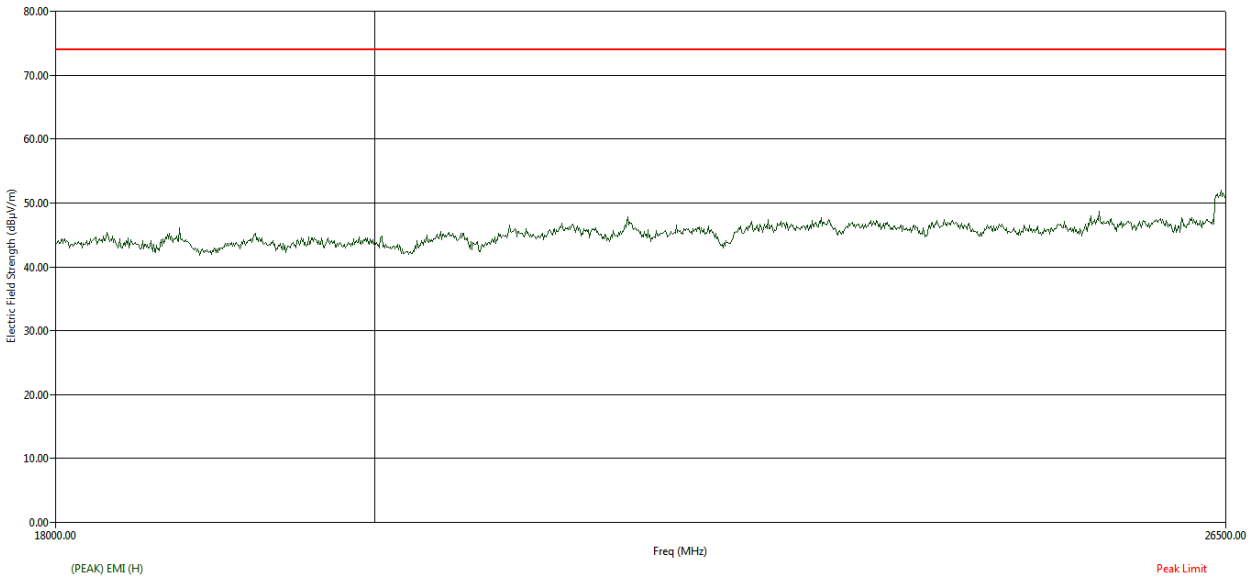

Figure 142: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

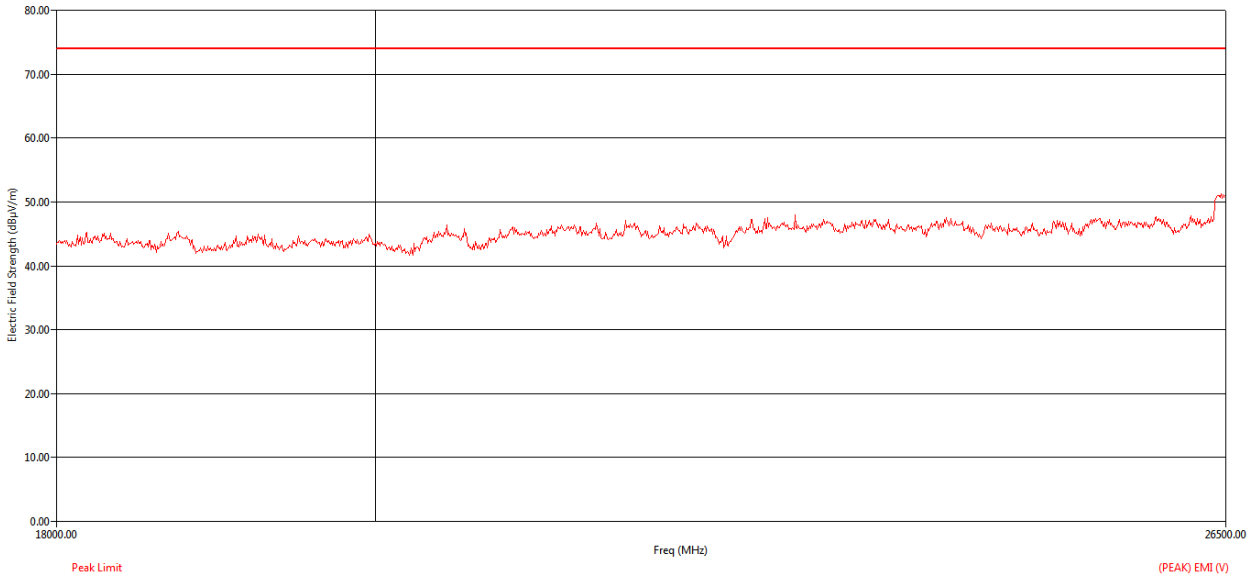

Figure 143: Peak RE from 18GHz to 26.5GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

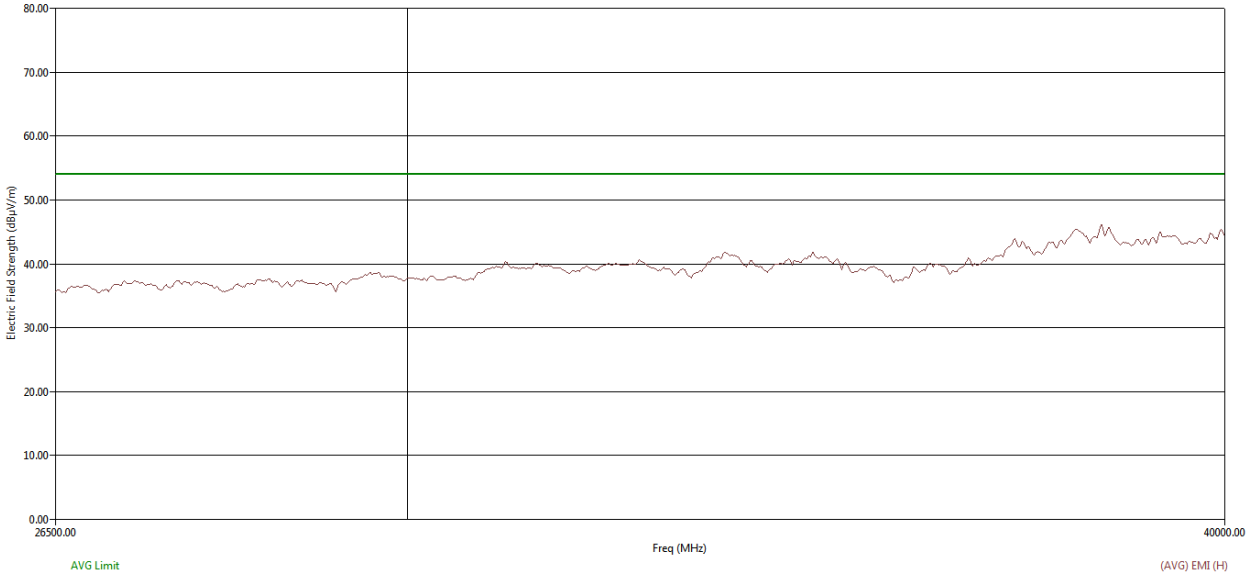

Figure 144: Average RE from 26.5GHz to 40GHz - Horizontal polarization

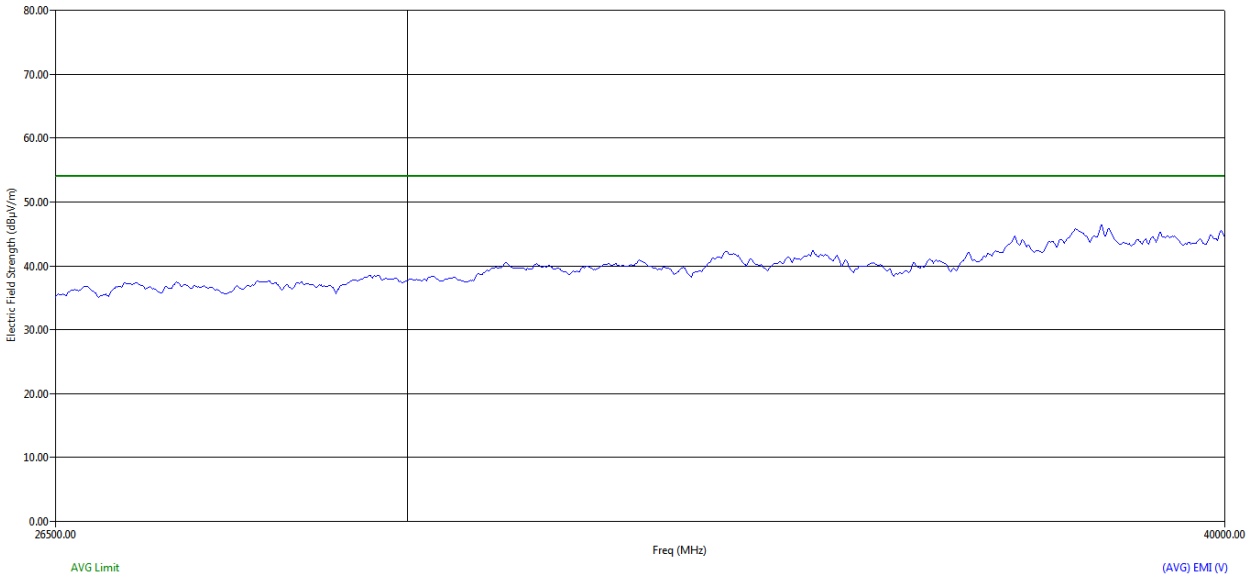

Figure 145 : Average RE from 26.5GHz to 40GHz - Vertical polarization

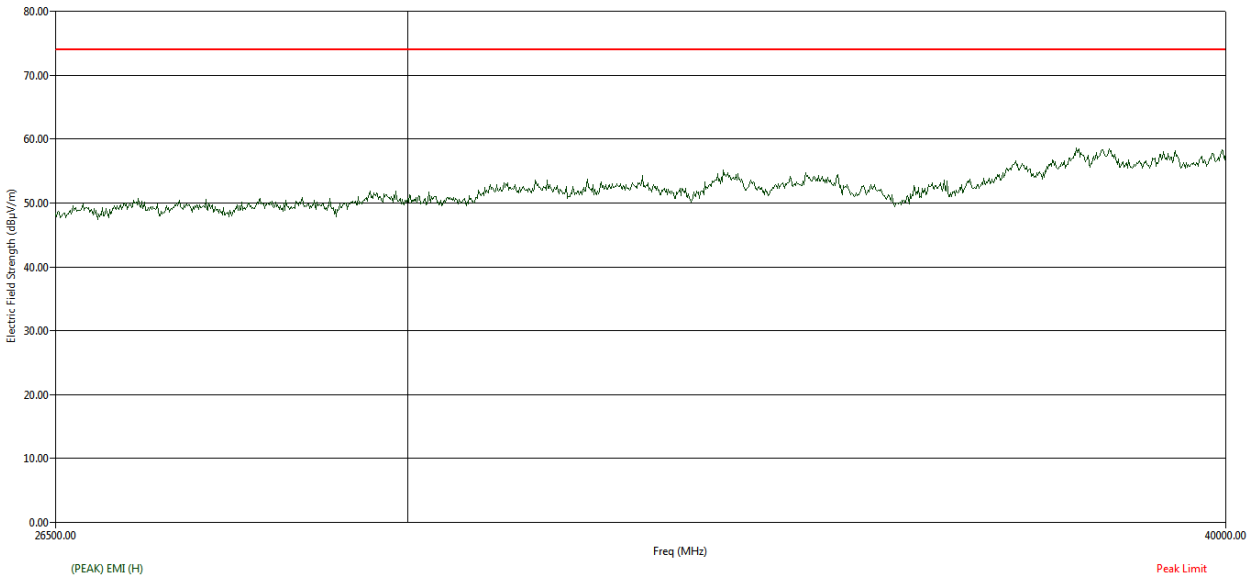

Figure 146: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

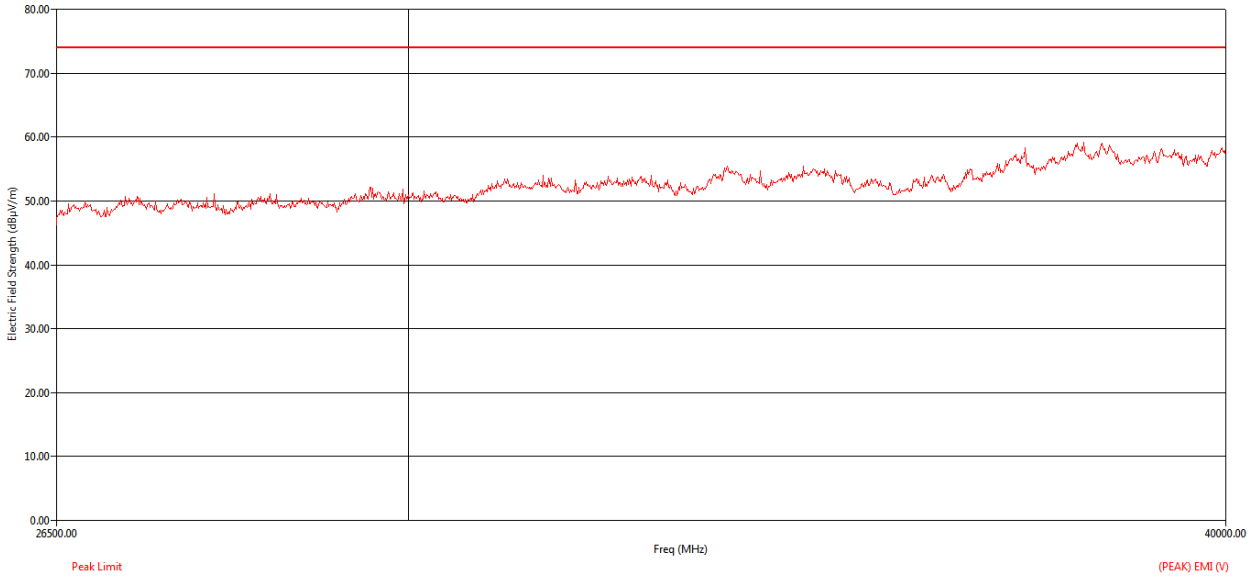

Figure 147: Peak RE from 26.5GHz to 40GHz - Vertical polarization

This report should always be reproduced in full. Any extracts of this report is invalid.

Note:
QP EMI (dBμV/m) = QP Trace (dBμV) + Cable (dB) + Transducer (dB/m) – Preamp (dB)
QP Margin (dB) = QP EMI (dBμV/m) – Limit (dBμV/m)
Avg EMI (dBμV/m) = Avg Trace (dBμV) + Cable (dB) + Transducer (dB/m) – Preamp (dB)
Avg Margin (dB) = Avg EMI (dBμV/m) – Limit (dBμV/m)

5.3.2.8 RESULT

Radiated Emissions from the EUT are **within the** specified Limit line.

This report should always be reproduced in full. Any extracts of this report is invalid.

APPENDIX I – ACRONYMS

dBµV	Decibel micro Volts
EUT	Equipment Under Test
FCC	Federal Communications Commission
GHz	Giga Hertz
kHz	Kilo Hertz
LISN	Line Impedance Stabilization Network
MHz	Mega Hertz
QP	Quasi Peak

END OF REPORT

This report should always be reproduced in full. Any extracts of this report is invalid.