EMC TEST REPORT	
TEST REPORT NUMBER	DOJ 1517TEL038-A1
TEST REPORT DATE	14th May 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	08
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

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AMENDMENT HISTORY

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

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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 09th 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

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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
Subhendu	Harsha Sainath	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

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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
  - Rate - HT40,
  - 54Mbps OFDM, MCS15 / 270 Mbps
  - Interframe spacing is tx100
  - Tx gain is 90 for Radiated Emissions & Conducted Emissions testing

- 10MHz modulation bandwidth
  - Rate – HT20,
  - 54Mbps OFDM, MCS15 / 130 Mbps
  - Interframe spacing is tx100
  - Tx gain is 90 for Radiated Emissions & Conducted Emissions testing

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

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

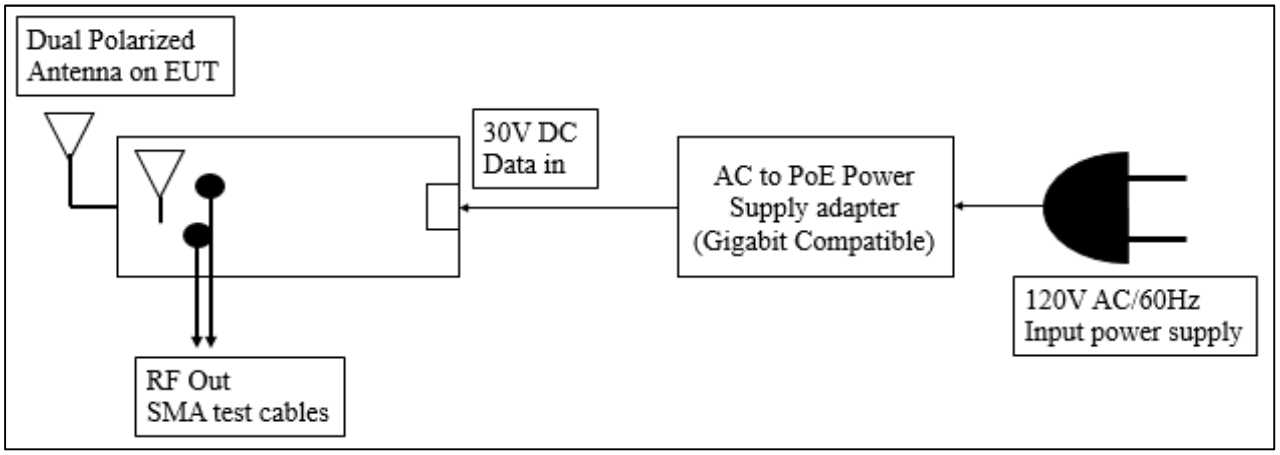

Figure 1: Block Diagram of the EUT test setup during the tests

5.1.3 ACCESSORIES

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

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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

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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*

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5.3.1.3 TEST SETUP

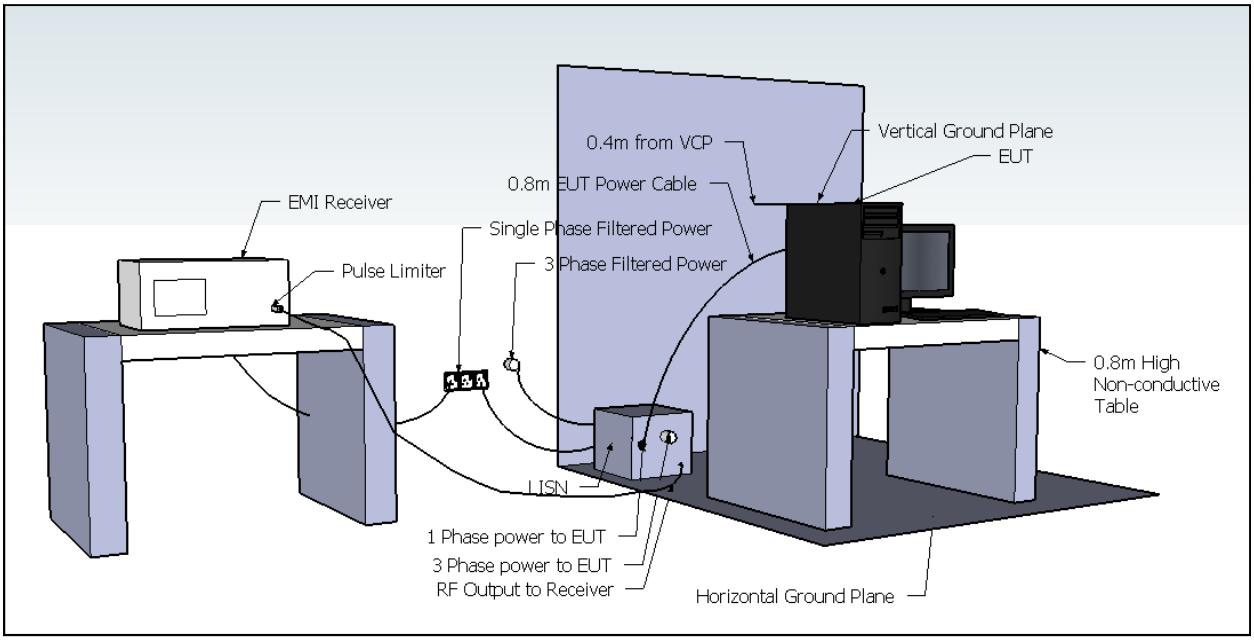

Figure 2: Typical test setup for conducted Emission test

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

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

5.3.1.5.1 LOW CHANNEL_5280 MHZ

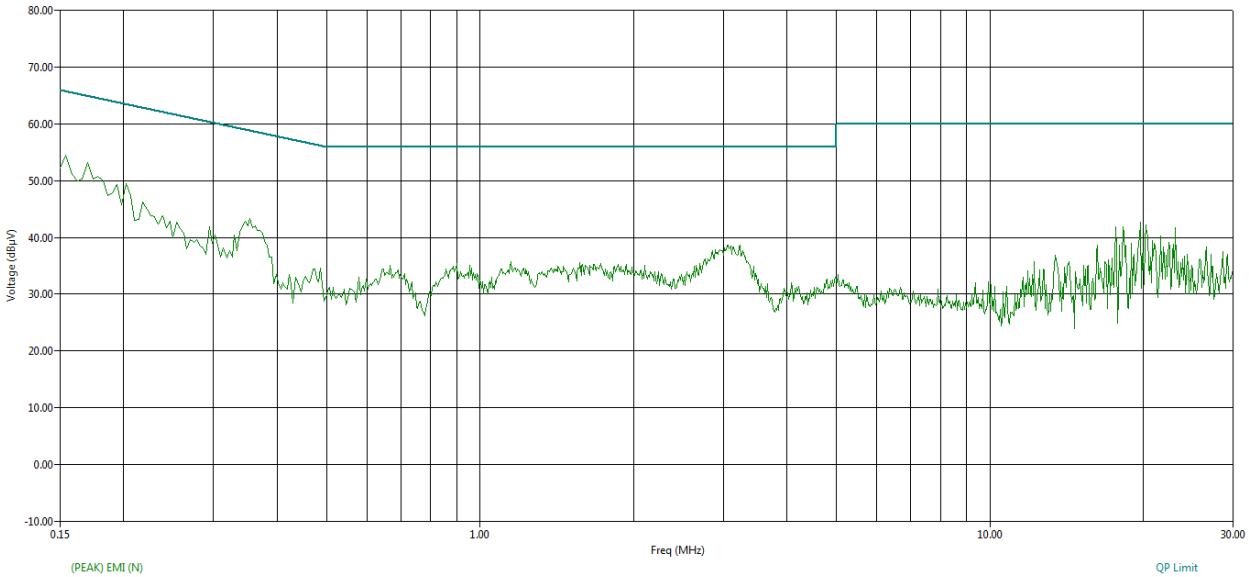

Figure 3: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

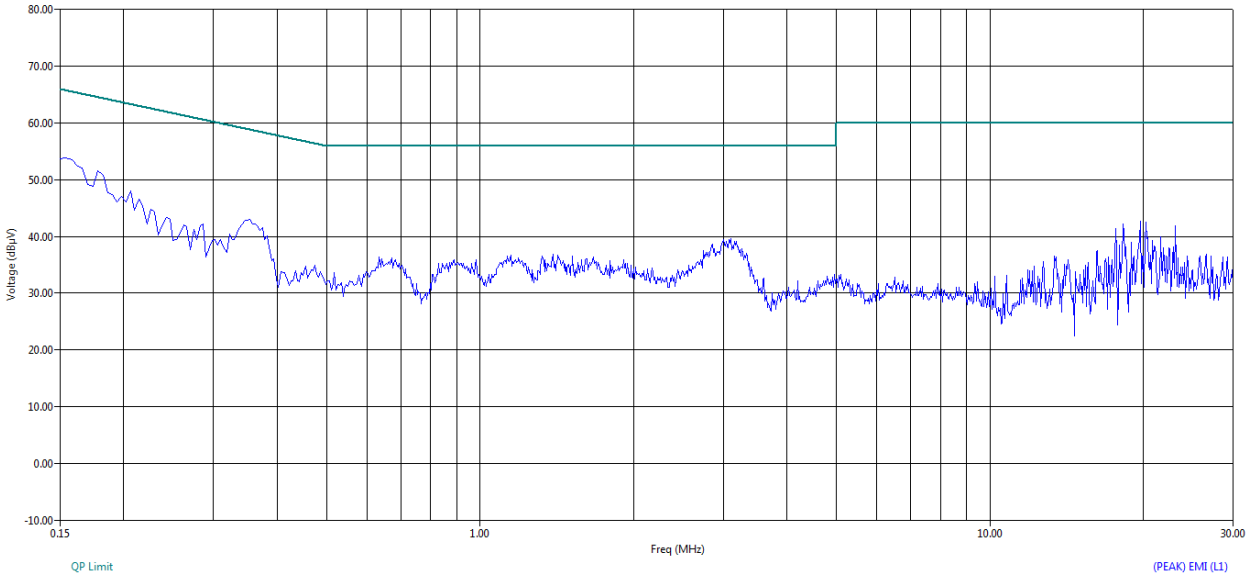

Figure 4: CE graph from 150 kHz to 30MHz using Peak detector - Line

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

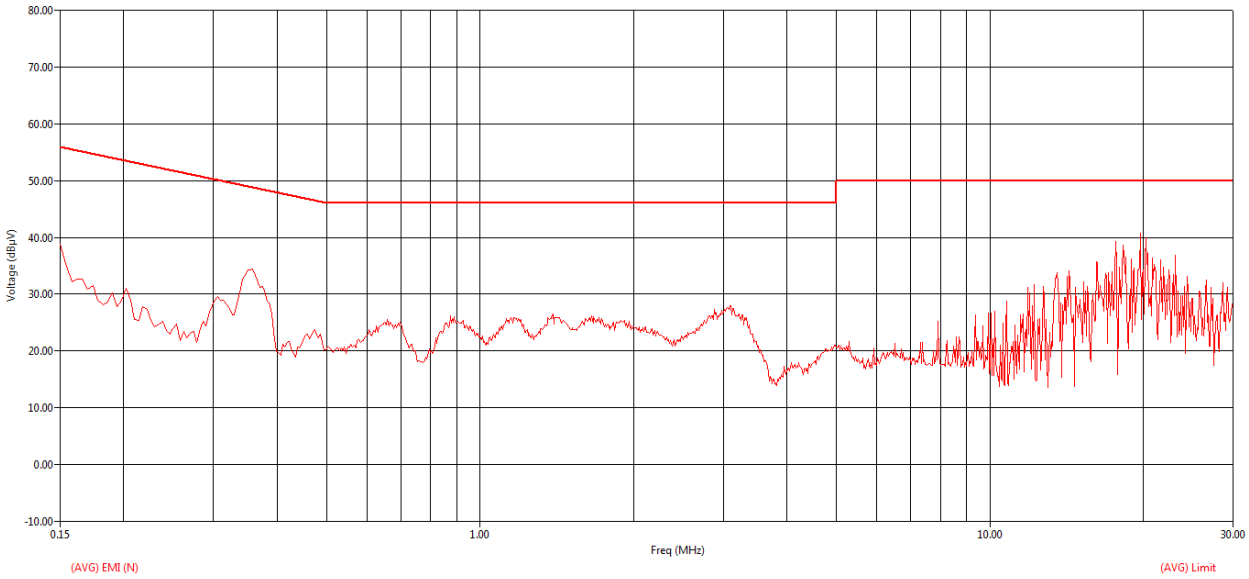

Figure 5: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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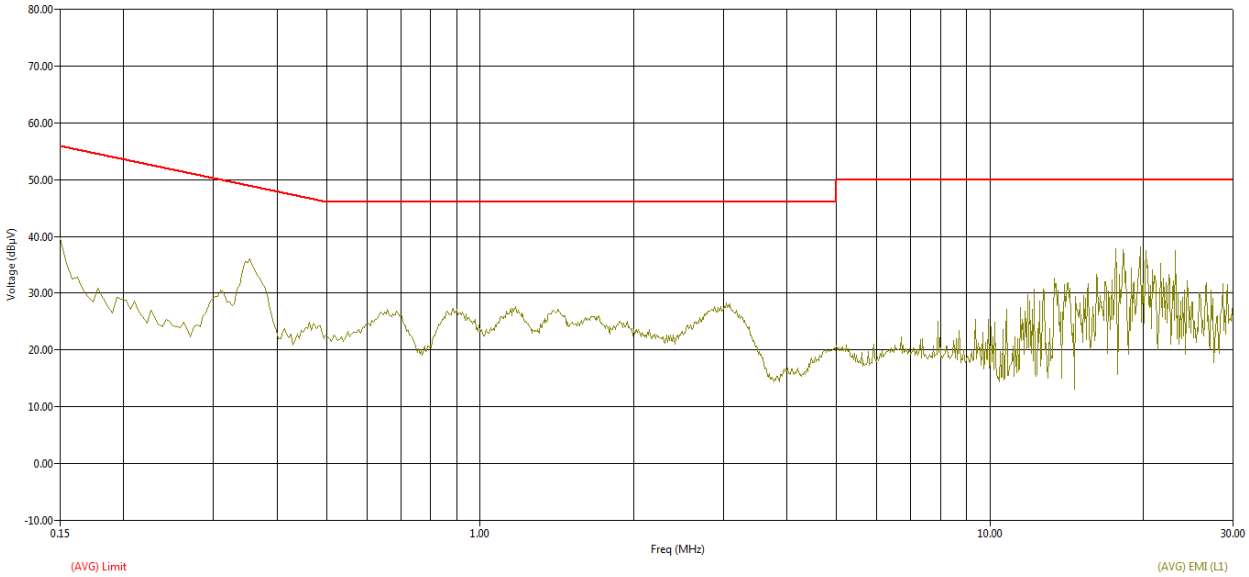

Figure 6: CE graph from 150 kHz to 30MHz using Average detector - Line

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

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5.3.1.5.2 MID CHANNEL_5300 MHz

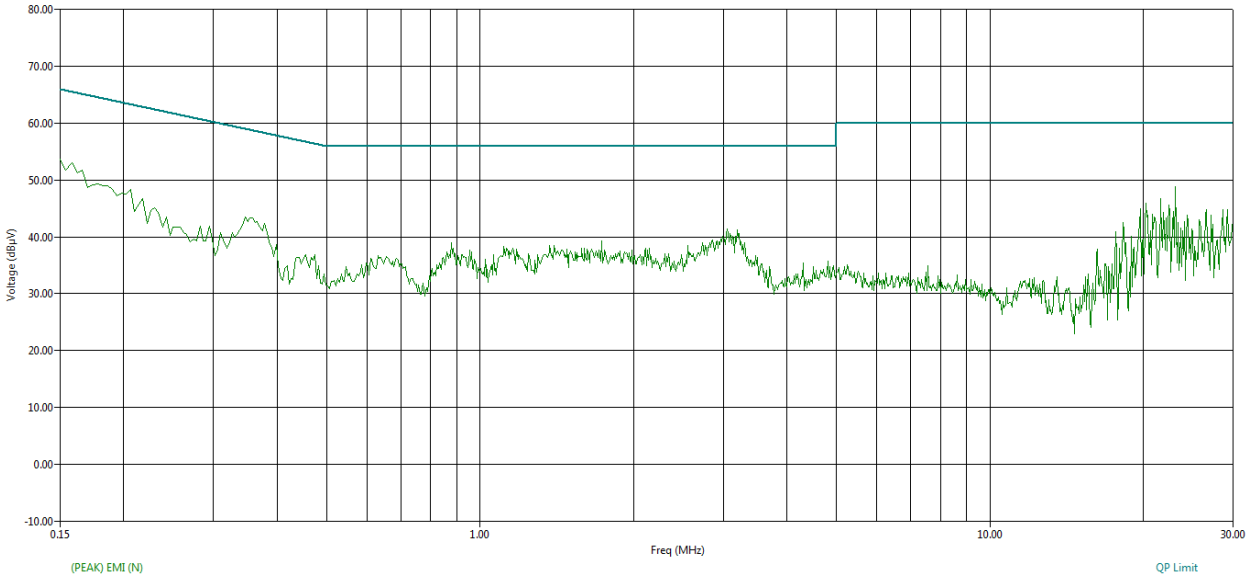

Figure 7: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

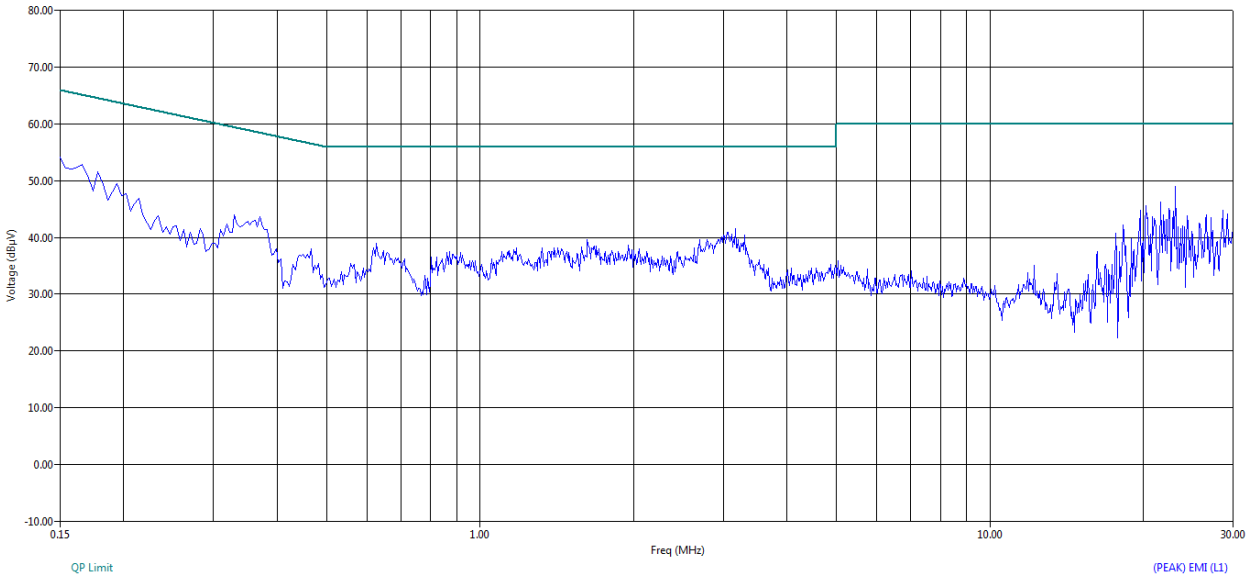

Figure 8: CE graph from 150 kHz to 30MHz using Peak detector - Line

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)
0.150	0.150	N	36.40	10.11	0.10	0.00	46.60	65.97	-19.37
0.150	0.150	L1	36.29	10.11	0.00	0.07	46.47	66.00	-19.53
0.350	0.353	L1	31.01	10.10	0.00	0.06	41.17	58.90	-17.73
3.054	3.049	L1	25.17	10.11	0.00	0.10	35.38	56.00	-20.62
3.078	3.082	N	24.62	10.11	0.13	0.00	34.86	56.00	-21.14
17.694	17.693	N	28.22	10.37	0.34	0.00	38.94	60.00	-21.06
17.694	17.694	L1	27.77	10.37	0.00	0.30	38.45	60.00	-21.55
18.242	18.244	N	31.07	10.38	0.35	0.00	41.80	60.00	-18.20
18.242	18.244	L1	30.06	10.38	0.00	0.30	40.74	60.00	-19.26
19.710	19.710	N	31.71	10.40	0.37	0.00	42.47	60.00	-17.53
19.710	19.709	L1	30.52	10.40	0.00	0.32	41.24	60.00	-18.76
20.258	20.258	N	29.31	10.41	0.37	0.00	40.09	60.00	-19.91
20.258	20.259	L1	28.28	10.41	0.00	0.32	39.01	60.00	-20.99
23.130	23.128	N	32.00	10.48	0.38	0.00	42.86	60.00	-17.14
23.130	23.128	L1	31.59	10.48	0.00	0.35	42.42	60.00	-17.58

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

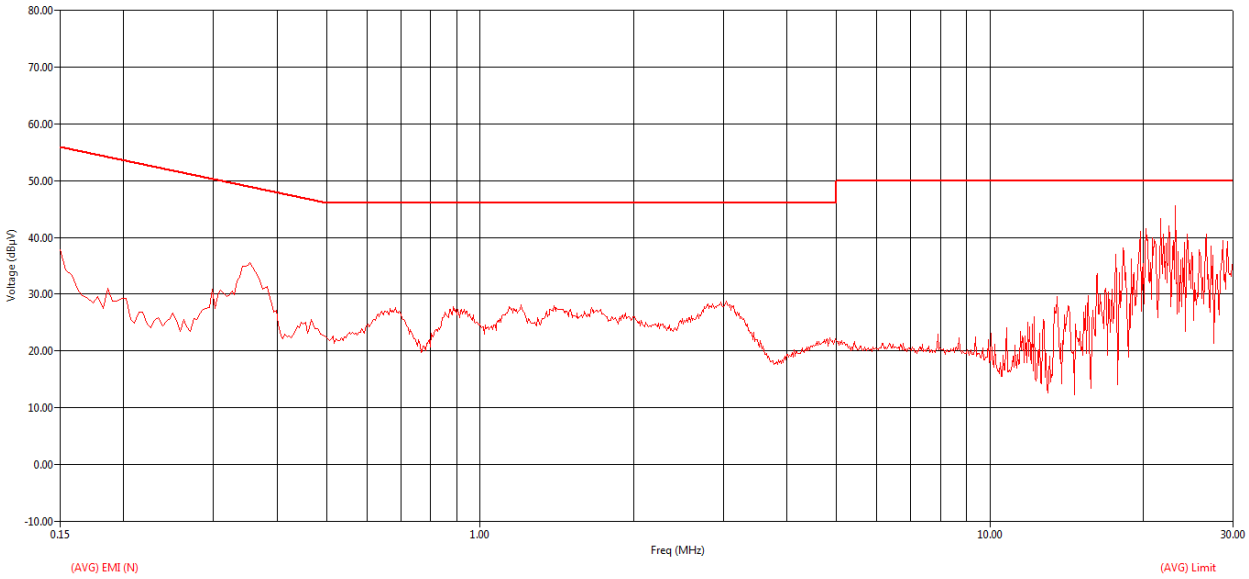

Figure 9: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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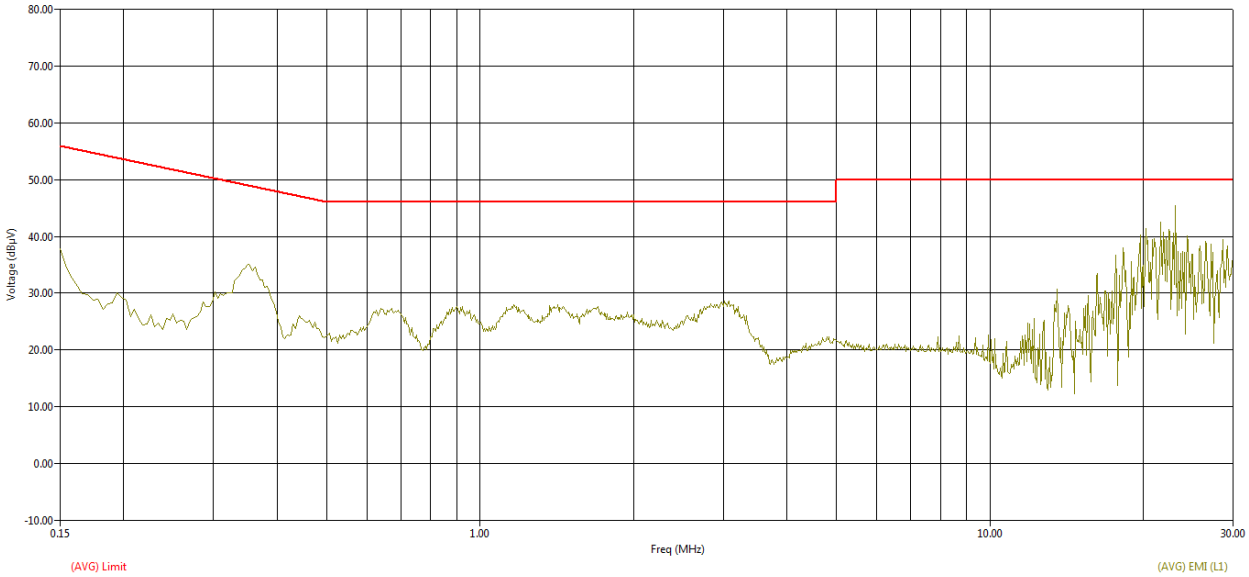

Figure 10: CE graph from 150 kHz to 30MHz using Average detector - Line

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)
0.150	0.150	N	27.11	10.11	0.10	0.00	37.31	55.97	-18.66
0.150	0.150	L1	27.23	10.11	0.00	0.07	37.40	56.00	-18.60
0.350	0.353	L1	24.76	10.10	0.00	0.06	34.93	48.90	-13.97
3.054	3.049	L1	16.90	10.11	0.00	0.10	27.12	46.00	-18.88
3.078	3.082	N	16.42	10.11	0.13	0.00	26.67	46.00	-19.33
17.694	17.693	N	25.02	10.37	0.34	0.00	35.74	50.00	-14.26
17.694	17.694	L1	24.59	10.37	0.00	0.30	35.27	50.00	-14.73
18.242	18.244	N	27.43	10.38	0.35	0.00	38.16	50.00	-11.84
18.242	18.244	L1	26.55	10.38	0.00	0.30	37.24	50.00	-12.76
19.710	19.710	N	27.44	10.40	0.37	0.00	38.20	50.00	-11.80
19.710	19.709	L1	26.40	10.40	0.00	0.32	37.12	50.00	-12.88
20.258	20.258	N	25.66	10.41	0.37	0.00	36.44	50.00	-13.56
20.258	20.259	L1	24.80	10.41	0.00	0.32	35.53	50.00	-14.47
23.130	23.128	N	29.50	10.48	0.38	0.00	40.36	50.00	-9.64
23.130	23.128	L1	29.01	10.48	0.00	0.35	39.84	50.00	-10.16

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

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5.3.1.5.3 HIGH CHANNEL_5320 MHZ

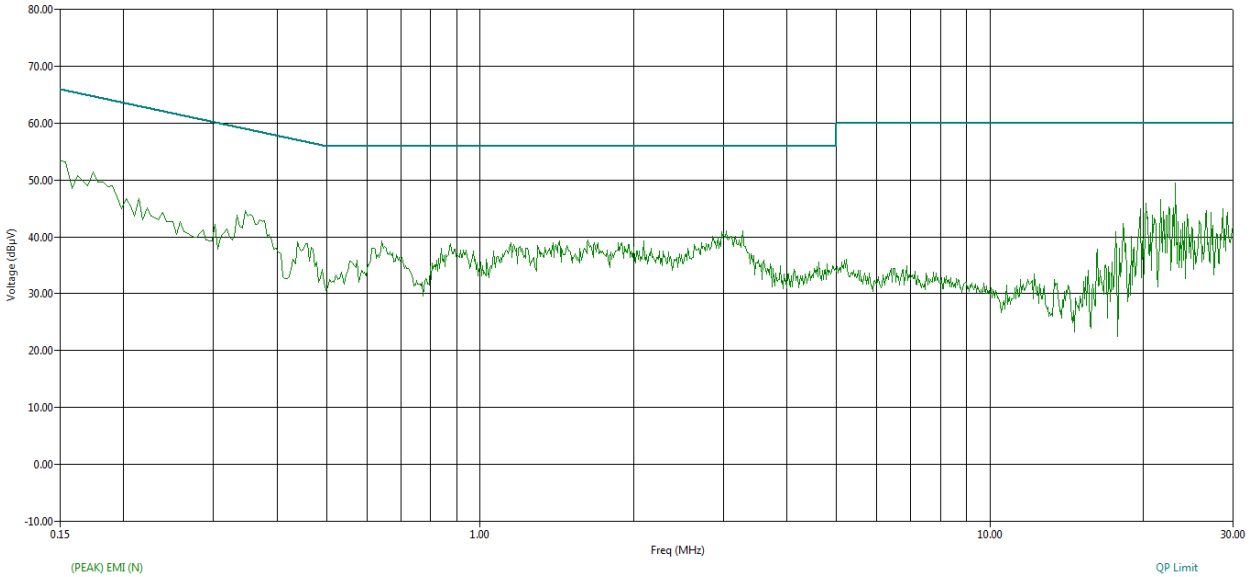

Figure 11: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

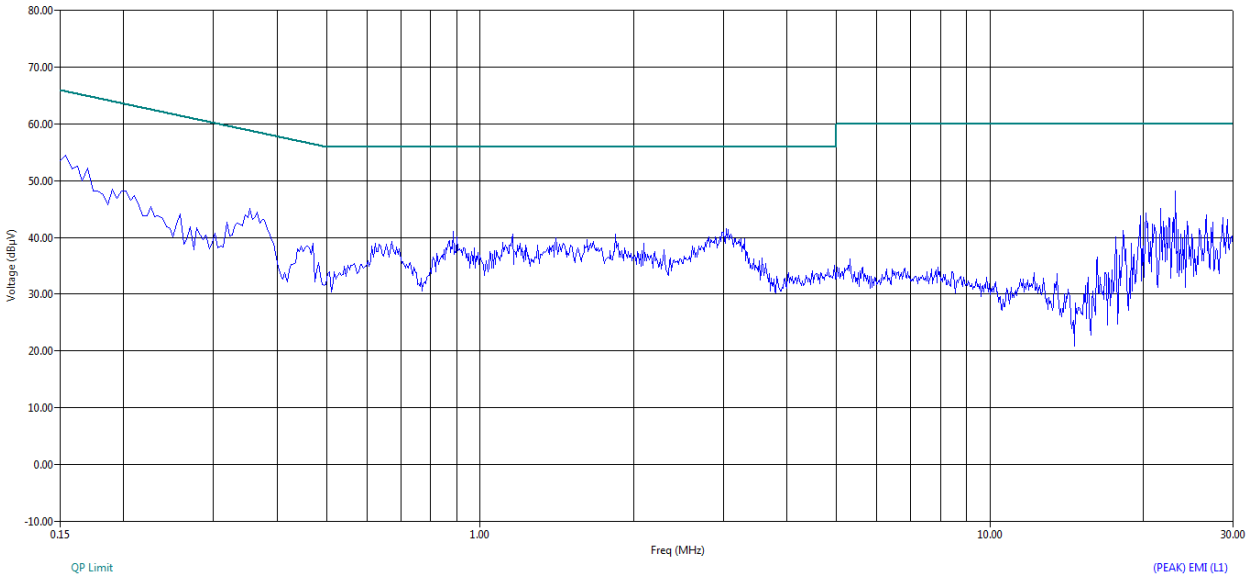

Figure 12: CE graph from 150 kHz to 30MHz using Peak detector - Line

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)
0.154	0.151	N	35.63	10.11	0.10	0.00	45.83	65.92	-20.09
0.154	0.150	L1	35.73	10.11	0.00	0.07	45.91	65.98	-20.07
0.180	0.182	L1	32.56	10.11	0.00	0.07	42.73	64.41	-21.67
0.350	0.352	L1	31.26	10.10	0.00	0.06	41.42	58.92	-17.50
1.394	1.393	L1	23.92	10.12	0.00	0.08	34.12	56.00	-21.88
3.030	3.033	L1	25.32	10.11	0.00	0.10	35.53	56.00	-20.47
19.710	19.709	N	33.36	10.40	0.37	0.00	44.12	60.00	-15.88
19.710	19.709	L1	32.37	10.40	0.00	0.32	43.09	60.00	-16.91
20.258	20.258	N	34.09	10.41	0.37	0.00	44.87	60.00	-15.13
20.258	20.258	L1	32.98	10.41	0.00	0.32	43.71	60.00	-16.29
21.662	21.663	N	35.50	10.44	0.38	0.00	46.32	60.00	-13.68
21.662	21.663	L1	34.31	10.44	0.00	0.34	45.09	60.00	-14.91
22.458	22.457	N	33.66	10.46	0.38	0.00	44.50	60.00	-15.50
22.886	22.884	N	33.36	10.47	0.38	0.00	44.22	60.00	-15.78
23.130	23.129	N	37.68	10.48	0.38	0.00	48.54	60.00	-11.46
23.130	23.129	L1	36.66	10.48	0.00	0.35	47.50	60.00	-12.50

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

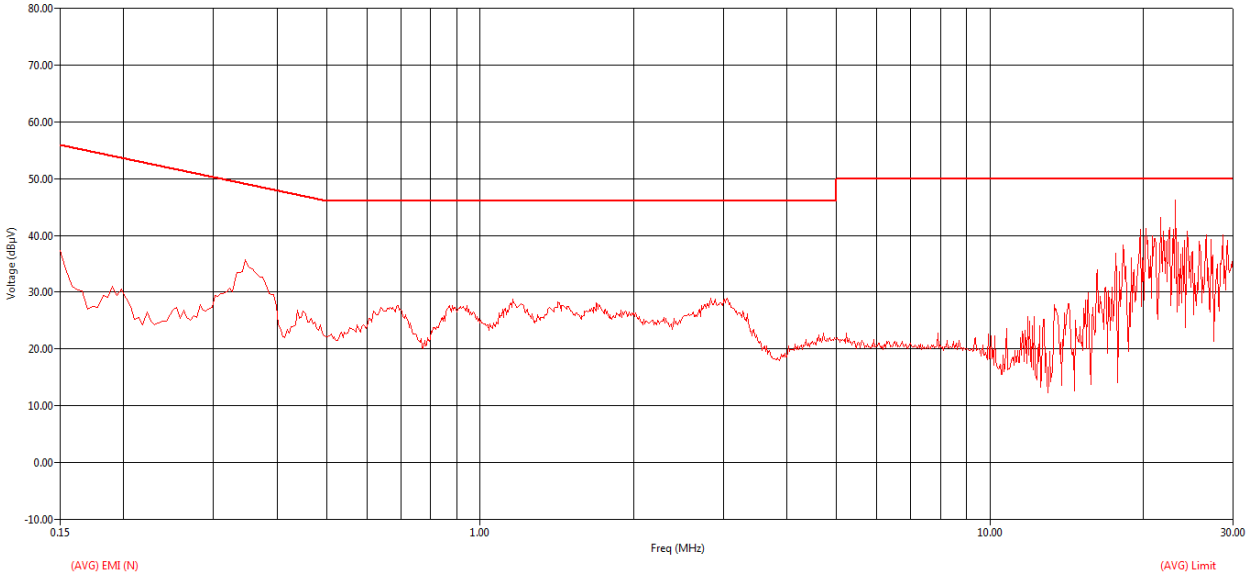

Figure 13: CE graph from 150 kHz to 30MHz using Average detector - Neutral

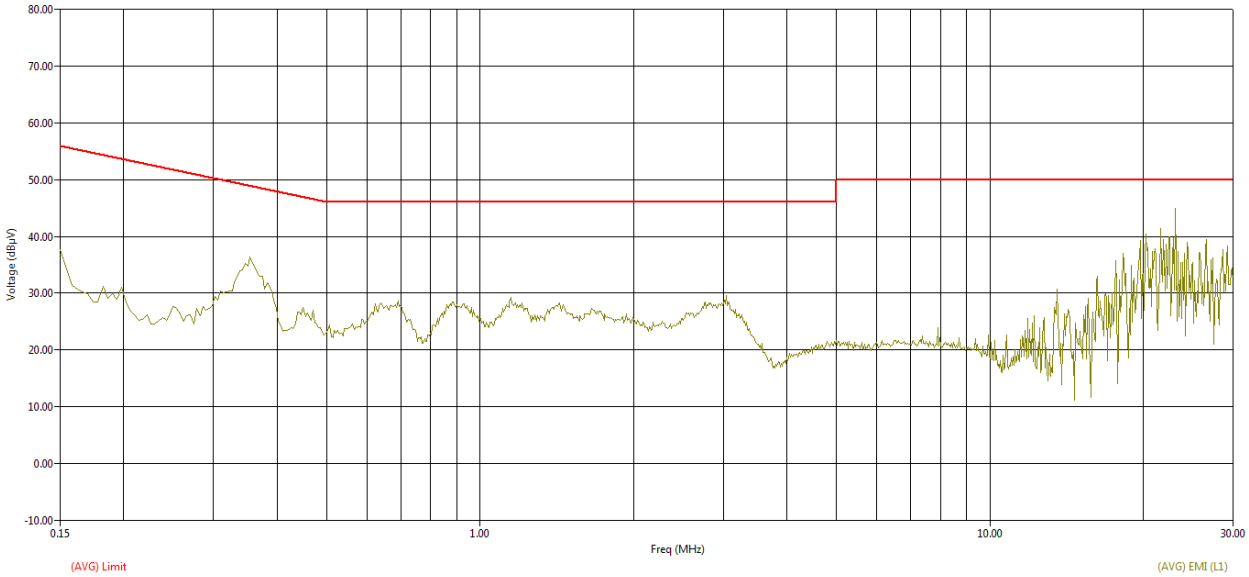

Figure 14: CE graph from 150 kHz to 30MHz using Average detector - Line

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)
0.154	0.151	N	26.60	10.11	0.10	0.00	36.81	55.92	-19.11
0.154	0.150	L1	27.02	10.11	0.00	0.07	37.20	55.98	-18.78
0.180	0.182	L1	18.29	10.11	0.00	0.07	28.47	54.41	-25.94
0.350	0.352	L1	25.09	10.10	0.00	0.06	35.25	48.92	-13.67
1.394	1.393	L1	16.98	10.12	0.00	0.08	27.18	46.00	-18.82
3.030	3.033	L1	17.22	10.11	0.00	0.10	27.43	46.00	-18.57
19.710	19.709	N	29.81	10.40	0.37	0.00	40.58	50.00	-9.42
19.710	19.709	L1	28.83	10.40	0.00	0.32	39.55	50.00	-10.45
20.258	20.258	N	30.53	10.41	0.37	0.00	41.30	50.00	-8.70
20.258	20.258	L1	29.49	10.41	0.00	0.32	40.22	50.00	-9.78
21.662	21.663	N	32.31	10.44	0.38	0.00	43.13	50.00	-6.87
21.662	21.663	L1	31.12	10.44	0.00	0.34	41.91	50.00	-8.09
22.458	22.457	N	30.50	10.46	0.38	0.00	41.34	50.00	-8.66
22.886	22.884	N	30.14	10.47	0.38	0.00	40.99	50.00	-9.01
23.130	23.129	N	34.78	10.48	0.38	0.00	45.64	50.00	-4.36
23.130	23.129	L1	33.82	10.48	0.00	0.35	44.65	50.00	-5.35

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

5.3.1.6 RESULT (SUPPORTING GRAPHS / DATA) FOR 10 MHZ MODULATION BANDWIDTH

5.3.1.6.1 LOW CHANNEL_5265 MHZ

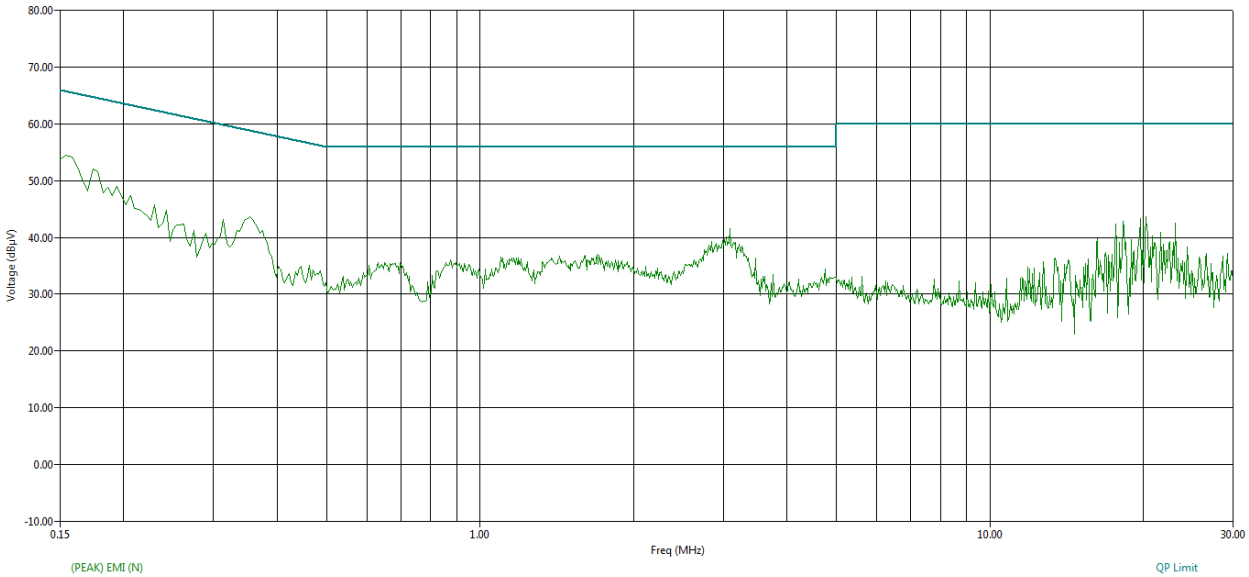

Figure 15: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

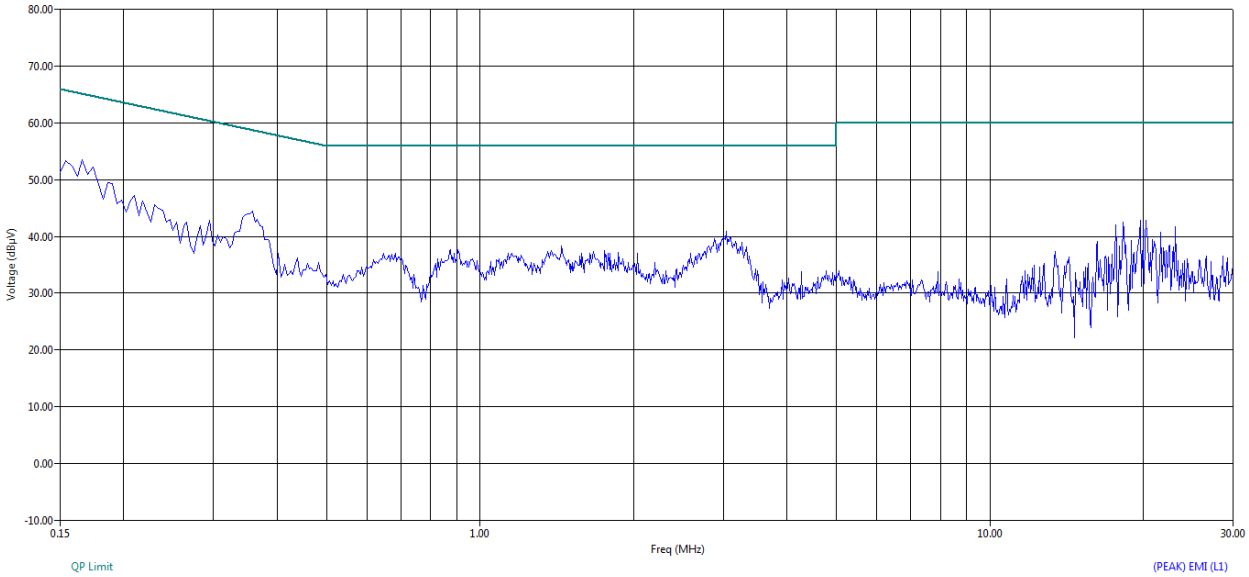

Figure 16: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.154	0.151	N	36.95	10.11	0.10	0.00	47.15	65.97	-18.82
0.166	0.158	L1	35.75	10.11	0.00	0.07	45.93	65.57	-19.64
0.350	0.346	L1	31.65	10.10	0.00	0.06	41.82	59.06	-17.25
3.046	3.040	L1	24.71	10.11	0.00	0.10	34.92	56.00	-21.08
3.086	3.084	N	24.58	10.11	0.13	0.00	34.82	56.00	-21.18
17.694	17.693	N	1.97	10.37	0.34	0.00	12.69	60.00	-47.31
17.694	17.697	L1	4.46	10.37	0.00	0.30	15.13	60.00	-44.87
18.242	18.250	N	1.93	10.38	0.35	0.00	12.66	60.00	-47.34
18.242	18.239	L1	5.39	10.38	0.00	0.30	16.07	60.00	-43.93
19.710	19.711	N	5.17	10.40	0.37	0.00	15.93	60.00	-44.07
19.710	19.712	L1	6.77	10.40	0.00	0.32	17.49	60.00	-42.51
20.258	20.259	N	9.95	10.41	0.37	0.00	20.73	60.00	-39.27
20.258	20.266	L1	9.70	10.41	0.00	0.32	20.43	60.00	-39.57
23.130	23.125	N	16.74	10.48	0.38	0.00	27.60	60.00	-32.40
23.130	23.125	L1	15.79	10.48	0.00	0.35	26.62	60.00	-33.38

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

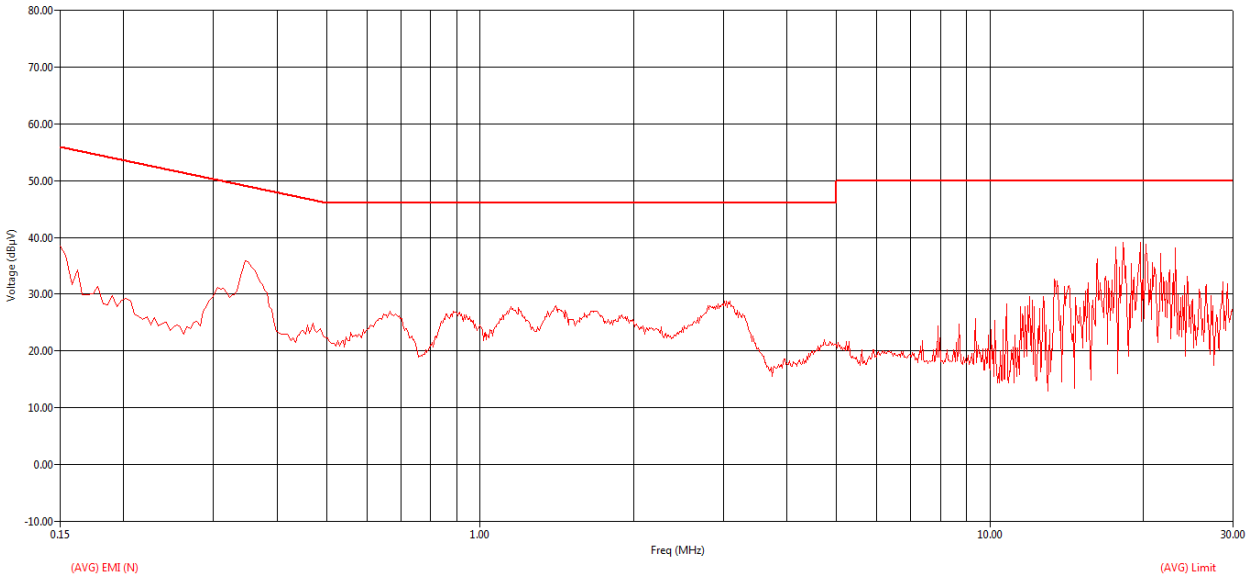

Figure 17: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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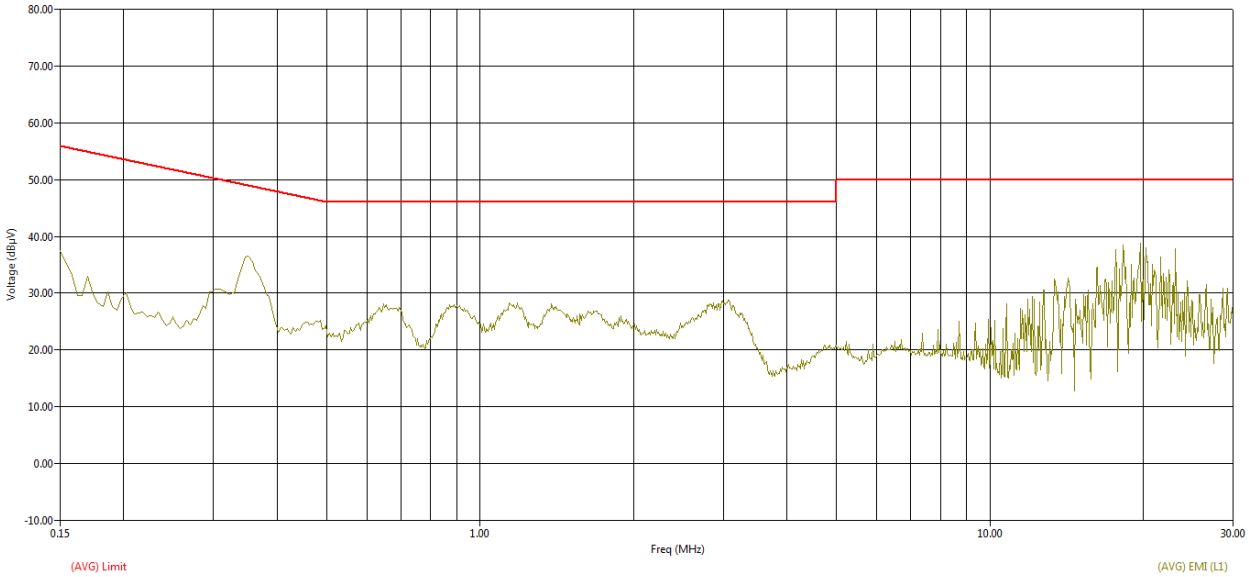

Figure 18: CE graph from 150 kHz to 30MHz using Average detector - Line

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	0.151	N	27.63	10.11	0.10	0.00	37.84	55.97	-18.13
0.166	0.158	L1	21.38	10.11	0.00	0.07	31.56	55.57	-24.01
0.350	0.346	L1	25.99	10.10	0.00	0.06	36.15	49.06	-12.91
3.046	3.040	L1	17.01	10.11	0.00	0.10	27.23	46.00	-18.77
3.086	3.084	N	16.71	10.11	0.13	0.00	26.96	46.00	-19.04
17.694	17.693	N	-4.79	10.37	0.34	0.00	5.93	50.00	-44.07
17.694	17.697	L1	-1.99	10.37	0.00	0.30	8.69	50.00	-41.31
18.242	18.250	N	-4.84	10.38	0.35	0.00	5.89	50.00	-44.11
18.242	18.239	L1	-0.80	10.38	0.00	0.30	9.89	50.00	-40.11
19.710	19.711	N	-0.74	10.40	0.37	0.00	10.03	50.00	-39.97
19.710	19.712	L1	0.91	10.40	0.00	0.32	11.62	50.00	-38.38
20.258	20.259	N	4.11	10.41	0.37	0.00	14.89	50.00	-35.11
20.258	20.266	L1	3.94	10.41	0.00	0.32	14.67	50.00	-35.33
23.130	23.125	N	10.72	10.48	0.38	0.00	21.57	50.00	-28.43
23.130	23.125	L1	9.78	10.48	0.00	0.35	20.61	50.00	-29.39

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

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5.3.1.6.2 MID CHANNEL_5300 MHZ

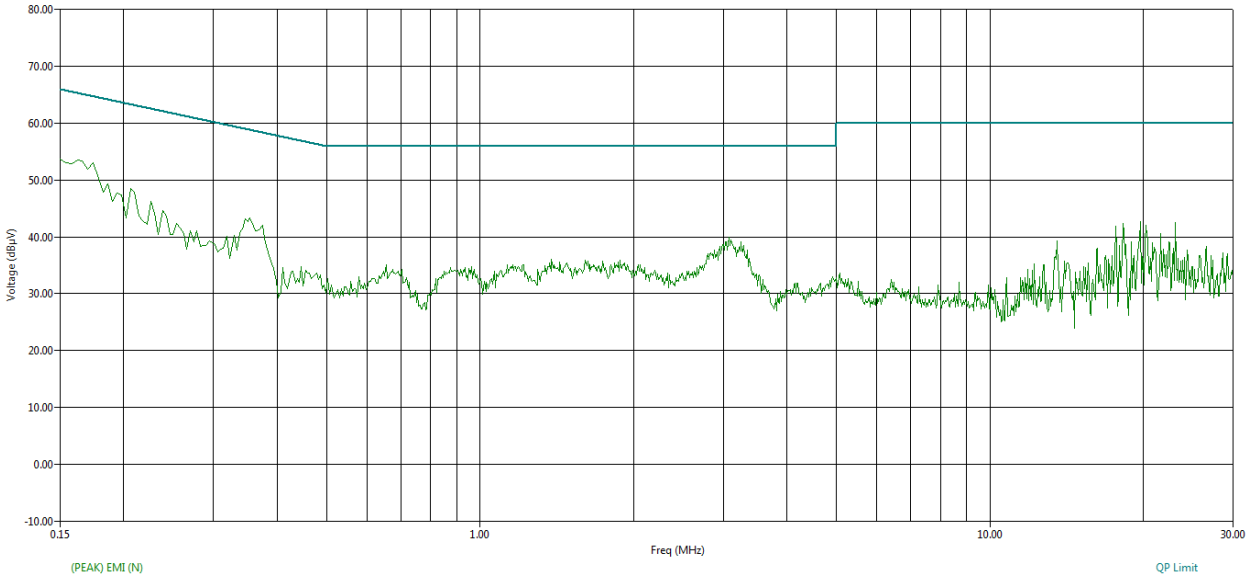

Figure 19: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

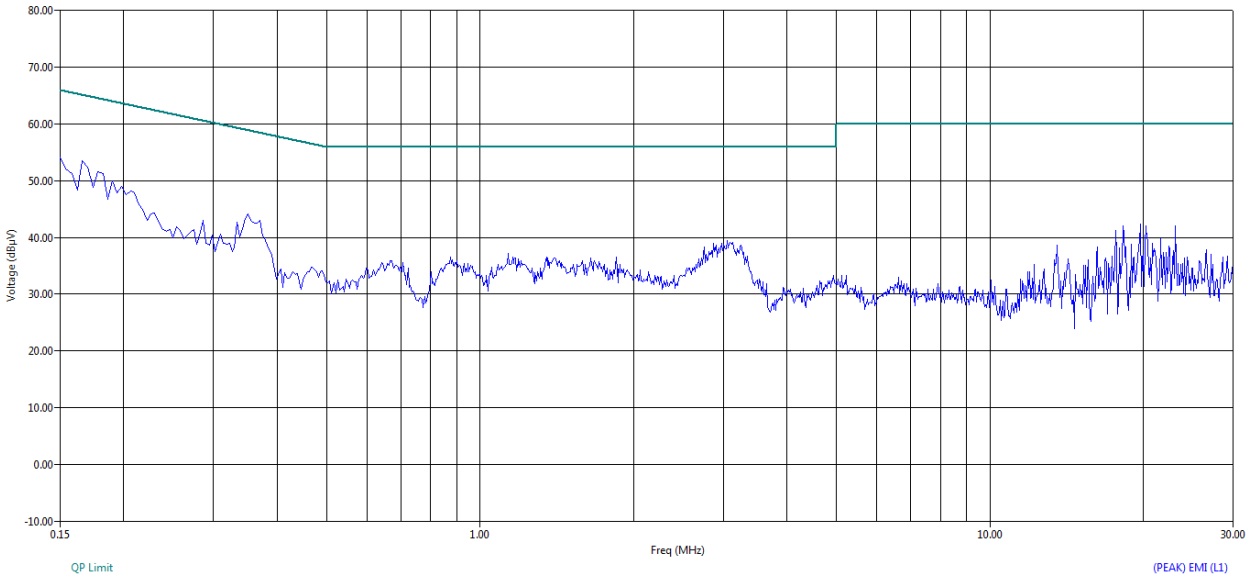

Figure 20: CE graph from 150 kHz to 30MHz using Peak detector - Line

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	0.151	N	37.73	10.11	0.10	0.00	47.93	65.94	-18.01
0.150	0.153	L1	37.45	10.11	0.00	0.07	47.63	65.83	-18.20
0.350	0.347	L1	31.41	10.10	0.00	0.06	41.58	59.03	-17.45
3.054	3.051	L1	25.32	10.11	0.00	0.10	35.53	56.00	-20.47
3.078	3.082	N	24.88	10.11	0.13	0.00	35.12	56.00	-20.88
17.694	17.694	N	29.33	10.37	0.34	0.00	40.05	60.00	-19.95
17.694	17.694	L1	28.64	10.37	0.00	0.30	39.32	60.00	-20.68
18.242	18.243	N	31.40	10.38	0.35	0.00	42.13	60.00	-17.87
18.242	18.243	L1	30.63	10.38	0.00	0.30	41.31	60.00	-18.69
19.710	19.709	N	33.39	10.40	0.37	0.00	44.16	60.00	-15.84
19.710	19.709	L1	32.42	10.40	0.00	0.32	43.14	60.00	-16.86
20.258	20.258	N	34.14	10.41	0.37	0.00	44.92	60.00	-15.08
20.258	20.258	L1	33.05	10.41	0.00	0.32	43.78	60.00	-16.22
23.130	23.129	N	37.94	10.48	0.38	0.00	48.80	60.00	-11.20
23.130	23.129	L1	36.76	10.48	0.00	0.35	47.59	60.00	-12.41

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

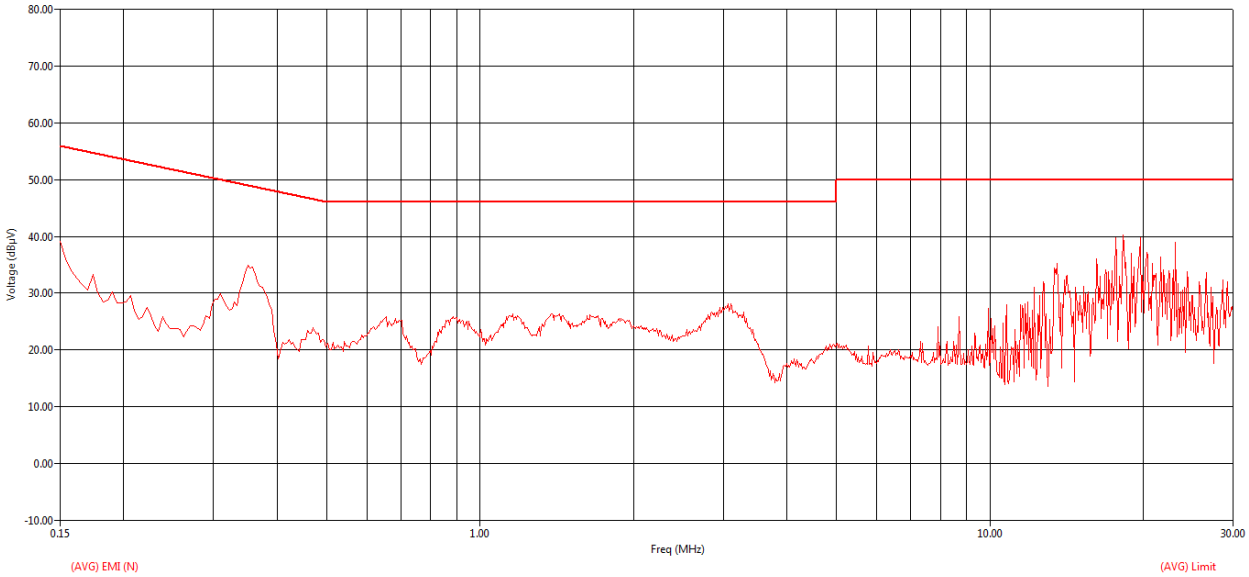

Figure 21: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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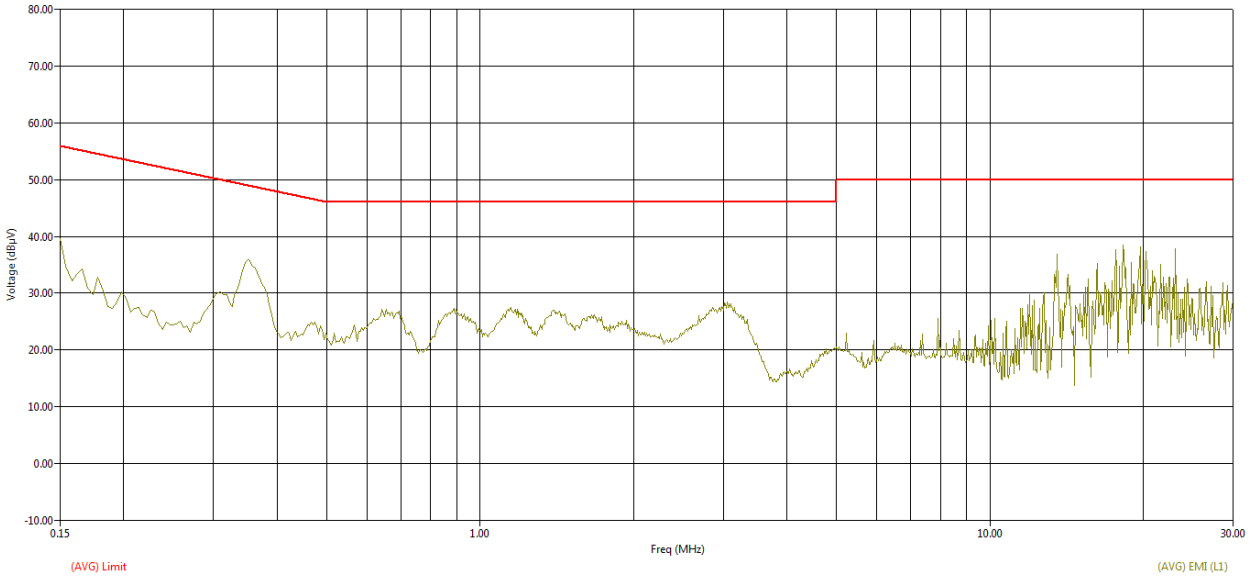

Figure 22: CE graph from 150 kHz to 30MHz using Average detector - Line

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	0.151	N	27.94	10.11	0.10	0.00	38.15	55.94	-17.80
0.150	0.153	L1	26.10	10.11	0.00	0.07	36.28	55.83	-19.55
0.350	0.347	L1	25.73	10.10	0.00	0.06	35.89	49.03	-13.14
3.054	3.051	L1	17.35	10.11	0.00	0.10	27.56	46.00	-18.44
3.078	3.082	N	17.03	10.11	0.13	0.00	27.27	46.00	-18.73
17.694	17.694	N	25.97	10.37	0.34	0.00	36.69	50.00	-13.31
17.694	17.694	L1	25.33	10.37	0.00	0.30	36.00	50.00	-14.00
18.242	18.243	N	27.95	10.38	0.35	0.00	38.68	50.00	-11.32
18.242	18.243	L1	27.19	10.38	0.00	0.30	37.87	50.00	-12.13
19.710	19.709	N	29.85	10.40	0.37	0.00	40.61	50.00	-9.39
19.710	19.709	L1	28.84	10.40	0.00	0.32	39.55	50.00	-10.45
20.258	20.258	N	30.55	10.41	0.37	0.00	41.33	50.00	-8.67
20.258	20.258	L1	29.49	10.41	0.00	0.32	40.22	50.00	-9.78
23.130	23.129	N	35.05	10.48	0.38	0.00	45.90	50.00	-4.10
23.130	23.129	L1	33.87	10.48	0.00	0.35	44.70	50.00	-5.30

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

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5.3.1.6.3 HIGH CHANNEL_5335 MHZ

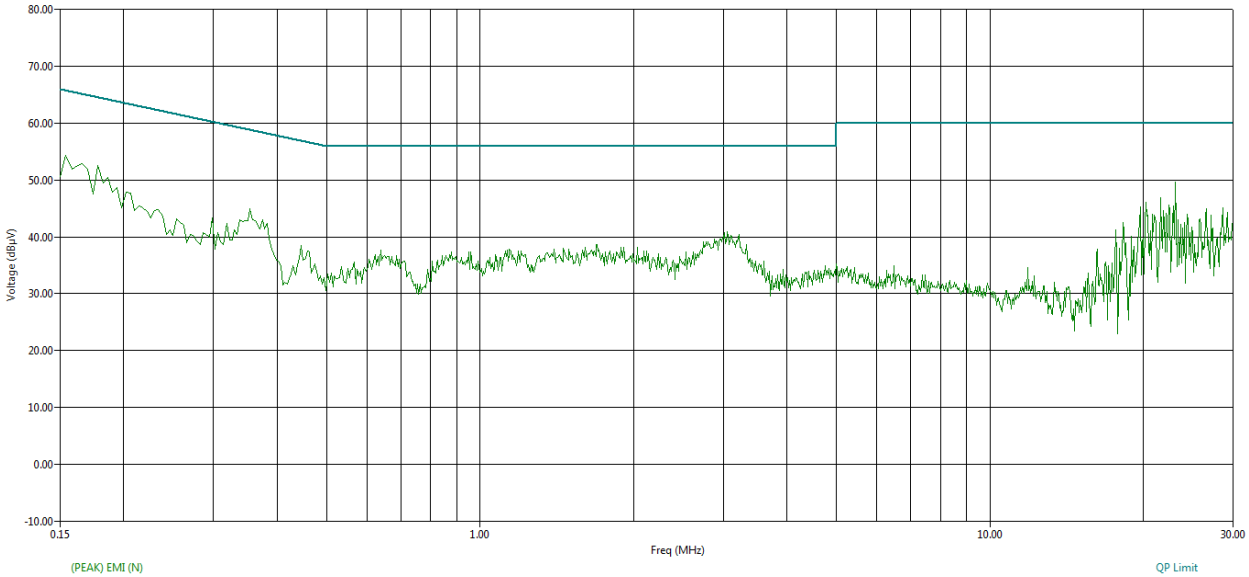

Figure 23: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

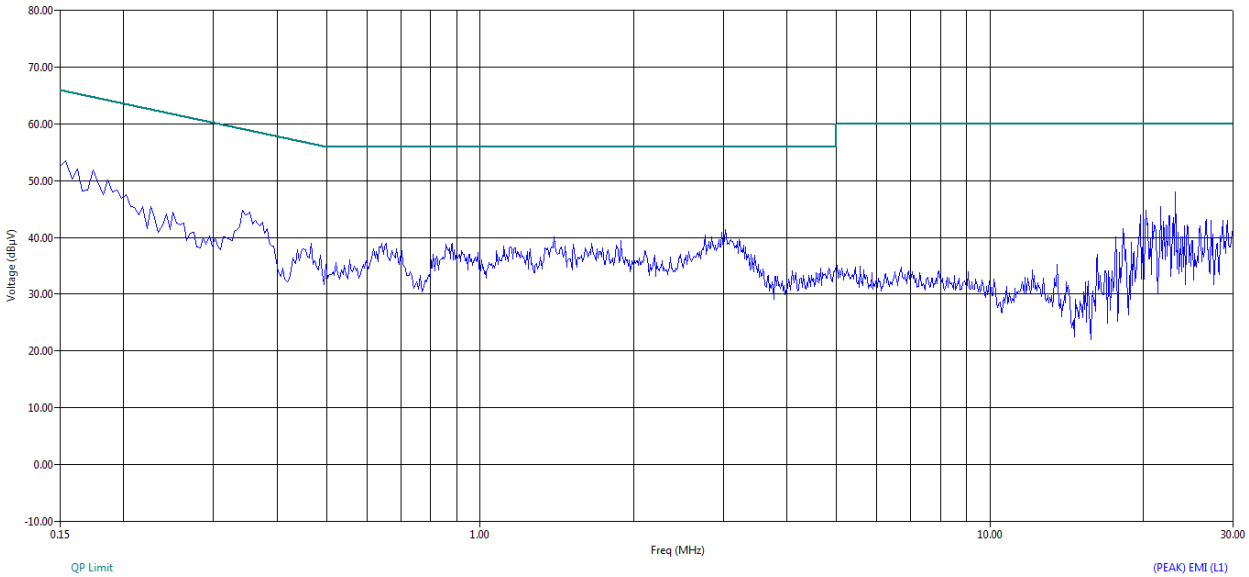

Figure 24: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.154	0.151	N	36.24	10.11	0.10	0.00	46.45	65.95	-19.50
0.154	0.152	L1	36.35	10.11	0.00	0.07	46.53	65.90	-19.37
0.180	0.165	L1	34.83	10.11	0.00	0.07	45.01	65.23	-20.22
0.350	0.348	L1	31.76	10.10	0.00	0.06	41.92	59.01	-17.09
1.394	1.395	L1	23.01	10.12	0.00	0.08	33.20	56.00	-22.80
3.030	3.031	L1	24.90	10.11	0.00	0.10	35.12	56.00	-20.88
19.710	19.716	N	5.19	10.40	0.37	0.00	15.96	60.00	-44.04
19.710	19.710	L1	6.65	10.40	0.00	0.32	17.36	60.00	-42.64
20.258	20.266	N	9.32	10.41	0.37	0.00	20.10	60.00	-39.90
20.258	20.265	L1	8.97	10.41	0.00	0.32	19.70	60.00	-40.30
21.662	21.656	N	7.40	10.44	0.38	0.00	18.22	60.00	-41.78
21.662	21.670	L1	7.63	10.44	0.00	0.34	18.41	60.00	-41.59
22.458	22.465	N	12.53	10.46	0.38	0.00	23.37	60.00	-36.63
22.886	22.883	N	15.54	10.47	0.38	0.00	26.39	60.00	-33.61
23.130	23.132	N	16.54	10.48	0.38	0.00	27.40	60.00	-32.60
23.130	23.126	L1	15.55	10.48	0.00	0.35	26.38	60.00	-33.62

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

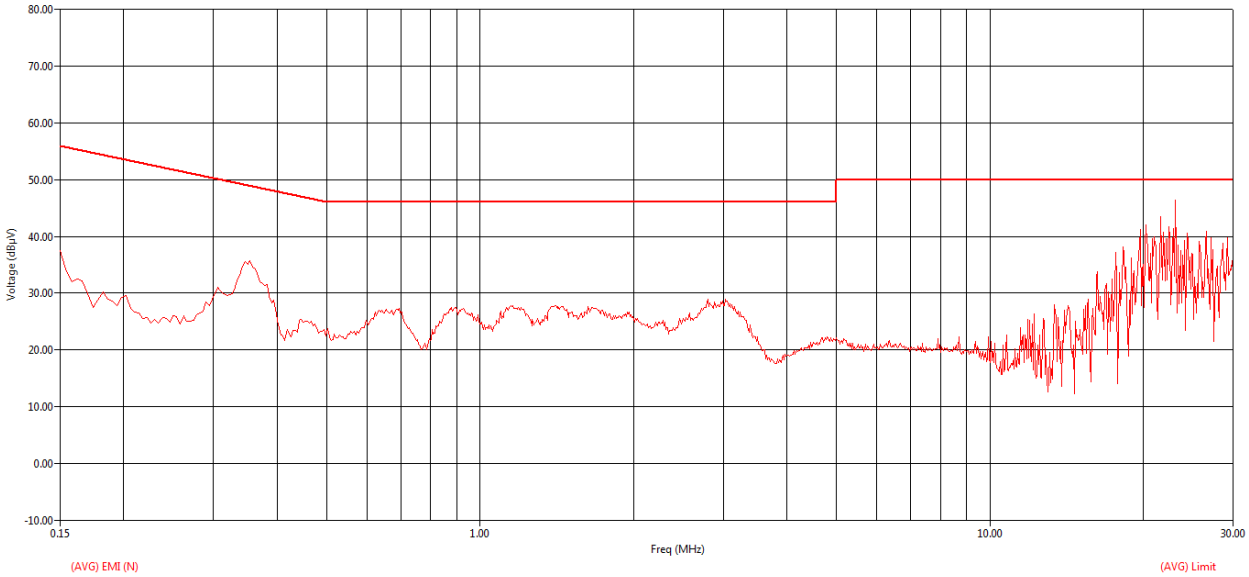

Figure 25: CE graph from 150 kHz to 30MHz using Average detector - Neutral

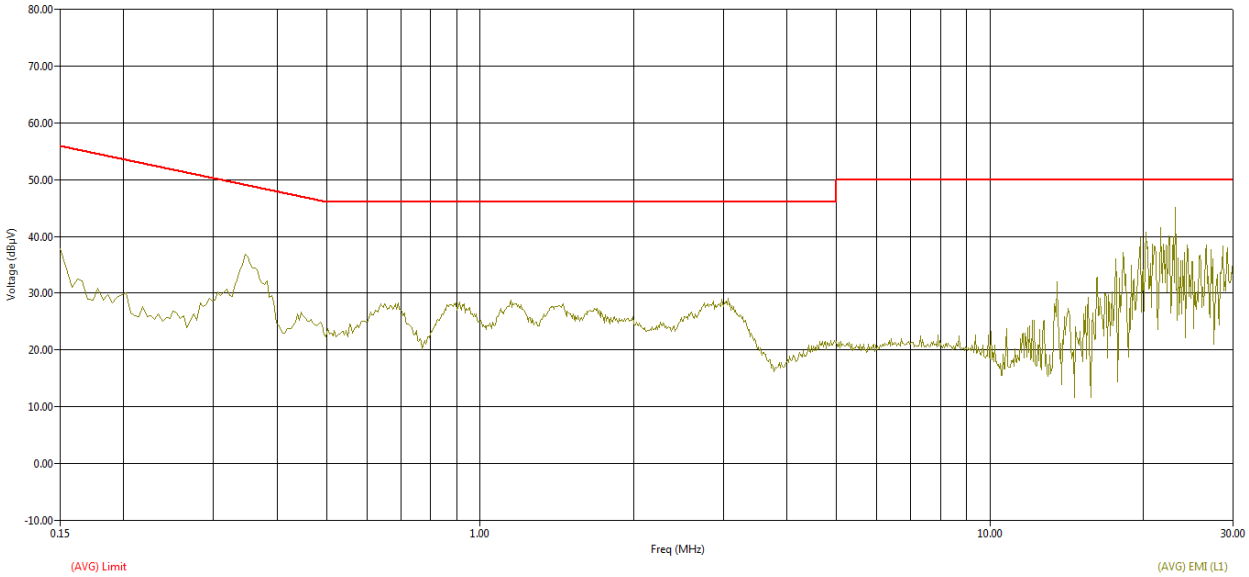

Figure 26: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Pulse Limiter+ Cable (dB)	Transducer N (dB)	Transducer L1 (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.154	0.151	N	27.17	10.11	0.10	0.00	37.38	55.95	-18.57
0.154	0.152	L1	26.74	10.11	0.00	0.07	36.91	55.90	-18.99
0.180	0.165	L1	20.18	10.11	0.00	0.07	30.36	55.23	-24.87
0.350	0.348	L1	26.05	10.10	0.00	0.06	36.21	49.01	-12.80
1.394	1.395	L1	16.72	10.12	0.00	0.08	26.91	46.00	-19.09
3.030	3.031	L1	16.95	10.11	0.00	0.10	27.16	46.00	-18.84
19.710	19.716	N	-0.91	10.40	0.37	0.00	9.85	50.00	-40.15
19.710	19.710	L1	0.76	10.40	0.00	0.32	11.47	50.00	-38.53
20.258	20.266	N	3.34	10.41	0.37	0.00	14.12	50.00	-35.88
20.258	20.265	L1	3.02	10.41	0.00	0.32	13.75	50.00	-36.25
21.662	21.656	N	1.37	10.44	0.38	0.00	12.19	50.00	-37.81
21.662	21.670	L1	1.50	10.44	0.00	0.34	12.28	50.00	-37.72
22.458	22.465	N	6.39	10.46	0.38	0.00	17.23	50.00	-32.77
22.886	22.883	N	9.44	10.47	0.38	0.00	20.29	50.00	-29.71
23.130	23.132	N	10.48	10.48	0.38	0.00	21.34	50.00	-28.66
23.130	23.126	L1	9.53	10.48	0.00	0.35	20.36	50.00	-29.64

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.

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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	23.8ºC	25.6ºC 23.8ºC	25.6ºC 22.9ºC	22.9ºC
Humidity	51.6%	51.6%	56.3%	59.5% 56.3%	59.5% 54.0%	54.0%
Tested By	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu
Test Date	20/04/2015	20/04/2015	30/04/2015	28/04/2015 30/04/2015	28/04/2015 29/04/2015	29/04/2015

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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	23.8ºC	25.6ºC 23.8ºC	25.6ºC 22.9ºC	22.9ºC
Humidity	51.6%	51.6%	56.3%	59.5% 56.3%	59.5% 54.0%	54.0%
Tested By	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu	Harsha /Subhendu
Test Date	20/04/2015	20/04/2015	30/04/2015	28/04/2015 30/04/2015	28/04/2015 29/04/2015	29/04/2015

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	39.54 43.52 46.02 53.98

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5.3.2.4 TEST SETUP

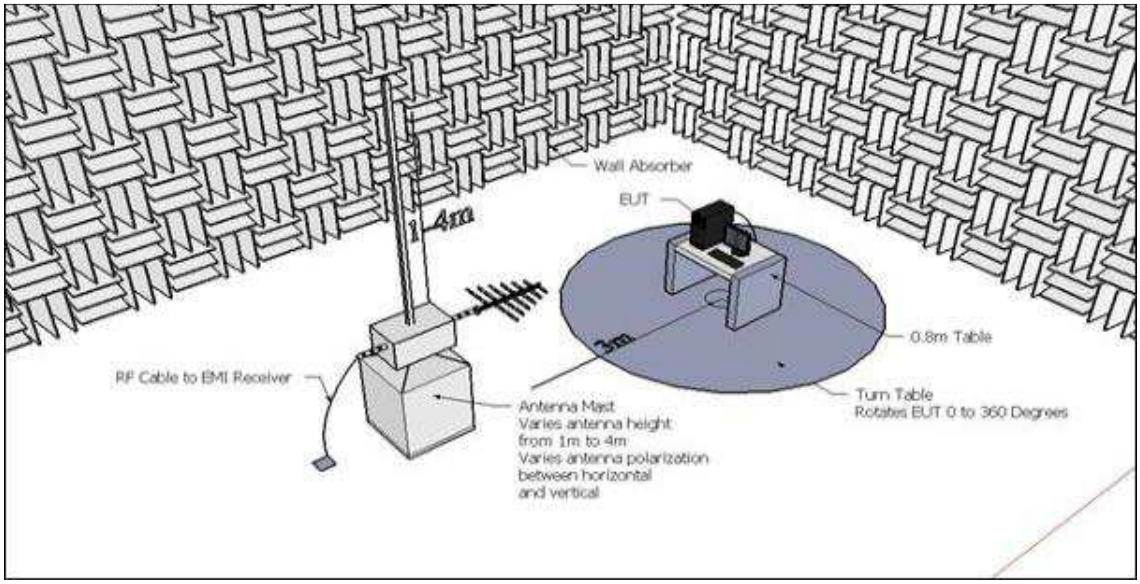

Figure 27: Typical test setup for Radiated Emission test

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_5280MHZ

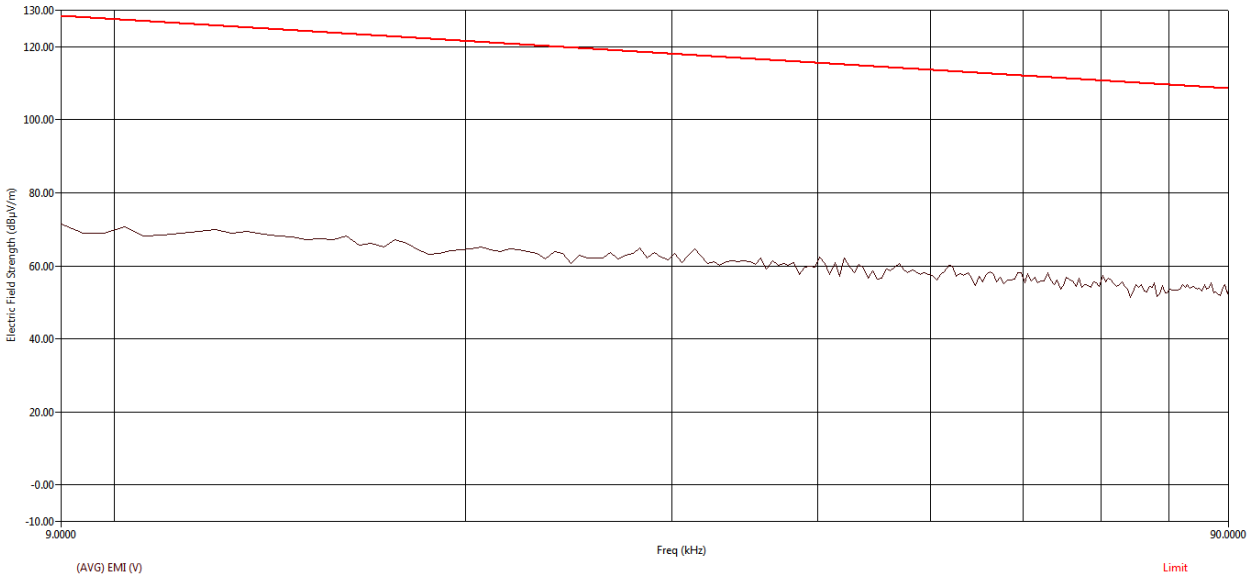

Figure 28: Average RE from 9 kHz to 90 kHz - Parallel

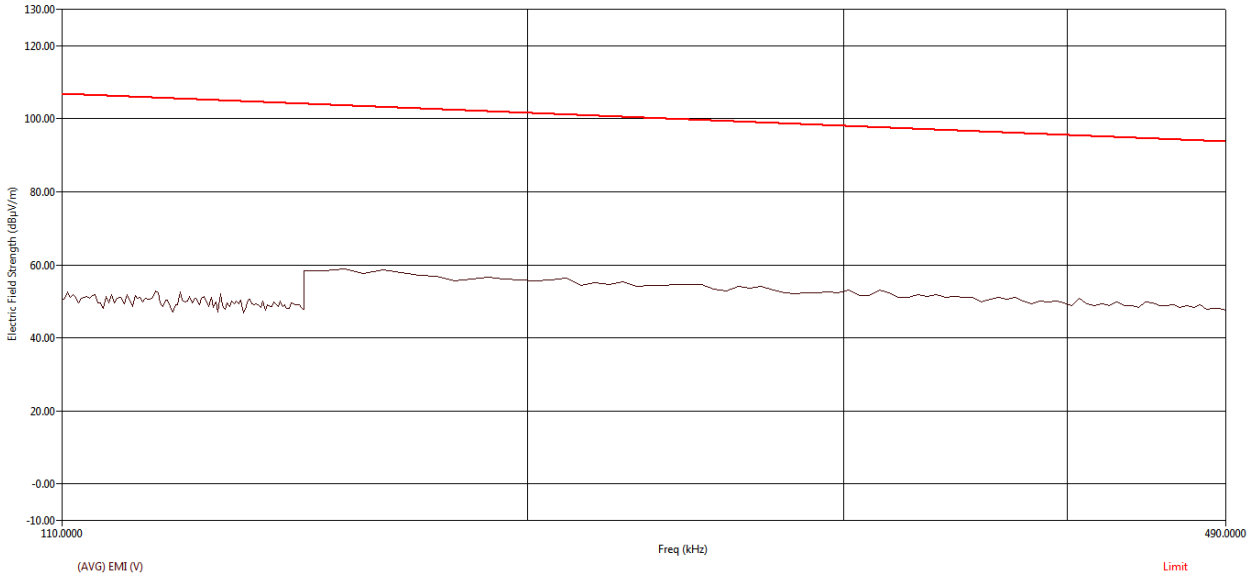

Figure 29: Average RE from 110 kHz to 490 kHz - Parallel

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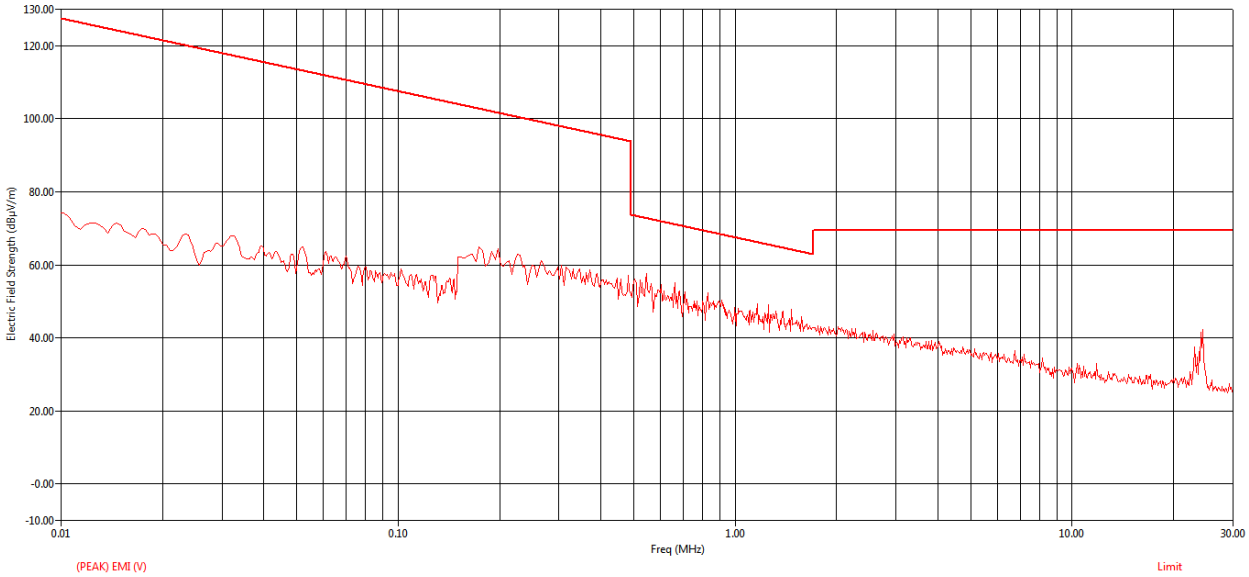

Figure 30: Peak RE from 9 kHz to 30MHz - Parallel

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	9.13	1.68	16.81	27.62	69.54	-41.92
24.40	24.39	V	2.56	1.72	16.73	21.02	69.54	-48.53

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

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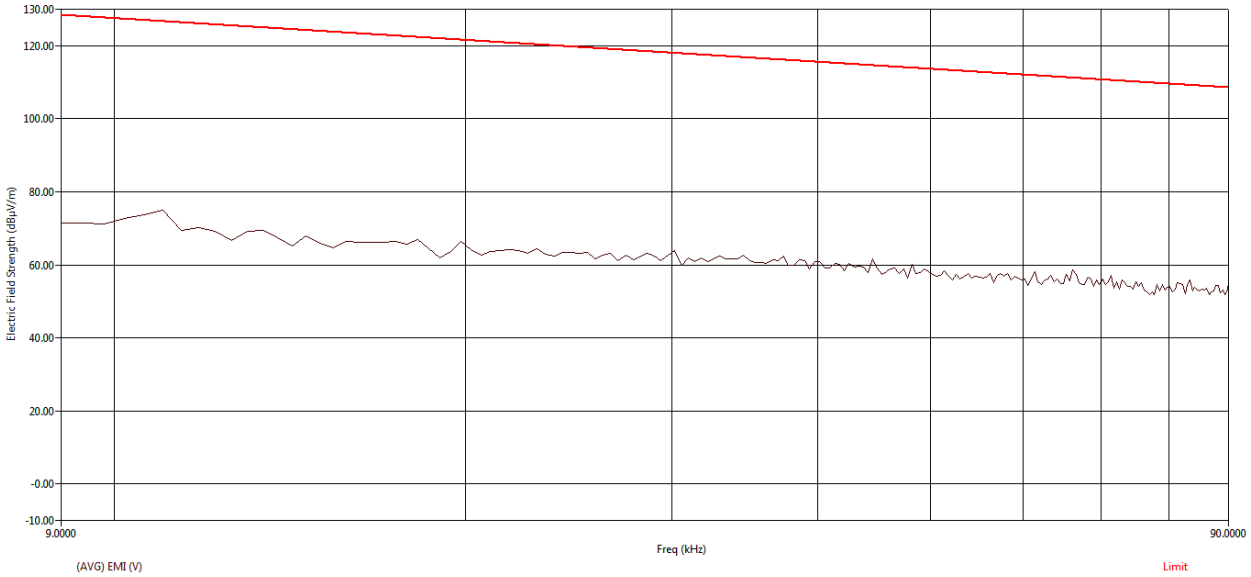

Figure 31: Average RE from 9 kHz to 90 kHz - Perpendicular

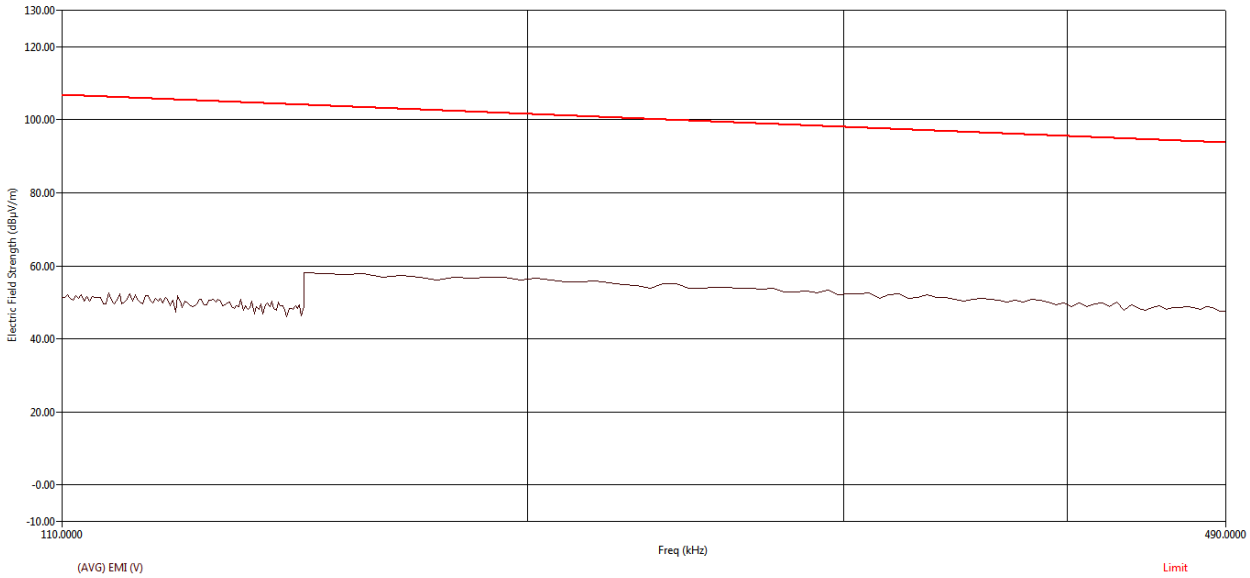

Figure 32: Average RE from 110 kHz to 490 kHz - Perpendicular

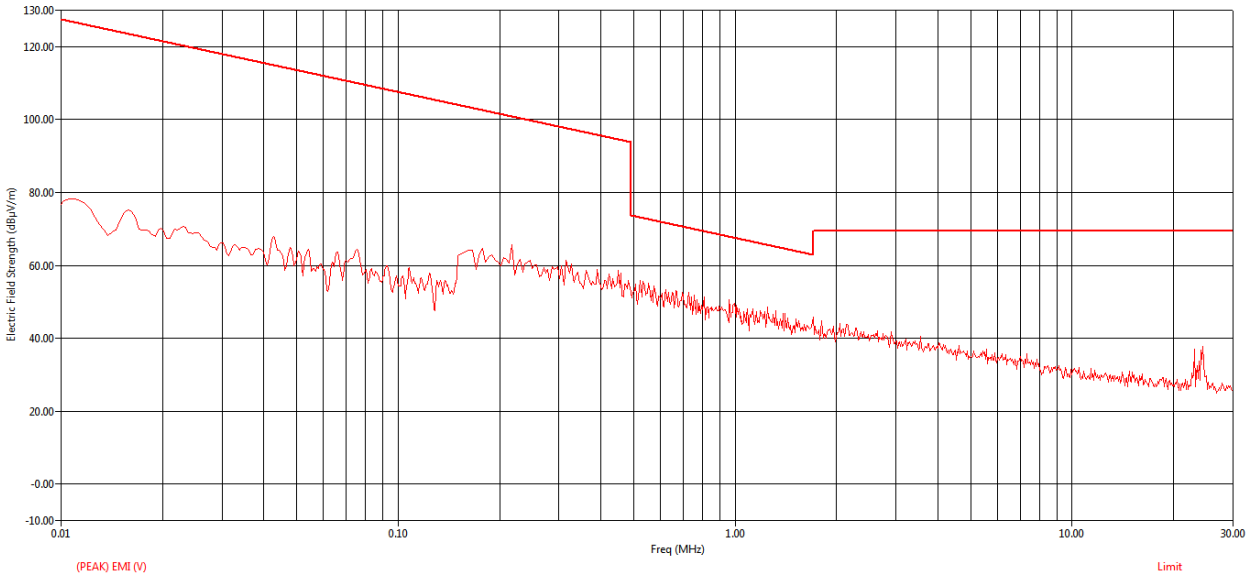

Figure 33Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
21.66	21.66	V	16.18	1.63	16.89	34.70	69.54	-34.85
23.06	23.07	V	11.41	1.68	16.81	29.90	69.54	-39.64

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

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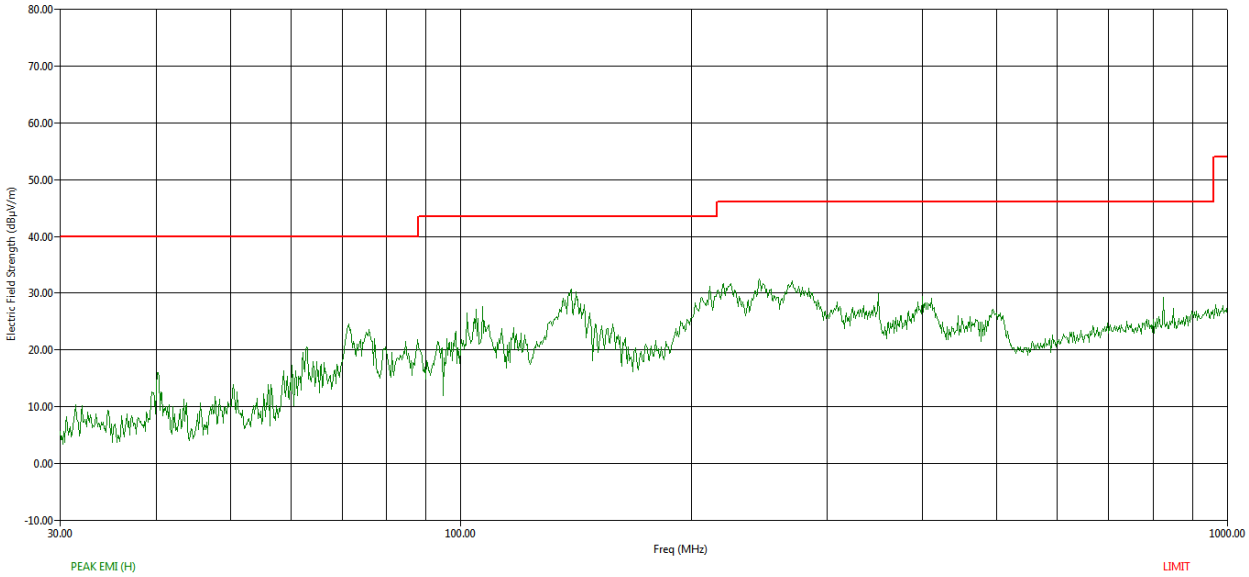

Figure 34:Peak RE from 30MHz to 1GHz - Horizontal polarization

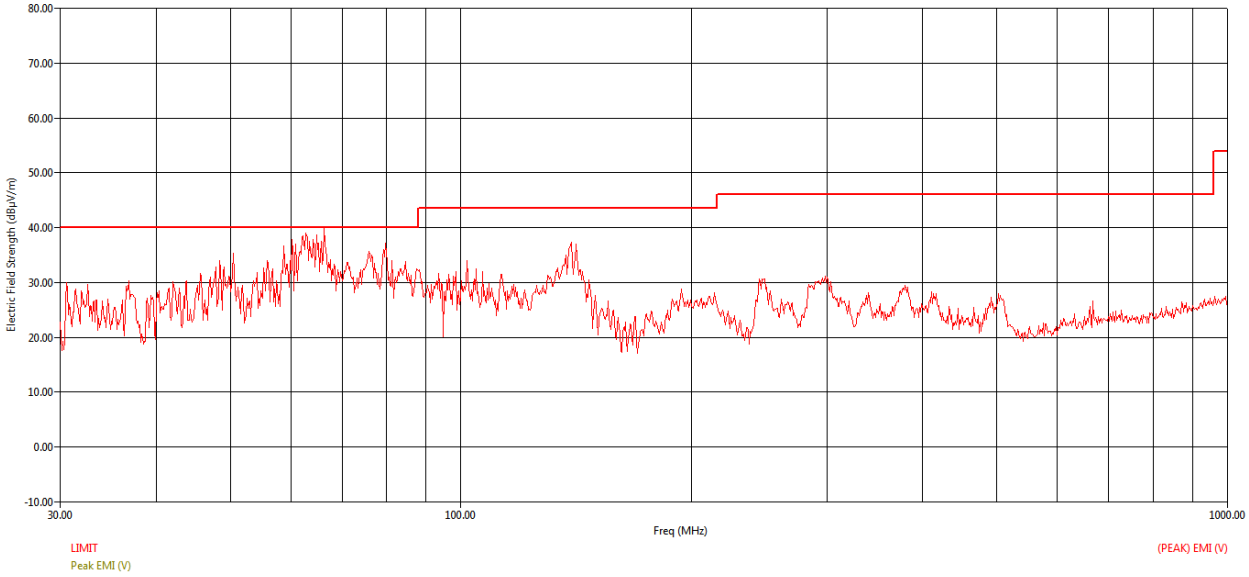

Figure 35: Peak RE from 30MHz to 1GHz - Vertical polarization

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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	62.77	V	39.80	100.00	55.41	2.85	9.45	32.17	35.55	40.00	-4.45
66.28	66.30	V	174.40	103.00	58.30	2.93	9.48	32.16	38.55	40.00	-1.45
139.28	139.21	V	313.20	100.00	50.69	4.27	11.76	32.05	34.67	43.52	-8.85
225.20	225.08	H	180.00	104.00	44.42	5.19	12.93	31.97	30.57	46.02	-15.45

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

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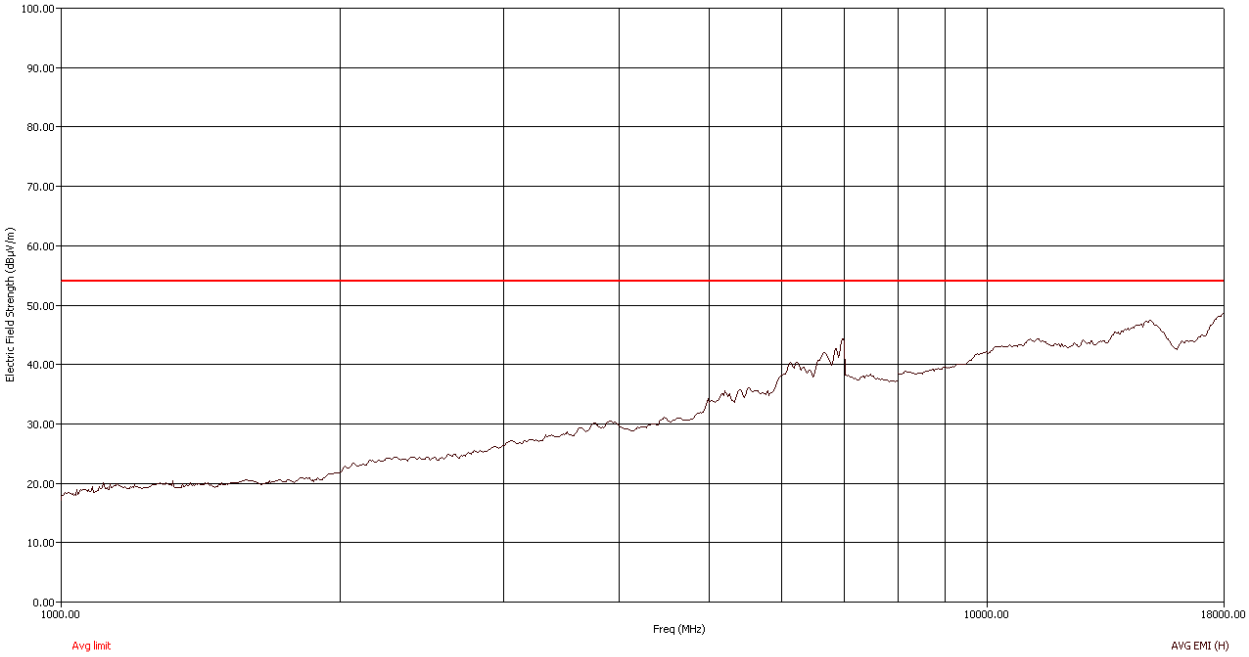

Figure 36: Average RE from 1GHz to 18GHz - Horizontal polarization

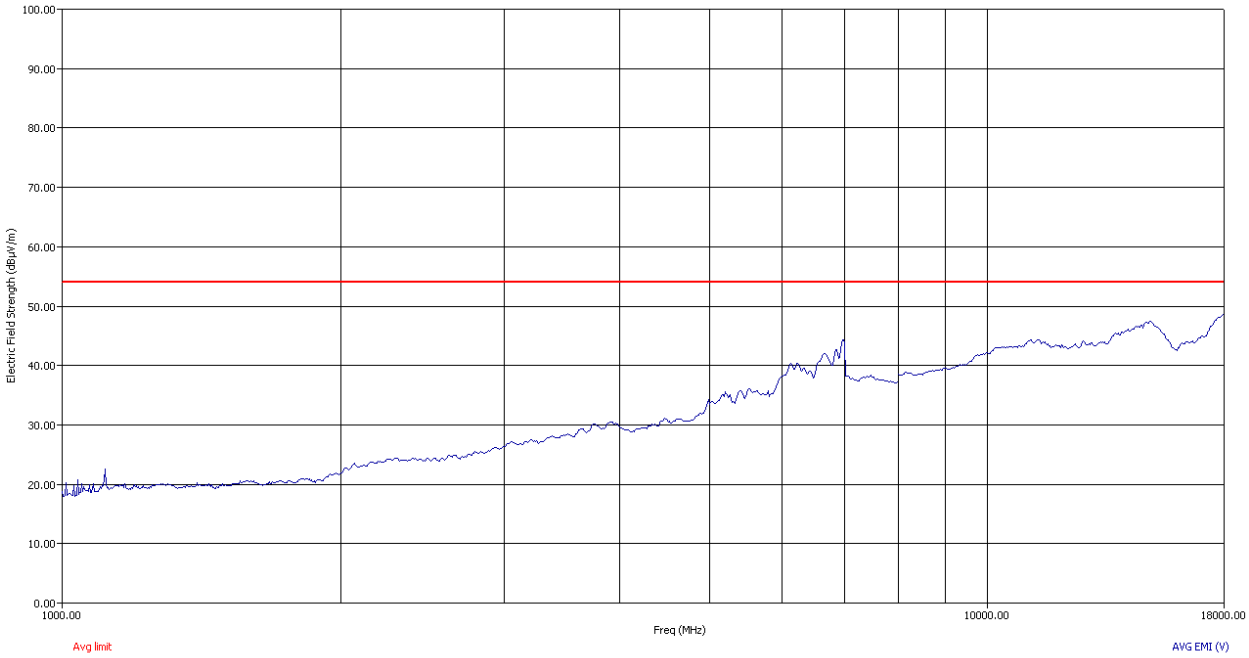

Figure 37: Average RE from 1GHz to 18GHz - Vertical polarization

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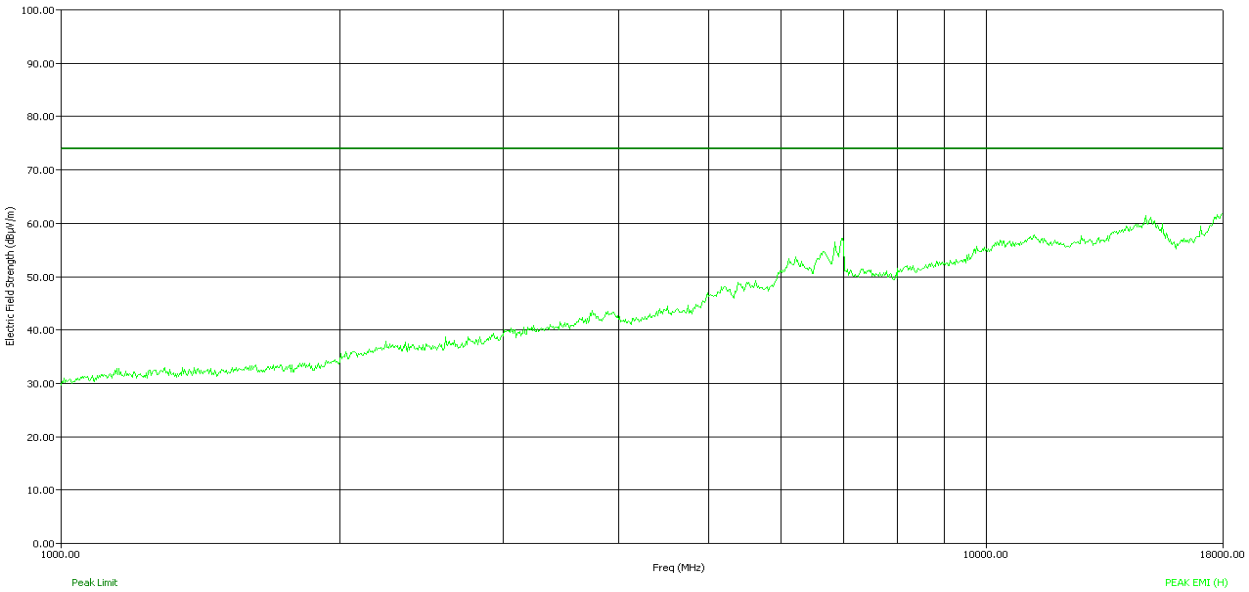

Figure 38: Peak RE from 1GHz to 18GHz - Horizontal polarization

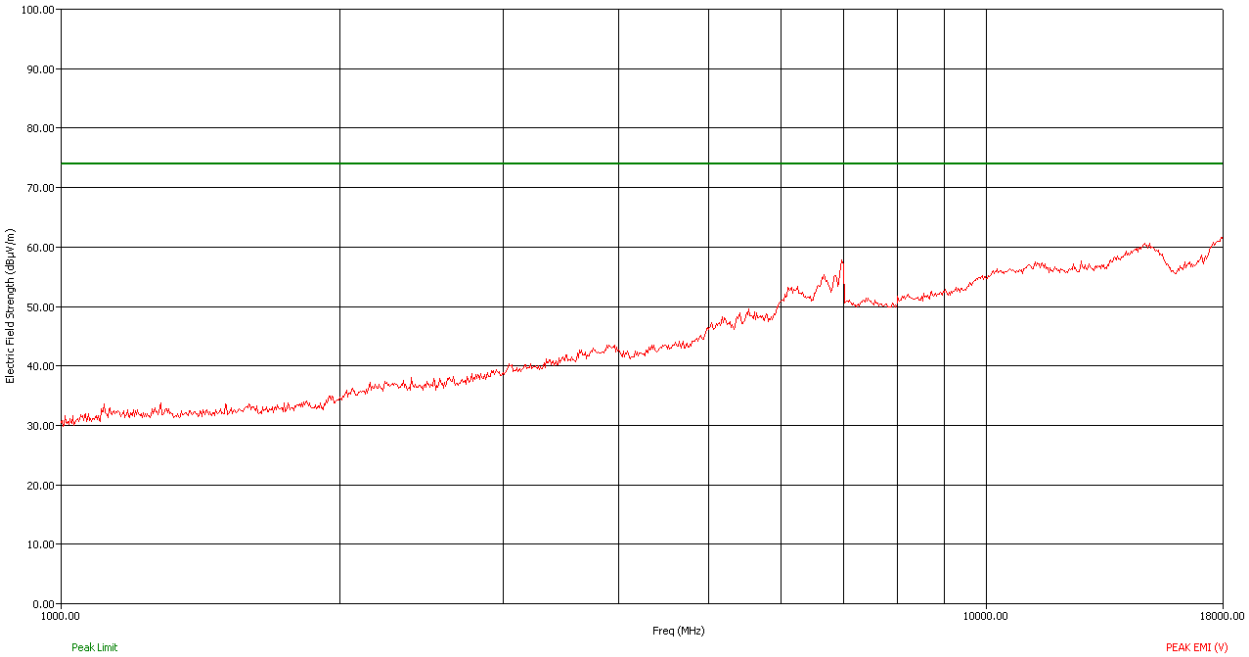

Figure 39: Peak RE from 1GHz to 18GHz - Vertical polarization

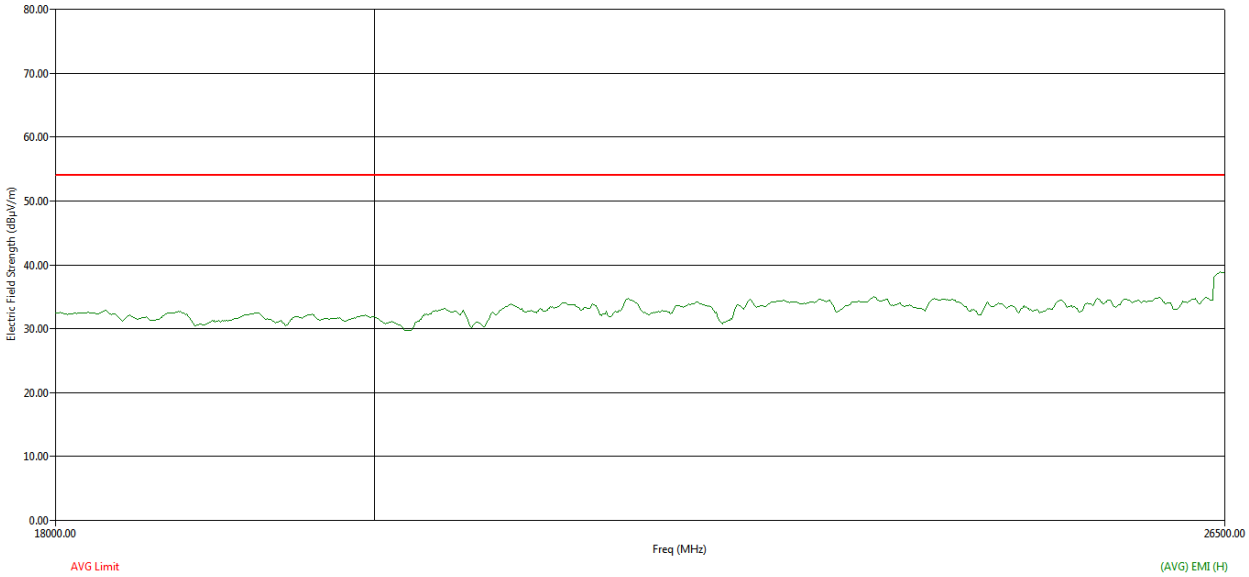

Figure 40: Average RE from 18GHz to 26.5GHz - Horizontal polarization

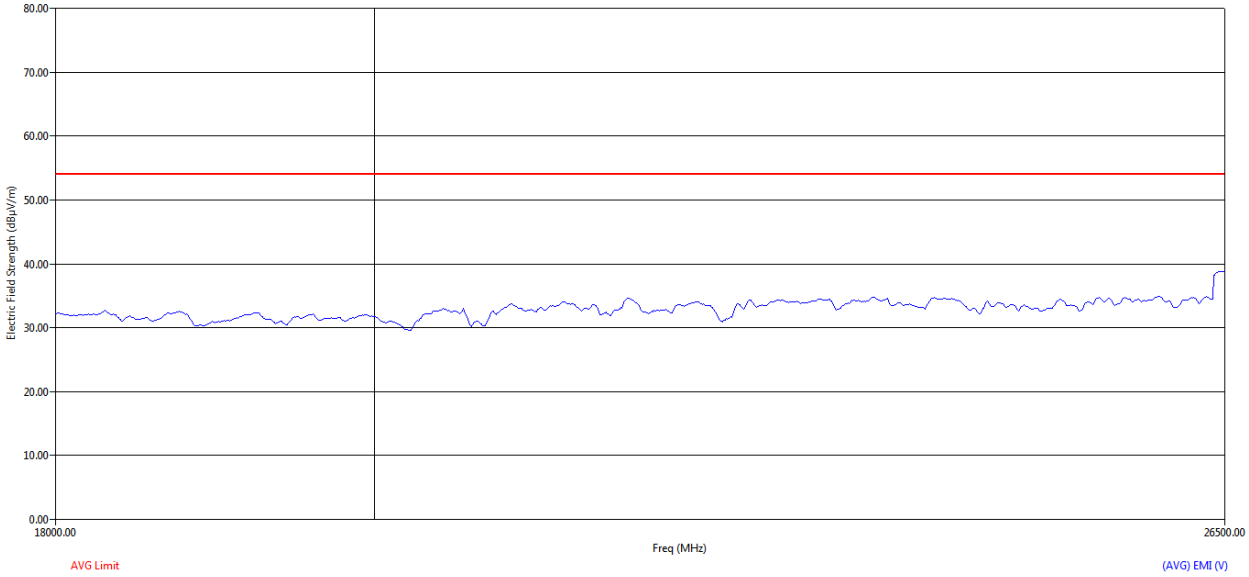

Figure 41: Average RE from 18GHz to 26.5GHz - Vertical polarization

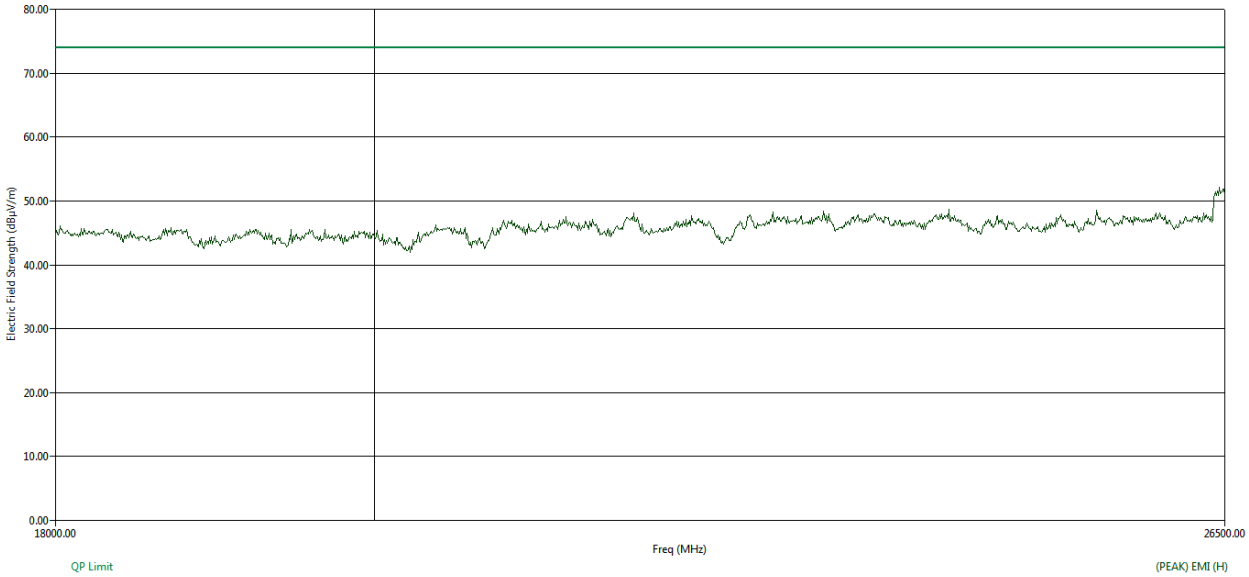

Figure 42: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

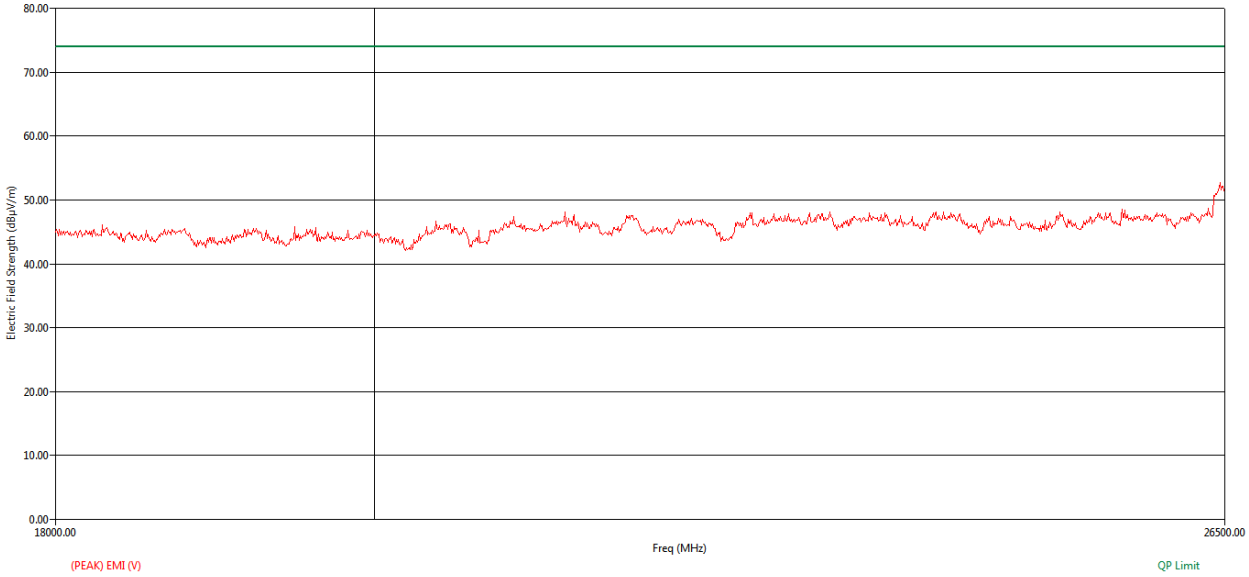

Figure 43: Peak RE from 18GHz to 26.5GHz - Vertical polarization

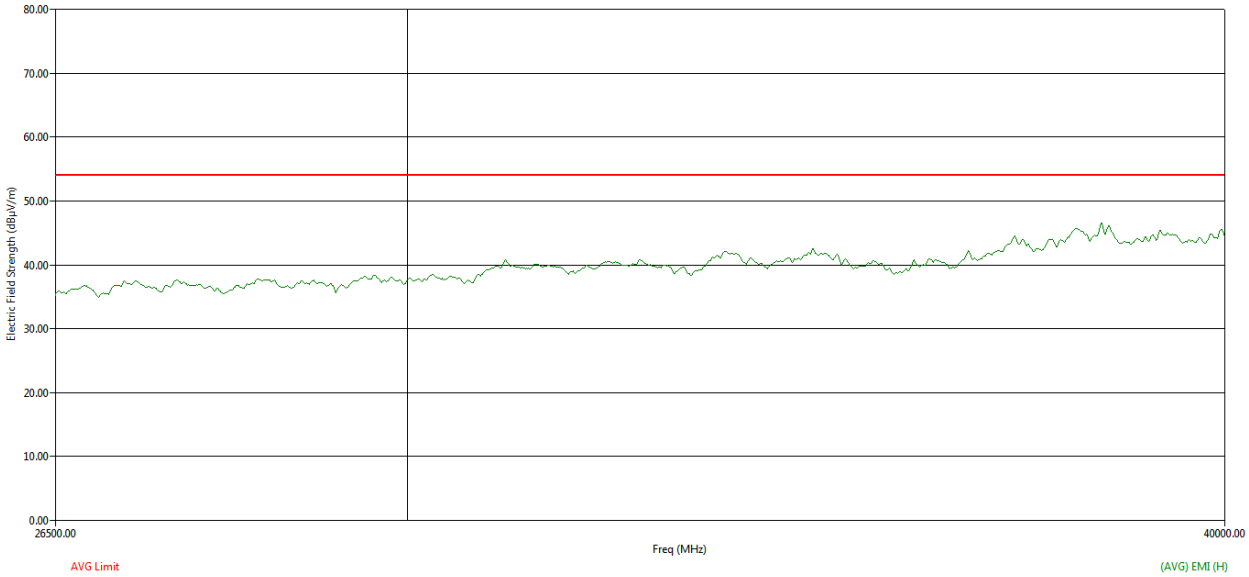

Figure 44: Average RE from 26.5GHz to 40GHz - Horizontal polarization

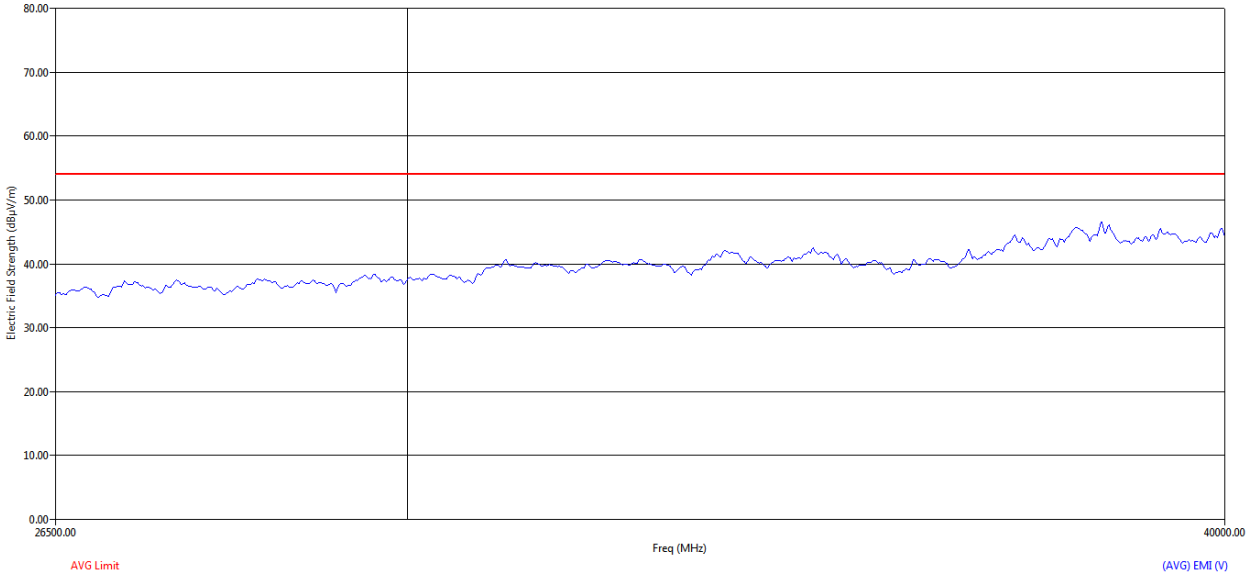

Figure 45: Average RE from 26.5GHz to 40GHz - Vertical polarization

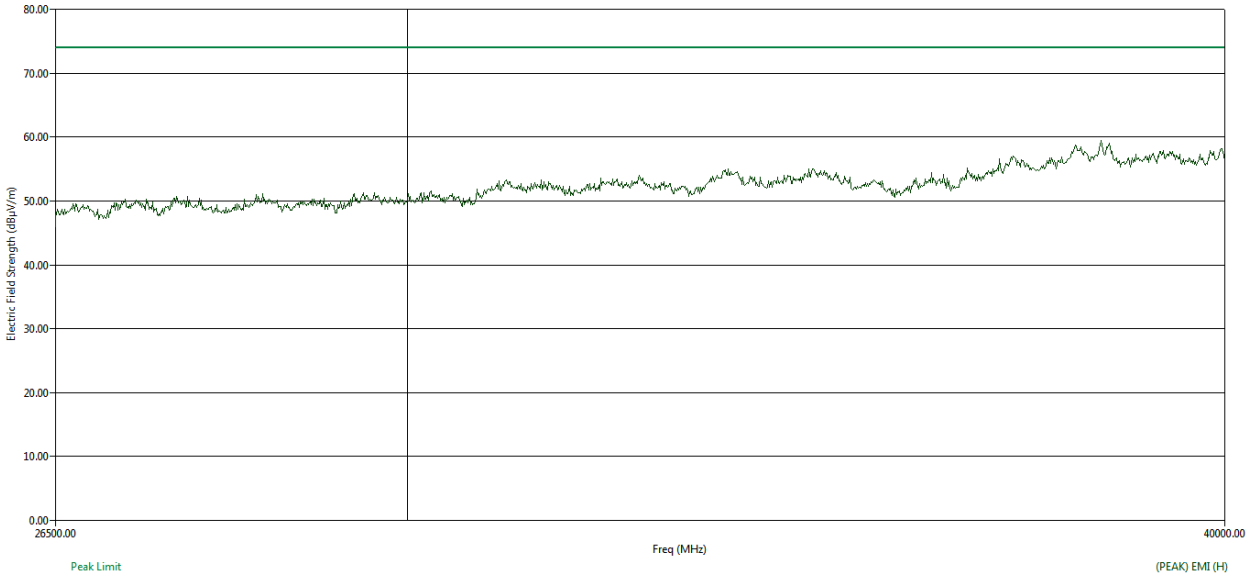

Figure 46: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

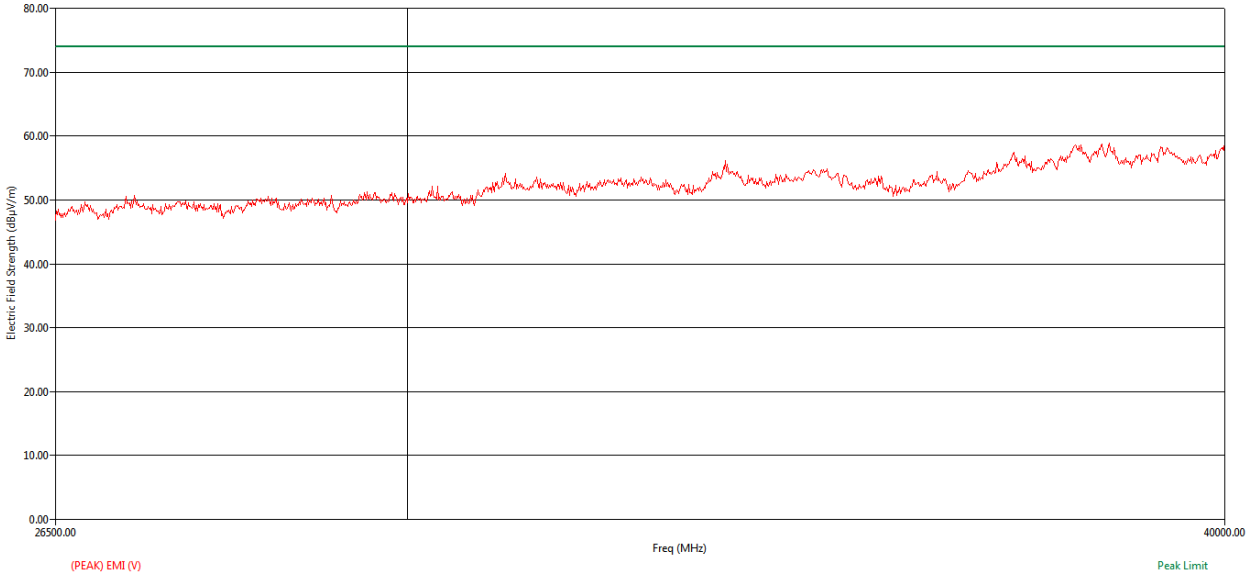

Figure 47: Peak RE from 26.5GHz to 40GHz - Vertical polarization

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5.3.2.6.2 MID CHANNEL_5300MHZ

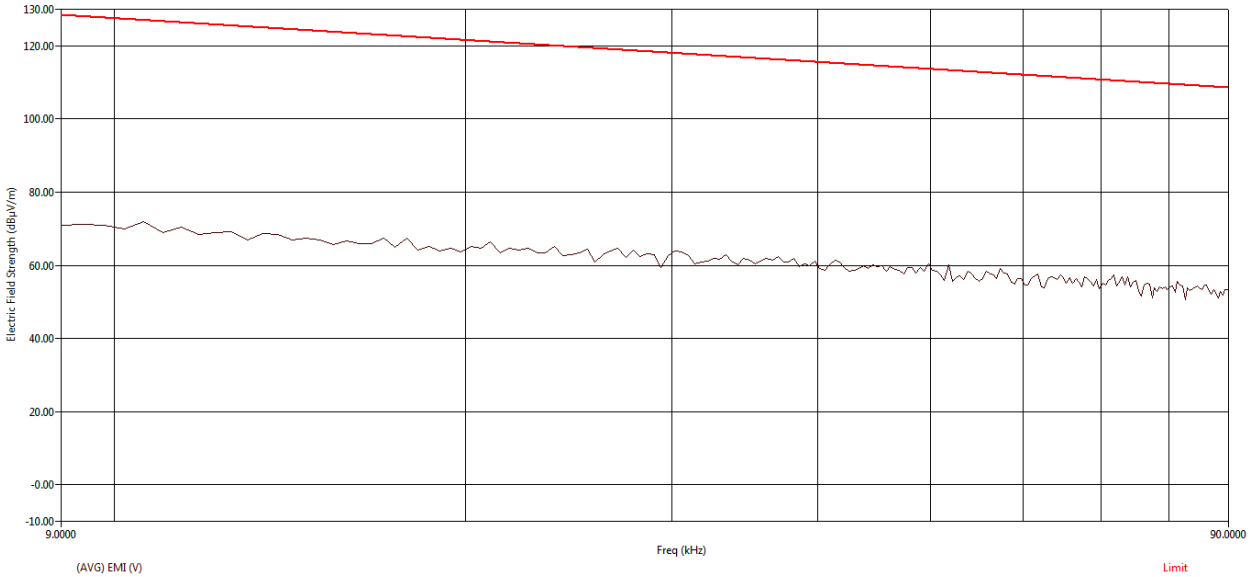

Figure 48: Average RE from 9 kHz to 90 kHz - Parallel

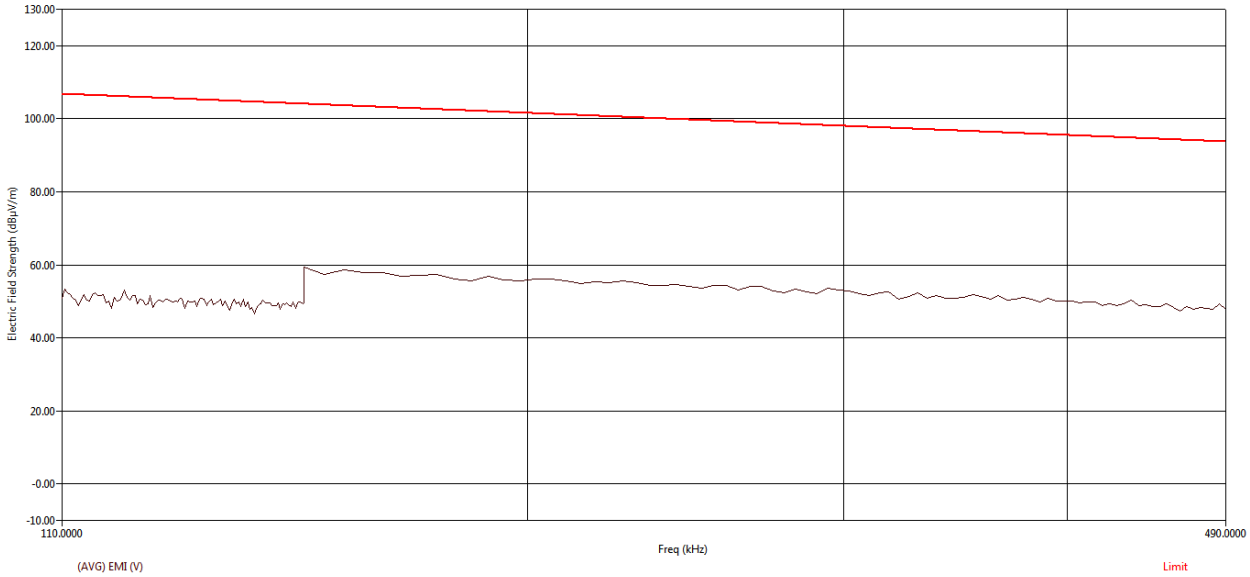

Figure 49: Average RE from 110 kHz to 490 kHz – Parallel

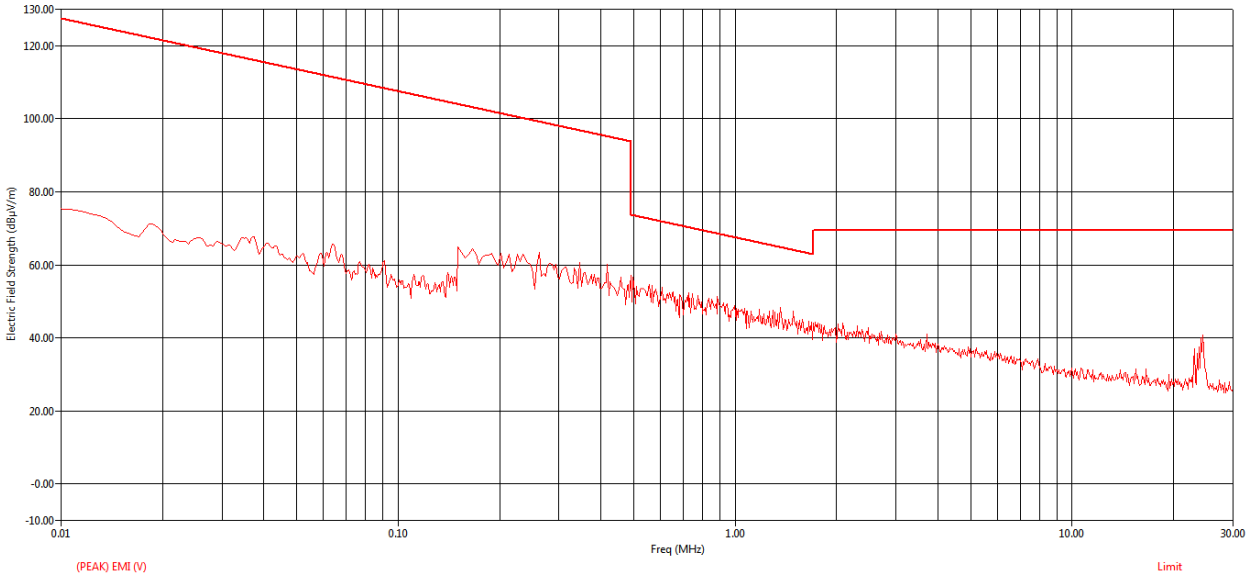

Figure 50 : Peak RE from 9 kHz to 30MHz - Parallel

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	9.24	1.68	16.81	27.73	69.54	-41.82
24.40	24.41	V	2.85	1.72	16.73	21.30	69.54	-48.24

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

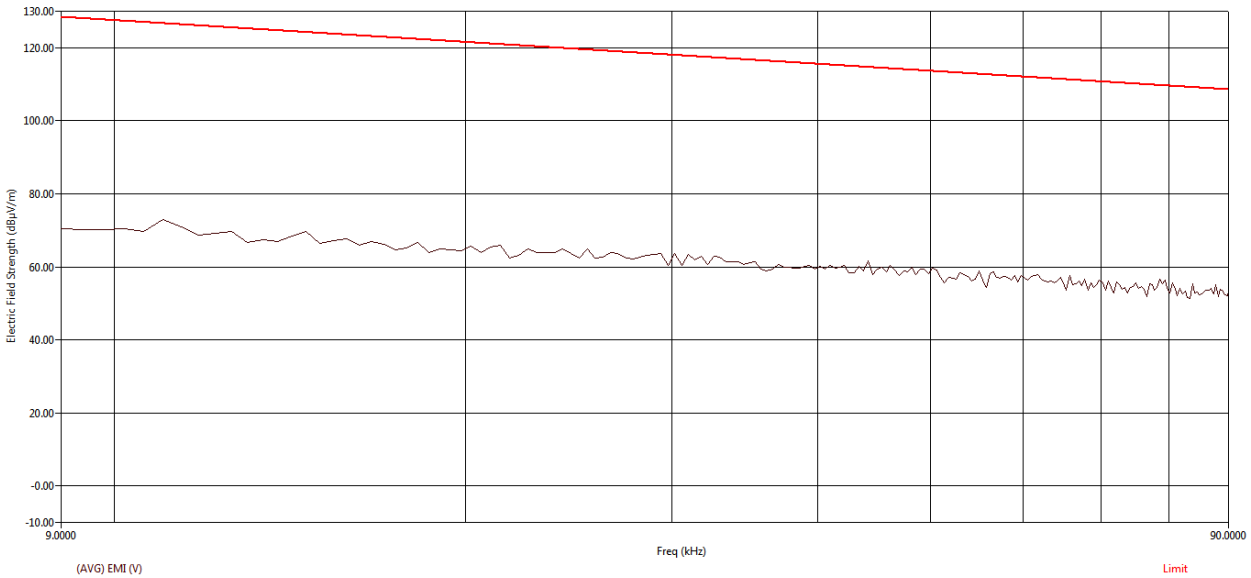

Figure 51 : Average RE from 9 kHz to 90 kHz - Perpendicular

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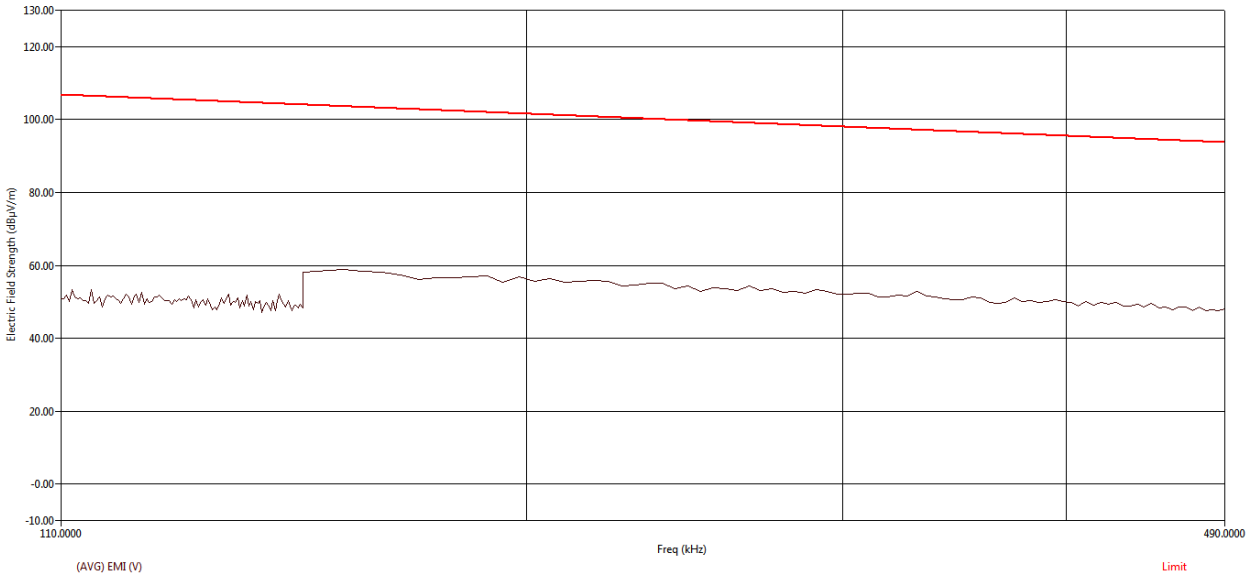

Figure 52 : Average RE from 110 kHz to 490 kHz - Perpendicular

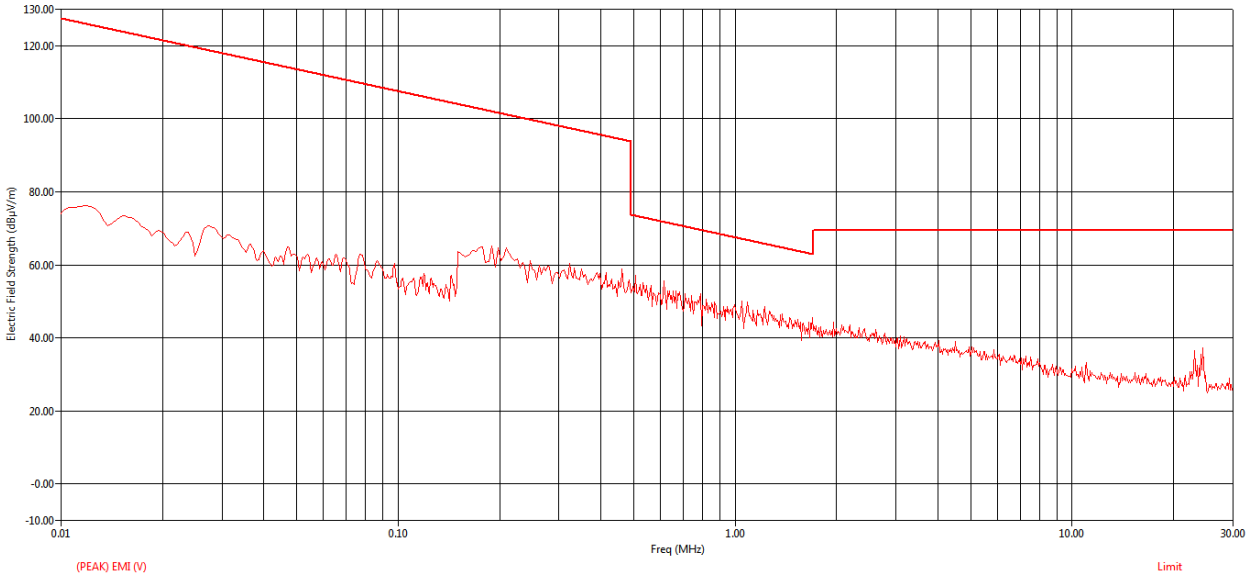

Figure 53 : Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
21.66	21.66	V	16.82	1.63	16.89	35.34	69.54	-34.20
23.06	23.07	V	11.47	1.68	16.81	29.96	69.54	-39.58

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

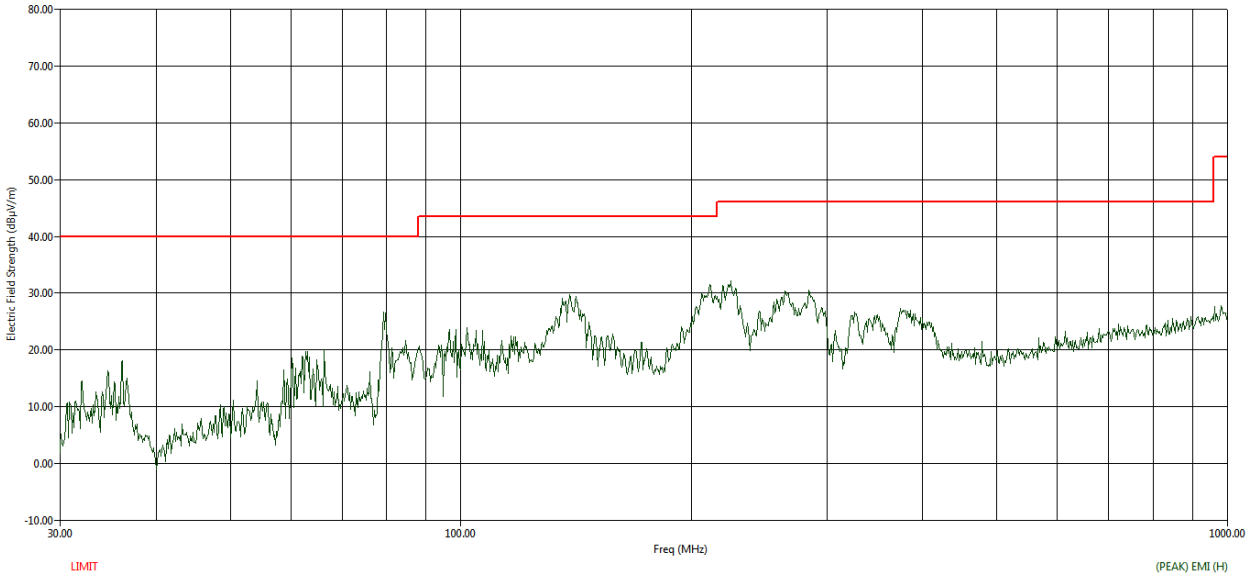

Figure 54 : Peak RE from 30MHz to 1GHz - Horizontal polarization

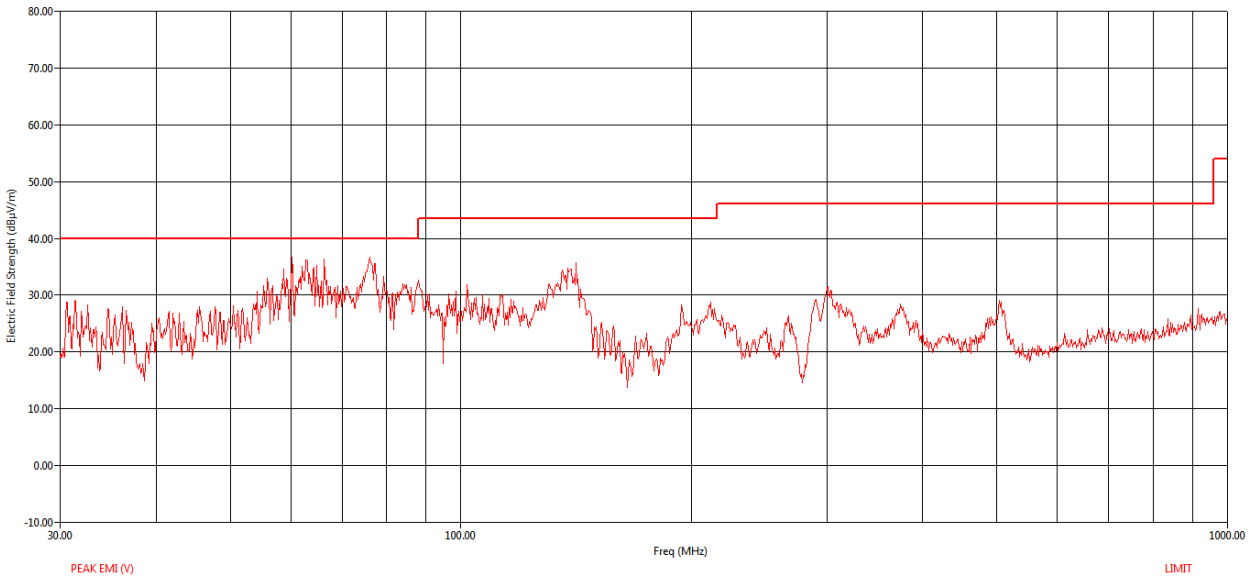

Figure 55 : Peak RE from 30MHz to 1GHz - Vertical polarization

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)
58.72	58.71	V	122.10	108.00	59.02	2.75	9.55	32.18	39.15	40.00	-0.85
60.24	60.22	V	47.20	231.00	54.57	2.80	9.42	32.17	34.62	40.00	-5.38
66.32	66.30	V	170.50	100.00	58.17	2.93	9.48	32.16	38.42	40.00	-1.58
77.16	77.22	V	197.40	100.00	55.93	3.16	9.12	32.14	36.07	40.00	-3.93
139.36	139.24	V	348.80	108.00	47.43	4.27	11.76	32.05	31.41	43.52	-12.11

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

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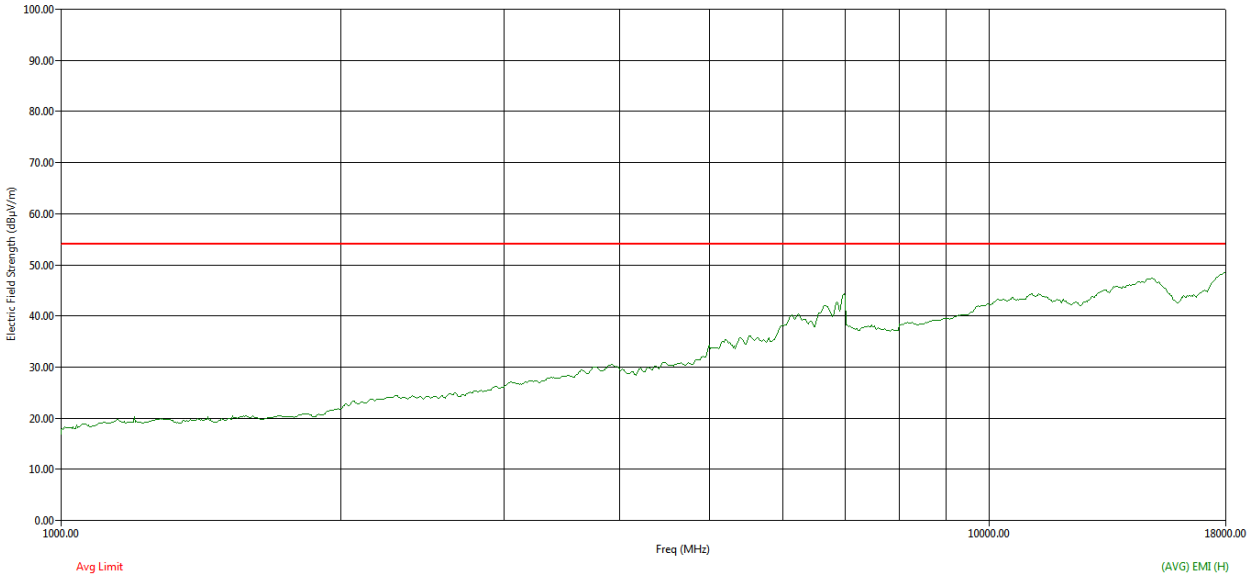

Figure 56 : Average RE from 1GHz to 18GHz - Horizontal polarization

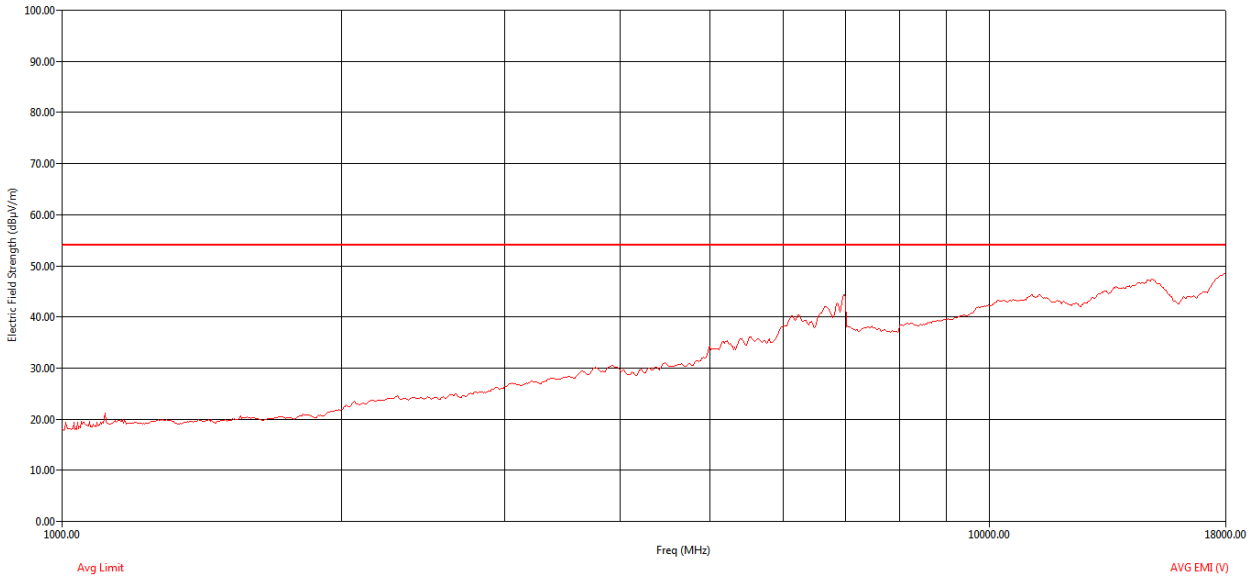

Figure 57 : Average RE from 1GHz to 18GHz - Vertical polarization

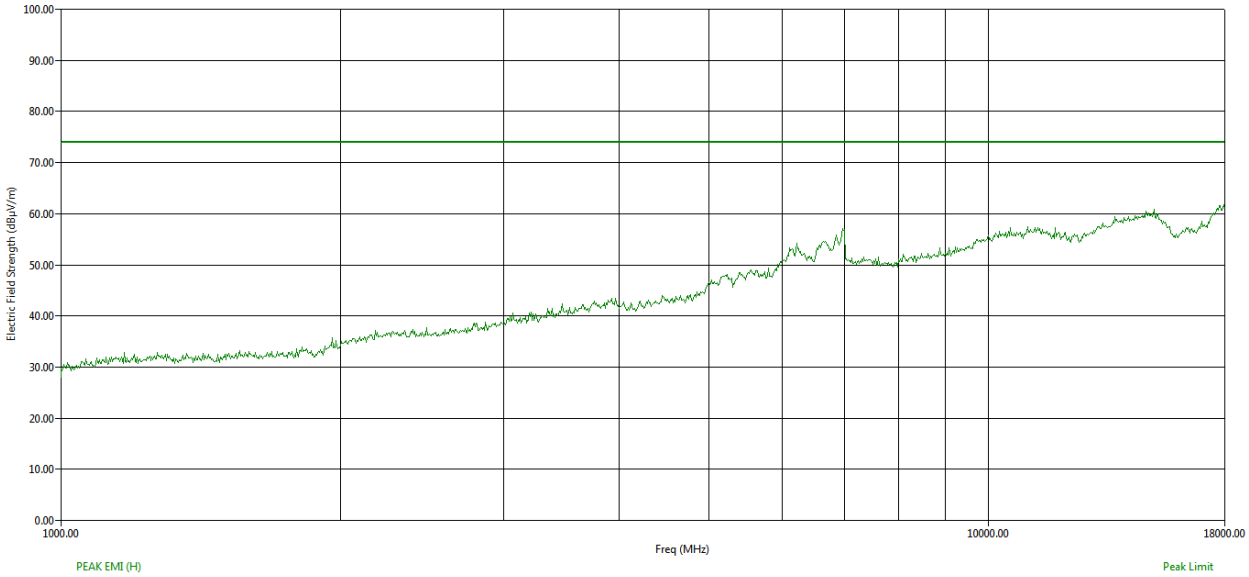

Figure 58 : Peak RE from 1GHz to 18GHz - Horizontal polarization

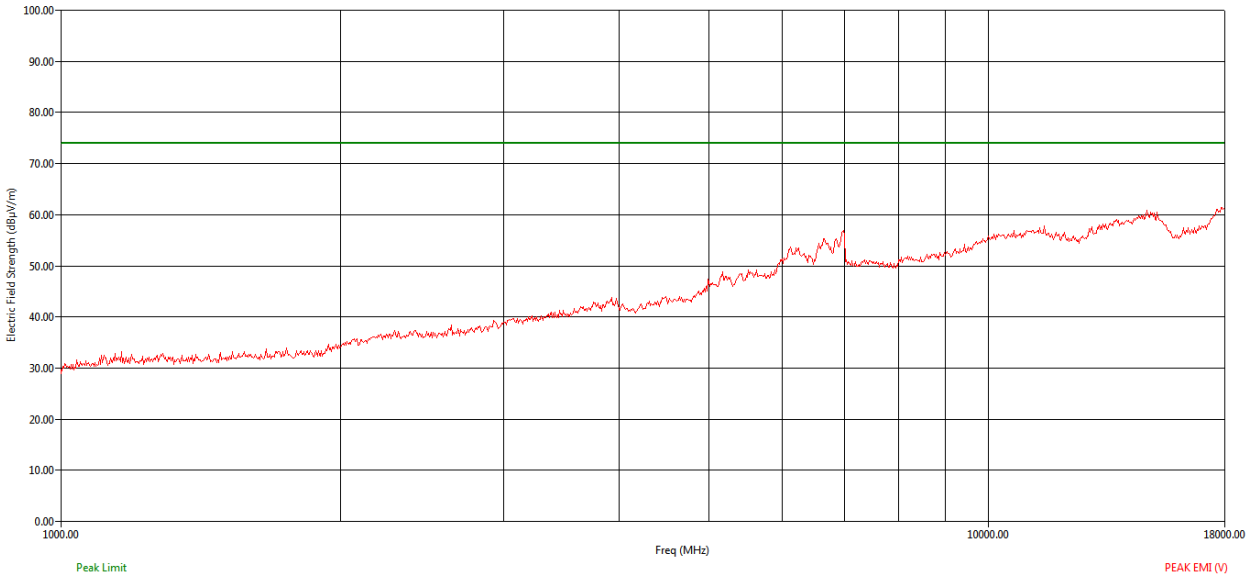

Figure 59 : Peak RE from 1GHz to 18GHz - Vertical polarization

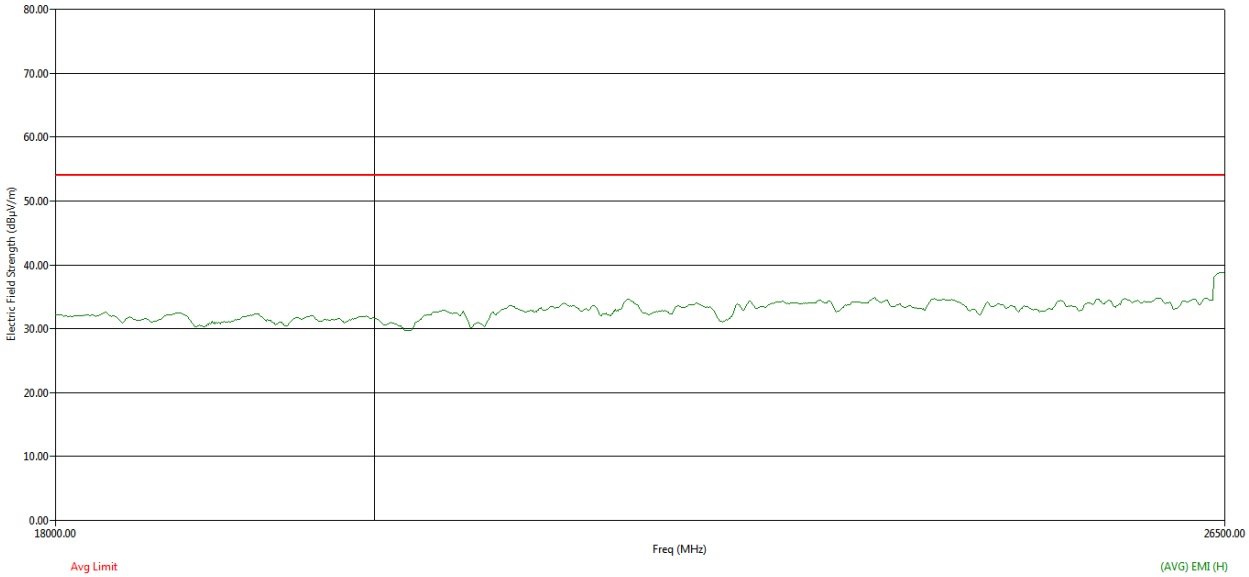

Figure 60 : Average RE from 18GHz to 26.5GHz - Horizontal polarization

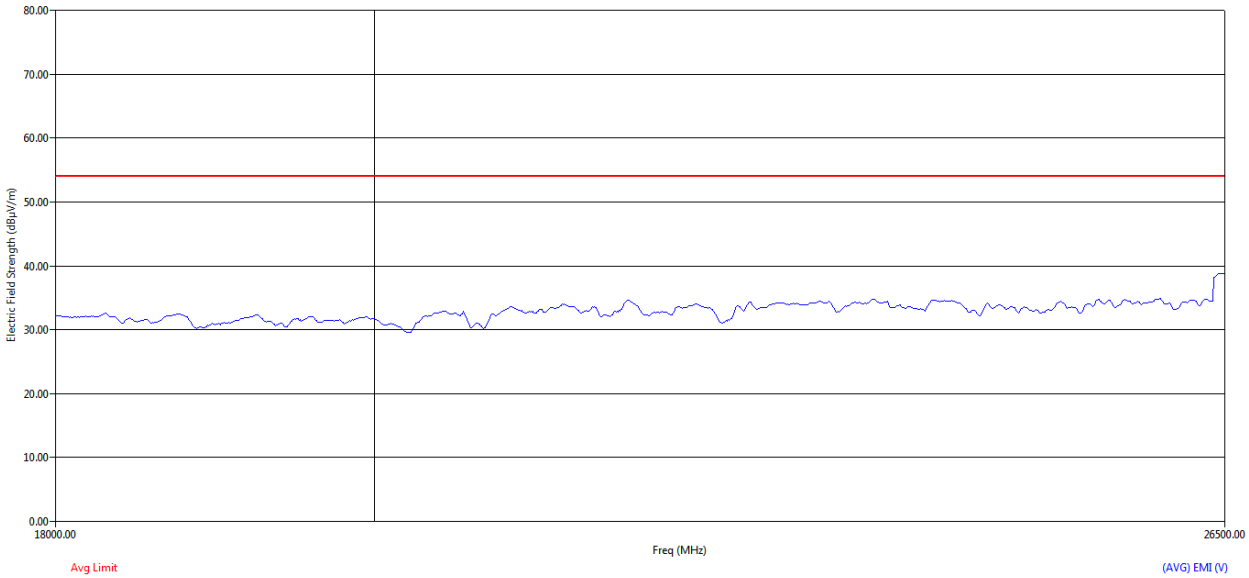

Figure 61 : Average RE from 18GHz to 26.5GHz - Vertical polarization

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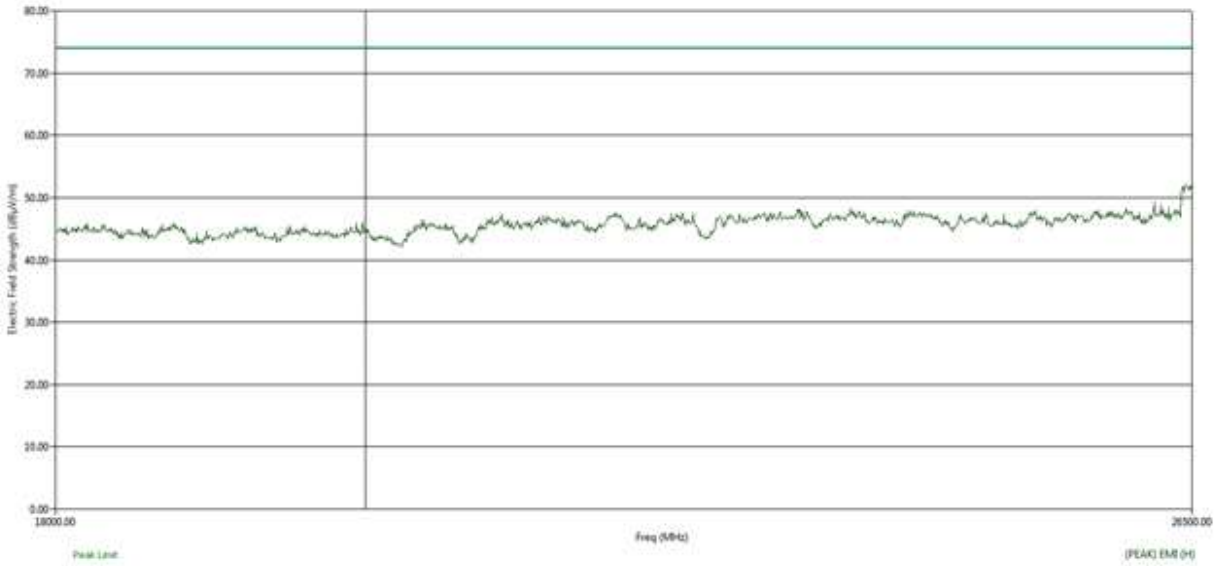

Figure 62 : Peak RE from 18GHz to 26.5GHz - Horizontal polarization

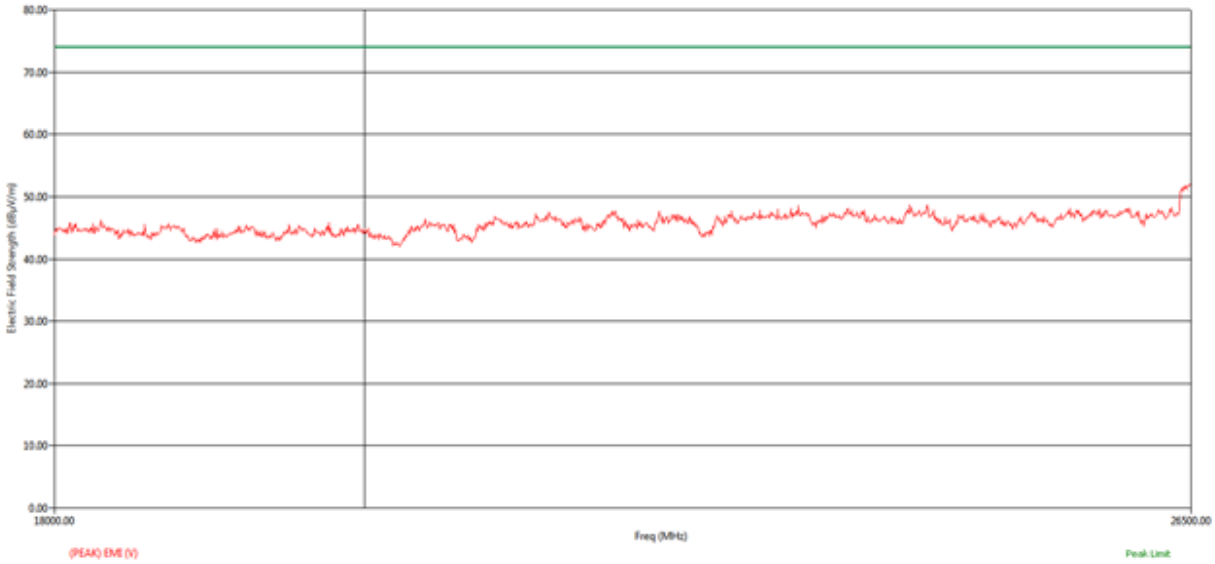

Figure 63 : Peak RE from 18GHz to 26.5GHz - Vertical polarization

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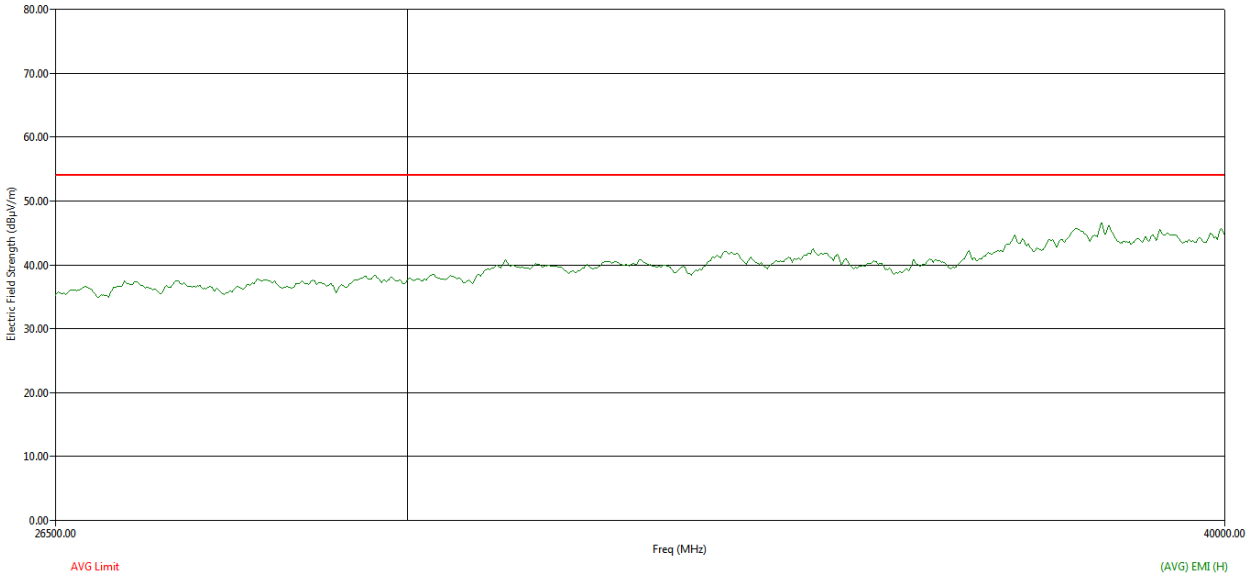

Figure 64 : Average RE from 26.5GHz to 40GHz - Horizontal polarization

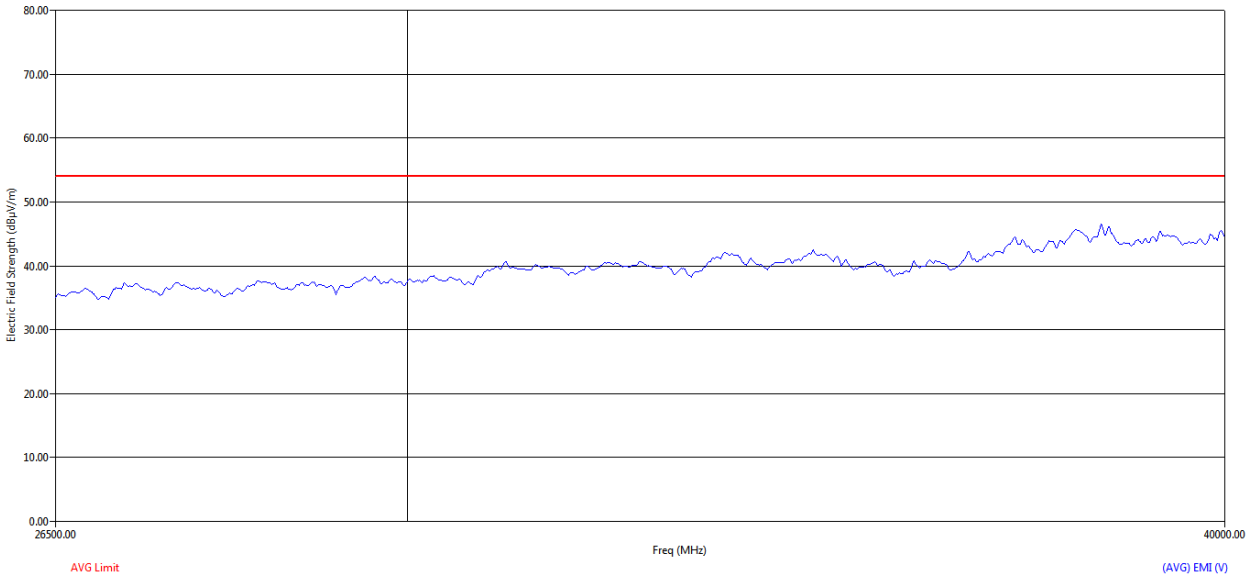

Figure 65 : Average RE from 26.5GHz to 40GHz - Vertical polarization

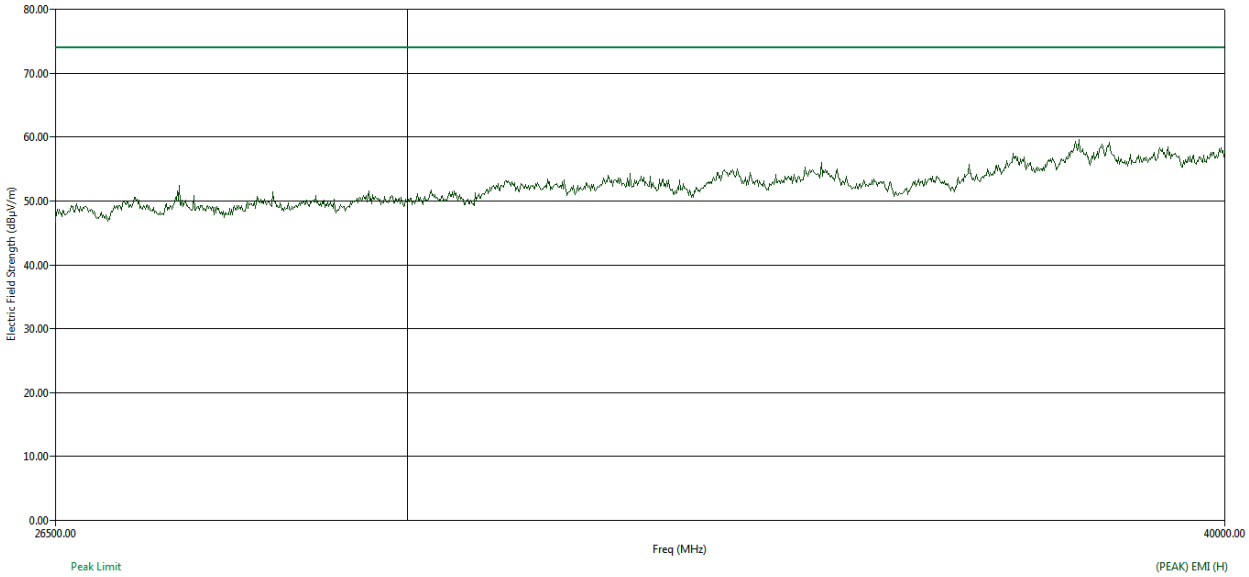

Figure 66 : Peak RE from 26.5GHz to 40GHz - Horizontal polarization

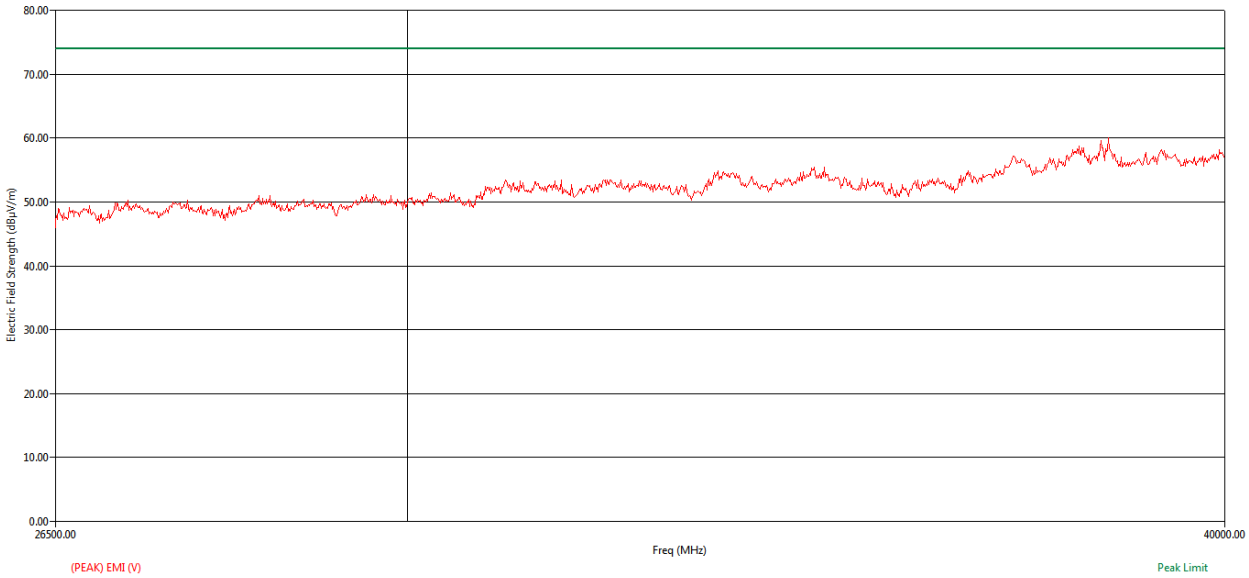

Figure 67 : Peak RE from 26.5GHz to 40GHz - Vertical polarization

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5.3.2.6.3 HIGH CHANNEL_5320MHZ

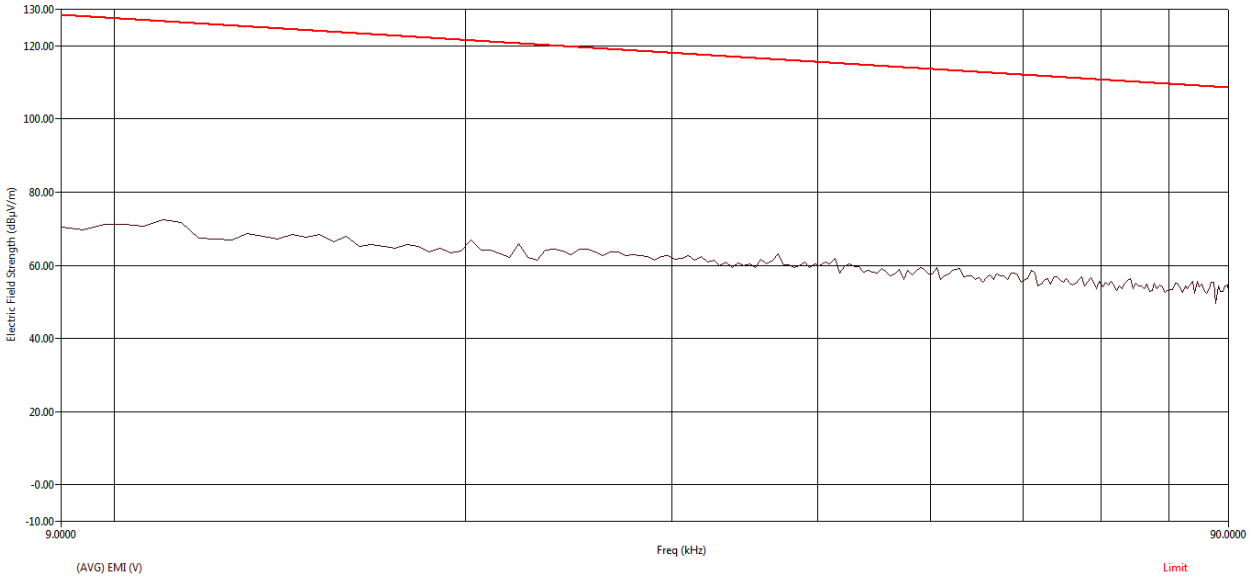

Figure 68 : Average RE from 9 kHz to 90 kHz - Parallel

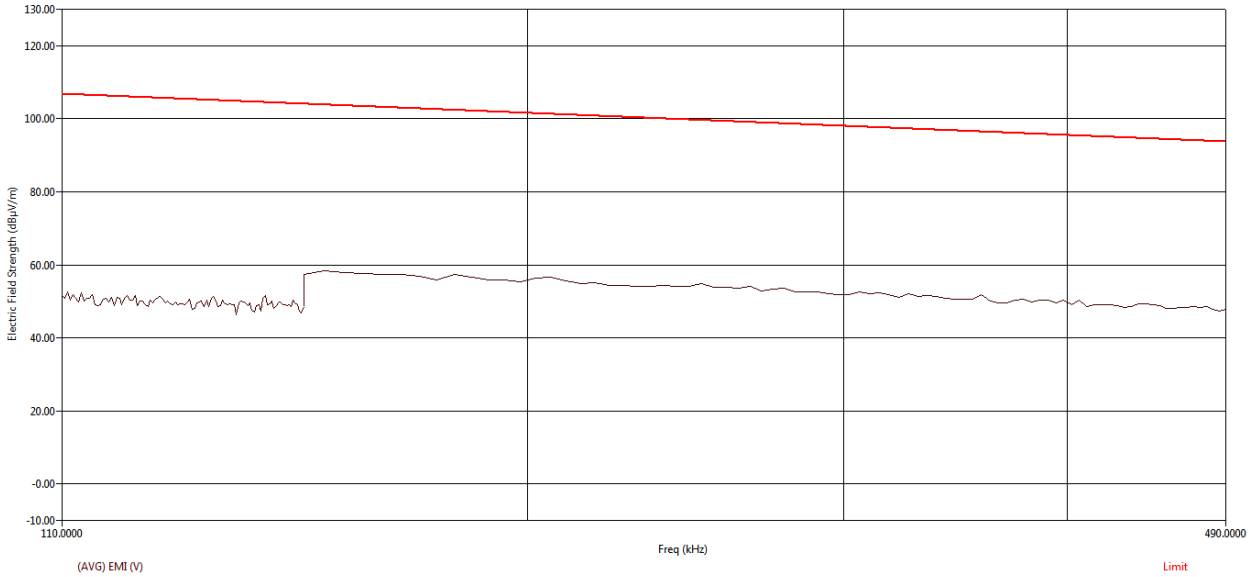

Figure 69: Average RE from 110 kHz to 490 kHz - Parallel

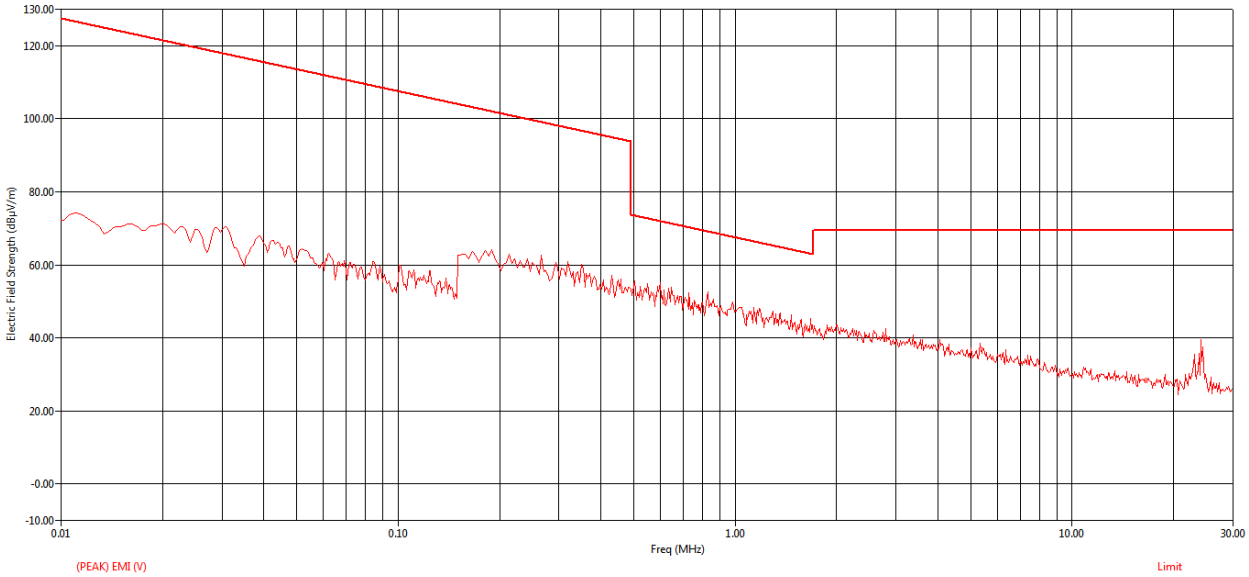

Figure 70 : Peak RE from 9 kHz to 30MHz - Parallel

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	9.53	1.68	16.81	28.02	69.54	-41.52
24.10	24.11	V	8.76	1.71	16.75	27.23	69.54	-42.32

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

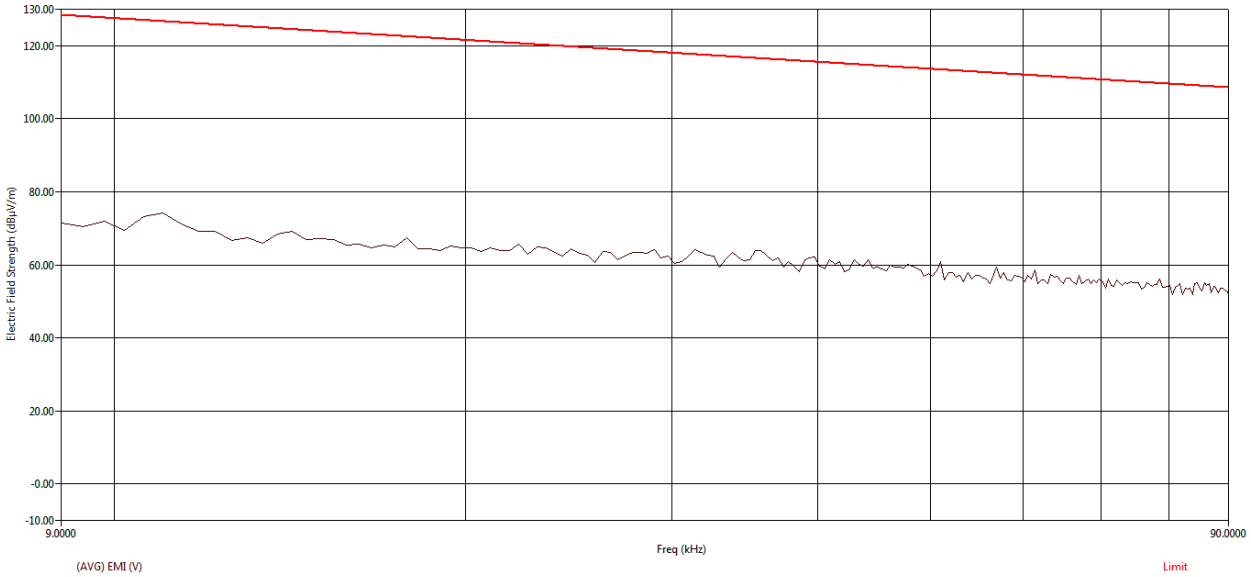

Figure 71 : Average RE from 9 kHz to 90 kHz - Perpendicular

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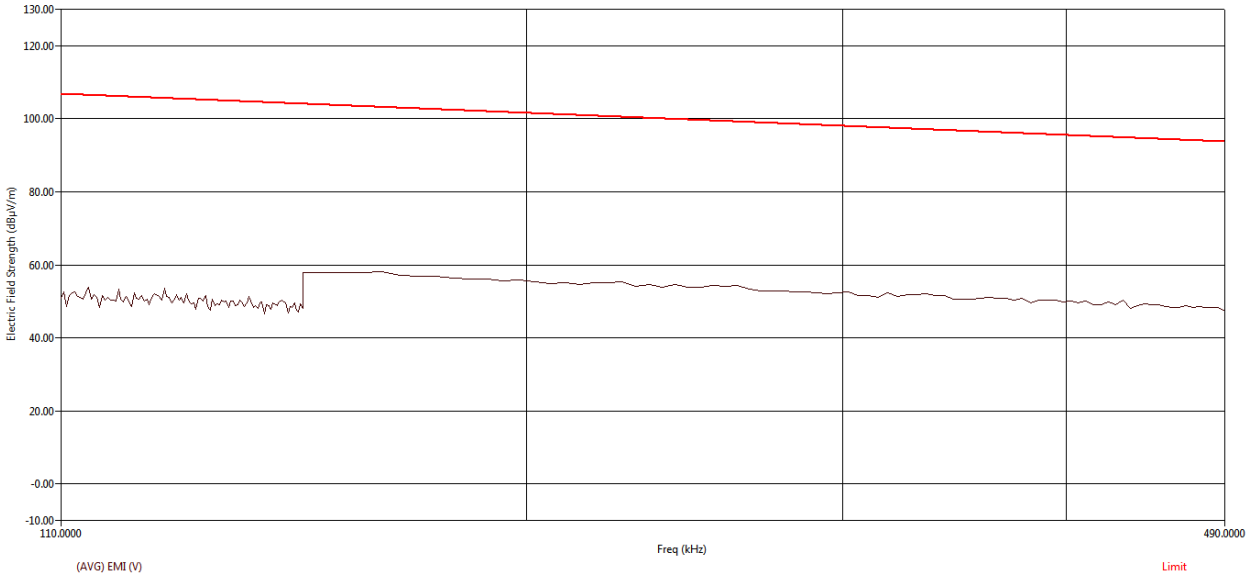

Figure 72 : Average RE from 110 kHz to 490 kHz - Perpendicular

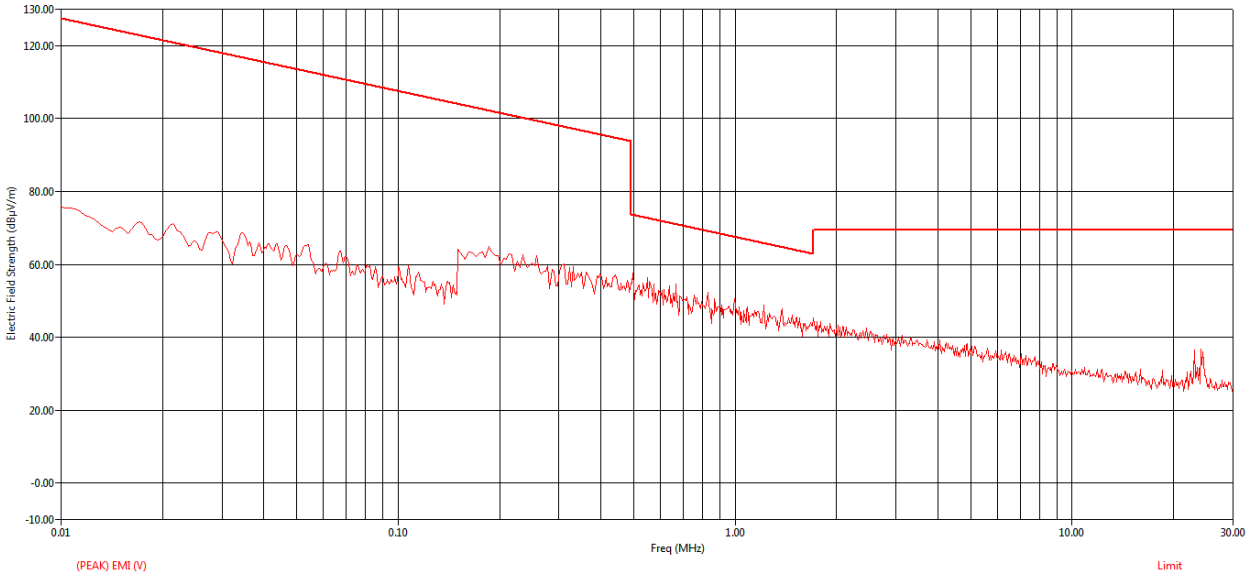

Figure 73 : Peak RE from 9 kHz to 30MHz - Perpendicular

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	11.65	1.68	16.81	30.14	69.54	-39.40
24.10	24.10	V	9.11	1.71	16.75	27.58	69.54	-41.97

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

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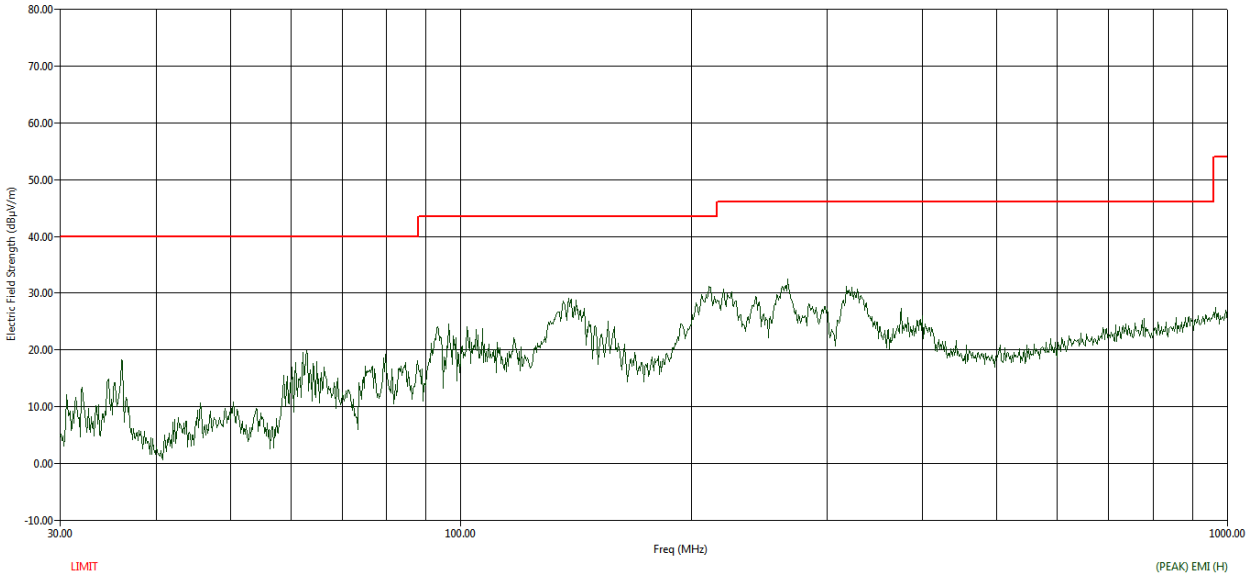

Figure 74 : Peak RE from 30MHz to 1GHz - Horizontal polarization

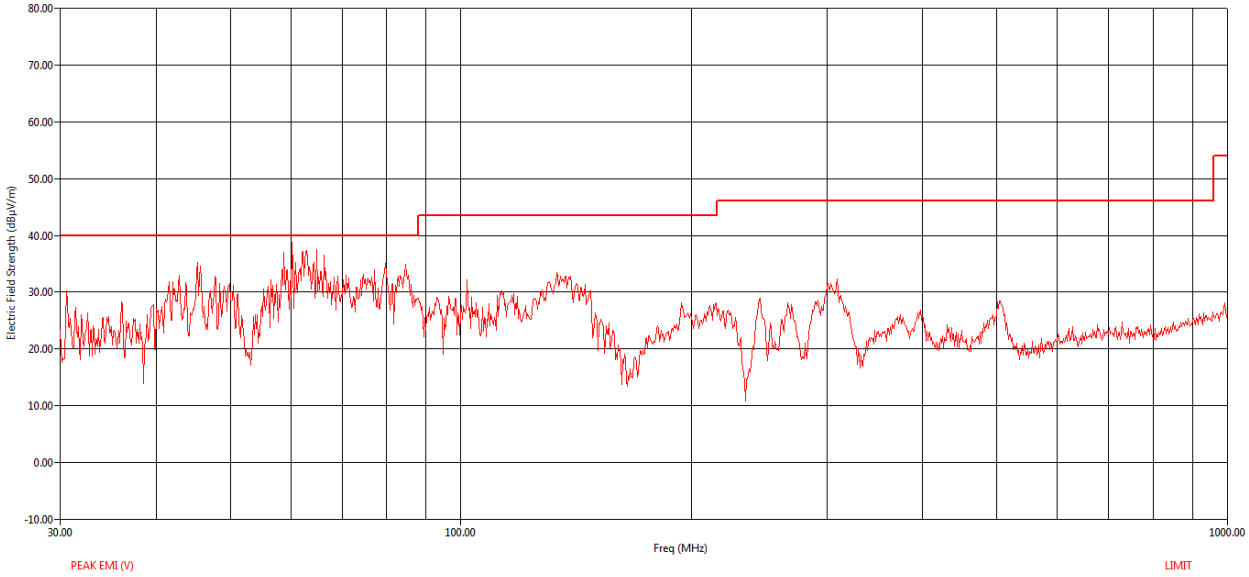

Figure 75 : Peak RE from 30MHz to 1GHz - Vertical polarization

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)
58.72	58.73	V	163.80	282.00	34.31	2.75	9.55	32.18	14.44	40.00	-25.56
60.24	60.02	V	141.60	247.00	34.12	2.79	9.42	32.17	14.16	40.00	-25.84
62.04	62.08	V	58.50	273.00	36.63	2.84	9.44	32.17	16.74	40.00	-23.26
64.80	64.69	V	202.10	365.00	36.81	2.90	9.46	32.16	17.01	40.00	-22.99

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

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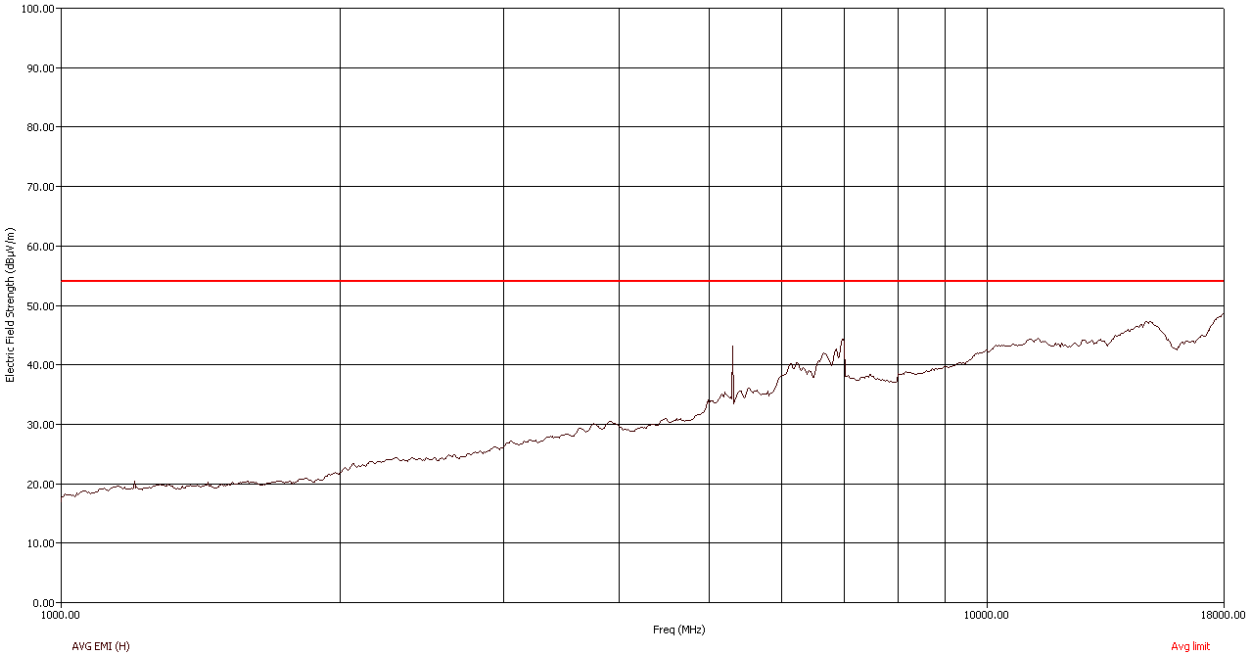

Figure 76: Average RE from 1GHz to 18GHz - Horizontal polarization

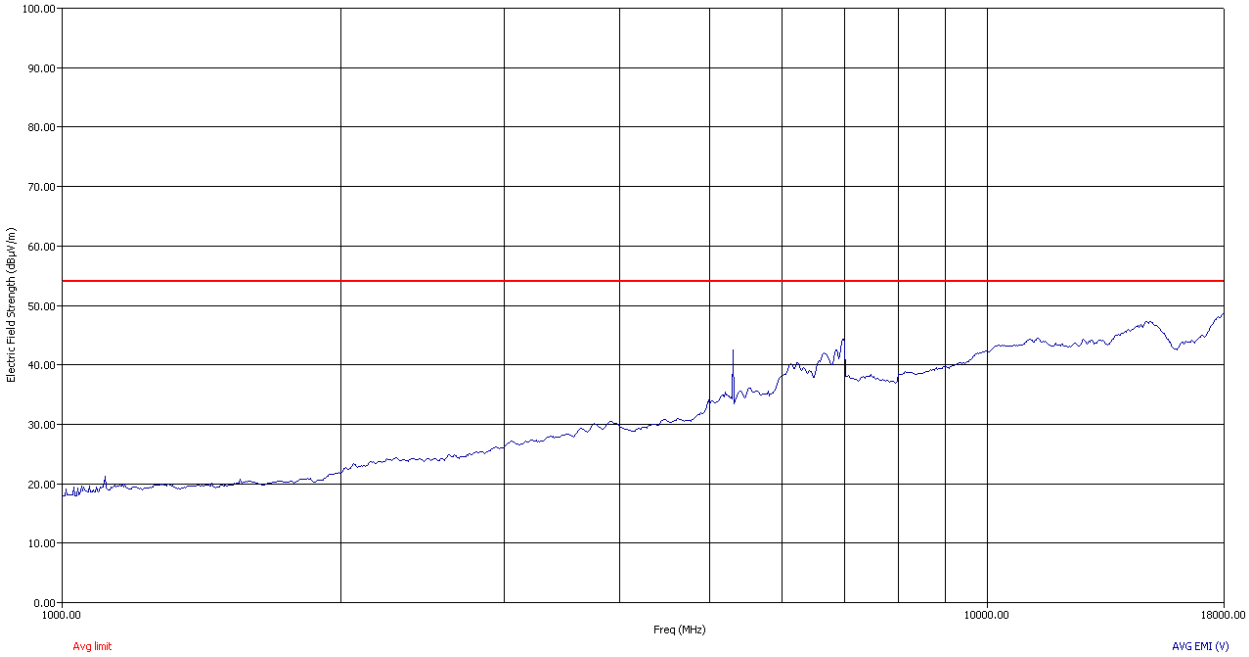

Figure 77: Average RE from 1GHz to 18GHz - Vertical polarization

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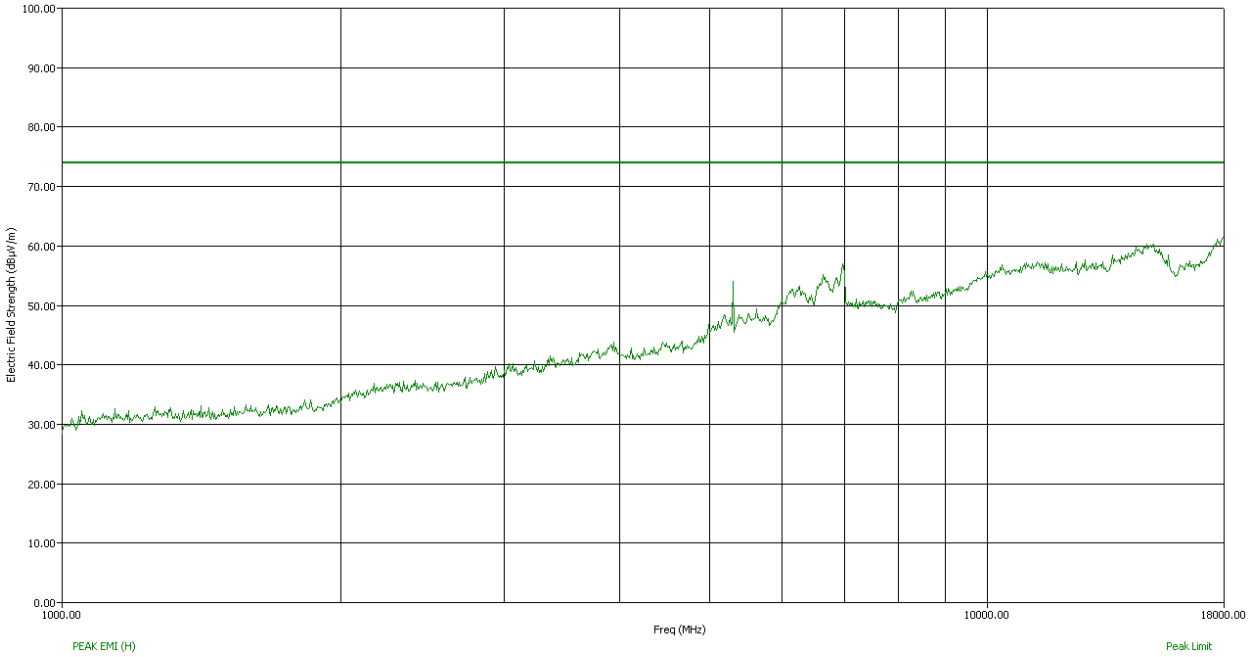

Figure 78: Peak RE from 1GHz to 18GHz - Horizontal polarization

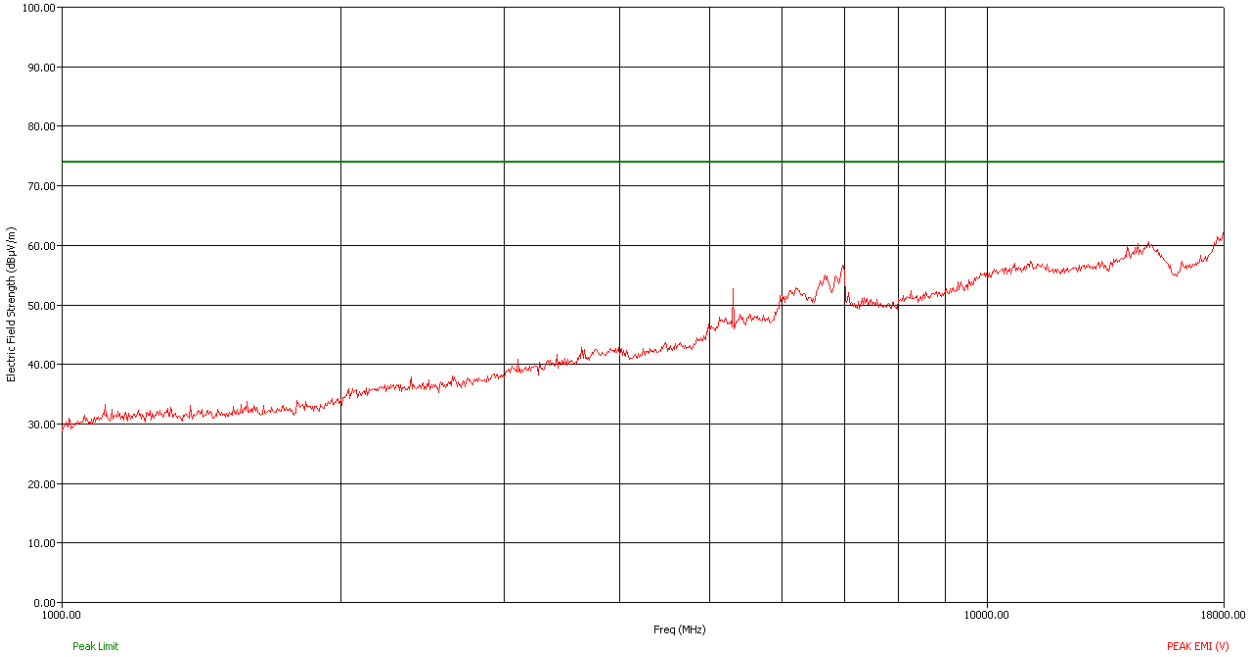

Figure 79: Peak RE from 1GHz to 18GHz - Vertical polarization

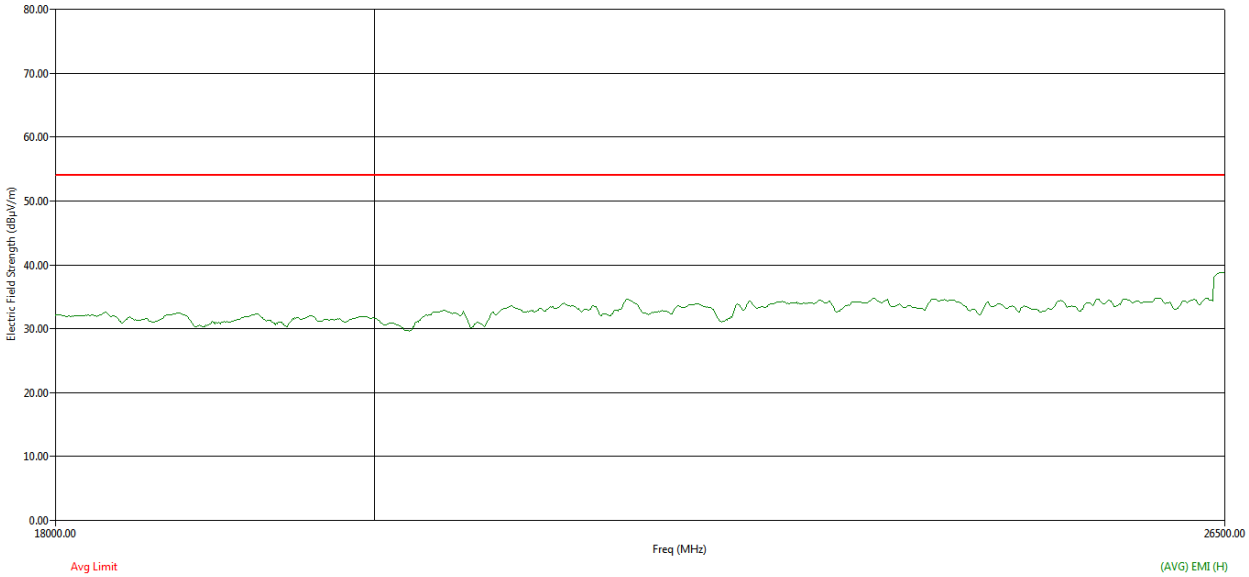

Figure 80:Average RE from 18GHz to 26.5GHz - Horizontal polarization

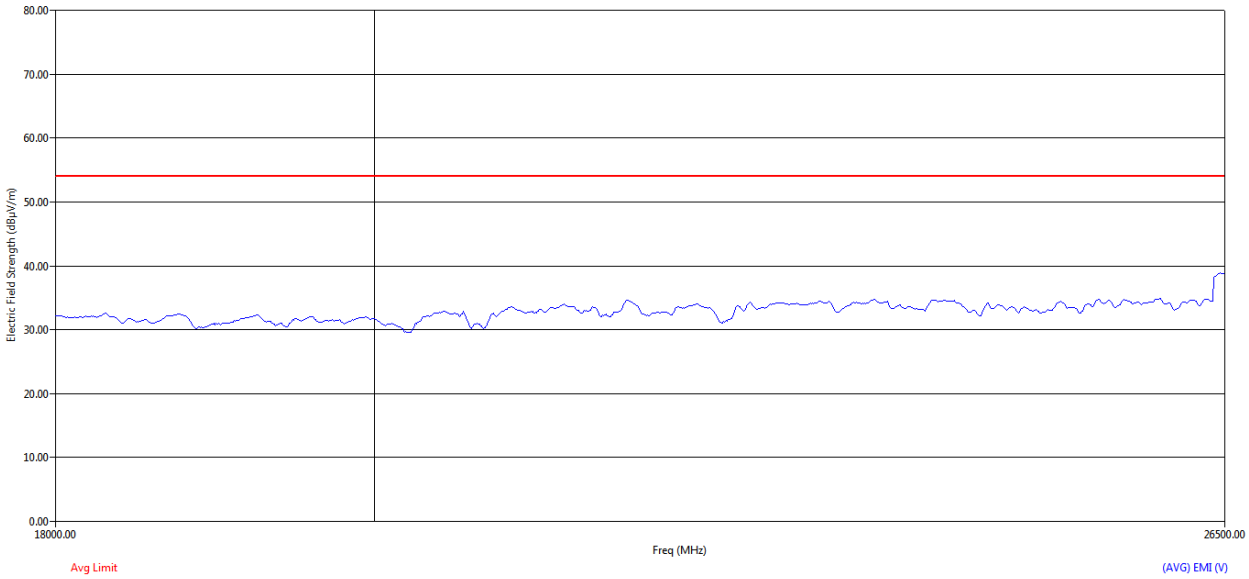

Figure 81: Average RE from 18GHz to 26.5GHz - Vertical polarization

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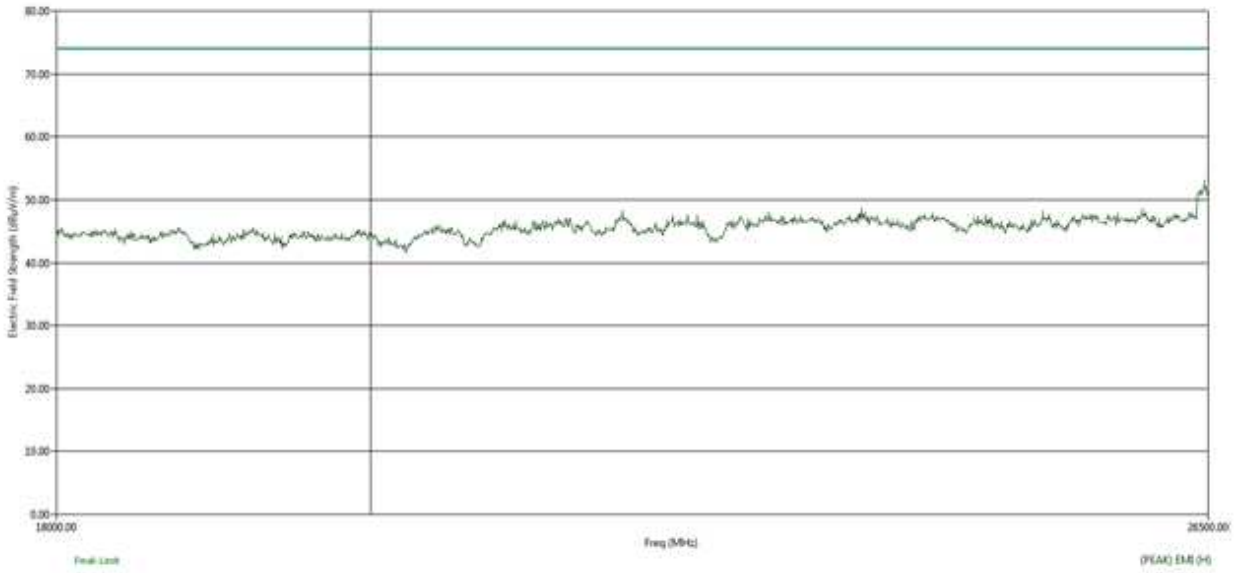

Figure 82: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

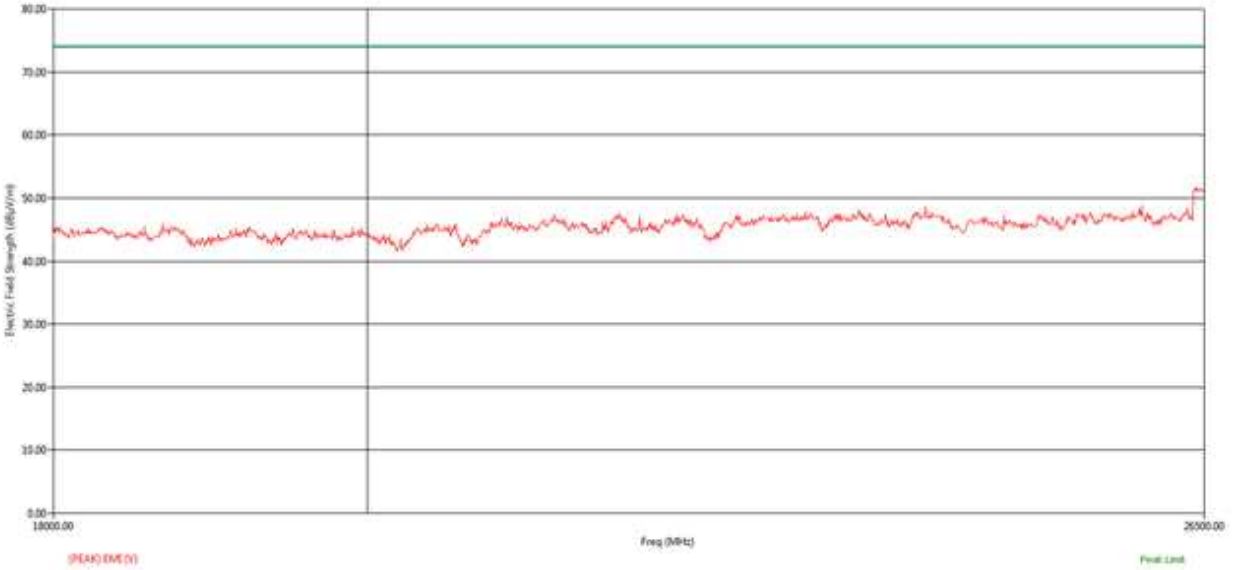

Figure 83: Peak RE from 18GHz to 26.5GHz - Vertical polarization

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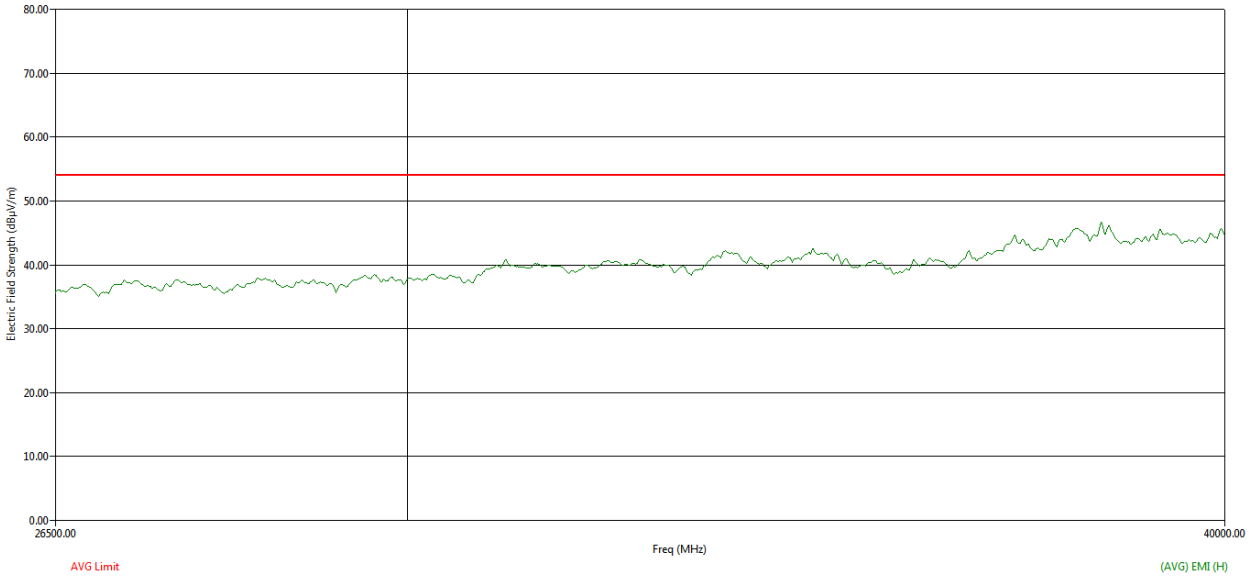

Figure 84 : Average RE from 26.5GHz to 40GHz - Horizontal polarization

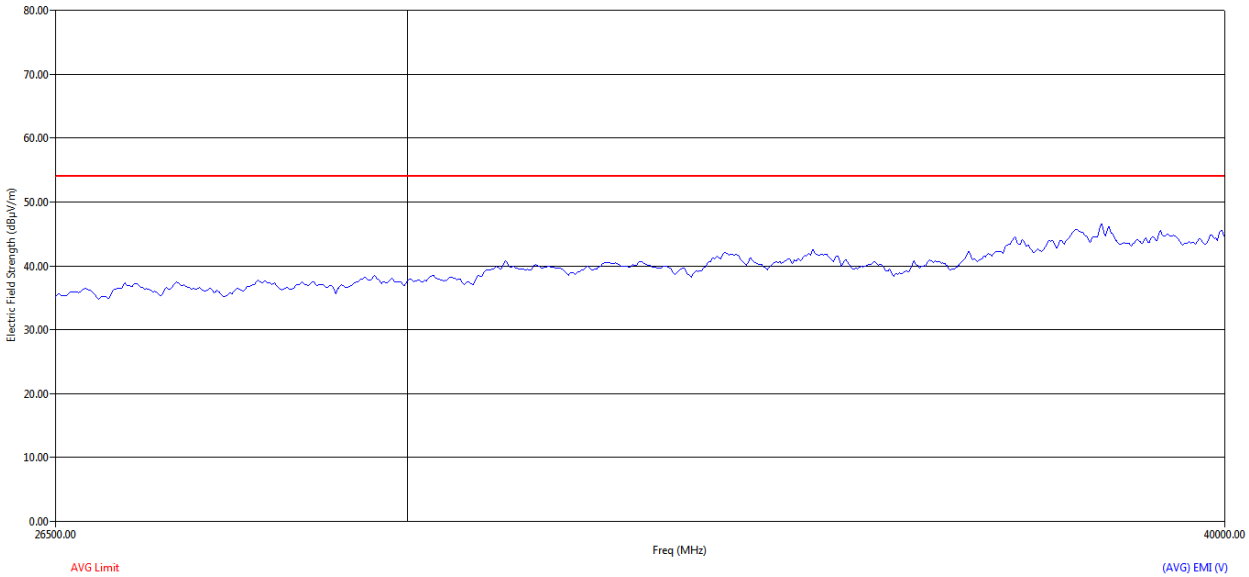

Figure 85 : Average RE from 26.5GHz to 40GHz - Vertical polarization

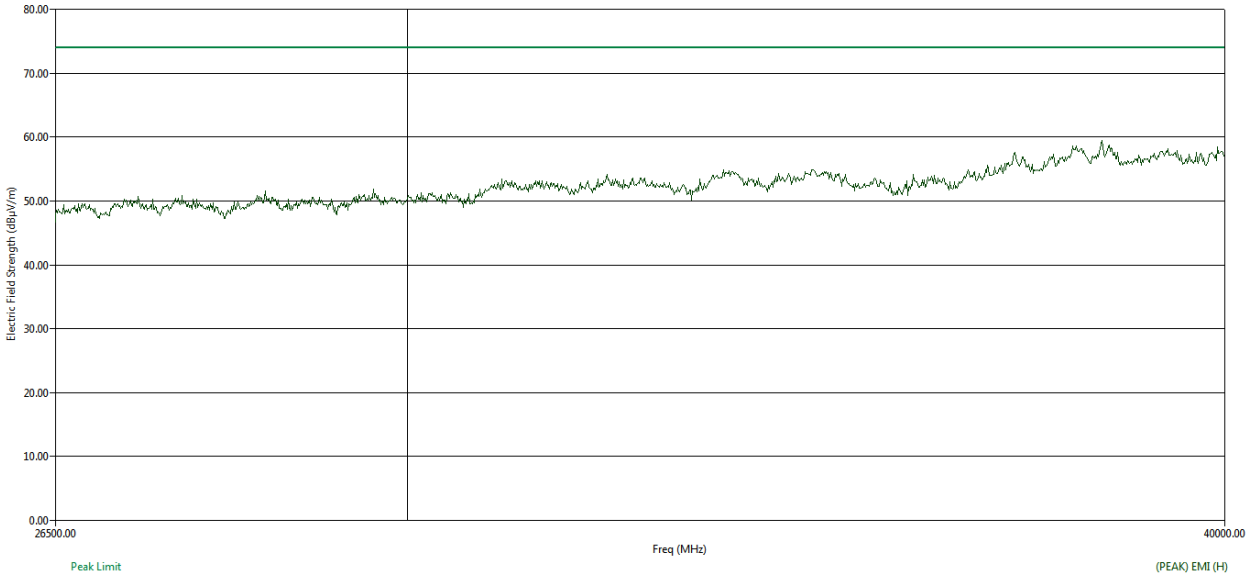

Figure 86: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

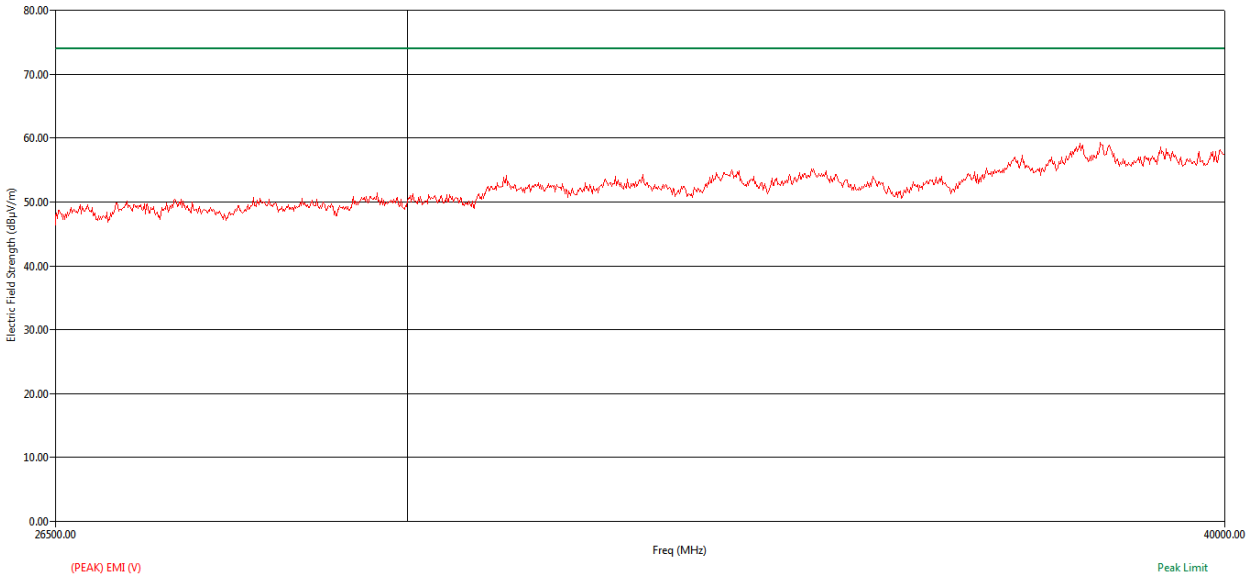

Figure 87 :Peak RE from 26.5GHz to 40GHz - Vertical polarization

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5.3.2.7 RESULT (SUPPORTING GRAPHS / DATA) FOR 10 MHZ MODULATION BANDWIDTH

5.3.2.7.1 LOW CHANNEL_5265 MHZ

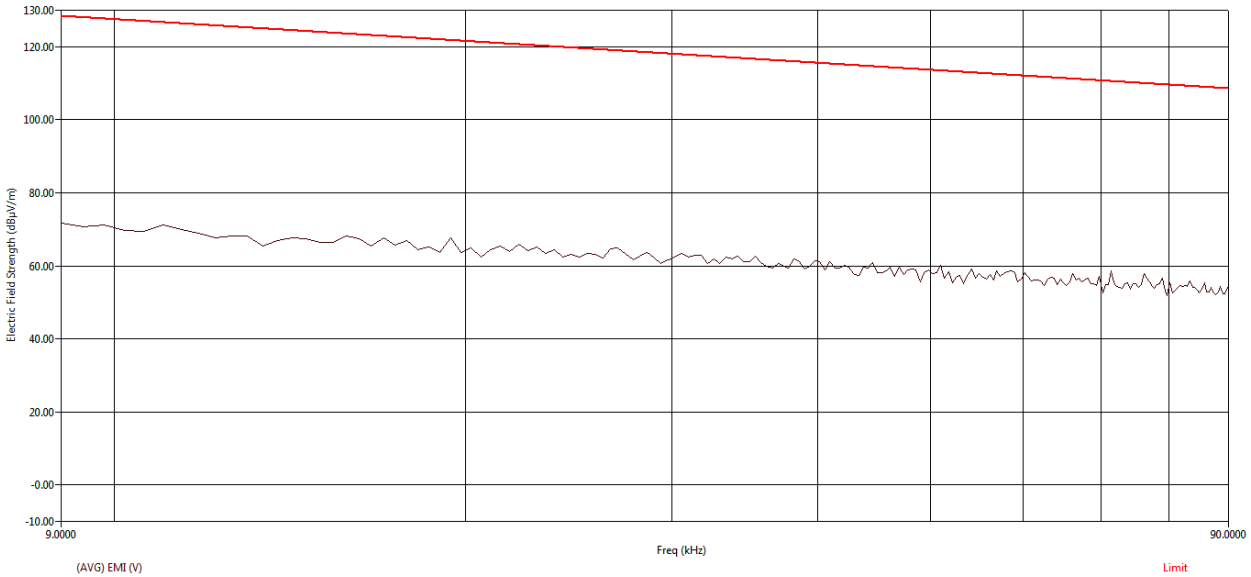

Figure 88: Average RE from 9 kHz to 90 kHz – Parallel

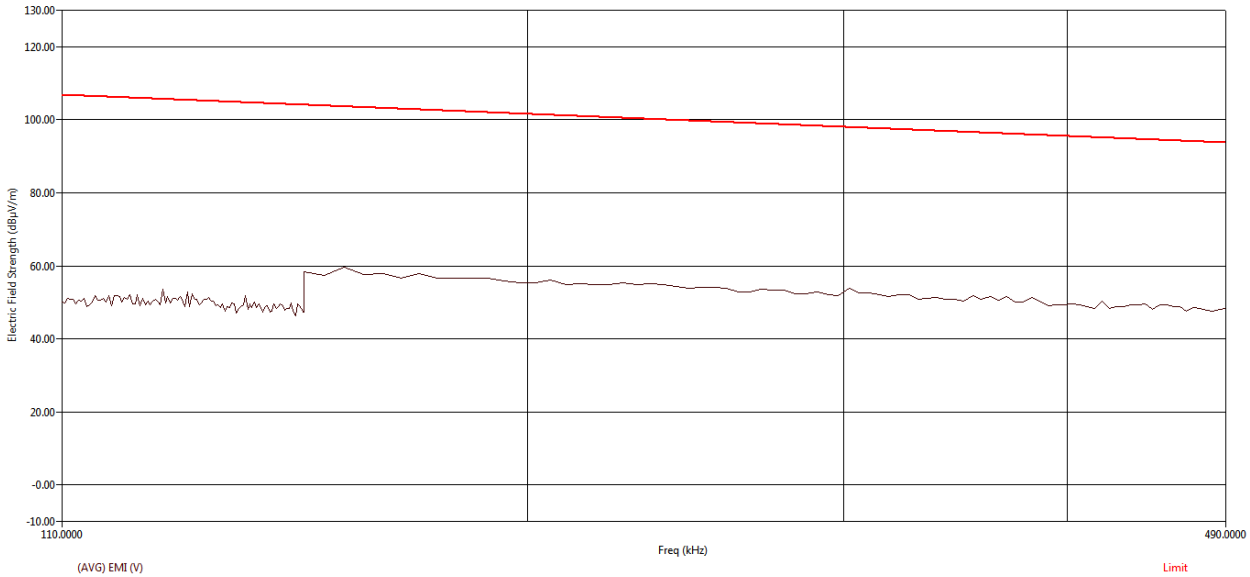

Figure 89: Average RE from 110 kHz to 490 kHz - Parallel

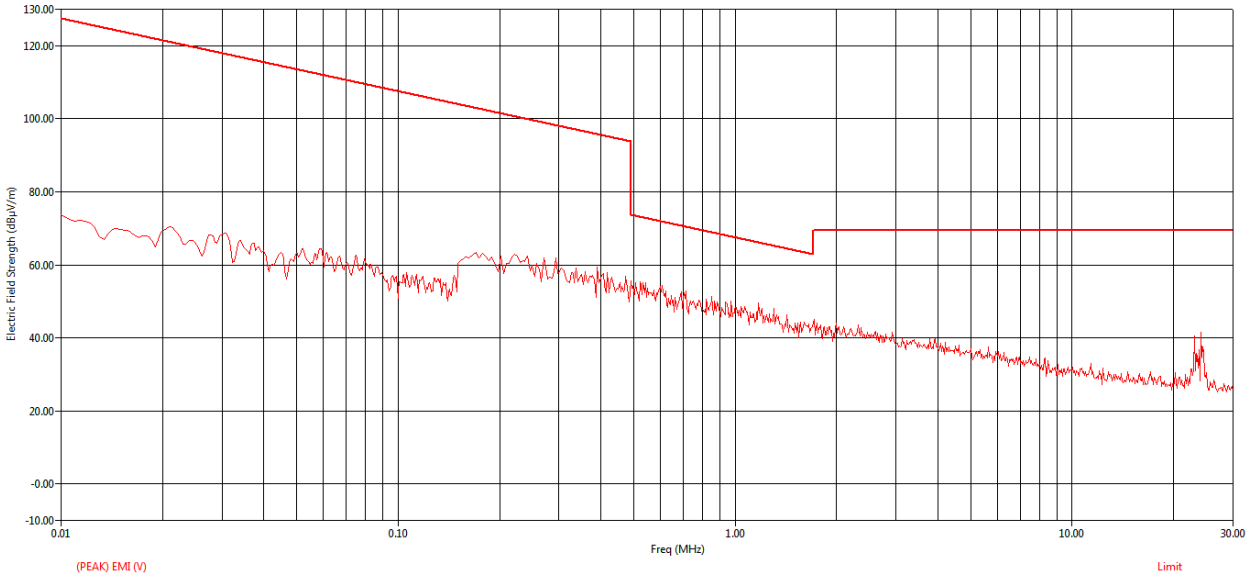

Figure 90: Peak RE from 9 kHz to 30MHz - Parallel

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	10.19	1.68	16.81	28.68	69.54	-40.86
24.10	24.11	V	8.91	1.71	16.75	27.37	69.54	-42.17

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

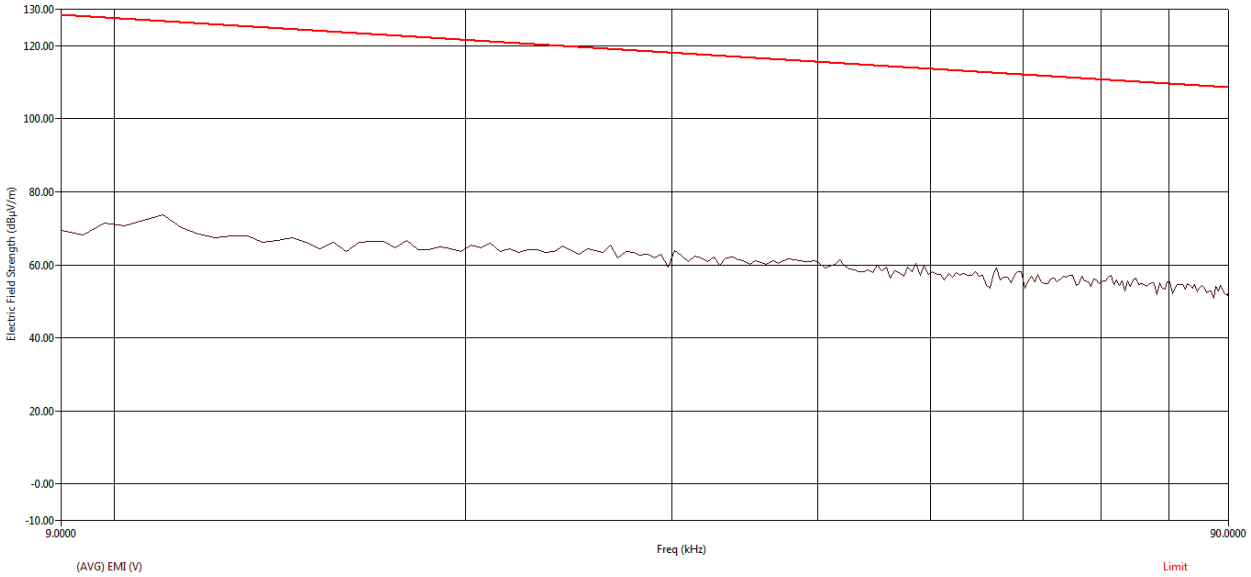

Figure 91: Average RE from 9 kHz to 90 kHz - Perpendicular

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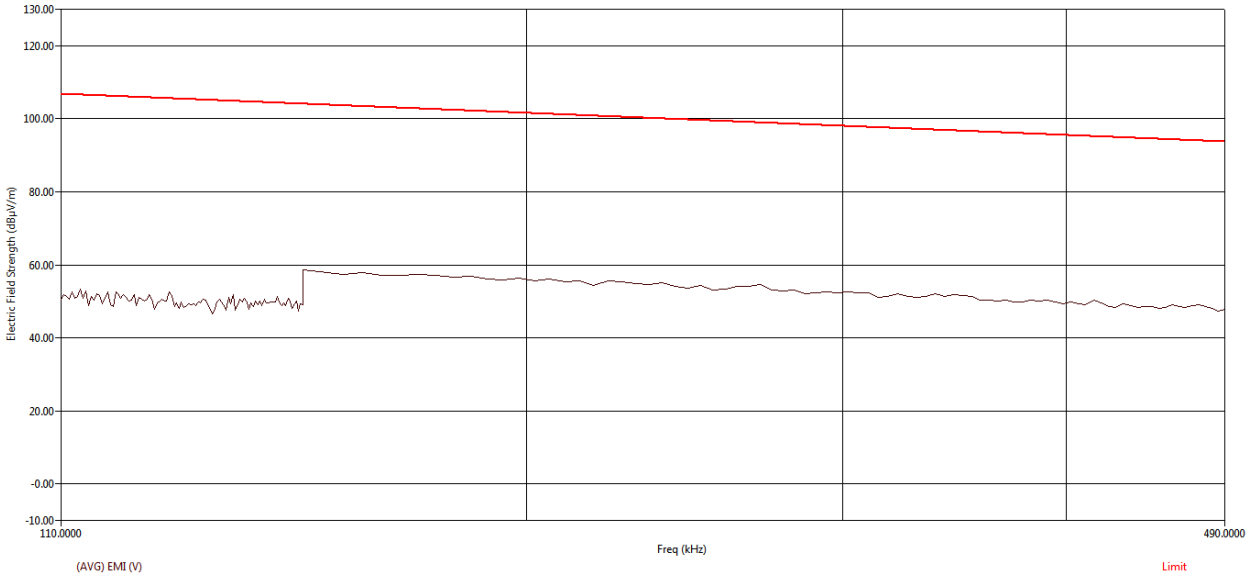

Figure 92: Average RE from 110 kHz to 490 kHz - Perpendicular

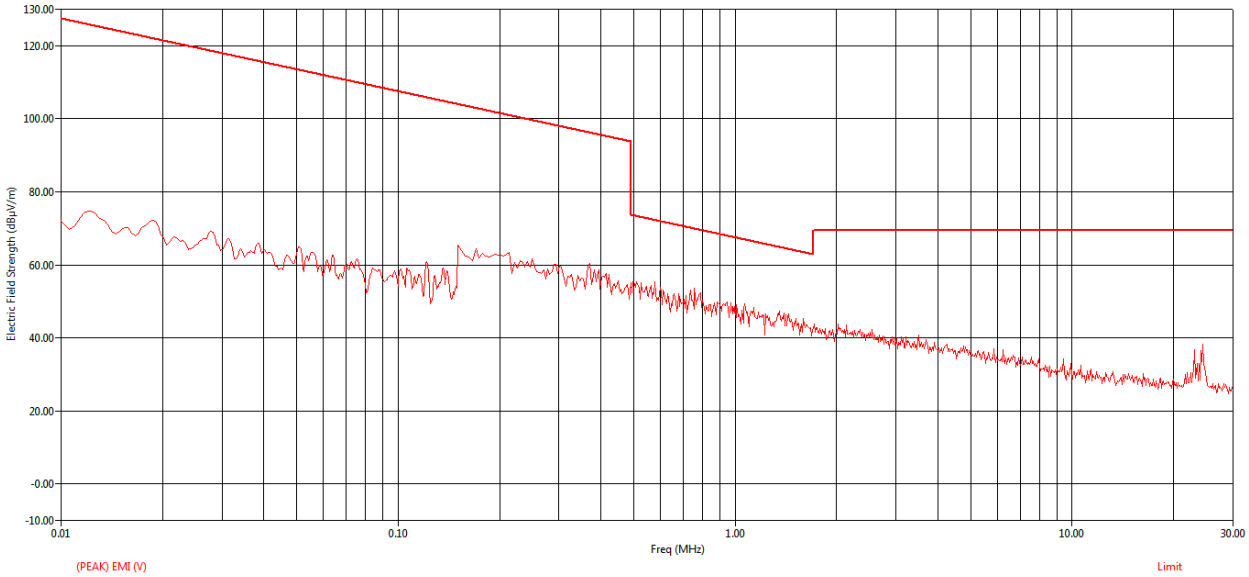

Figure 93: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	11.78	1.68	16.81	30.27	69.54	-39.27
24.40	24.41	V	4.14	1.72	16.73	22.60	69.54	-46.95

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

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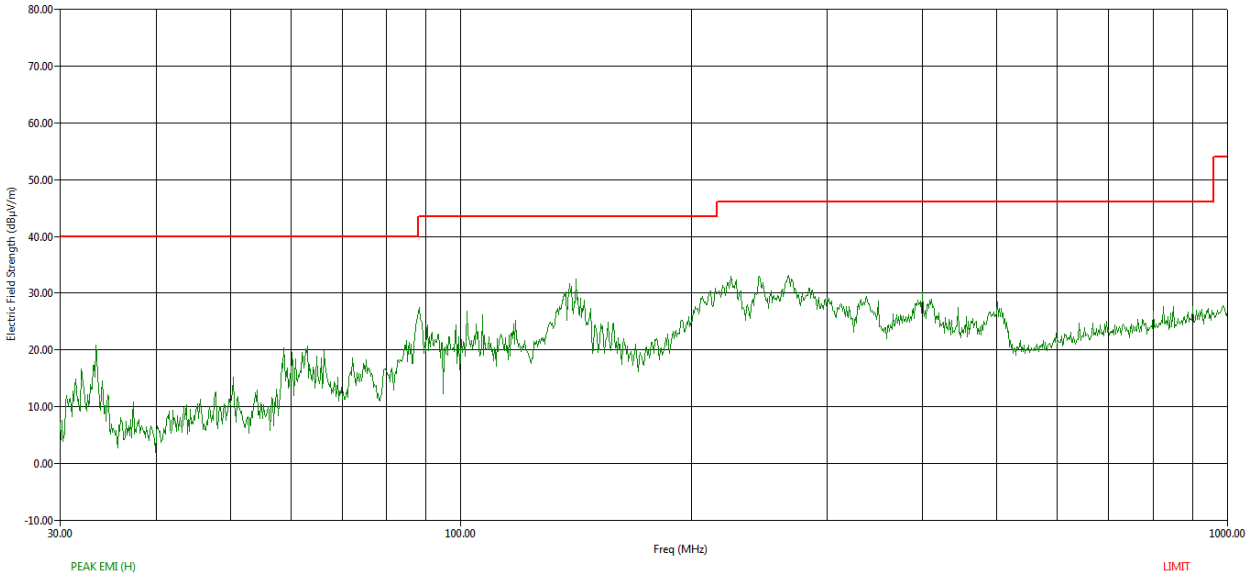

Figure 94: Peak RE from 30MHz to 1GHz - Horizontal polarization

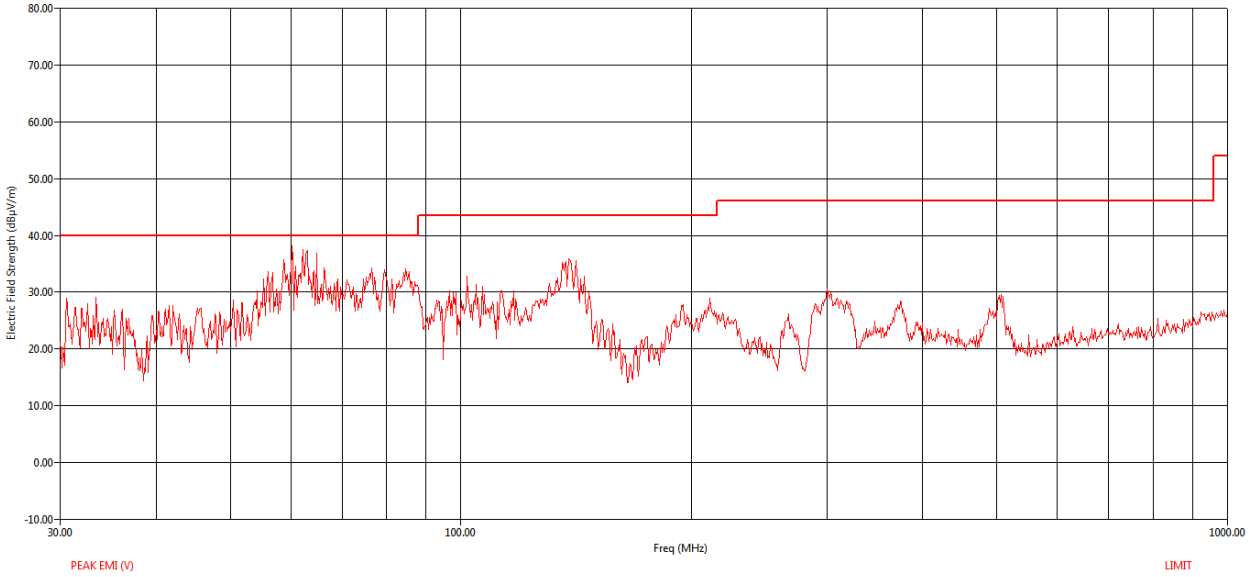

Figure 95: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
58.72	58.63	V	180.10	286.00	38.48	2.75	9.56	32.18	18.61	40.00	-21.39
60.24	60.15	V	239.90	153.00	38.62	2.79	9.42	32.17	18.66	40.00	-21.34

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

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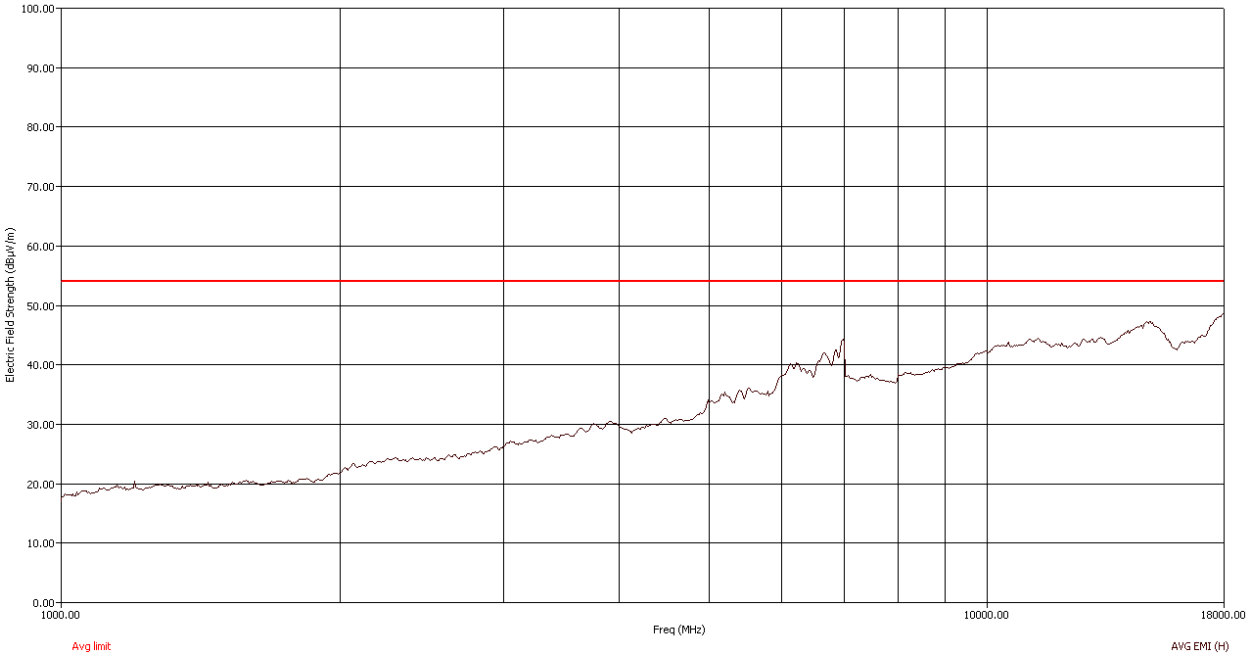

Figure 96: Average RE from 1GHz to 18GHz - Horizontal polarization

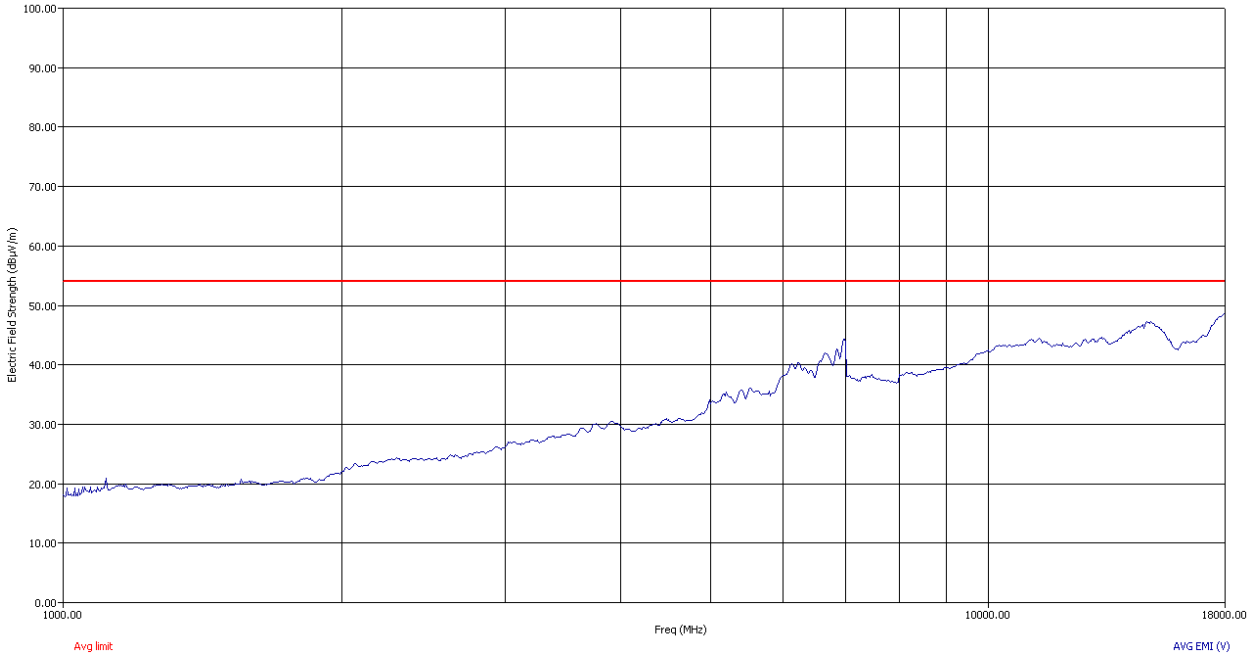

Figure 97: Average RE from 1GHz to 18GHz - Vertical polarization

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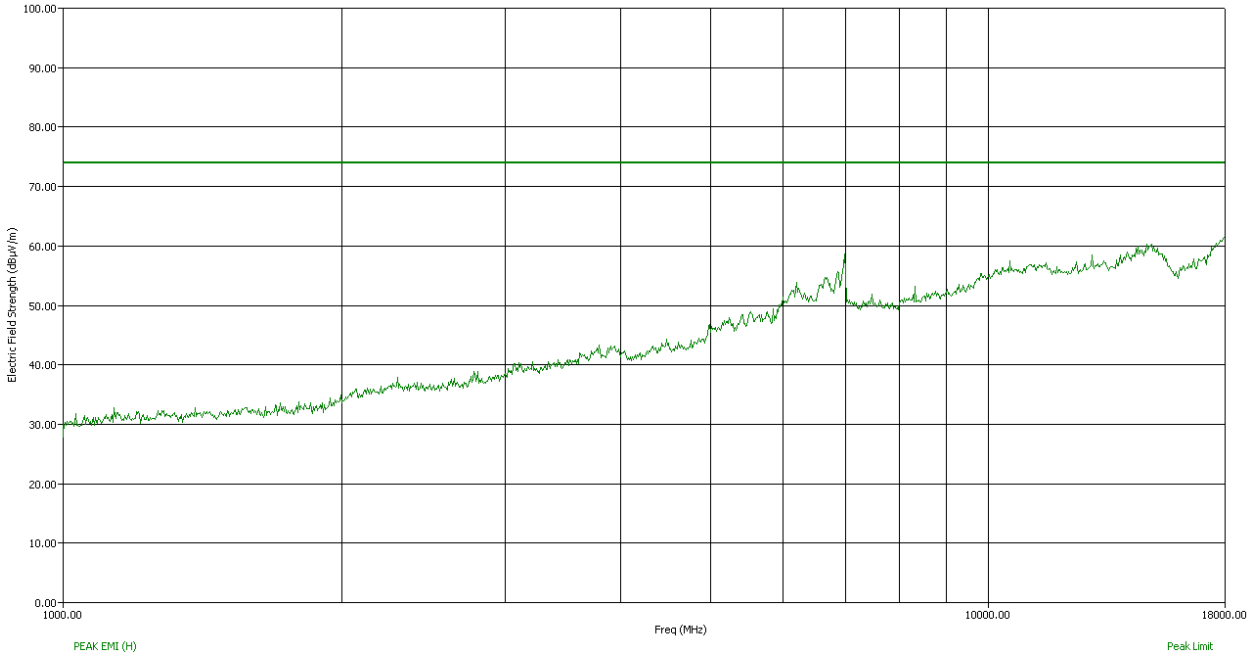

Figure 98: Peak RE from 1GHz to 18GHz - Horizontal polarization

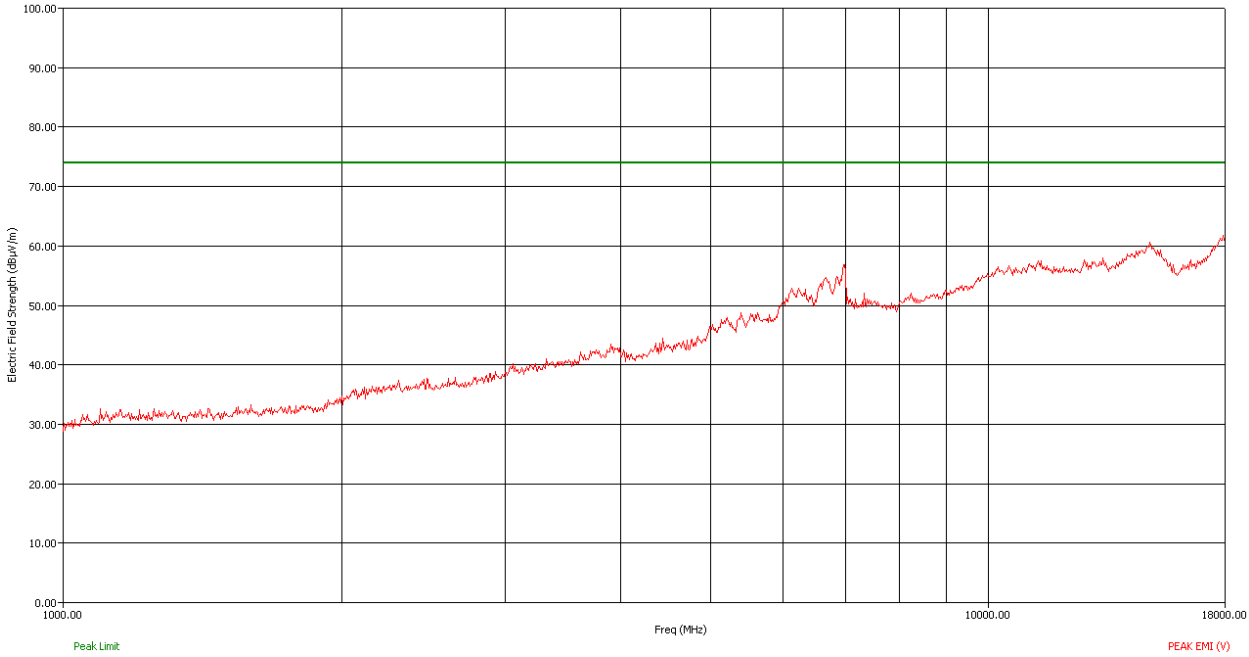

Figure 99 : Peak RE from 1GHz to 18GHz - Vertical polarization

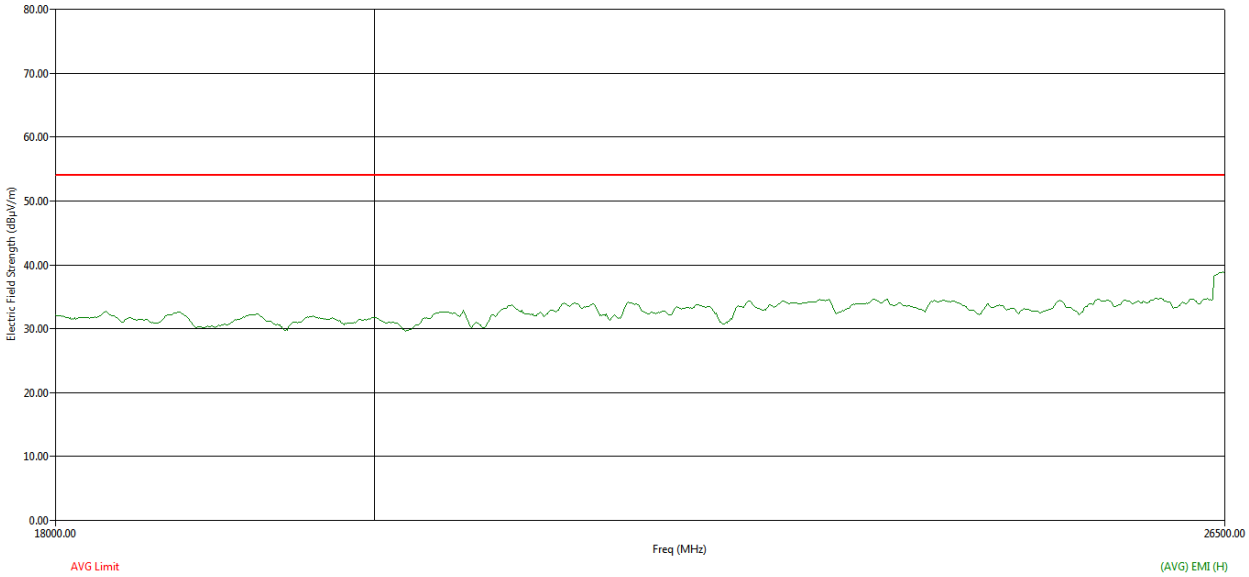

Figure 100: Average RE from 18GHz to 26.5GHz - Horizontal polarization

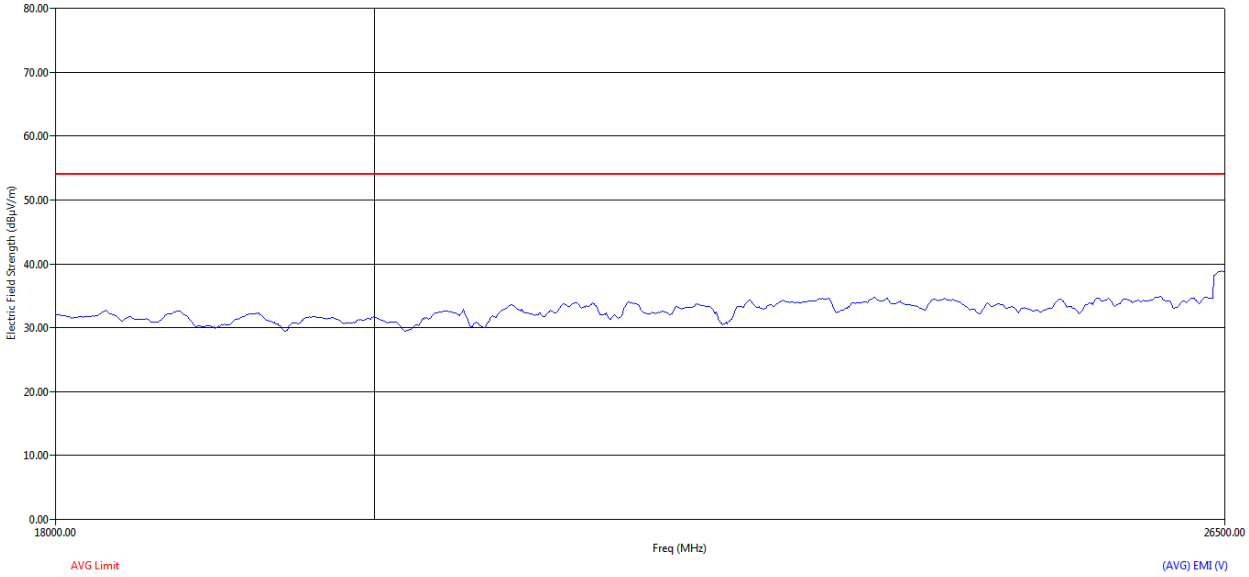

Figure 101: Average RE from 18GHz to 26.5GHz - Vertical polarization

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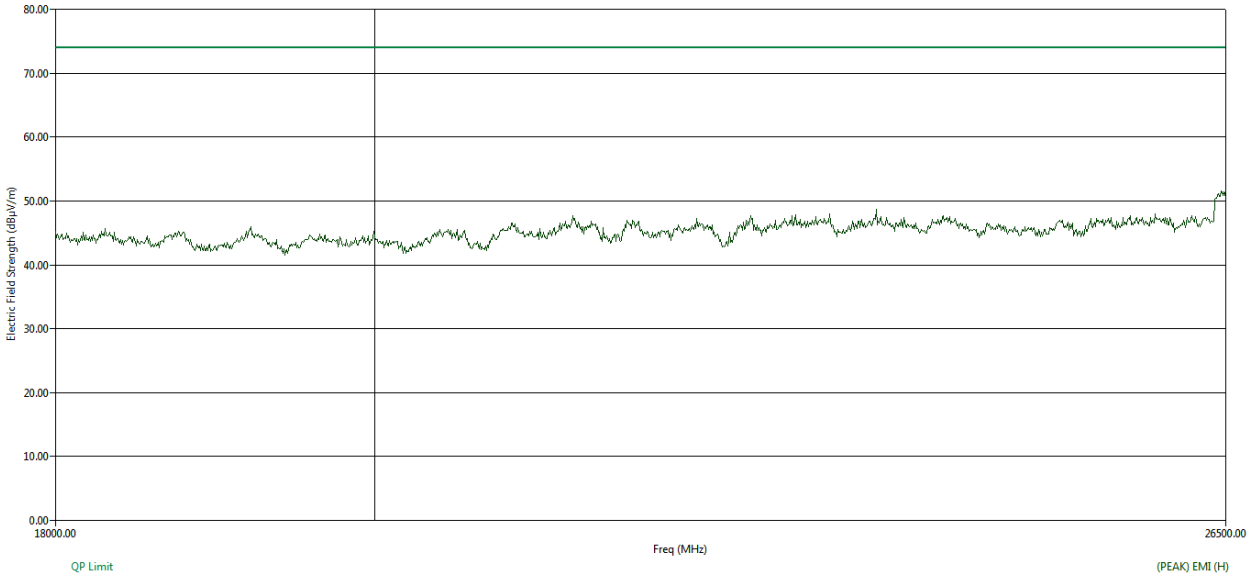

Figure 102: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

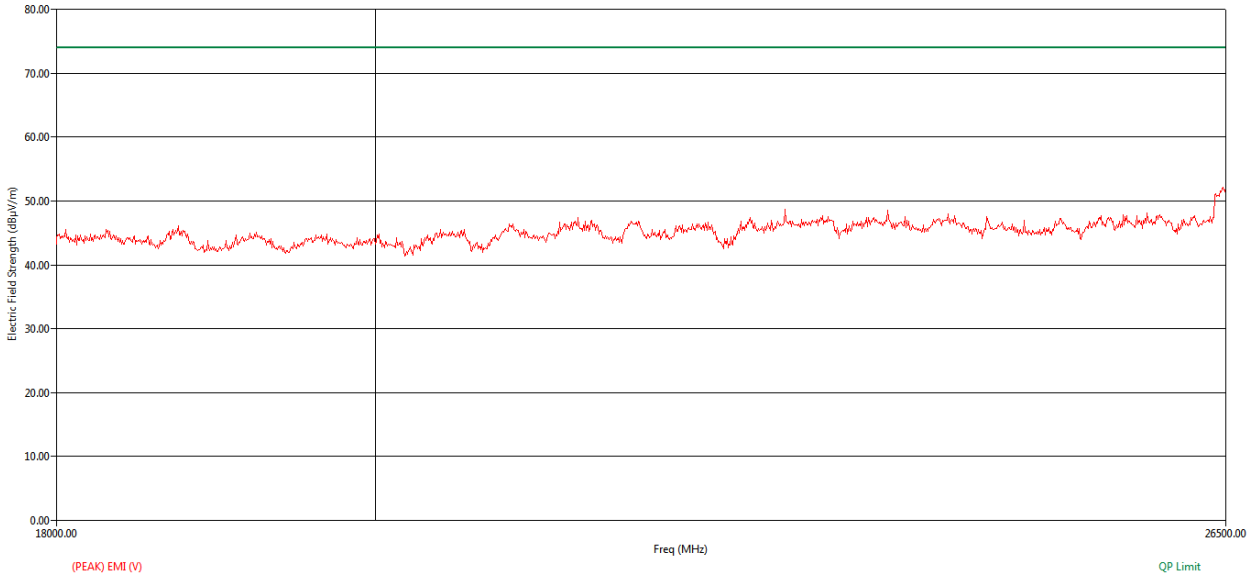

Figure 103: Peak RE from 18GHz to 26.5GHz - Vertical polarization

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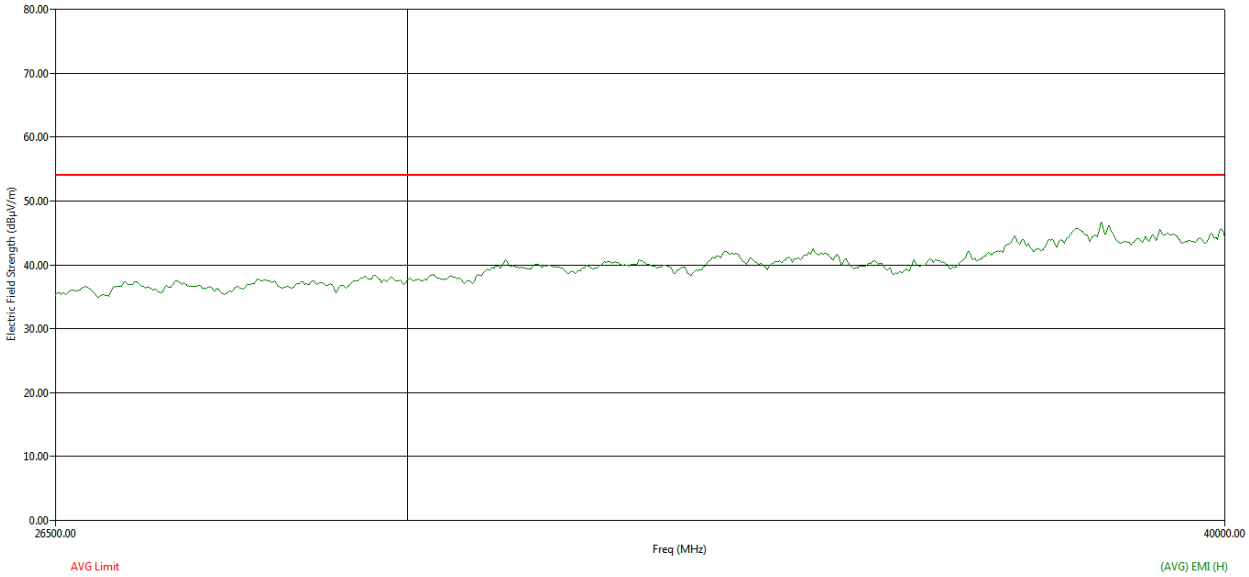

Figure 104: Average RE from 26.5GHz to 40GHz - Horizontal polarization

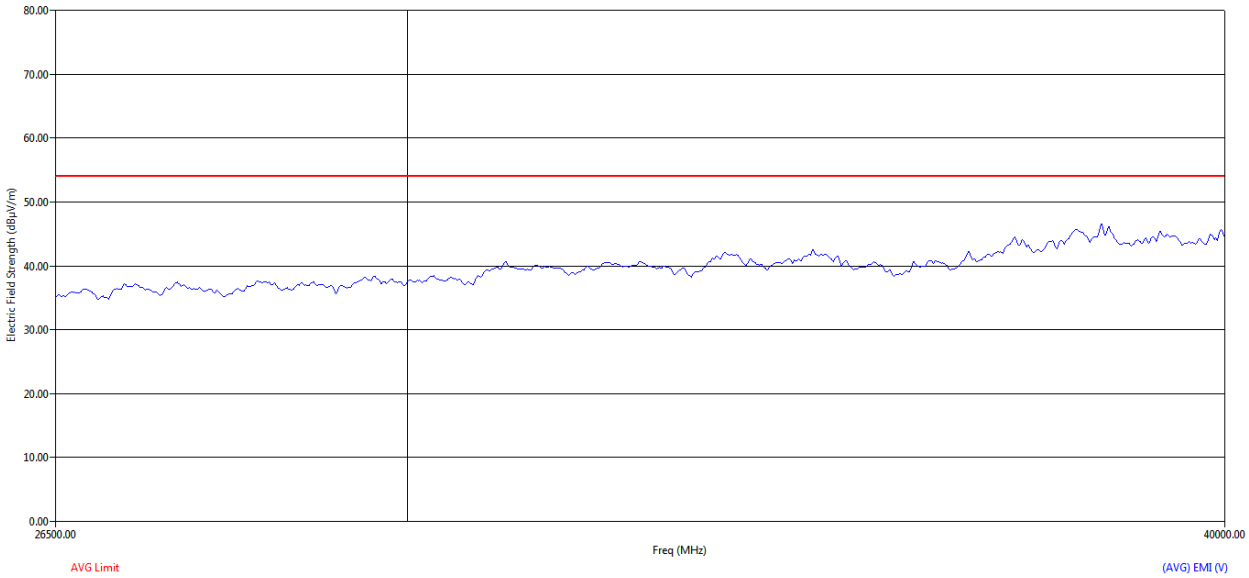

Figure 105: Average RE from 26.5GHz to 40GHz - Vertical polarization

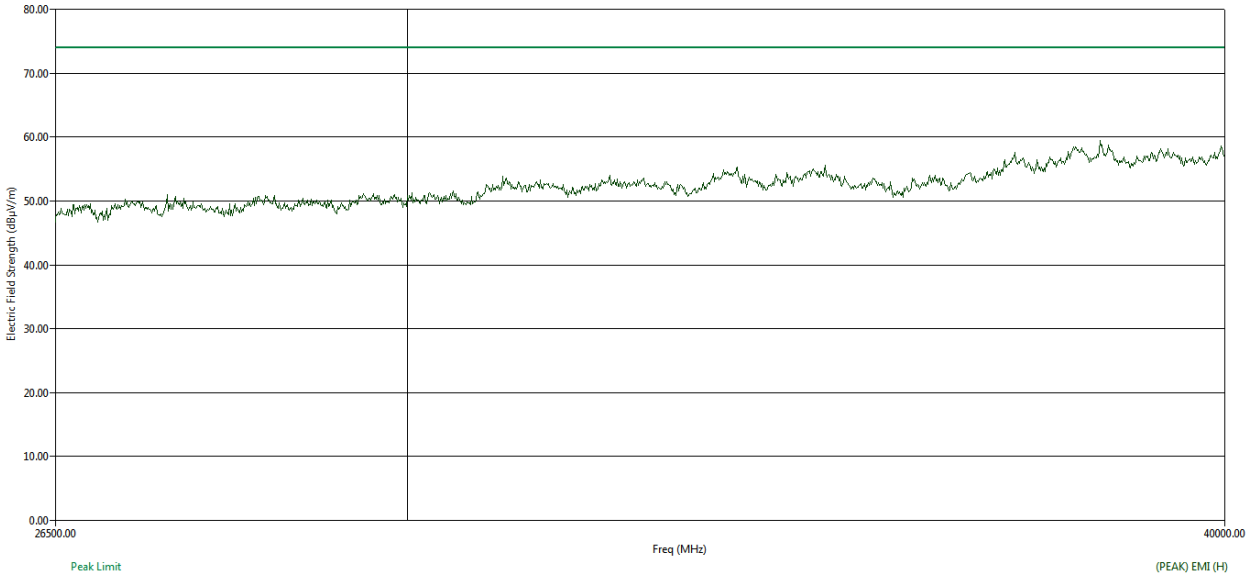

Figure 106: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

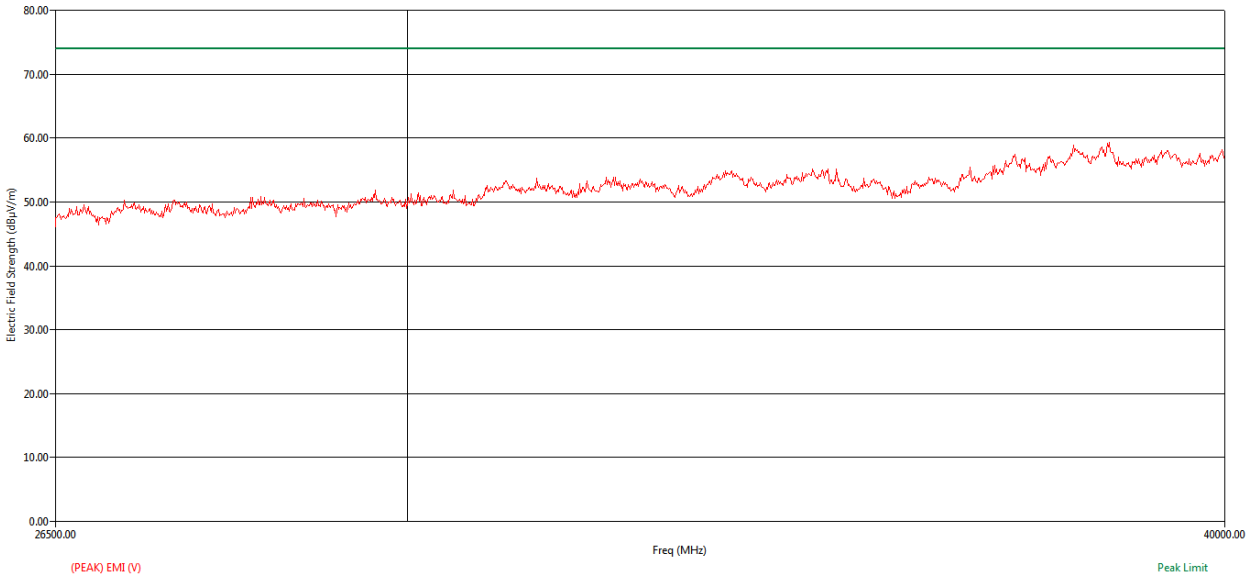

Figure 107: Peak RE from 26.5GHz to 40GHz - Vertical polarization

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5.3.2.7.2 MID CHANNEL_5300 MHZ

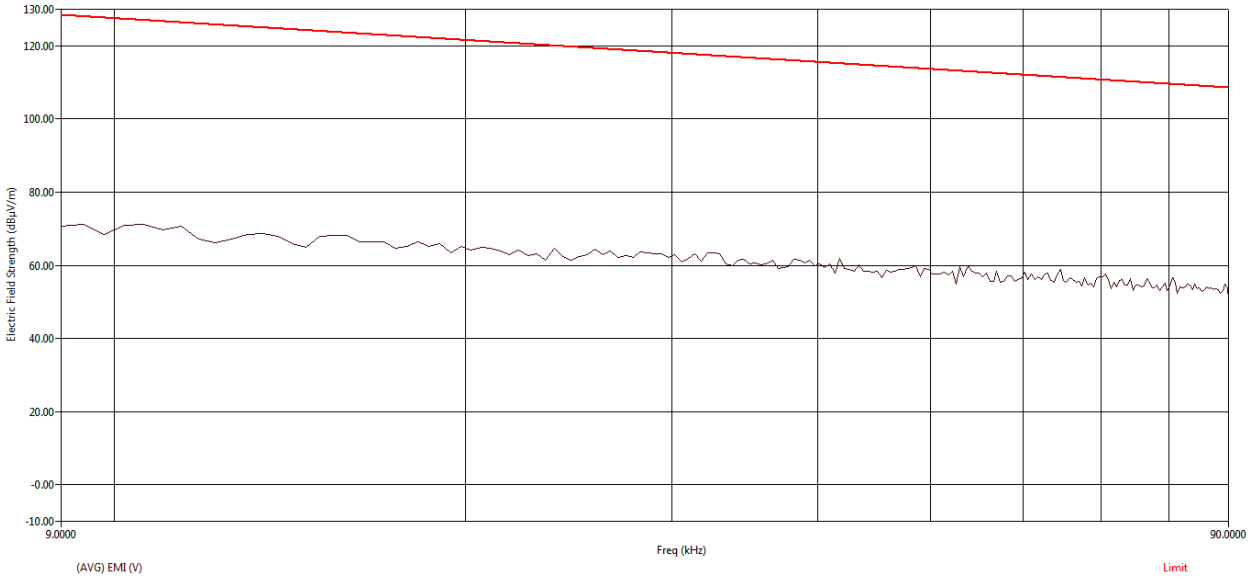

Figure 108: Average RE from 9 kHz to 90 kHz - Parallel

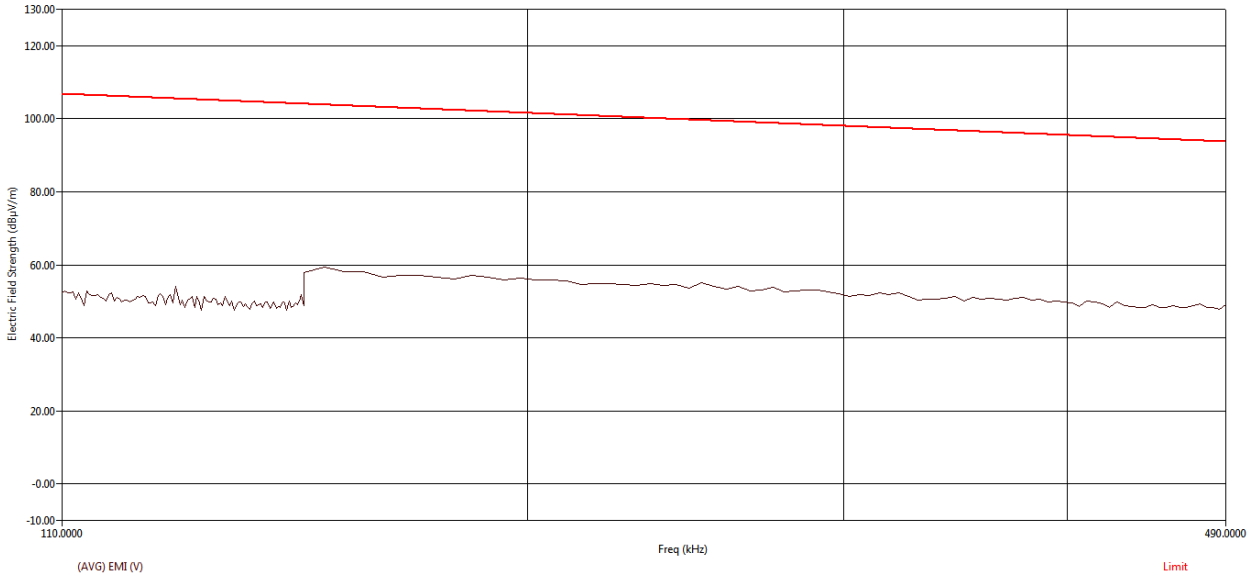

Figure 109: Average RE from 110 kHz to 490 kHz - Parallel

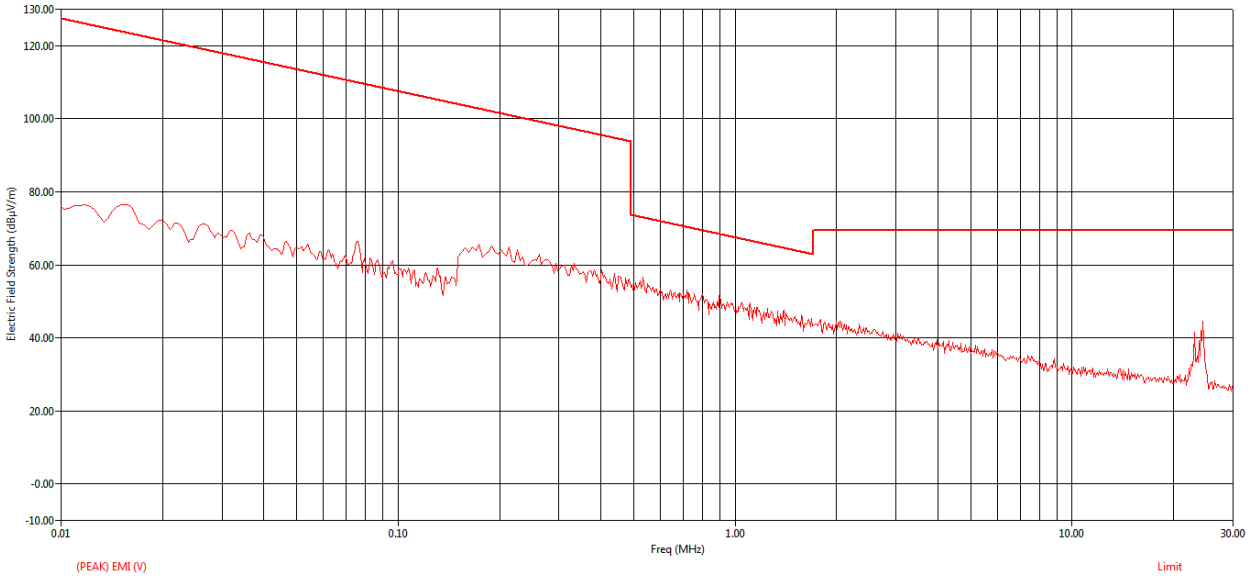

Figure 110: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	10.28	1.68	16.81	28.77	69.54	-40.78
24.40	24.41	V	3.08	1.72	16.73	21.54	69.54	-48.00

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

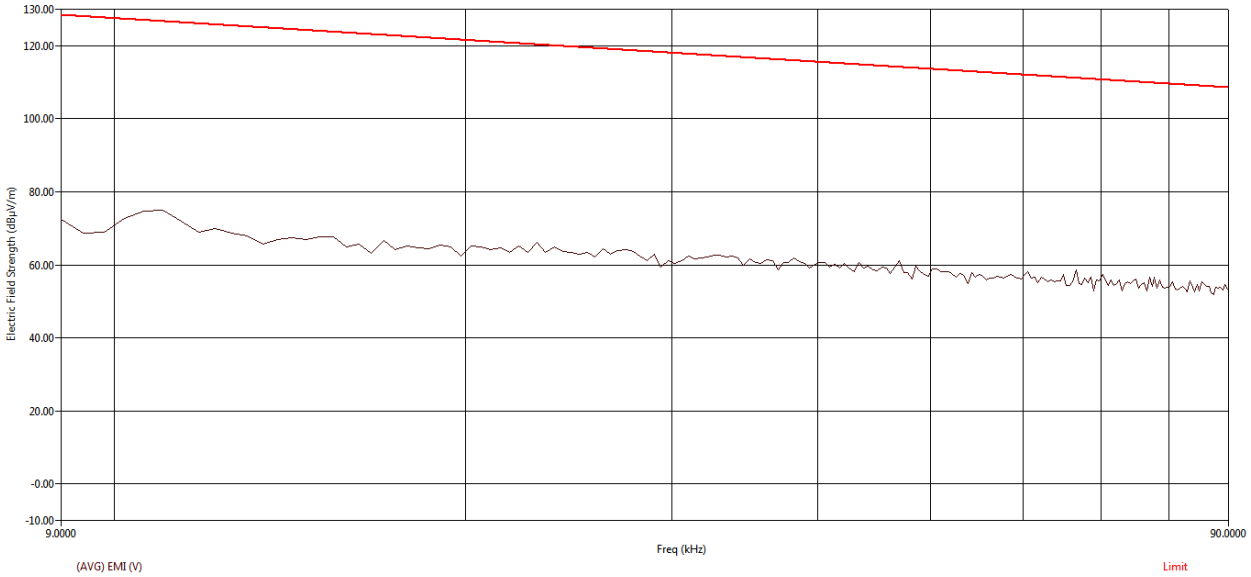

Figure 111: Average RE from 9 kHz to 90 kHz - Perpendicular

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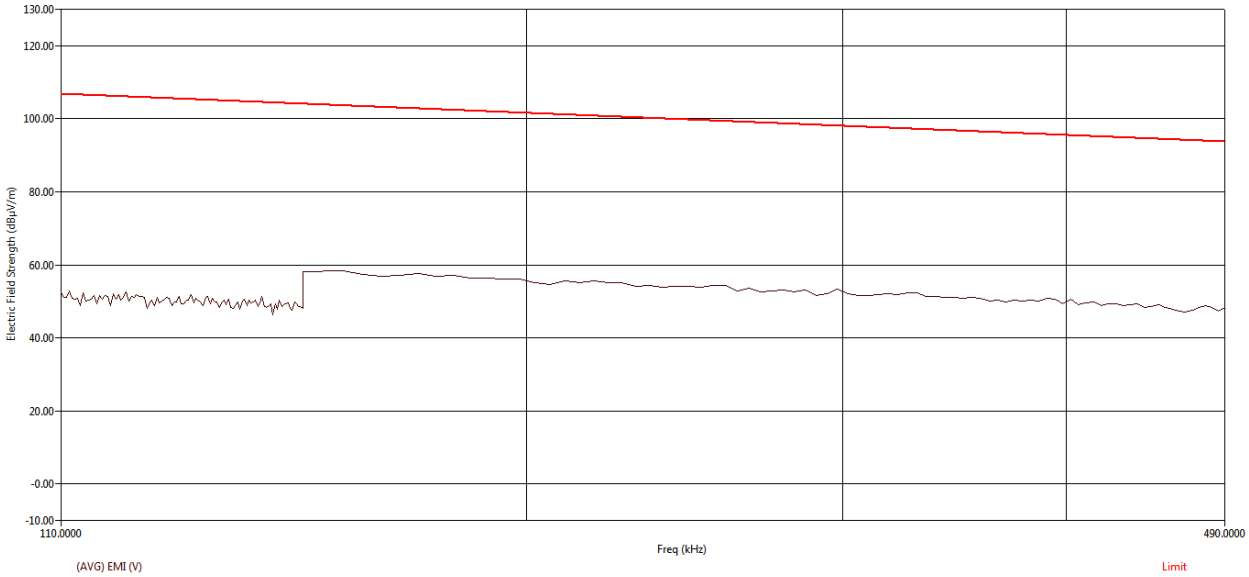

Figure 112: Average RE from 110 kHz to 490 kHz - Perpendicular

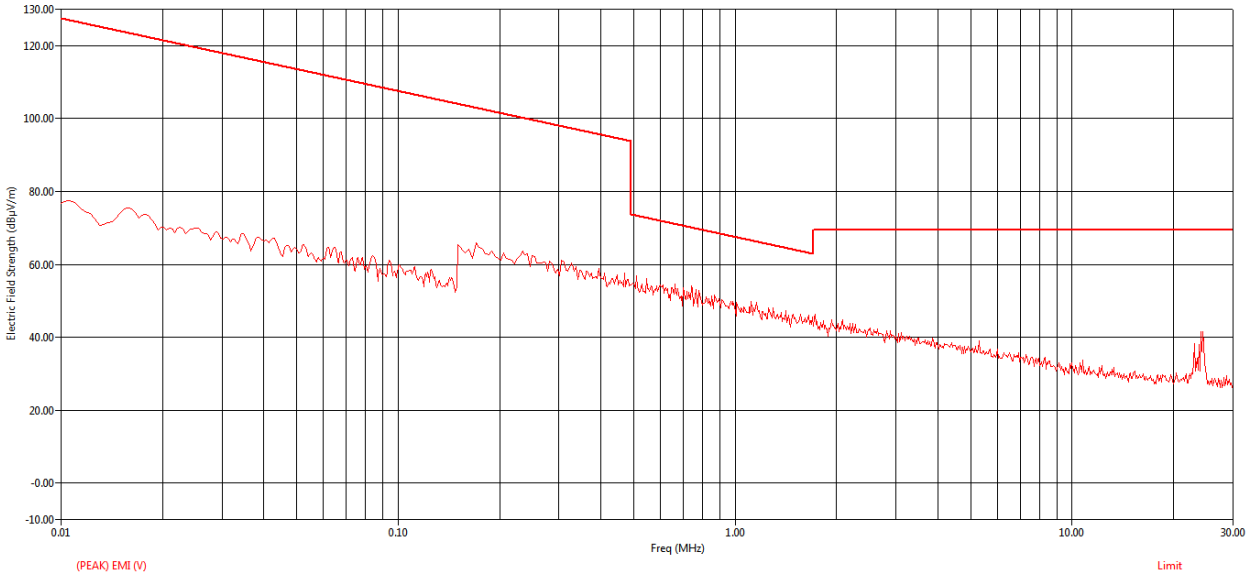

Figure 113: Peak RE from 9 kHz to 30MHz-Perpendicular

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	11.42	1.68	16.81	29.91	69.54	-39.63
24.10	24.11	V	9.07	1.71	16.75	27.54	69.54	-42.01
24.40	24.41	V	3.31	1.72	16.73	21.76	69.54	-47.78

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

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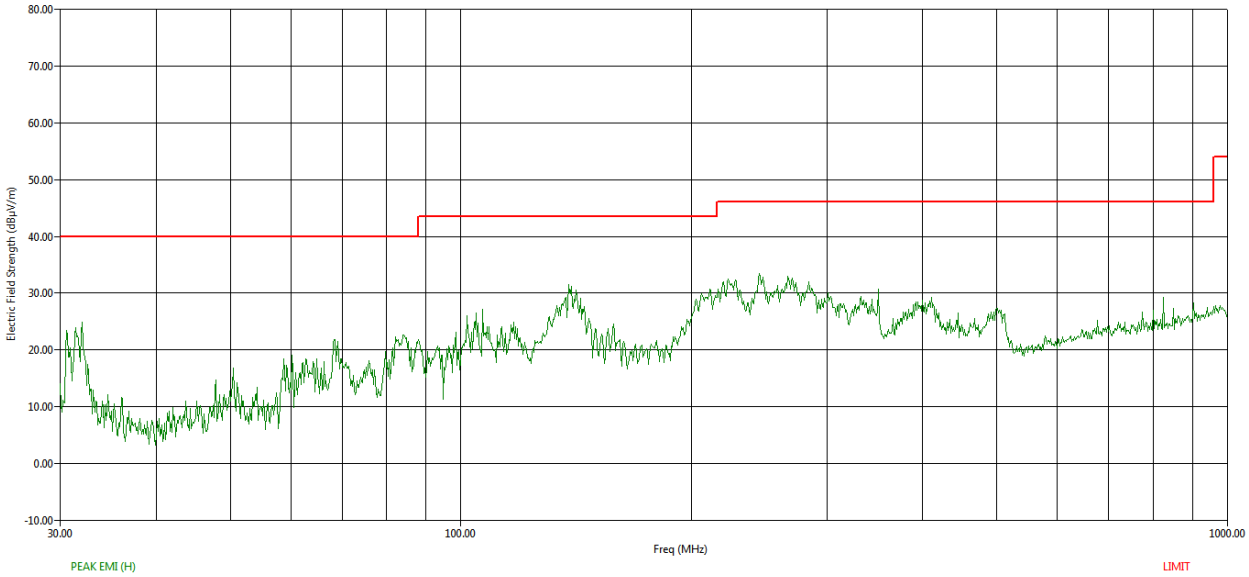

Figure 114: Peak RE from 30MHz to 1GHz - Horizontal polarization

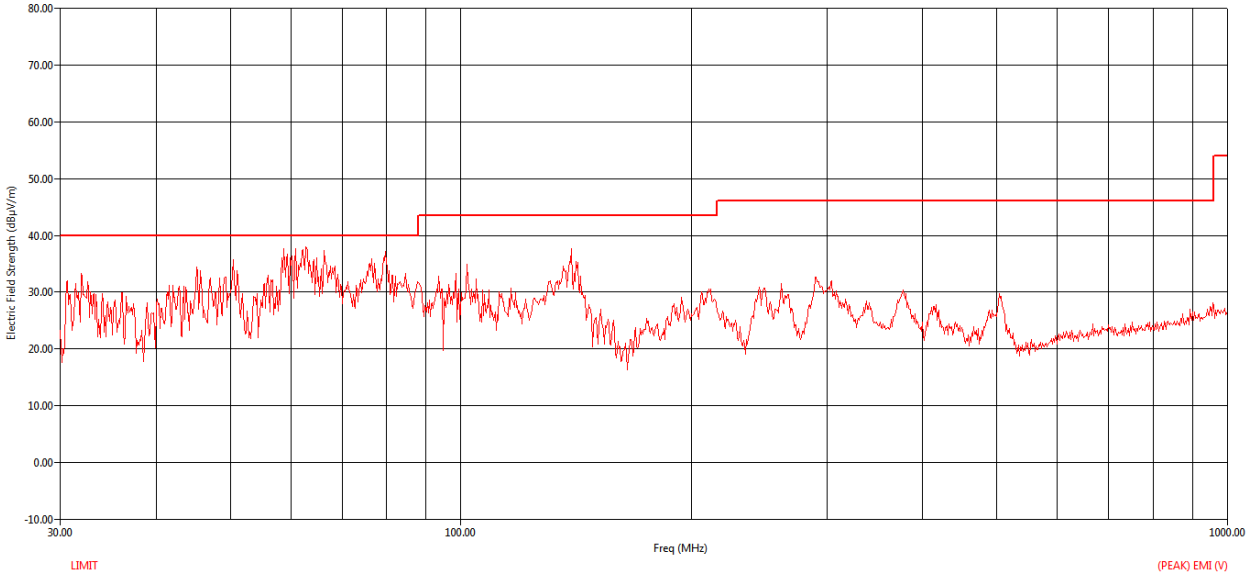

Figure 115: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
58.76	58.88	V	166.90	118.00	44.50	2.76	9.53	32.18	24.61	40.00	-15.39
60.84	60.83	V	76.40	100.00	53.16	2.81	9.43	32.17	33.22	40.00	-6.78
62.76	62.76	V	72.30	103.00	56.49	2.85	9.45	32.17	36.63	40.00	-3.37
79.70	79.74	V	199.70	100.00	56.65	3.21	8.99	32.13	36.71	40.00	-3.29

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

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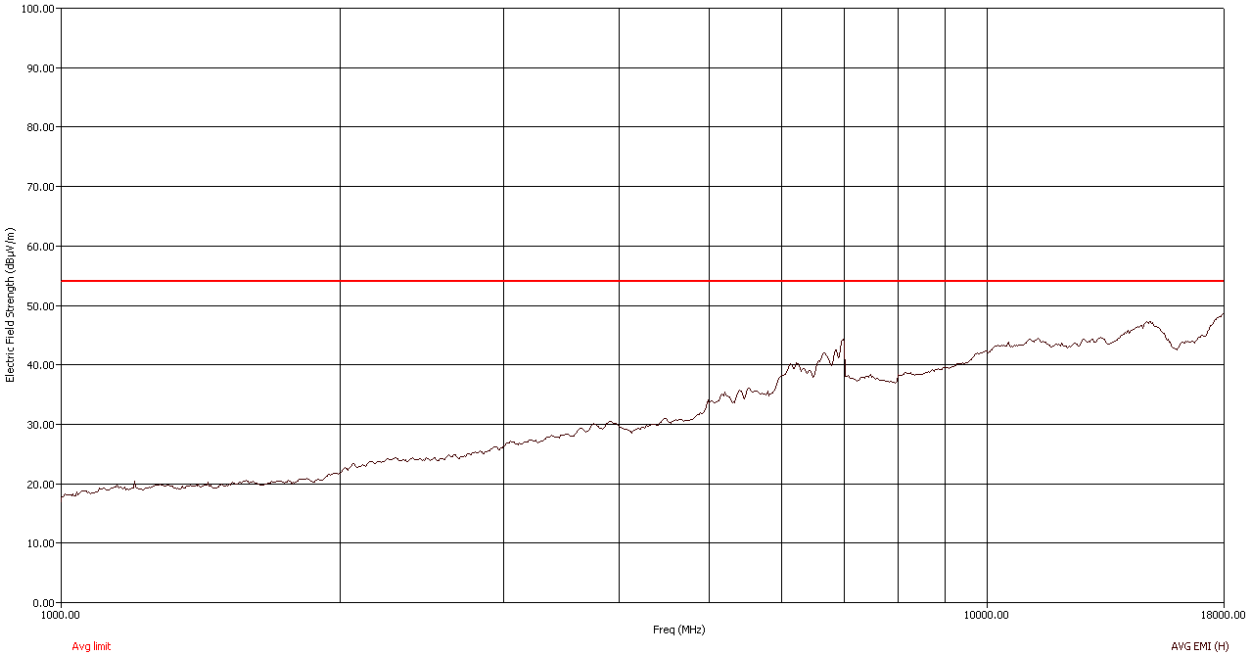

Figure 116: Average RE from 1GHz to 18GHz - Horizontal polarization

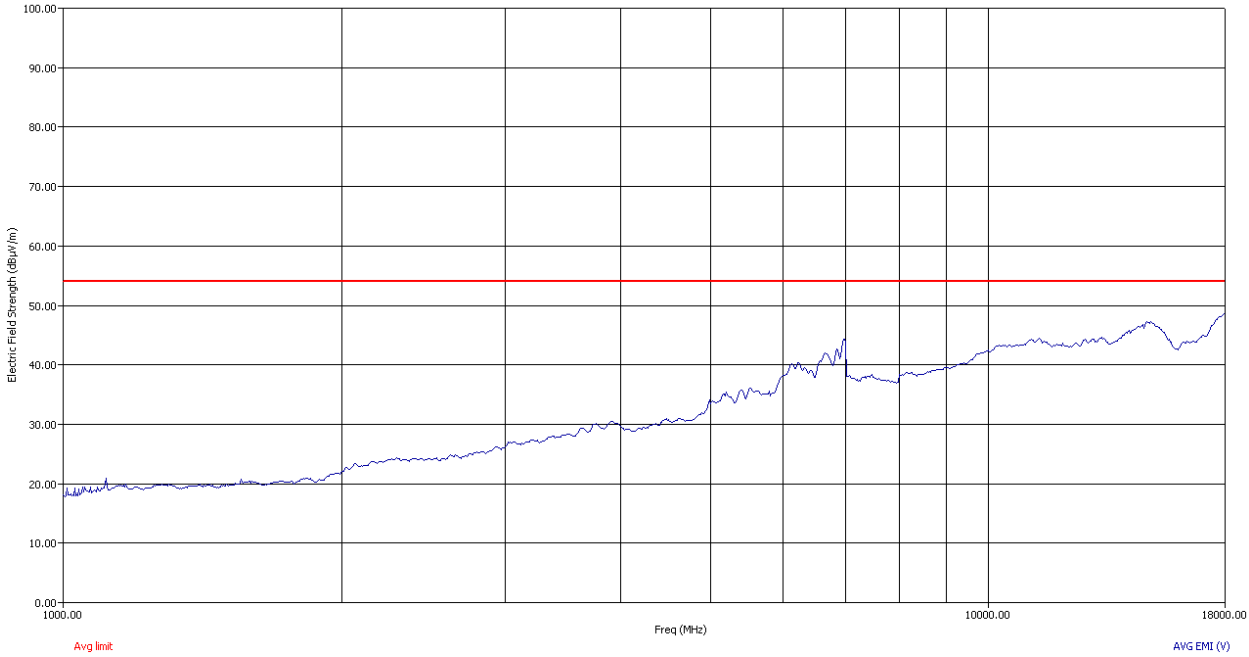

Figure 117: Average RE from 1GHz to 18GHz - Vertical polarization

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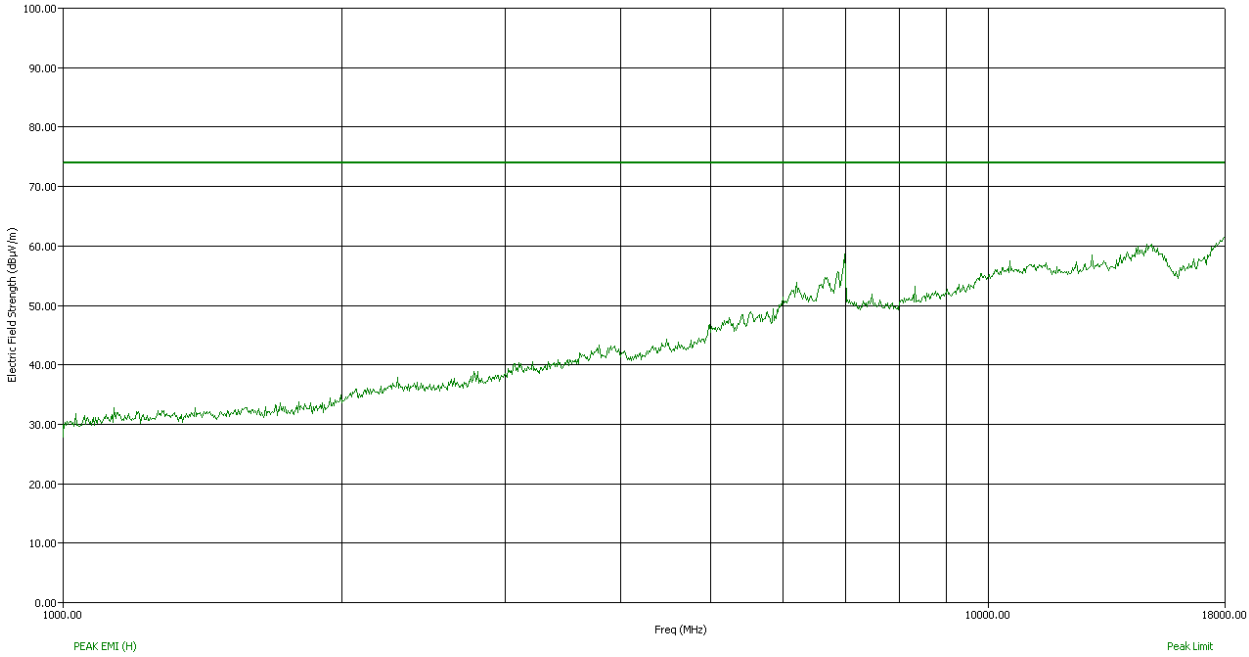

Figure 118: Peak RE from 1GHz to 18GHz - Horizontal polarization

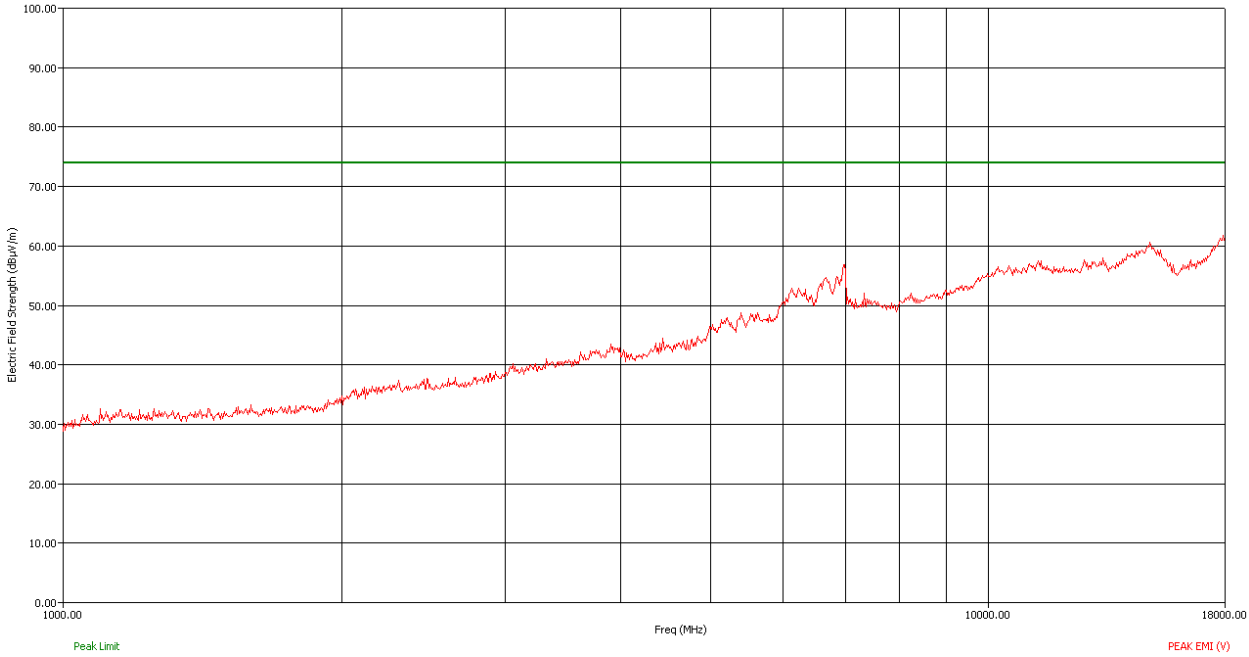

Figure 119: Peak RE from 1GHz to 18GHz - Vertical polarization

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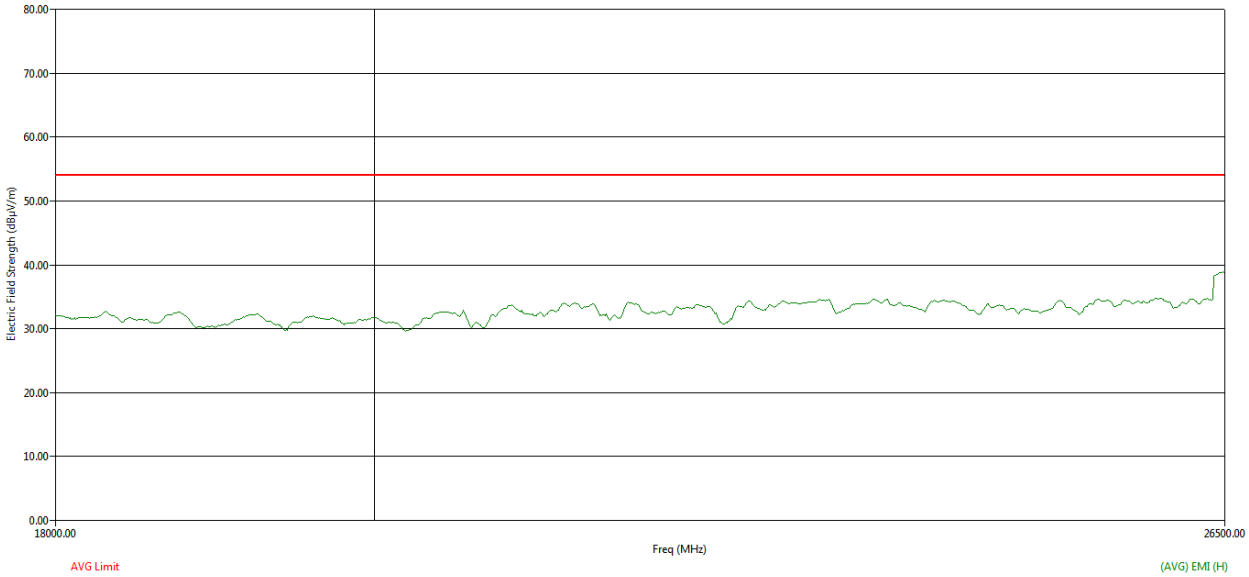

Figure 120: Average RE from 18GHz to 26.5GHz - Horizontal polarization

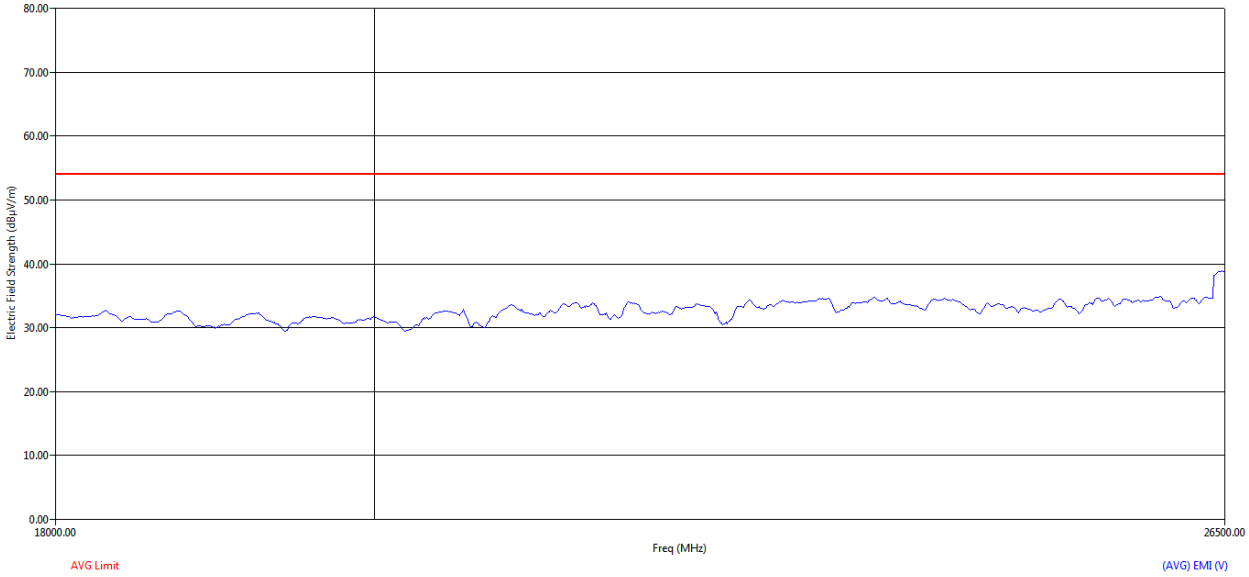

Figure 121: Average RE from 18GHz to 26.5GHz - Vertical polarization

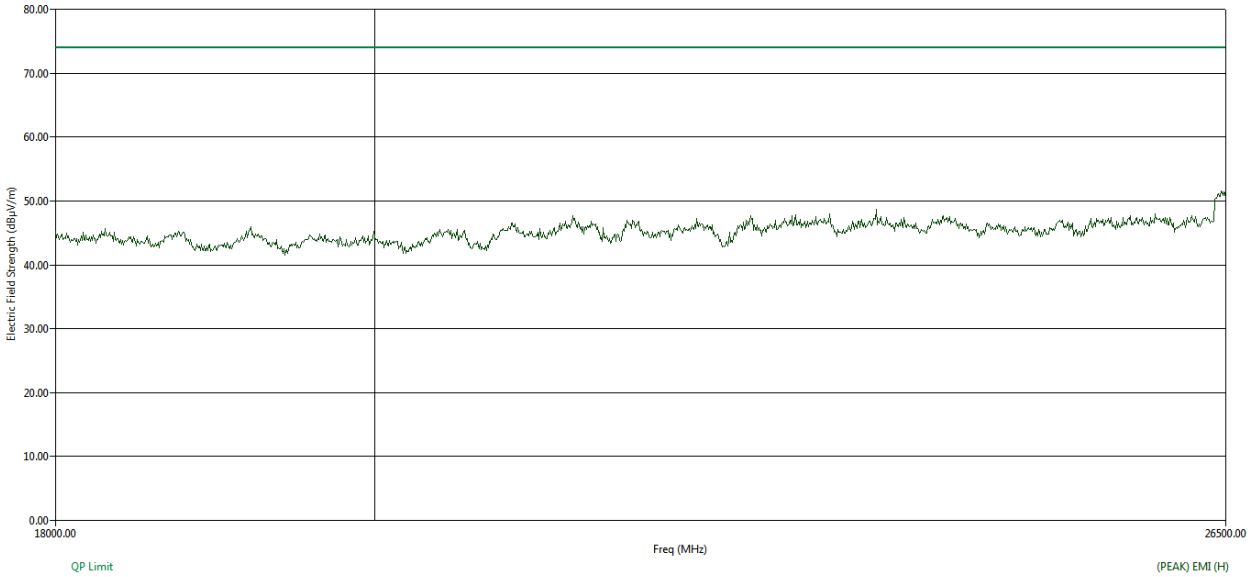

Figure 122: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

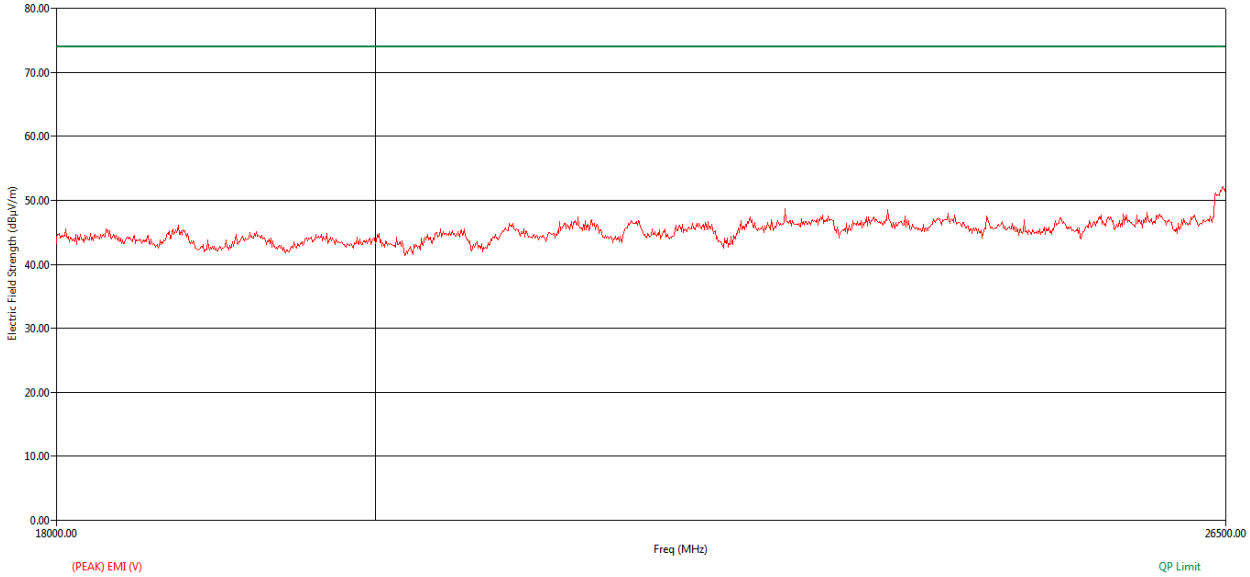

Figure 123: Peak RE from 18GHz to 26.5GHz - Vertical polarization

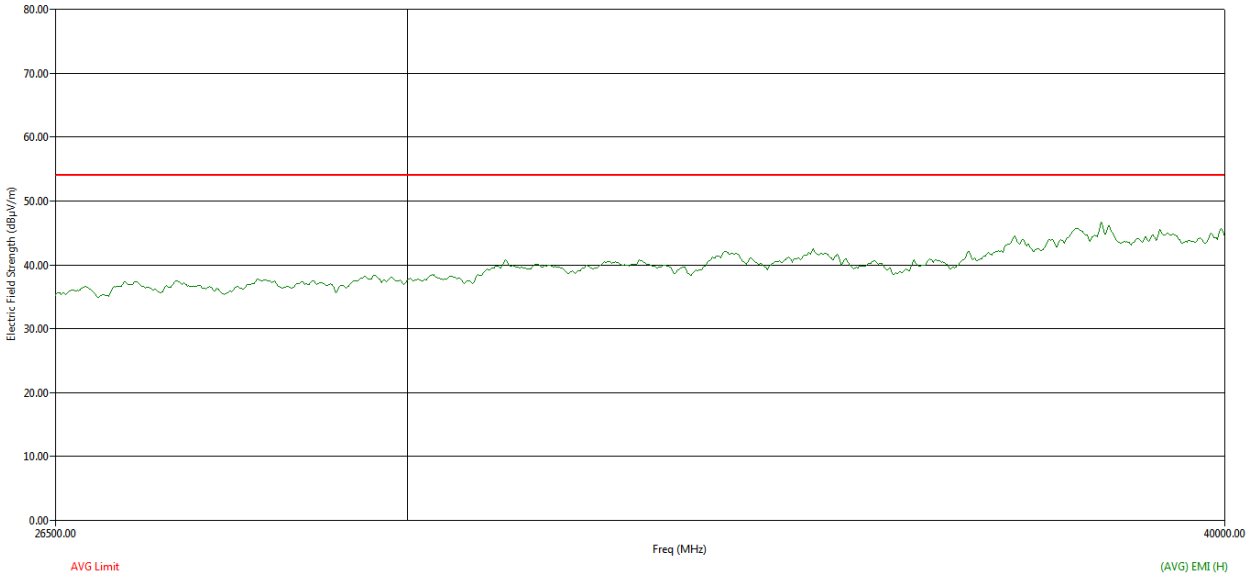

Figure 124: Average RE from 26.5GHz to 40GHz - Horizontal polarization

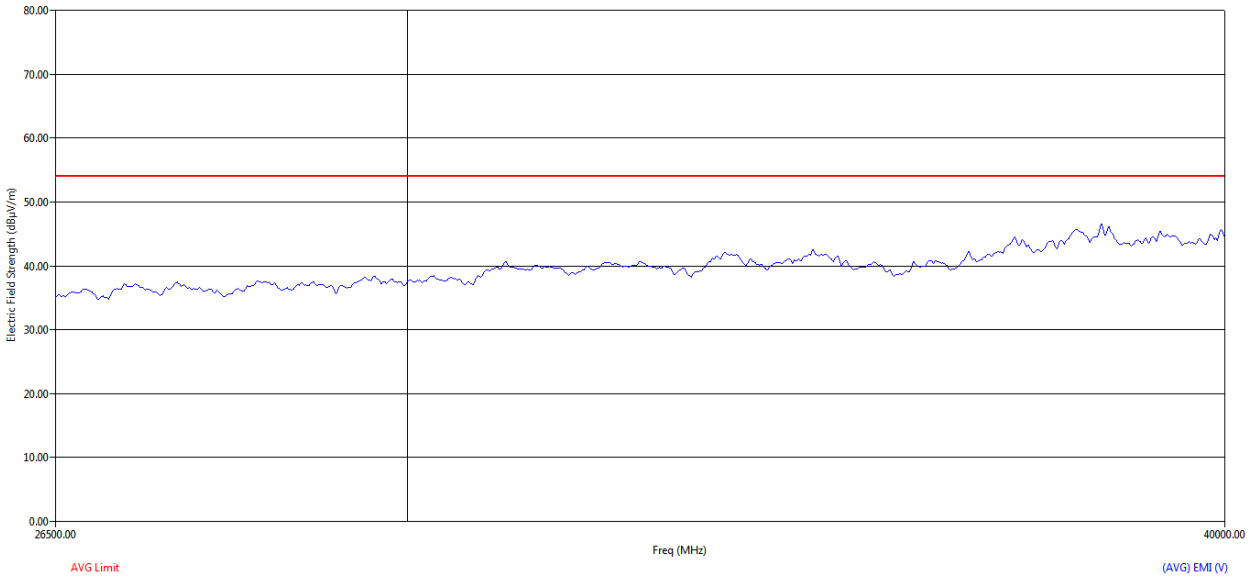

Figure 125: Average RE from 26.5GHz to 40GHz - Vertical polarization

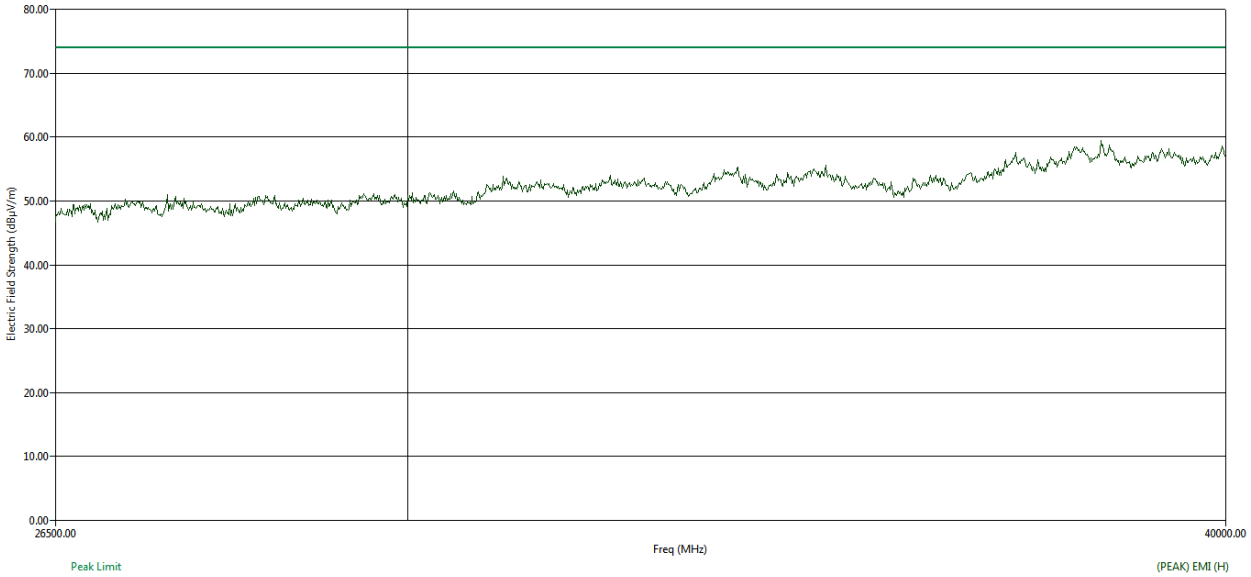

Figure 126: Peak RE from 26.5GHz to 40GHz - Horizontal polarization

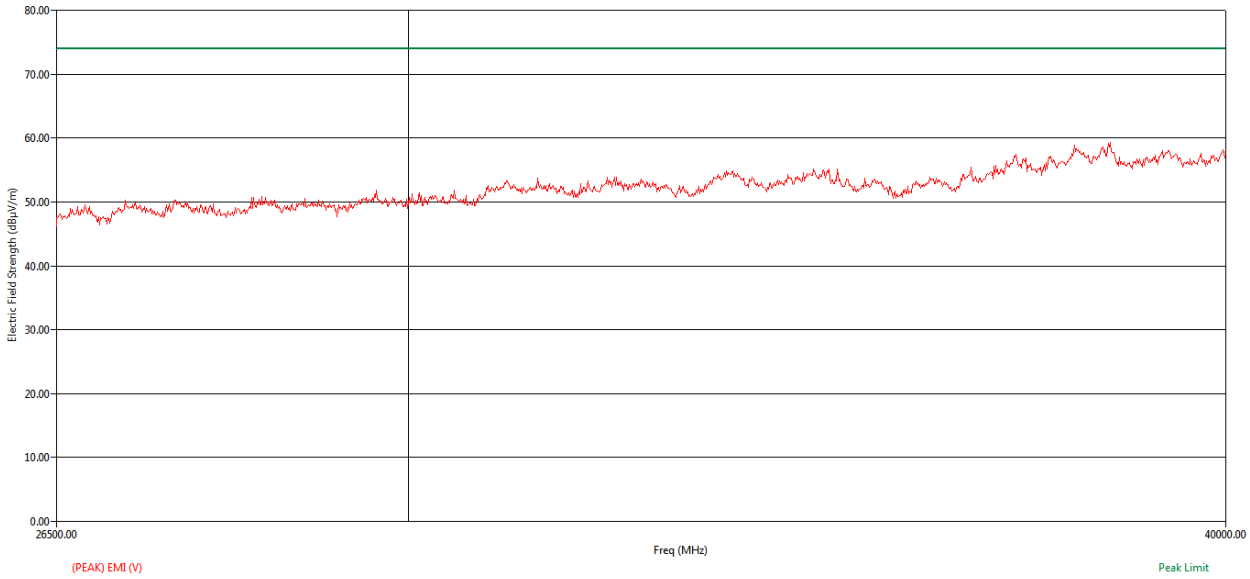

Figure 127: Peak RE from 26.5GHz to 40GHz - Vertical polarization

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5.3.2.7.3 HIGH CHANNEL_5335 MHZ

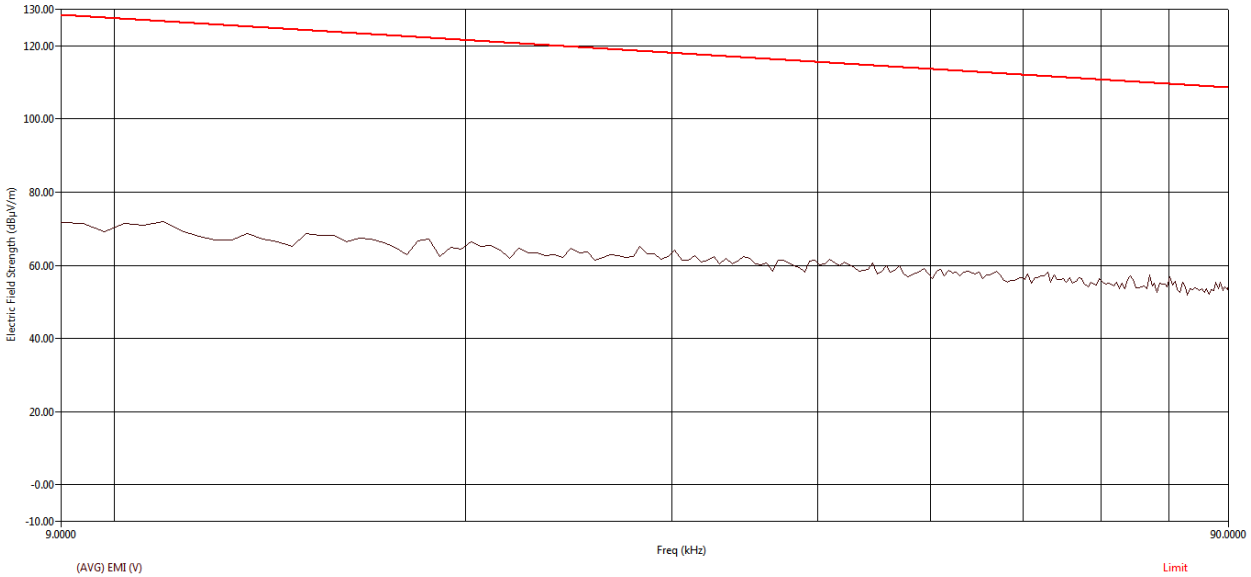

Figure 128: Average RE from 9 kHz to 90 kHz – Parallel

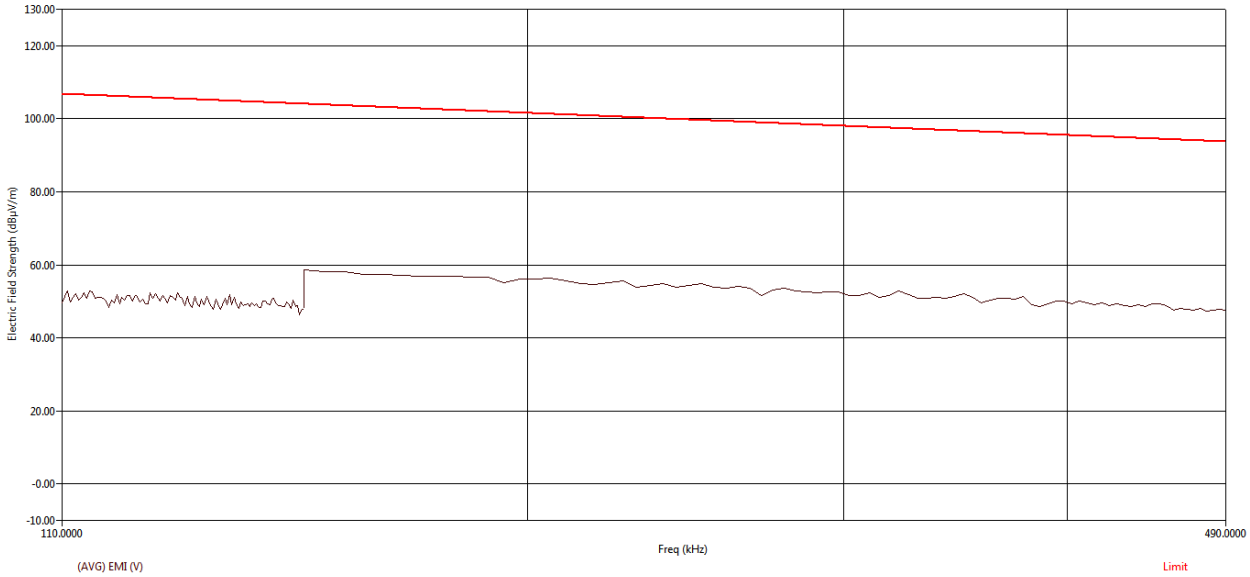

Figure 129: Average RE from 110 kHz to 490 kHz - Parallel

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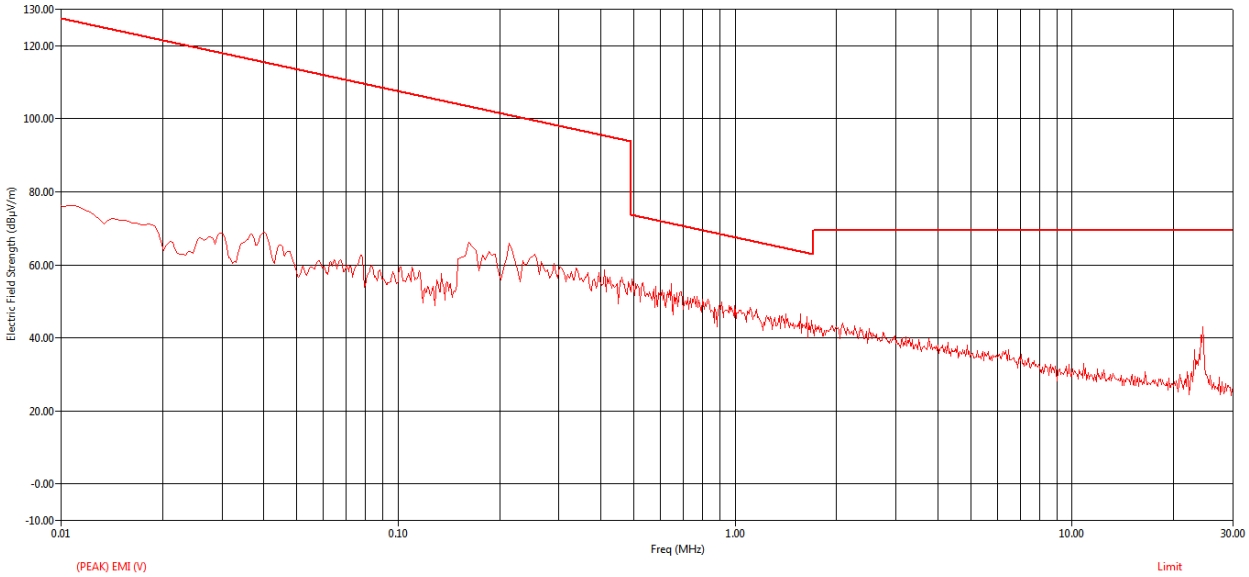

Figure 130: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
23.06	23.07	V	10.08	1.68	16.81	28.57	69.54	-40.98
24.40	24.41	V	2.88	1.72	16.73	21.34	69.54	-48.20

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

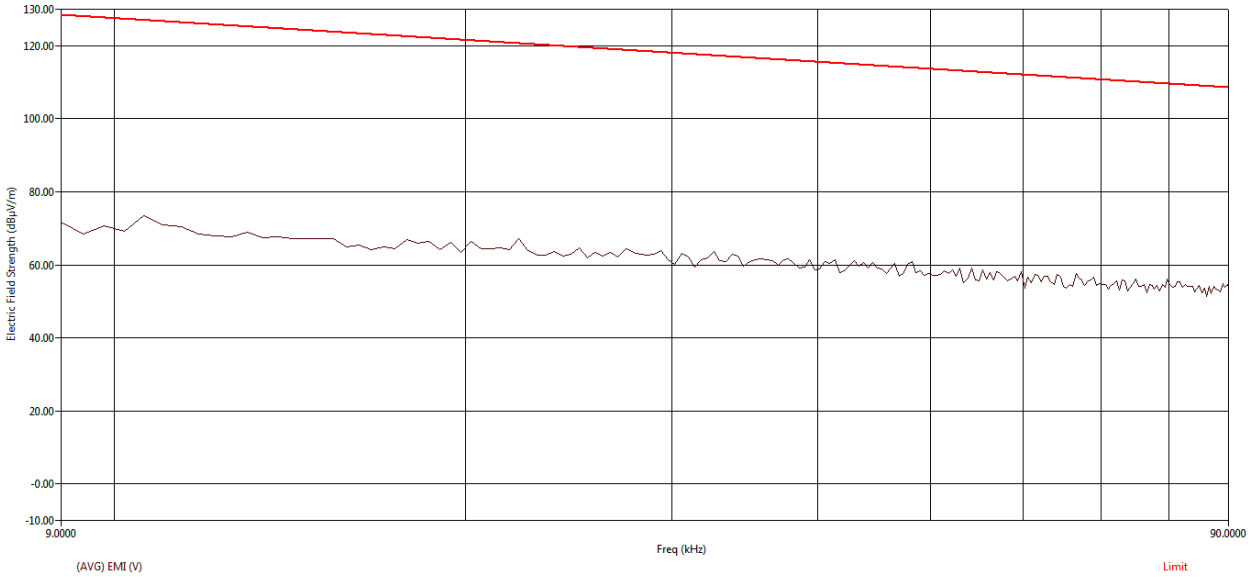

Figure 131: Average RE from 9 kHz to 90 kHz - Perpendicular

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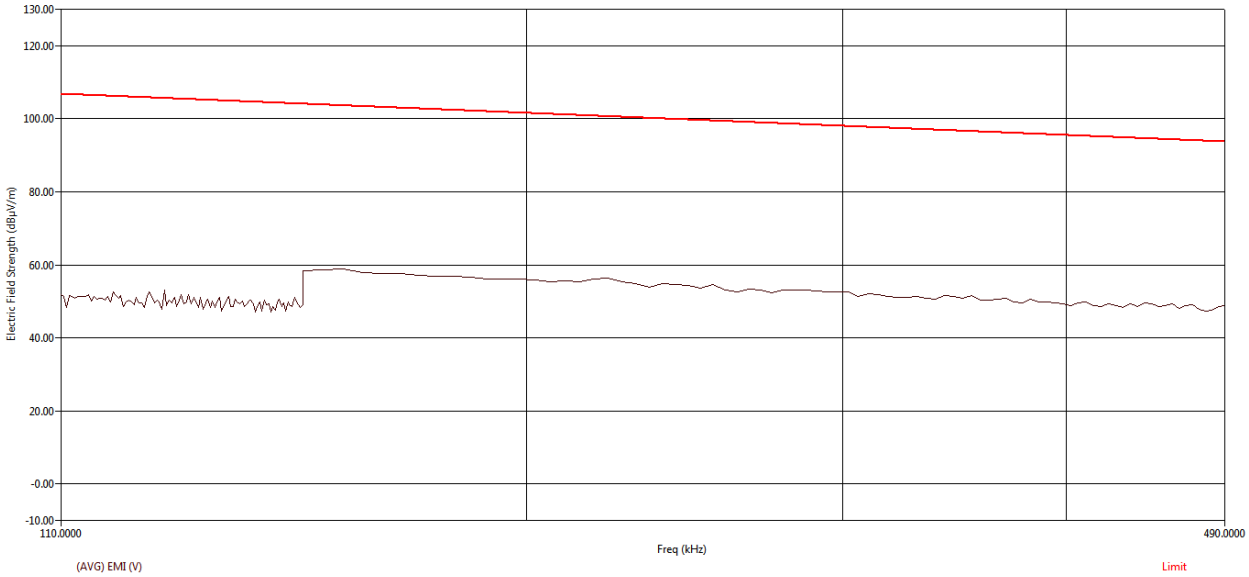

Figure 132: Average RE from 110 kHz to 490 kHz - Perpendicular

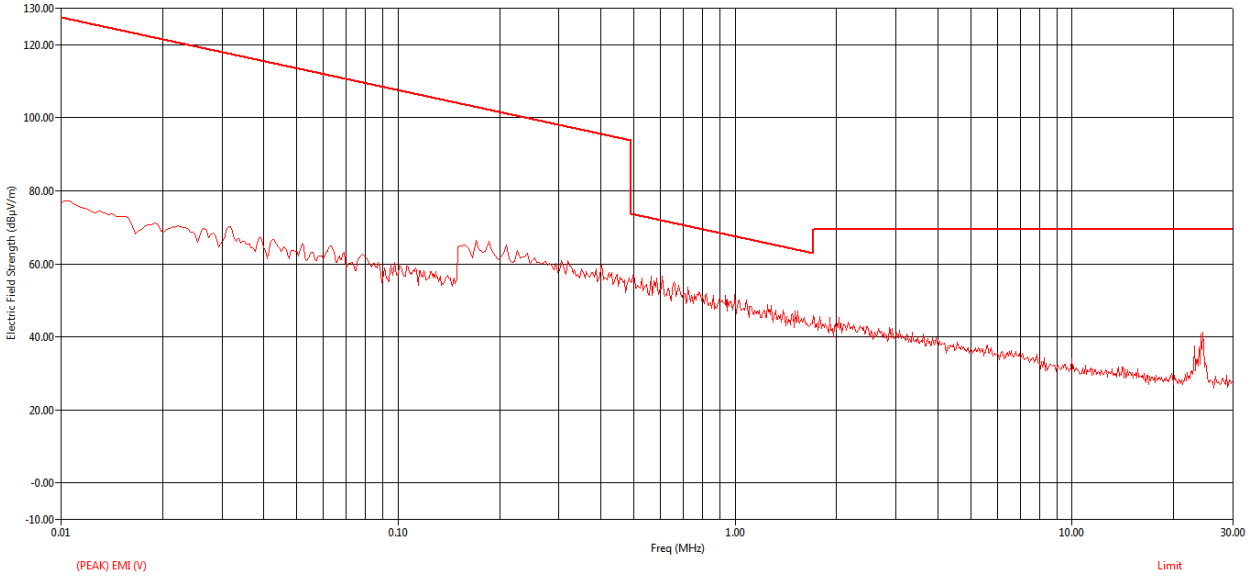

Figure 133: Peak RE from 9 kHz to 30MHz - Perpendicular

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	11.86	1.68	16.81	30.36	69.54	-39.19
24.10	24.10	V	9.08	1.71	16.75	27.54	69.54	-42.00
24.40	24.41	V	4.08	1.72	16.73	22.53	69.54	-47.01

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

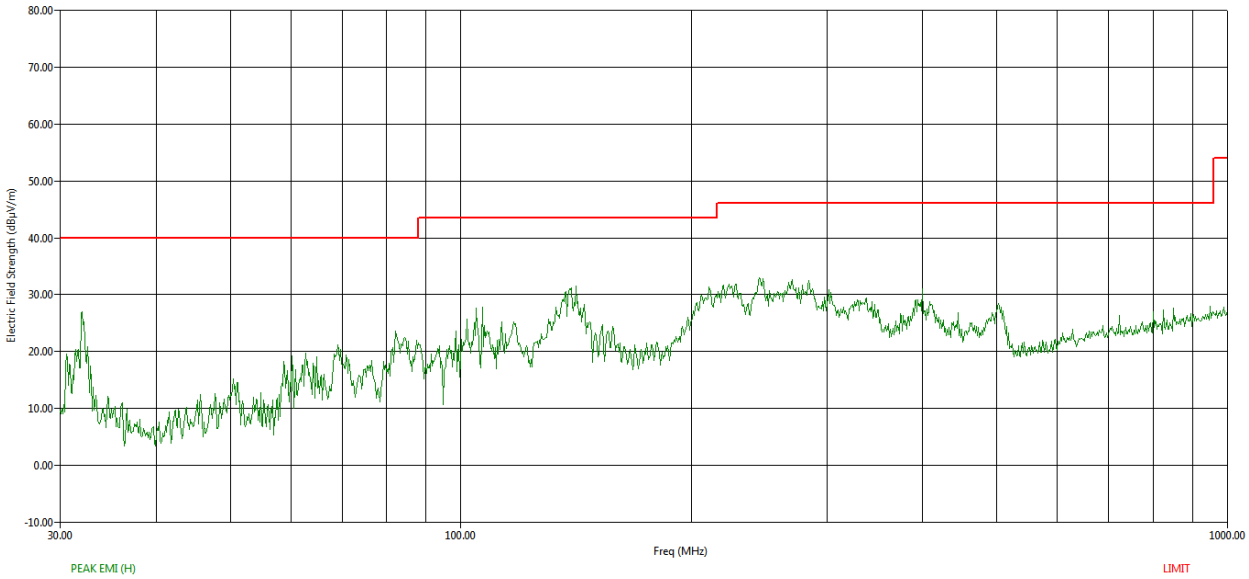

Figure 134: Peak RE from 30MHz to 1GHz - Horizontal polarization

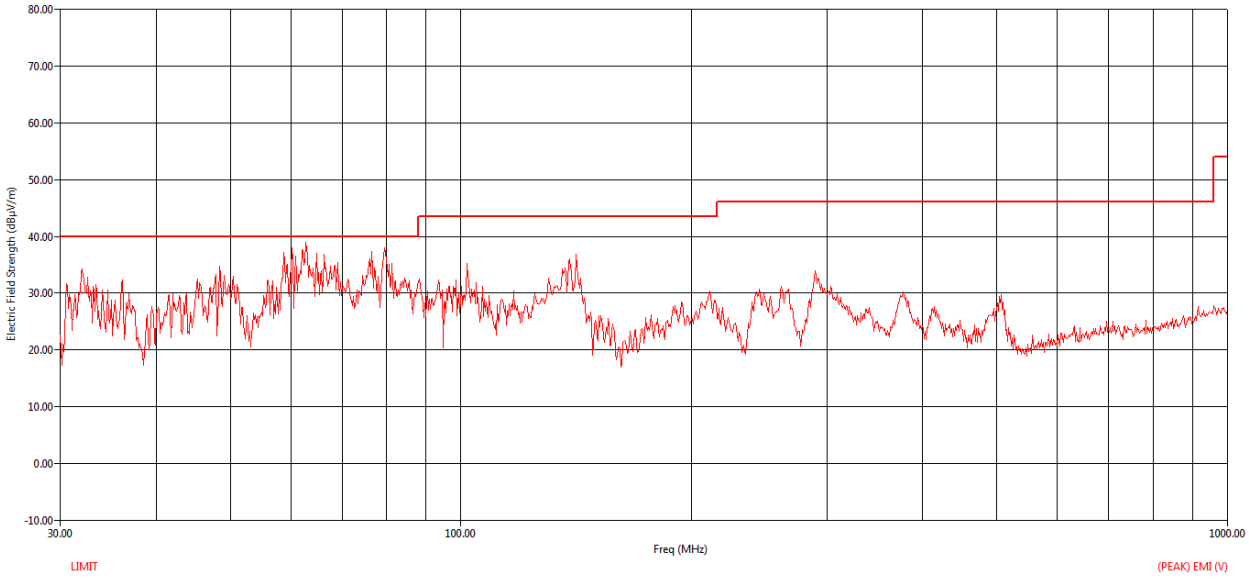

Figure 135: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
60.24	60.20	V	180.00	274.00	35.63	2.79	9.42	32.17	15.67	40.00	-24.33
62.80	62.74	V	213.50	166.00	47.47	2.85	9.45	32.17	27.60	40.00	-12.40
76.56	76.54	V	197.20	103.00	54.56	3.14	9.16	32.14	34.72	40.00	-5.28
79.40	79.28	V	46.90	100.00	51.72	3.20	9.02	32.13	31.80	40.00	-8.20

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

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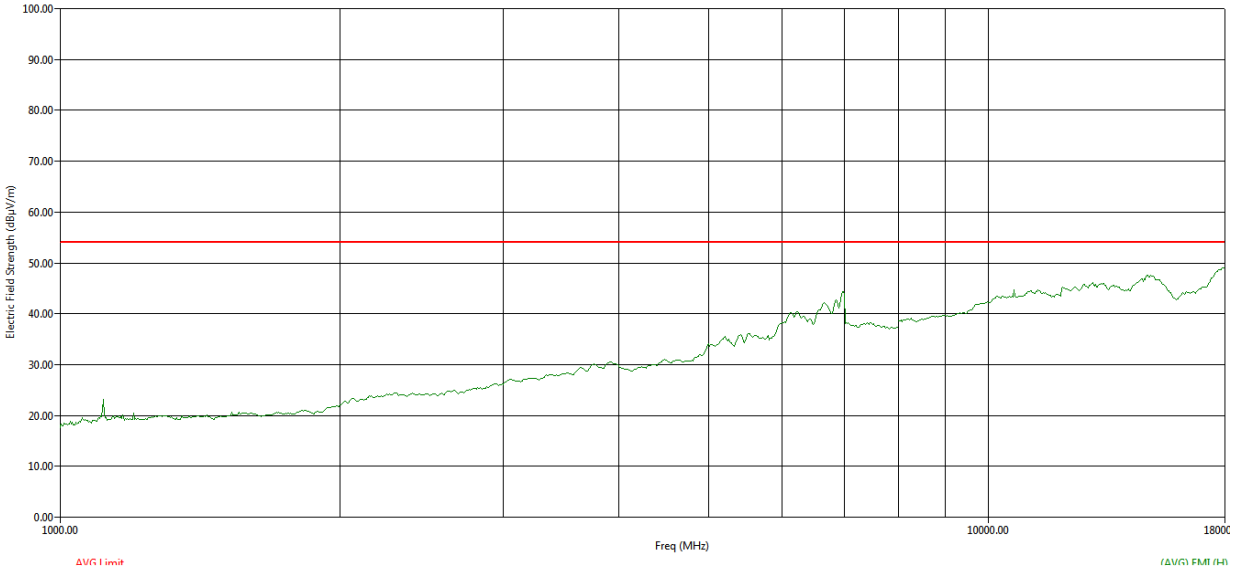

Figure 136: Average RE from 1GHz to 18GHz - Horizontal polarization

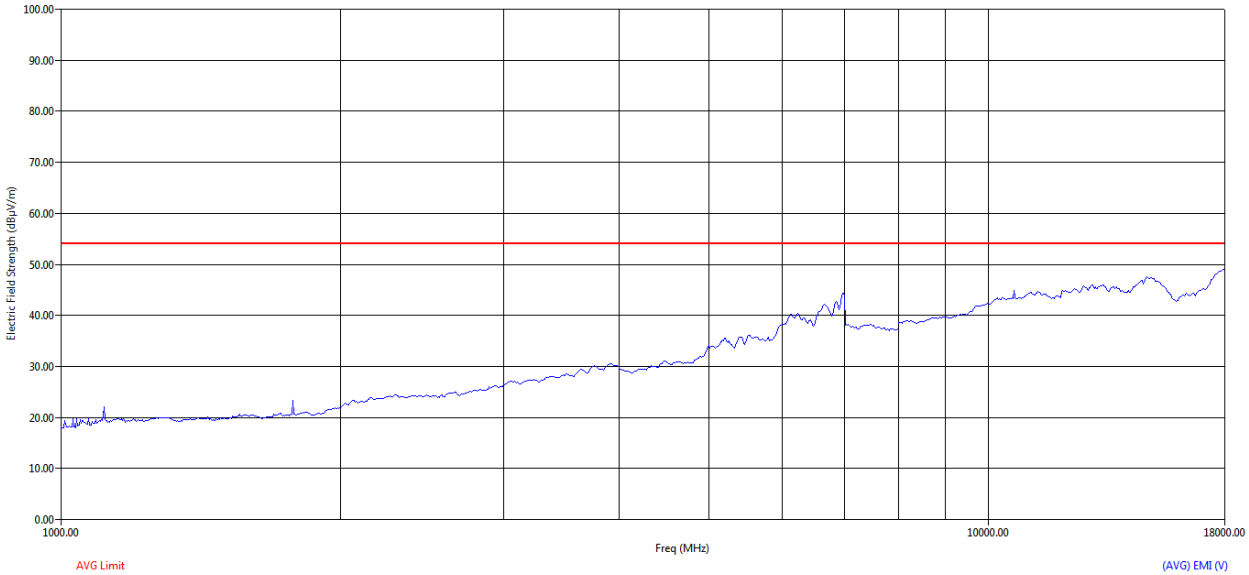

Figure 137: Average RE from 1GHz to 18GHz - Vertical polarization

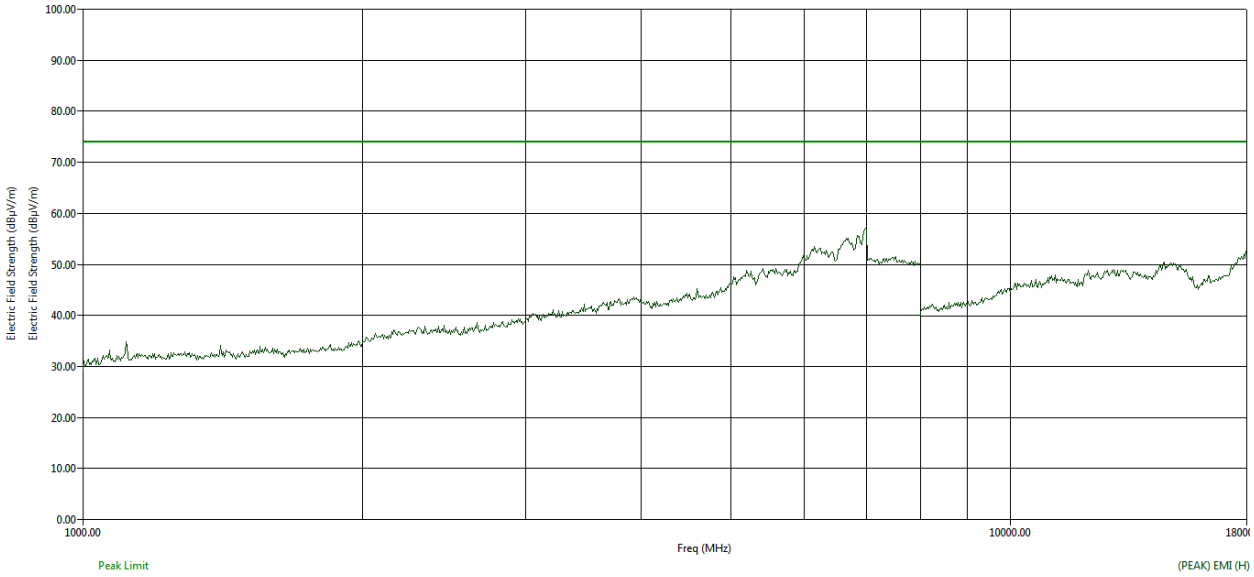

Figure 138: Peak RE from 1GHz to 18GHz - Horizontal polarization

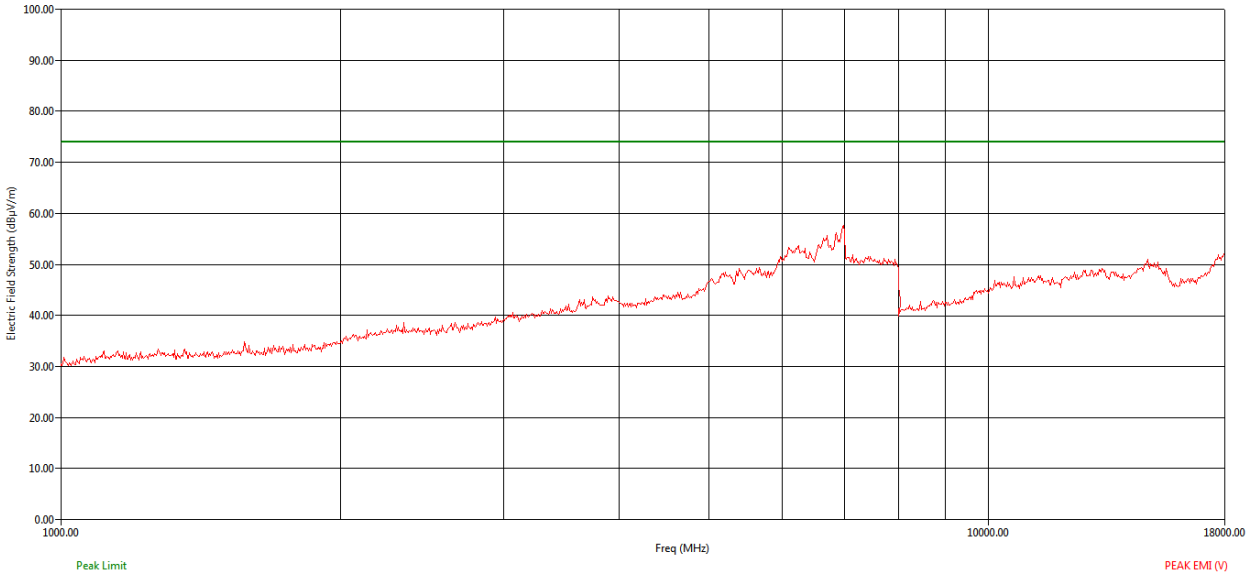

Figure 139: Peak RE from 1GHz to 18GHz - Vertical polarization

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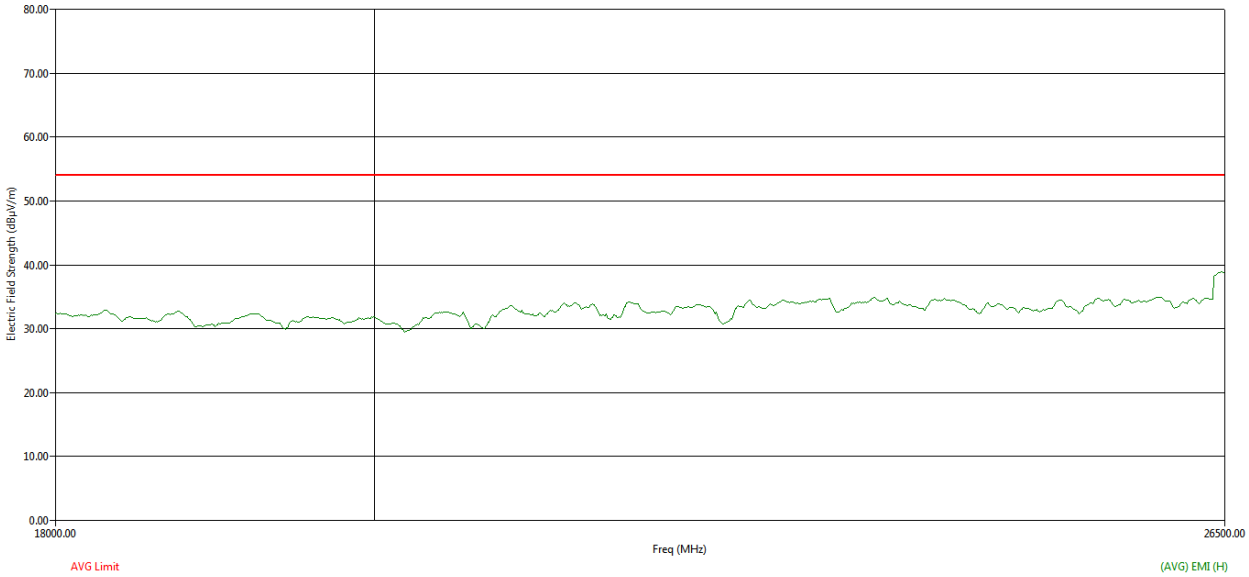

Figure 140: Average RE from 18GHz to 26.5GHz - Horizontal polarization

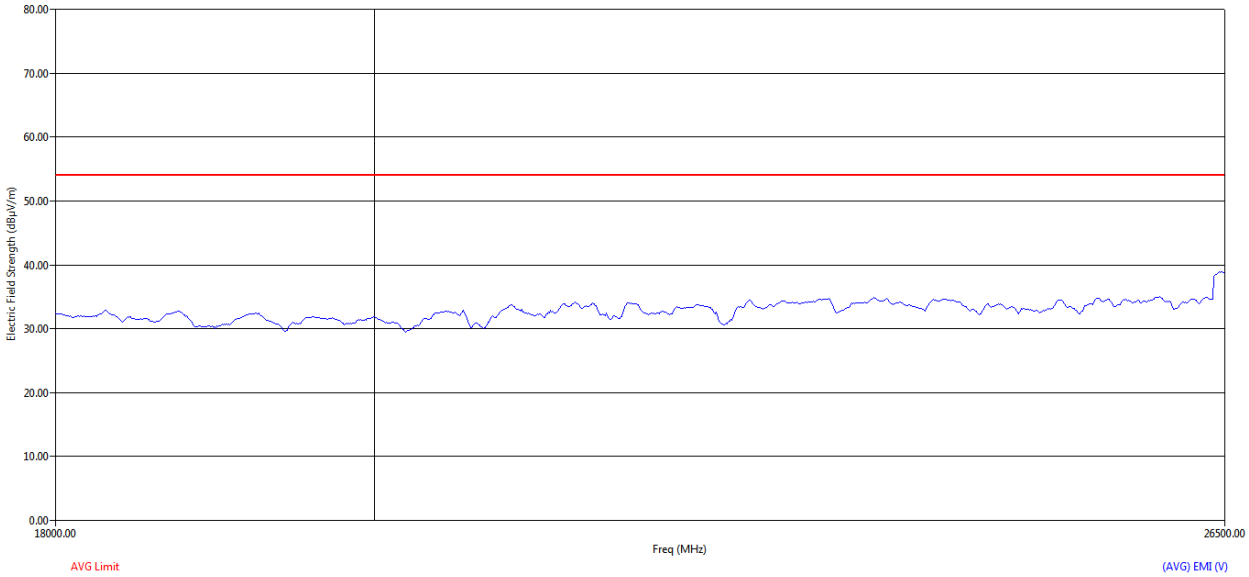

Figure 141: Average RE from 18GHz to 26.5GHz - Vertical polarization

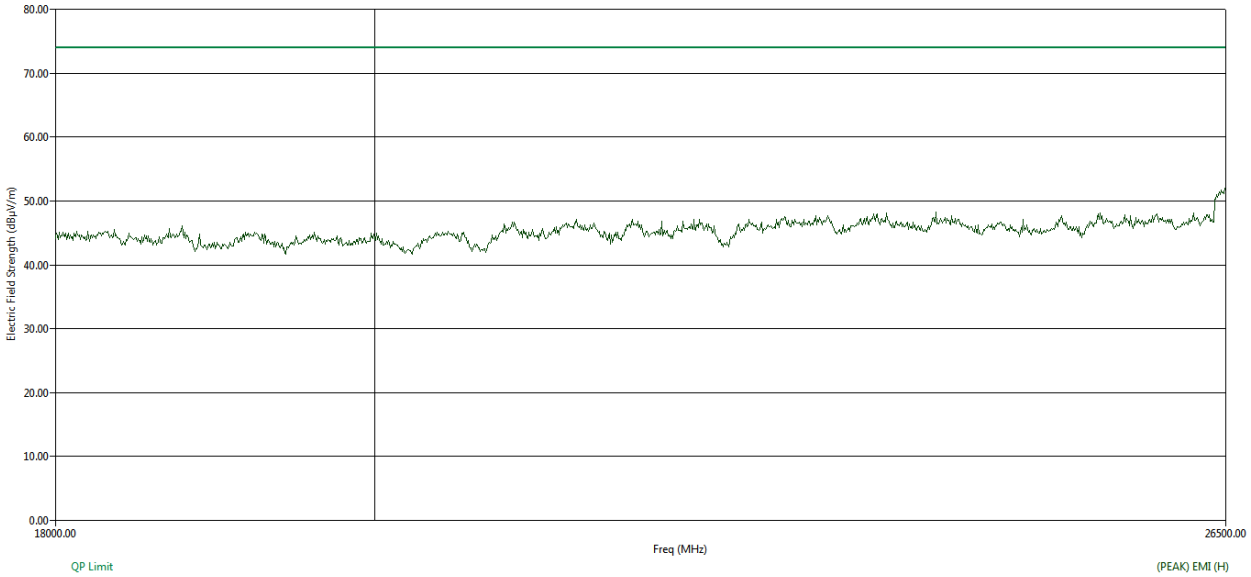

Figure 142: Peak RE from 18GHz to 26.5GHz - Horizontal polarization

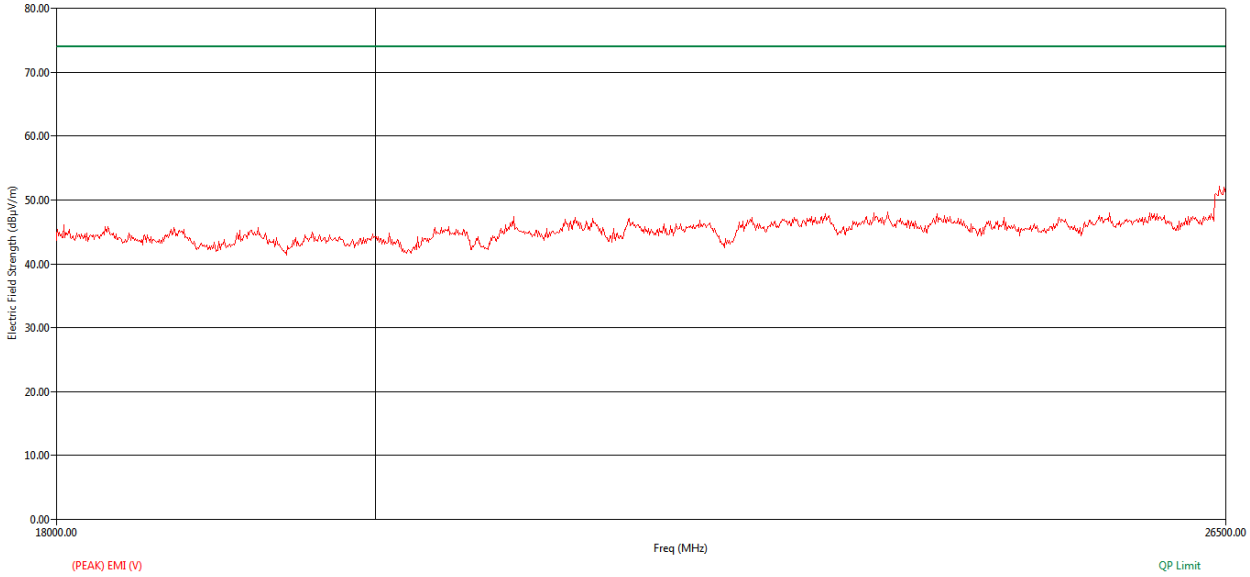

Figure 143: Peak RE from 18GHz to 26.5GHz - Vertical polarization

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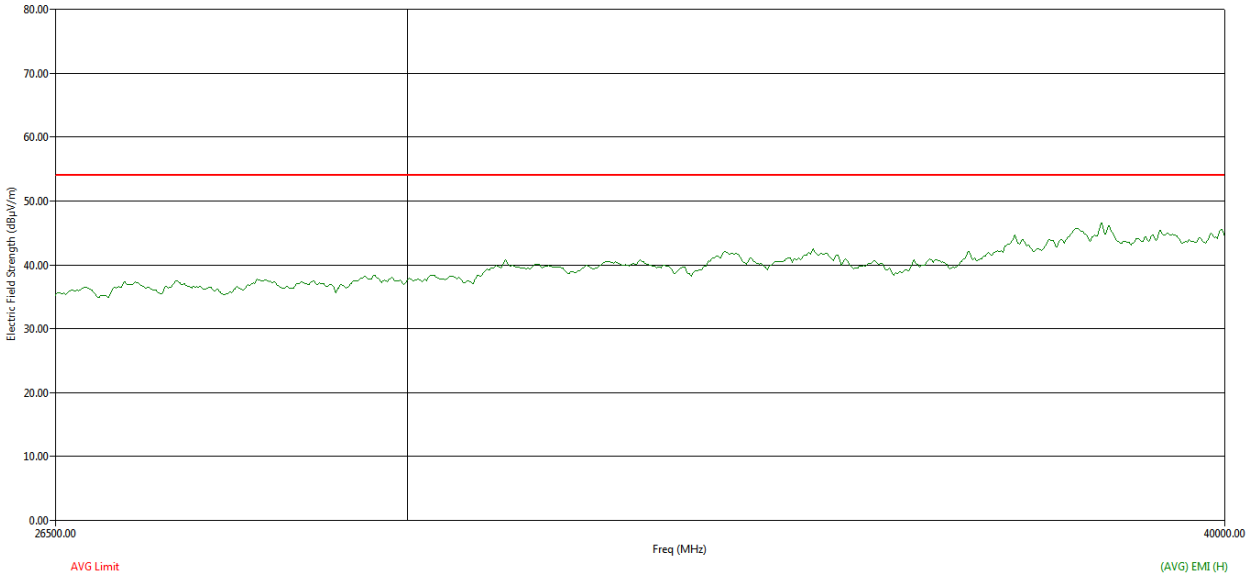

Figure 144: Average RE from 26.5GHz to 40GHz - Horizontal polarization

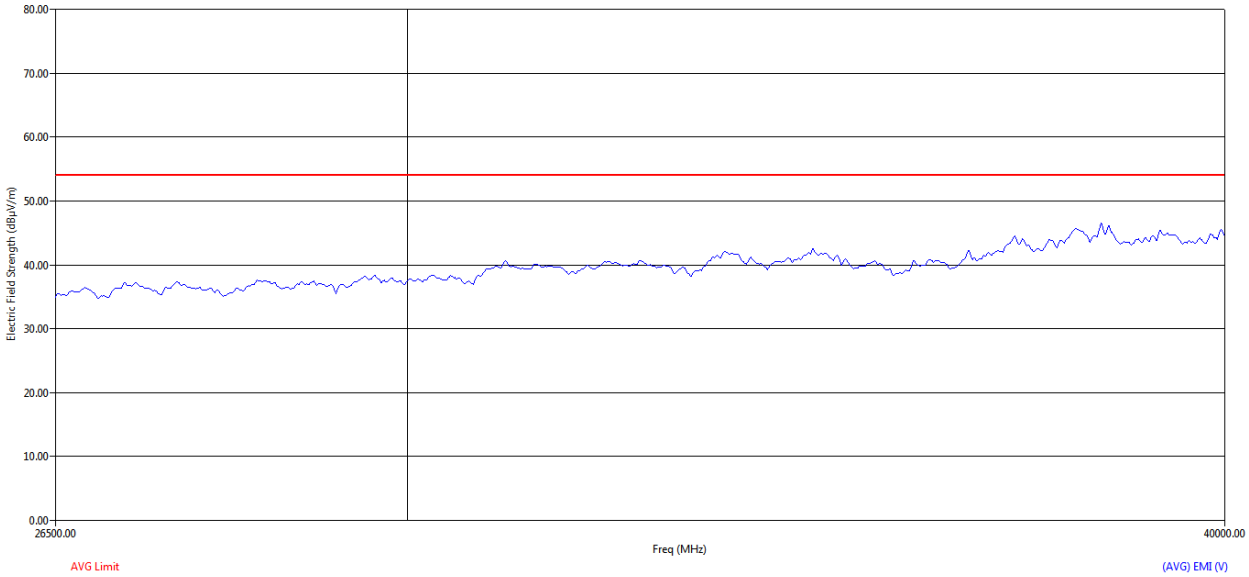

Figure 145 : Average RE from 26.5GHz to 40GHz - Vertical polarization

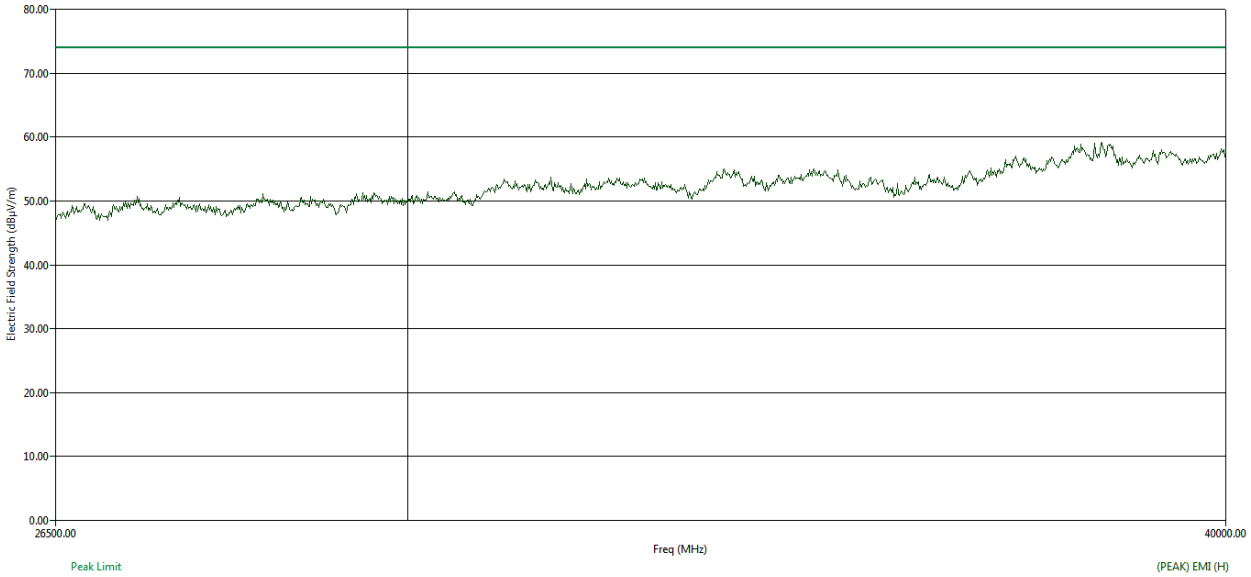

Figure 146: Peak RE from 26.5GHz to 40GHz - Vertical polarization

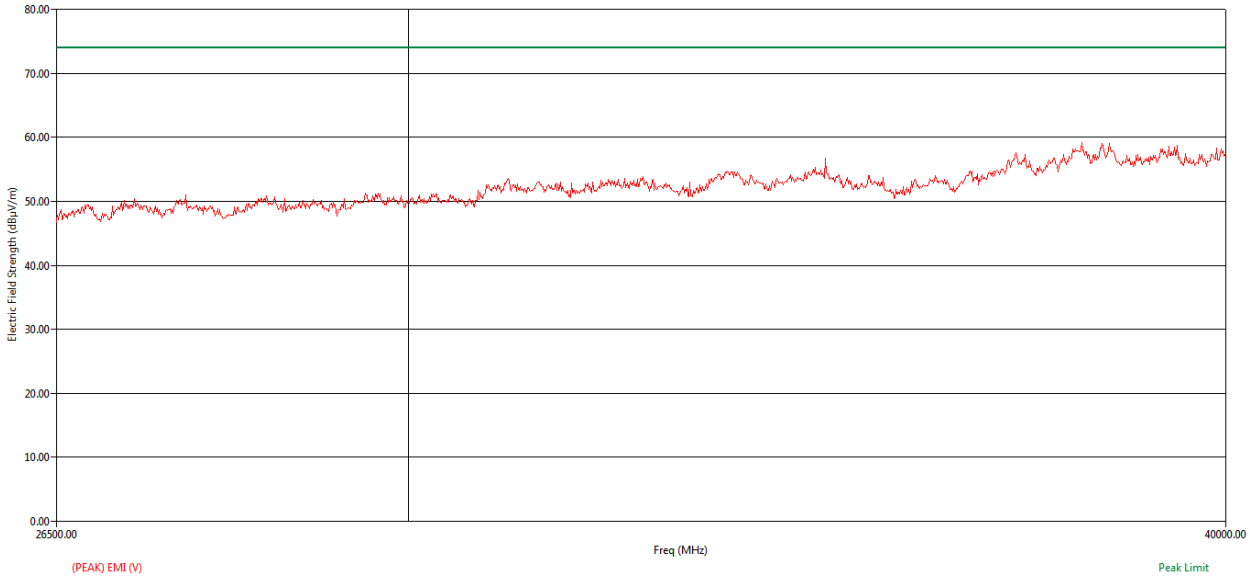

Figure 147: Peak RE from 26.5GHz to 40GHz - Vertical polarization

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.

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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

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