EMC TEST REPORT	
TEST REPORT NUMBER	DBN 1528TEL187-A1
TEST REPORT DATE	17th Aug 2015
TEST REPORT VERSION	1.0
MANUFACTURER	Cambium Networks
PRODUCT NAME	ePMP 2.4GHz Transceiver (Force 200)
PRODUCT MODEL NO.	C024900P161A
PART NO.	C024900C161A, 142000001127A, 142000001227A
REV	0B
CONDITION OF EUT WHEN RECEIVED	GOOD and in working condition
ISSUED TO	**ACCTON TECHNOLOGY CORP** 1 creation 3rd RD science-based industrial park hsinchu 300 TAIWAN
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

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1. TEST REPORT SUMMARY

Applicant	Cambium Networks			
Manufacturer	Cambium Networks			
Equipment Under Test	ePMP 2.4GHz Transceiver (Force 200)			
Model	C024900P161A			
Serial number	**Type of test**	**Serial no.**	**Wi-Fi MAC**	**Ethernet MAC**
	Radiated	AF02016113	000456F80375	000456F80374
	Radiated	AF02016179	000456F803F9	000456F803F8
	Conducted	AF02016179	000456F803F9	000456F803F8
Date of Submission	20th Apr 2015			
Date of Test	20th Apr 2015 to 07 Aug 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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ePMP 2.4GHz Transceiver (Force 200) 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 J	Albin A	Rajneesh R
Test Engineer	Principal EMC 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
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 1meter	±1.9055 dB
Radiated Emission from 30MHz to 1GHz at 3meter	±4.6670 dB
Radiated Emission from 1 GHz to 18 GHz at 3meter	±3.2271 dB
Radiated Emission from 18GHz to 26.5GHz at 3meter	±3.7810 dB
Radiated Emission from 26.5GHz to 40GHz at 3meter	±3.7940 dB
Conducted Emission from 150 kHz to 30MHz	±1.6322 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

3.2.1 RADIATED EMISSION TESTING

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	04th Jul 2016
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130334	25th Jul 2015
Pre-Amplifier	SONOMA	310	270817	14th Apr 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	14th Apr 2016
Preamplifier	TDK RF solutions	Preamp	2007331	14th Apr 2016
Preamplifier	TDK RF solutions	Preamp	2007332	14th Apr 2016
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

3.2.2 CONDUCTED EMISSION TESTING

EMI Test Receiver	R&S	ESIB40	100306	04th Jul 2016
V-LISN	SME	NNLK 8128	8128-243	08th Aug 2015
Pulse Limiter	Impuls-Bergrelzer	ESH3-Z2	100718	26th Mar 2016

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4. PRODUCT INFORMATION

4.1DESCRIPTION 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

4.2SOFTWARE AND FIRMWARE DETAILS

The ePMP 2.4GHz Transceiver (Force 200) Radio was configured with test software and configured to have the following settings during the course of testing:

- 40MHz modulation bandwidth for low, mid & high channels
  - Rate - HT40,
  - 54Mbps OFDM, MCS15 / 270 Mbps
  - Interframe spacing is tx100
  - Tx Power is 31.5 for 2.15dBi antenna configuration

- 5MHz modulation bandwidth for low, mid & high channels
  - Rate – HT20,
  - 54Mbps OFDM, MCS15 / 130 Mbps
  - Interframe spacing is tx100
  - Tx Power is 31.5 for 2.15dBi antenna configuration

The unit was monitored for transmission using an auxiliary antenna before and after the radiated tests.

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4.3PRODUCT CONFIGURATION

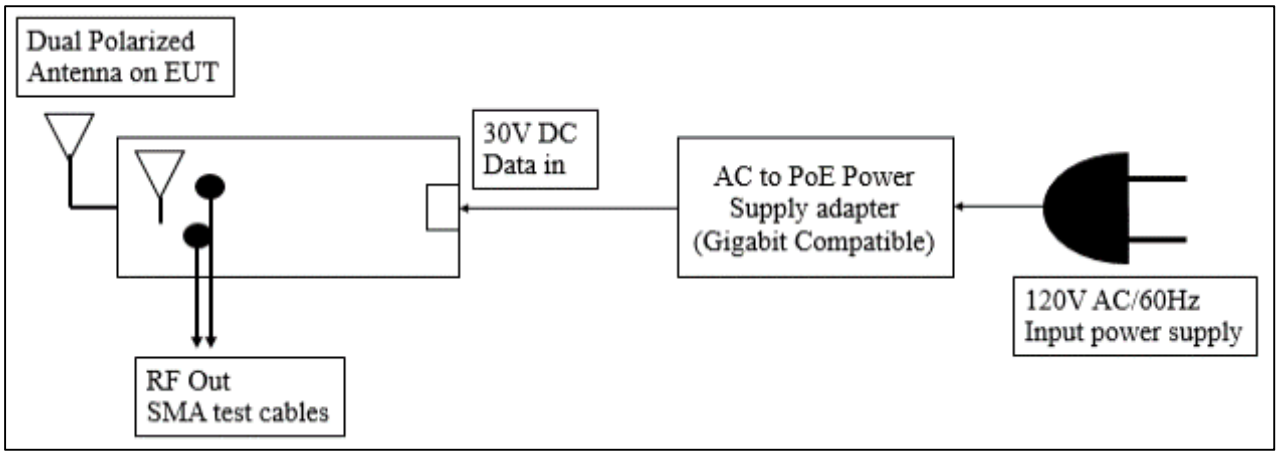

Figure 1 EUT Configuration

Figure 1 shows the product configuration during the tests. The EUT was powered through AC power supply (120VAC / 60Hz). The EUT was connected to Ethernet switch by using RJ45 cable. 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 all test, RF ports of EUT were terminated using 50Ω terminations. and EUT was configured to radiate at mentioned operating power, laptop was kept near to the EUT and connection was established in conducted measurements.

The operating frequency range of EUT is from 2400MHz to 2483.5MHz, the channels with their frequency is as follows:

5MHz Modulation Bandwidth	40MHz Modulation Bandwidth
• **Low Channel**:2412MHz • **Mid Channel** 2442MHz • **High Channel**:2477MHz	• **Low Channel**: 2427MHz • **Mid Channel** 2427MHz • **High Channel**: 2462MHz

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5. TEST SETUP DETAILS

5.1SUPPORTING EQUIPMENT

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

5.2I/O CABLE

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	1 meter	Power	Unshielded

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6. 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 26.5GHz	Enclosure

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7. TEST RESULT

7.1 CONDUCTED EMISSION

7.1.1 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	21.2 ºC
Humidity	51.0 %
Tested By	Narendra
Test Date	05th Aug 2015

7.1.2 Limits

7.1.2.1 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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7.1.3 Test Setup

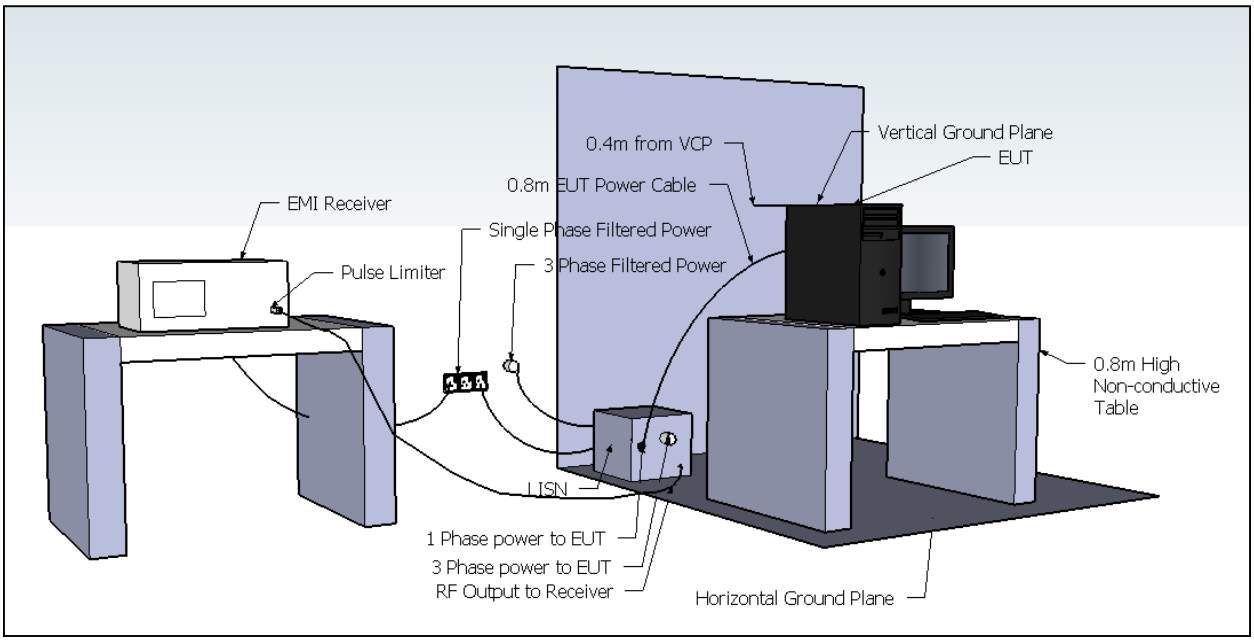

Figure 2 Typical test setup for conducted Emission test

7.1.4 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

7.1.5 Result (Supporting Graphs / Data) For 40 MHz Modulation Bandwidth

7.1.5.1 Low Channel_2427 MHz

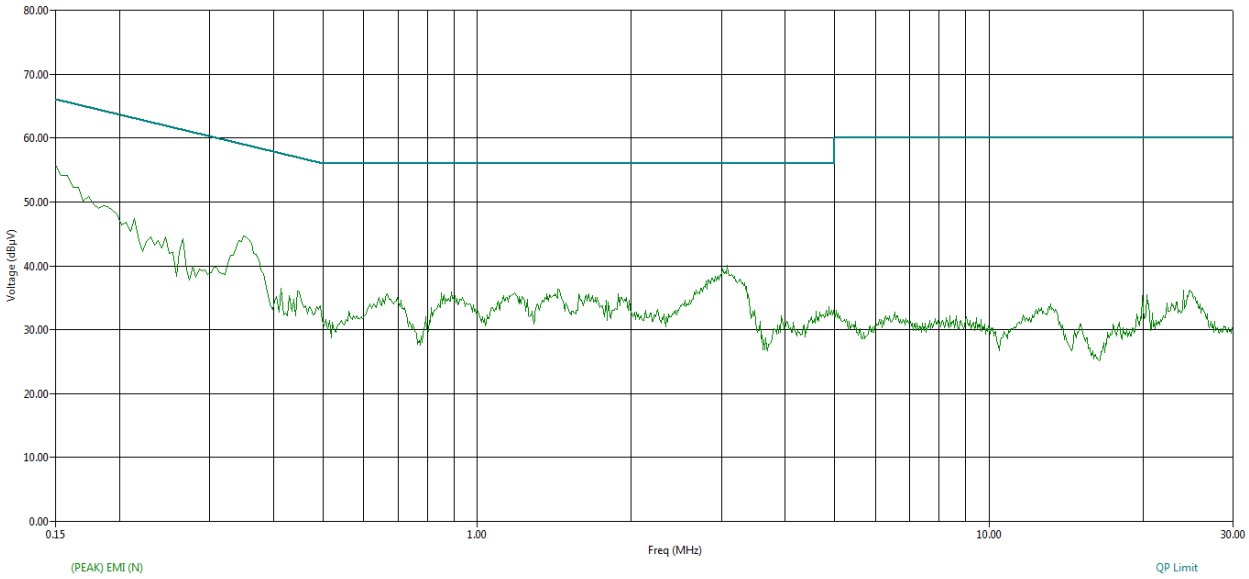

Figure 3: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

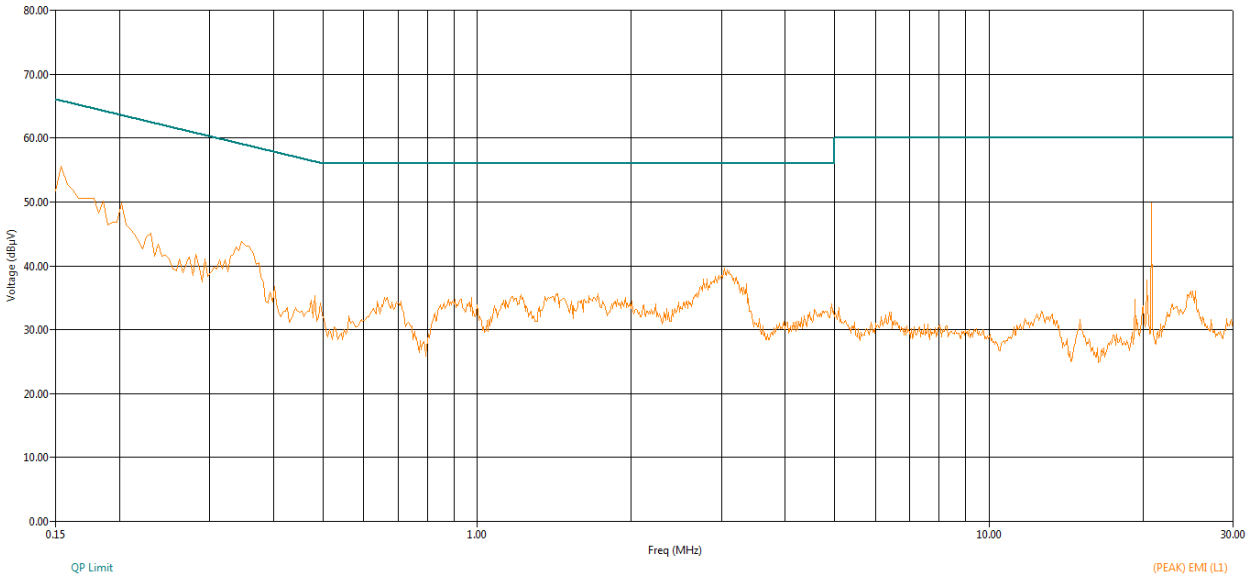

Figure 4: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	38.06	10.11	0.10	0.00	48.26	65.82	-17.56
0.15	0.15	L1	38.10	10.11	0.00	0.07	48.27	65.94	-17.67
0.35	0.35	N	31.77	10.10	0.09	0.00	41.96	59.02	-17.06
0.35	0.36	L1	30.91	10.10	0.00	0.06	41.07	58.80	-17.73
3.04	3.04	L1	26.18	10.11	0.00	0.10	36.39	56.00	-19.61
3.08	3.08	N	26.30	10.11	0.13	0.00	36.54	56.00	-19.46
4.88	4.88	N	18.24	10.11	0.16	0.00	28.50	56.00	-27.50
12.70	12.71	L1	16.05	10.27	0.00	0.24	26.57	60.00	-33.43
13.21	13.22	N	15.88	10.29	0.29	0.00	26.46	60.00	-33.54
19.34	19.33	L1	12.31	10.39	0.00	0.31	23.02	60.00	-36.98
20.36	20.36	L1	14.99	10.41	0.00	0.32	25.72	60.00	-34.28
20.39	20.39	N	15.76	10.41	0.37	0.00	26.54	60.00	-33.46
20.75	20.75	L1	13.45	10.42	0.00	0.33	24.20	60.00	-35.80
24.68	24.69	N	19.77	10.51	0.39	0.00	30.67	60.00	-29.33
25.30	25.30	L1	18.88	10.52	0.00	0.37	29.77	60.00	-30.23

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

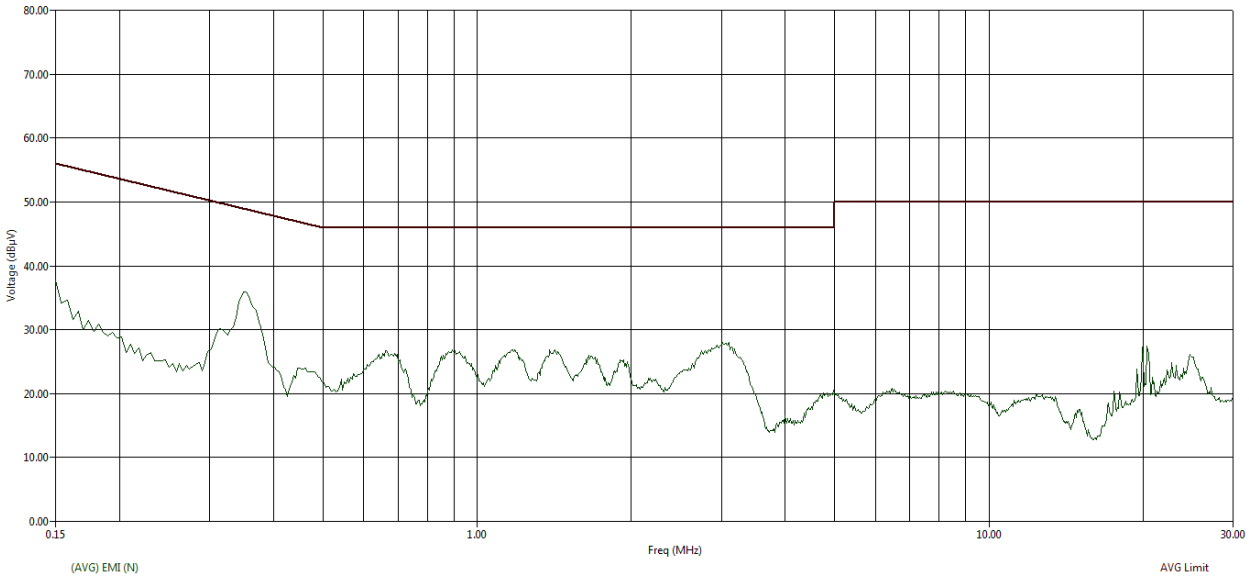

Figure 5: CE graph from 150 kHz to 30MHz using Average detector - Neutral

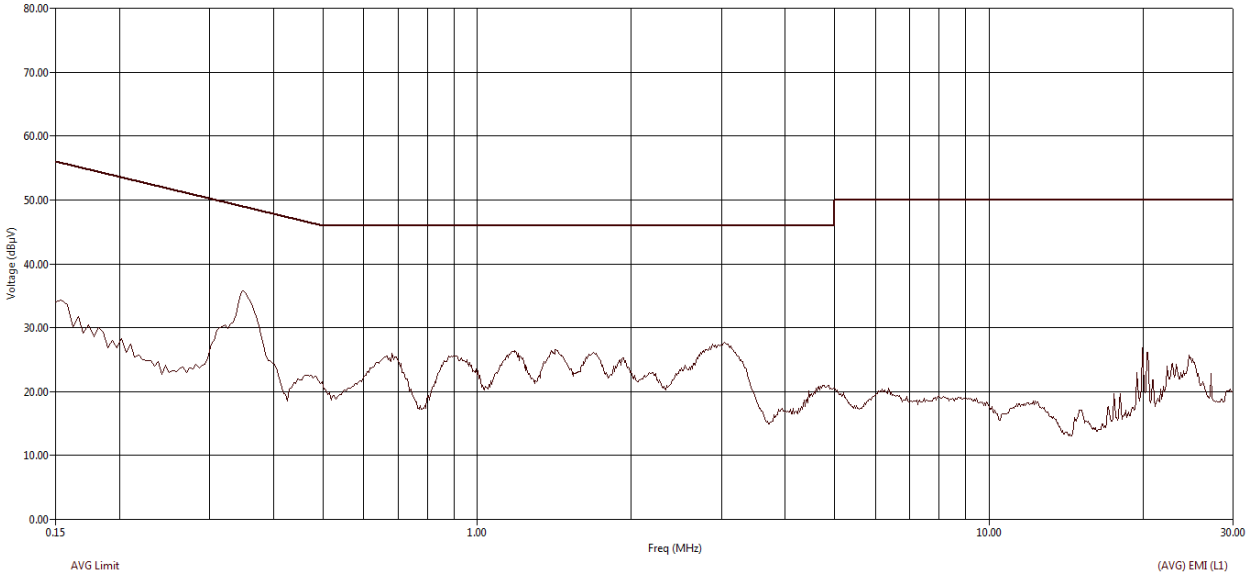

Figure 6: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	23.57	10.11	0.10	0.00	33.77	55.82	-22.05
0.15	0.15	L1	24.58	10.11	0.00	0.07	34.76	55.94	-21.18
0.35	0.35	N	26.12	10.10	0.09	0.00	36.31	49.02	-12.71
0.35	0.36	L1	24.70	10.10	0.00	0.06	34.86	48.80	-13.94
3.04	3.04	L1	18.37	10.11	0.00	0.10	28.58	46.00	-17.42
3.08	3.08	N	18.46	10.11	0.13	0.00	28.70	46.00	-17.30
4.88	4.88	N	10.81	10.11	0.16	0.00	21.08	46.00	-24.92
12.70	12.71	L1	5.60	10.27	0.00	0.24	16.12	50.00	-33.88
13.21	13.22	N	7.02	10.29	0.29	0.00	17.60	50.00	-32.40
19.34	19.33	L1	6.06	10.39	0.00	0.31	16.77	50.00	-33.23
20.36	20.36	L1	8.98	10.41	0.00	0.32	19.71	50.00	-30.29
20.39	20.39	N	9.54	10.41	0.37	0.00	20.33	50.00	-29.67
20.75	20.75	L1	7.51	10.42	0.00	0.33	18.26	50.00	-31.74
24.68	24.69	N	13.78	10.51	0.39	0.00	24.67	50.00	-25.33
25.30	25.30	L1	12.58	10.52	0.00	0.37	23.47	50.00	-26.53

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

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7.1.5.2 Mid Channel_2442 MHz

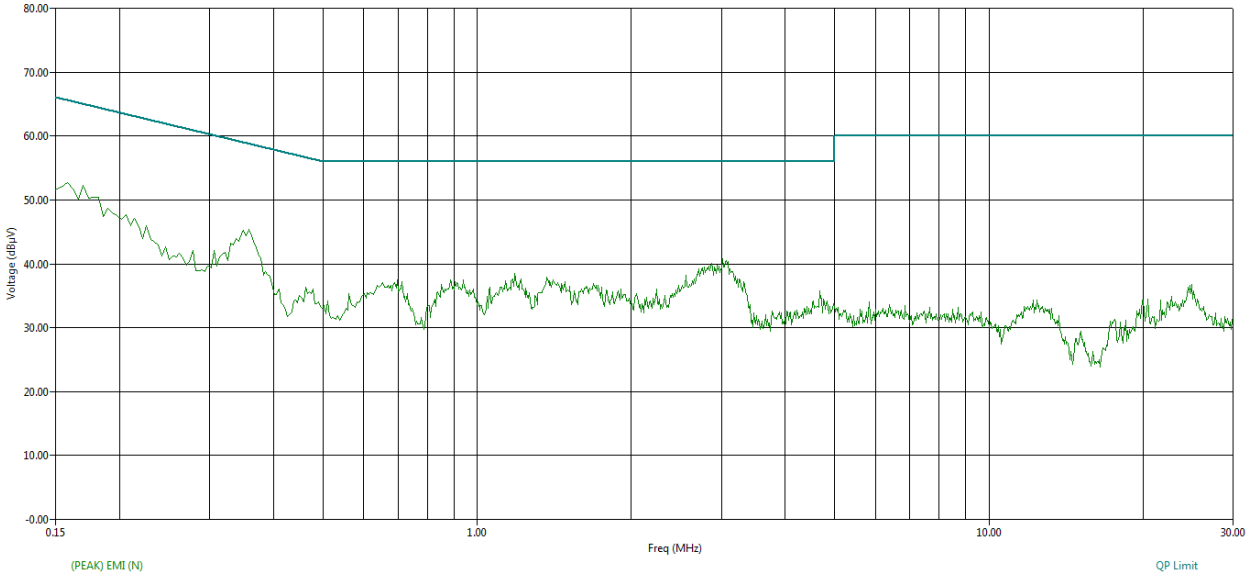

Figure 7: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

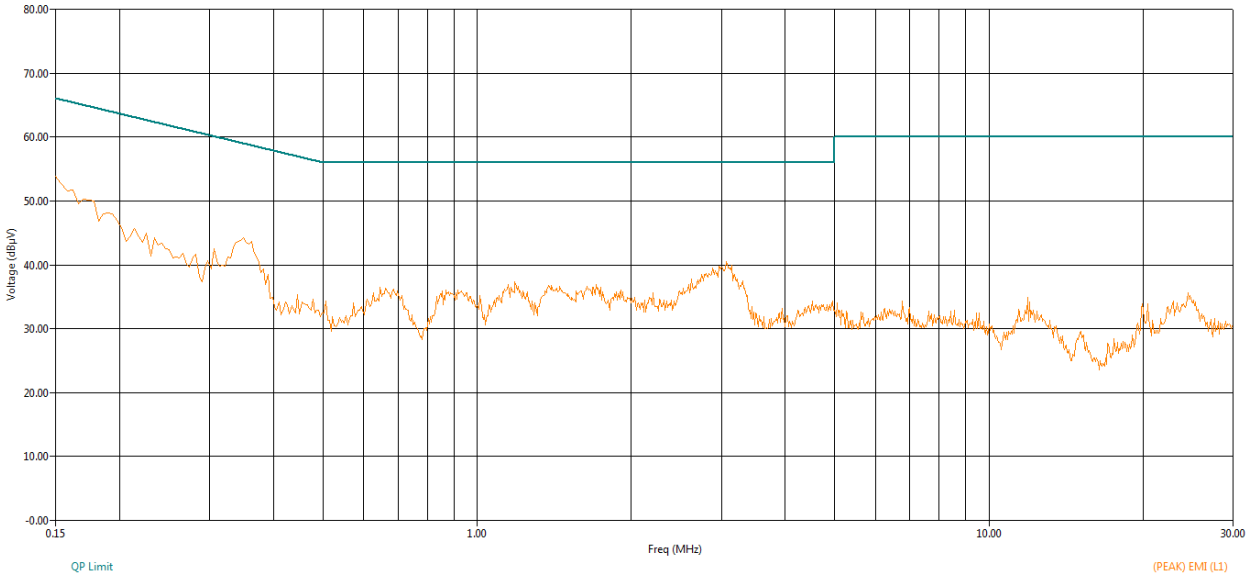

Figure 8: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	L1	36.68	10.11	0.00	0.07	46.85	66.00	-19.15
0.16	0.16	N	35.89	10.11	0.10	0.00	46.10	65.57	-19.47
0.35	0.35	N	32.08	10.10	0.09	0.00	42.27	58.96	-16.69
0.35	0.35	L1	31.16	10.10	0.00	0.06	41.33	58.96	-17.64
3.02	3.01	N	25.61	10.11	0.13	0.00	35.85	56.00	-20.15
3.07	3.07	L1	25.54	10.11	0.00	0.10	35.76	56.00	-20.24
11.89	11.89	L1	16.27	10.25	0.00	0.23	26.75	60.00	-33.25
12.43	12.44	N	17.11	10.27	0.28	0.00	27.65	60.00	-32.35
24.50	24.50	L1	18.27	10.51	0.00	0.37	29.15	60.00	-30.85
24.95	24.95	N	18.95	10.52	0.39	0.00	29.86	60.00	-30.14

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

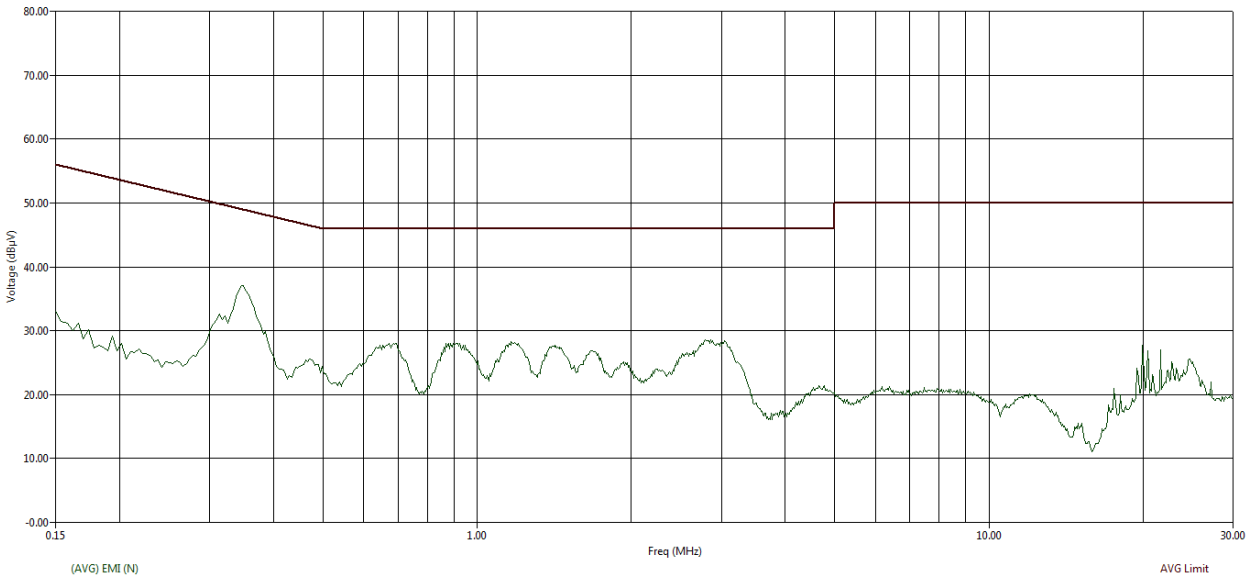

Figure 9: CE graph from 150 kHz to 30MHz using Average detector - Neutral

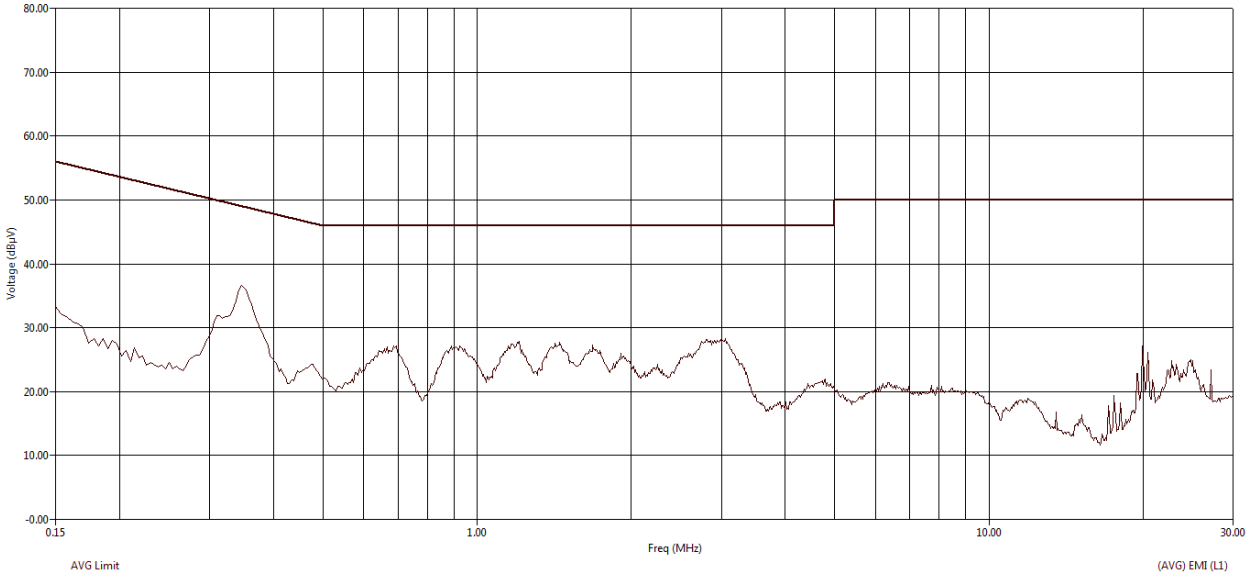

Figure 10: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	L1	23.58	10.11	0.00	0.07	33.75	56.00	-22.25
0.16	0.16	N	21.51	10.11	0.10	0.00	31.71	55.57	-23.86
0.35	0.35	N	26.45	10.10	0.09	0.00	36.64	48.96	-12.32
0.35	0.35	L1	25.54	10.10	0.00	0.06	35.71	48.96	-13.26
3.02	3.01	N	17.94	10.11	0.13	0.00	28.19	46.00	-17.81
3.07	3.07	L1	17.98	10.11	0.00	0.10	28.20	46.00	-17.80
11.89	11.89	L1	7.80	10.25	0.00	0.23	18.28	50.00	-31.72
12.43	12.44	N	8.23	10.27	0.28	0.00	18.77	50.00	-31.23
24.50	24.50	L1	12.12	10.51	0.00	0.37	22.99	50.00	-27.01
24.95	24.95	N	12.49	10.52	0.39	0.00	23.39	50.00	-26.61

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

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7.1.5.3 High Channel_2462 MHz

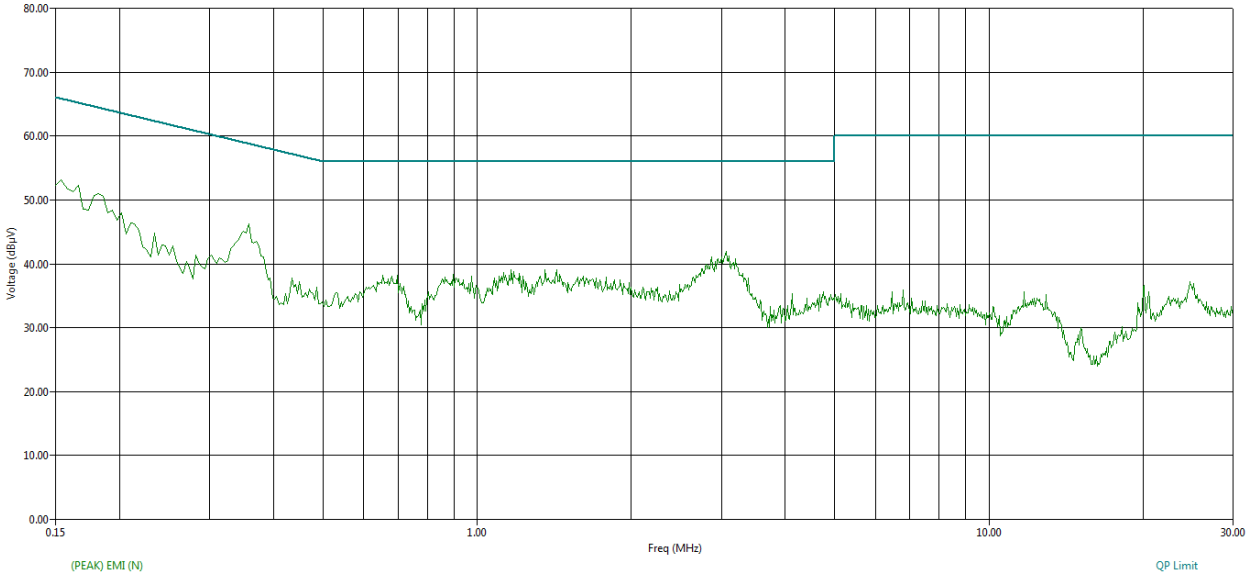

Figure 11: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

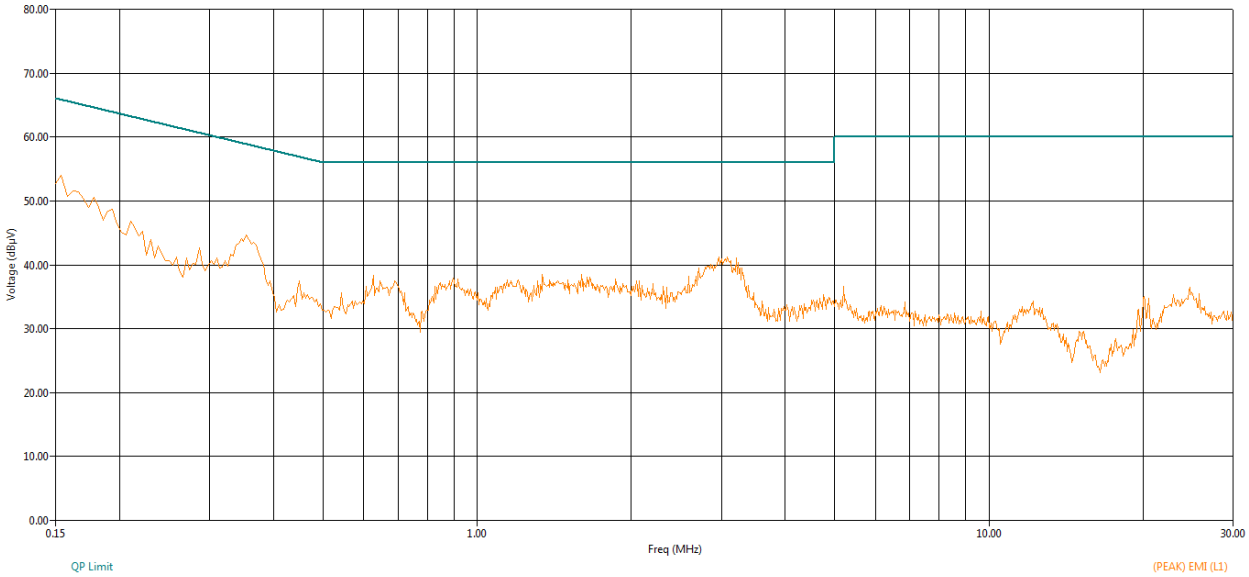

Figure 12: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	36.16	10.11	0.10	0.00	46.37	65.97	-19.61
0.15	0.15	L1	35.60	10.11	0.00	0.07	45.77	65.89	-20.12
0.36	0.35	N	31.71	10.10	0.09	0.00	41.91	58.88	-16.97
2.97	2.96	L1	24.27	10.11	0.00	0.10	34.48	56.00	-21.52
3.07	3.07	N	24.42	10.11	0.13	0.00	34.67	56.00	-21.33
11.70	11.71	N	15.67	10.24	0.27	0.00	26.18	60.00	-33.82
12.20	12.20	L1	15.73	10.26	0.00	0.23	26.22	60.00	-33.78
20.09	20.08	L1	16.92	10.40	0.00	0.32	27.64	60.00	-32.36
20.11	20.11	N	16.68	10.40	0.37	0.00	27.45	60.00	-32.55
24.69	24.70	L1	17.90	10.51	0.00	0.37	28.78	60.00	-31.22
24.70	24.71	N	18.27	10.51	0.39	0.00	29.17	60.00	-30.83

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

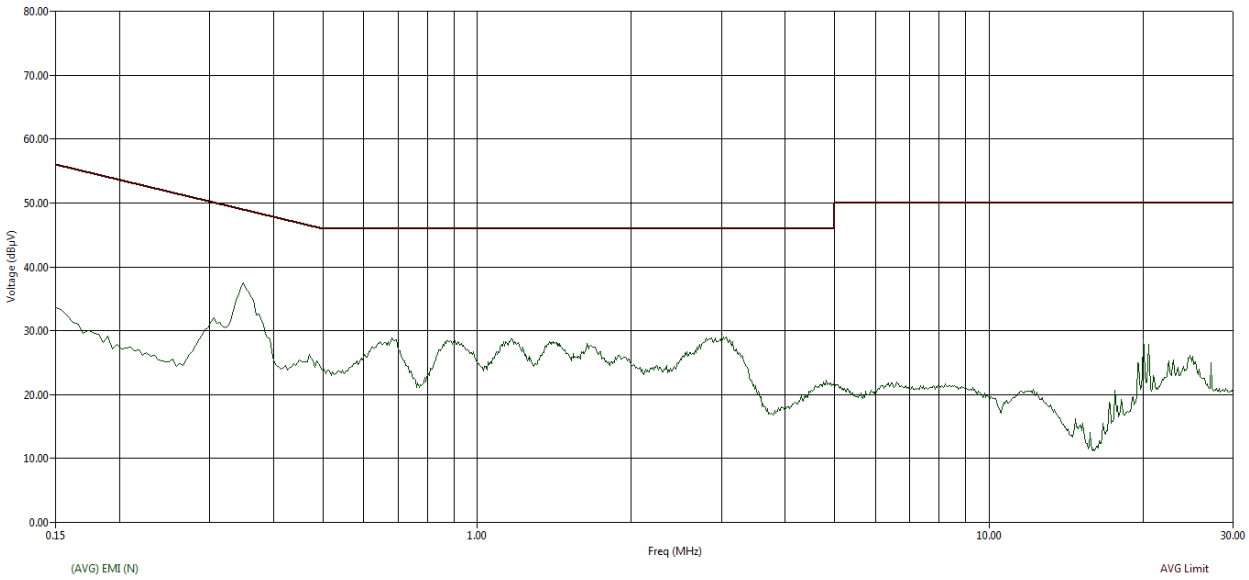

Figure 13: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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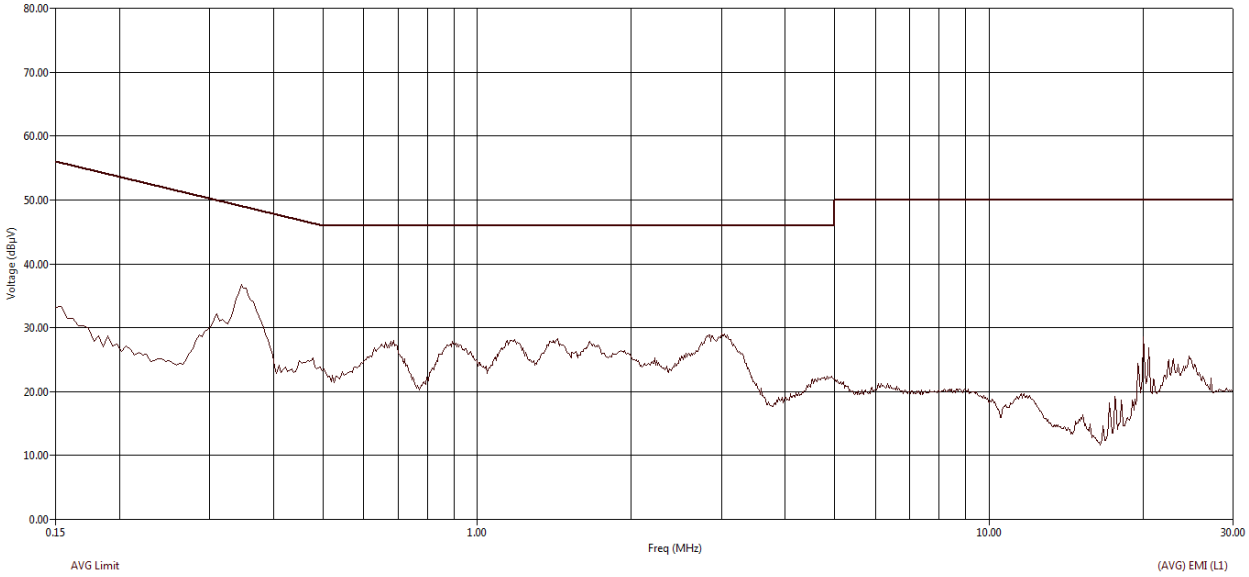

Figure 14: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	22.88	10.11	0.10	0.00	33.09	55.97	-22.88
0.15	0.15	L1	22.62	10.11	0.00	0.07	32.79	55.89	-23.10
0.36	0.35	N	25.75	10.10	0.09	0.00	35.95	48.88	-12.93
2.97	2.96	L1	16.83	10.11	0.00	0.10	27.04	46.00	-18.96
3.07	3.07	N	16.73	10.11	0.13	0.00	26.98	46.00	-19.02
11.70	11.71	N	8.18	10.24	0.27	0.00	18.69	50.00	-31.31
12.20	12.20	L1	6.52	10.26	0.00	0.23	17.02	50.00	-32.98
20.09	20.08	L1	10.76	10.40	0.00	0.32	21.48	50.00	-28.52
20.11	20.11	N	10.46	10.40	0.37	0.00	21.23	50.00	-28.77
24.69	24.70	L1	11.70	10.51	0.00	0.37	22.58	50.00	-27.42
24.70	24.71	N	12.64	10.51	0.39	0.00	23.54	50.00	-26.46

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

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7.1.6 Result (Supporting Graphs / Data) For 5 MHz Modulation Bandwidth

7.1.6.1 Low Channel_2412 MHz

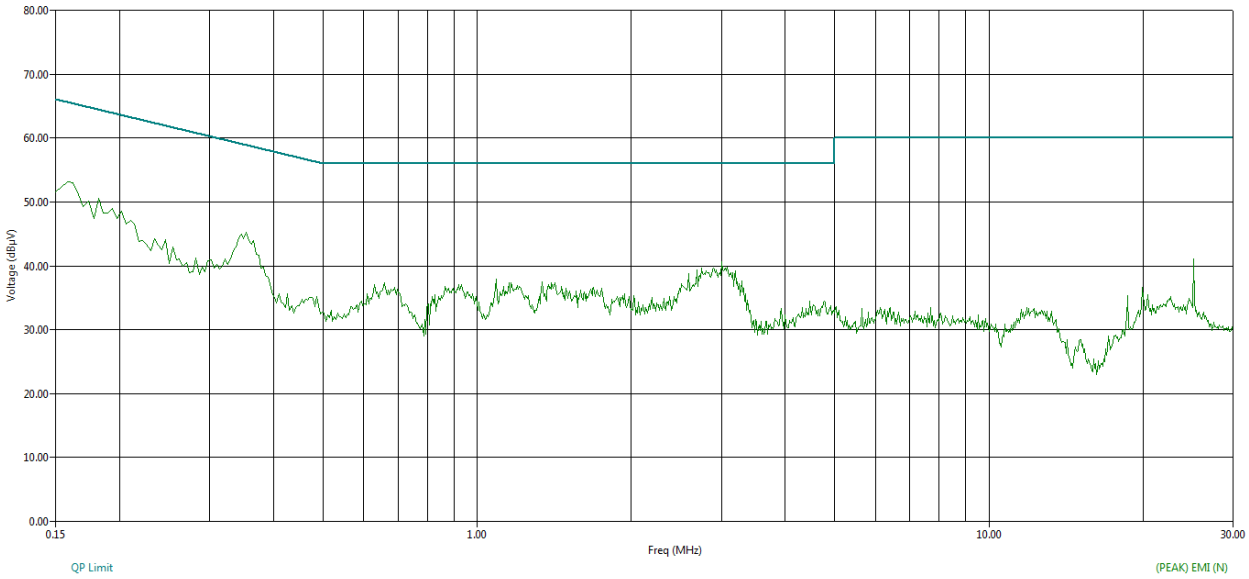

Figure 15: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

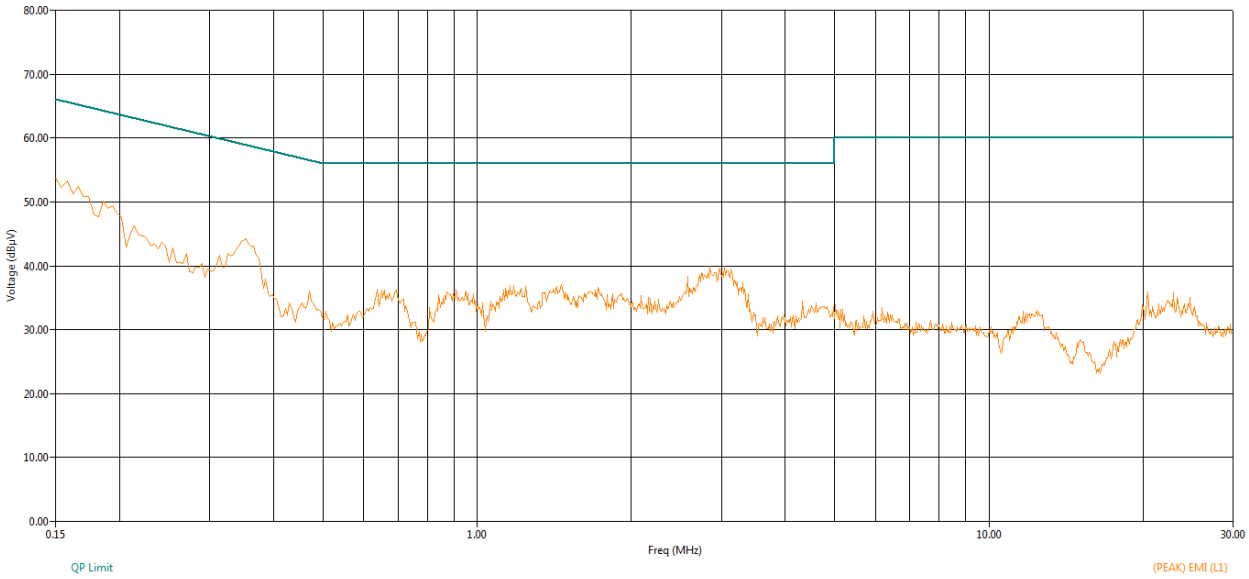

Figure 16: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	L1	35.95	10.11	0.00	0.07	46.13	65.97	-19.84
0.16	0.15	N	36.05	10.11	0.10	0.00	46.25	65.99	-19.74
0.35	0.36	N	31.10	10.10	0.09	0.00	41.29	58.81	-17.52
0.35	0.35	L1	31.30	10.10	0.00	0.06	41.46	59.01	-17.55
2.85	2.86	L1	24.02	10.11	0.00	0.10	34.23	56.00	-21.77
3.01	3.02	N	24.29	10.11	0.13	0.00	34.54	56.00	-21.46
11.88	11.89	N	15.81	10.25	0.27	0.00	26.32	60.00	-33.68
12.41	12.42	L1	15.12	10.27	0.00	0.24	25.62	60.00	-34.38
18.65	18.65	N	12.33	10.39	0.36	0.00	23.07	60.00	-36.93
20.46	20.46	L1	19.89	10.41	0.00	0.33	30.63	60.00	-29.37
25.12	25.12	N	16.31	10.52	0.39	0.00	27.22	60.00	-32.78

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

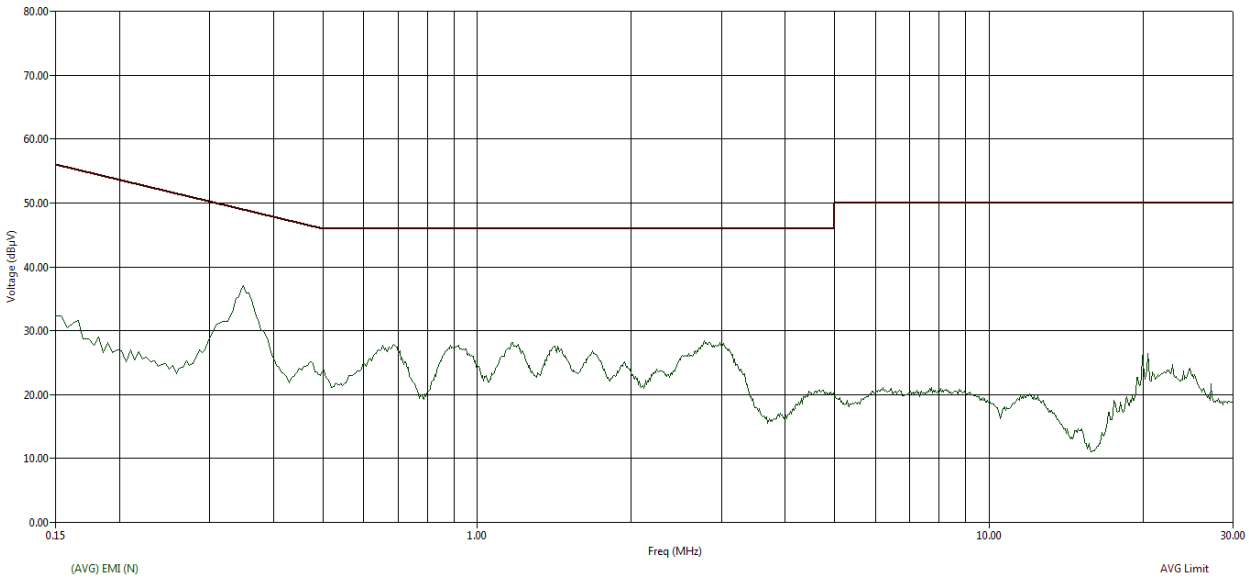

Figure 17: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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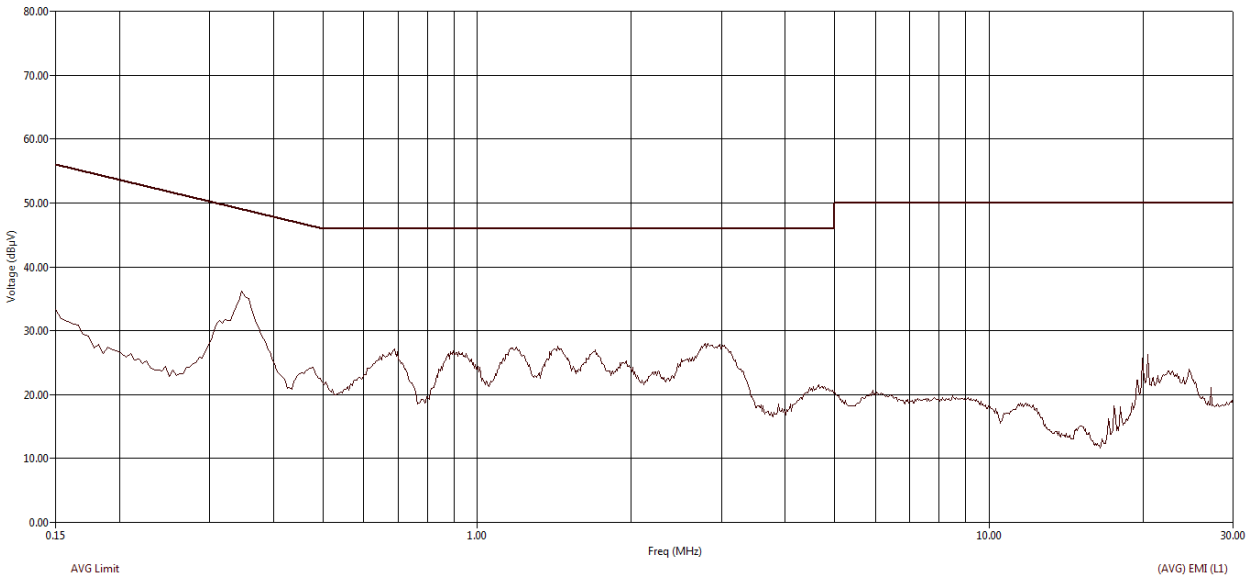

Figure 18: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	L1	22.50	10.11	0.00	0.07	32.67	55.97	-23.30
0.16	0.15	N	22.19	10.11	0.10	0.00	32.39	55.99	-23.59
0.35	0.36	N	25.13	10.10	0.09	0.00	35.32	48.81	-13.48
0.35	0.35	L1	25.51	10.10	0.00	0.06	35.67	49.01	-13.34
2.85	2.86	L1	16.89	10.11	0.00	0.10	27.10	46.00	-18.90
3.01	3.02	N	16.74	10.11	0.13	0.00	26.99	46.00	-19.01
11.88	11.89	N	7.96	10.25	0.27	0.00	18.48	50.00	-31.52
12.41	12.42	L1	5.74	10.27	0.00	0.24	16.24	50.00	-33.76
18.65	18.65	N	6.32	10.39	0.36	0.00	17.06	50.00	-32.94
20.46	20.46	L1	14.88	10.41	0.00	0.33	25.61	50.00	-24.39
25.12	25.12	N	10.24	10.52	0.39	0.00	21.15	50.00	-28.85

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

7.1.6.2 Mid Channel_2442 MHz

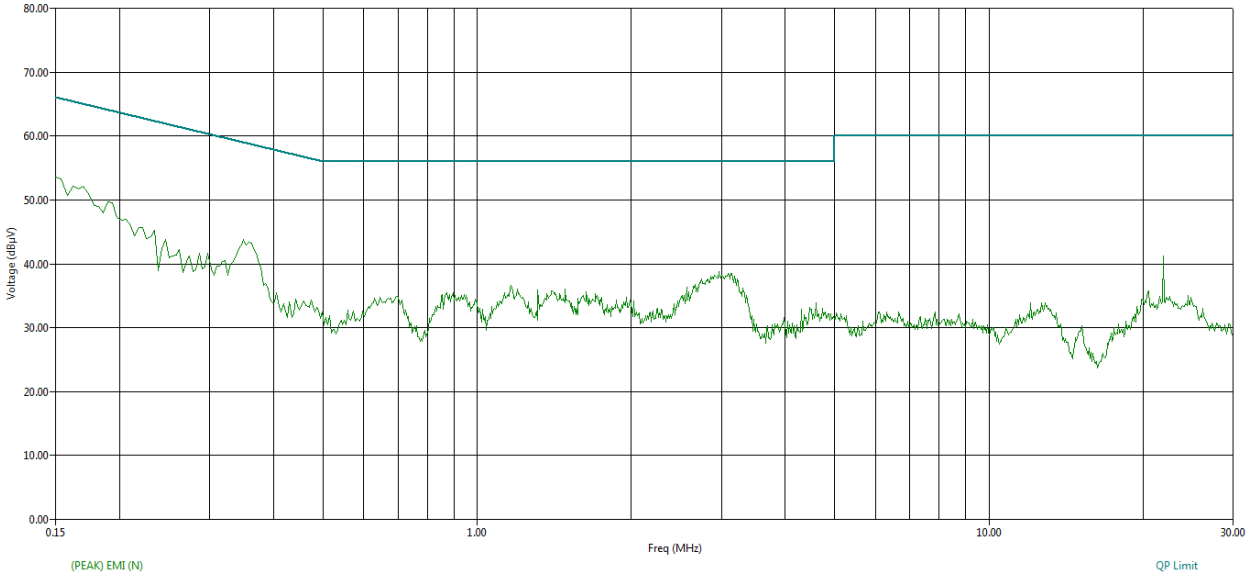

Figure 19: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

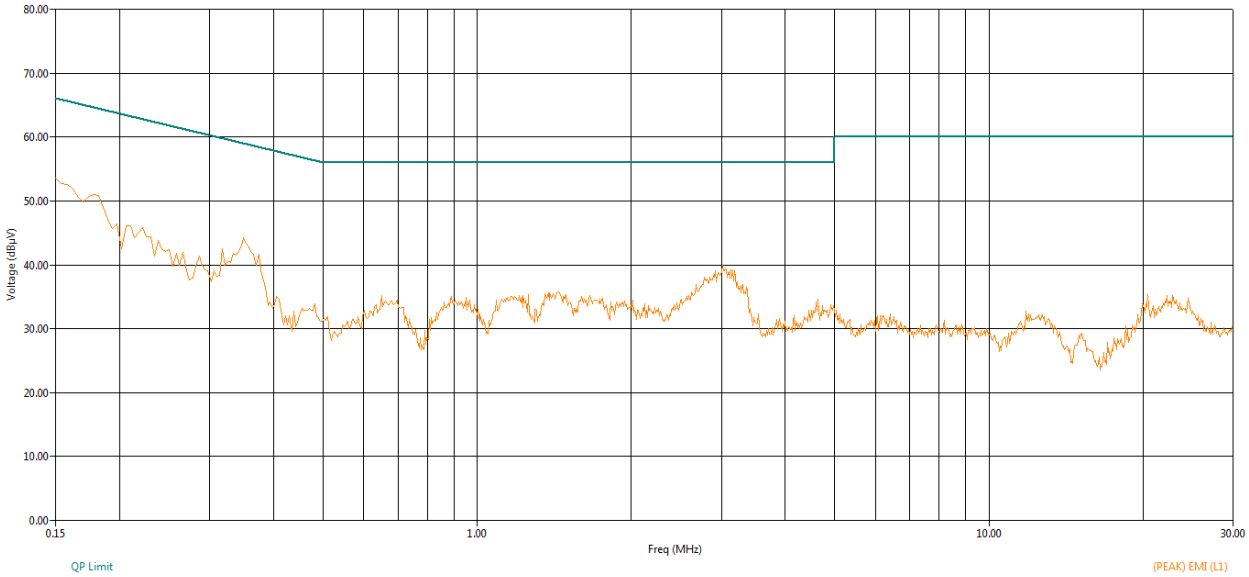

Figure 20: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	36.42	10.11	0.10	0.00	46.63	65.88	-19.26
0.15	0.15	L1	36.47	10.11	0.00	0.07	46.65	65.85	-19.21
0.35	0.35	N	31.54	10.10	0.09	0.00	41.73	59.02	-17.29
0.35	0.34	L1	30.11	10.10	0.00	0.06	40.27	59.12	-18.85
2.97	2.97	N	24.05	10.11	0.13	0.00	34.30	56.00	-21.70
3.02	3.02	L1	24.12	10.11	0.00	0.10	34.33	56.00	-21.67
4.63	4.63	L1	17.08	10.11	0.00	0.12	27.31	56.00	-28.69
11.81	11.81	L1	14.67	10.25	0.00	0.23	25.14	60.00	-34.86
12.91	12.91	N	15.73	10.28	0.28	0.00	26.30	60.00	-33.70
20.43	20.43	L1	19.36	10.41	0.00	0.32	30.10	60.00	-29.90
21.95	21.96	N	17.83	10.45	0.38	0.00	28.66	60.00	-31.34

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

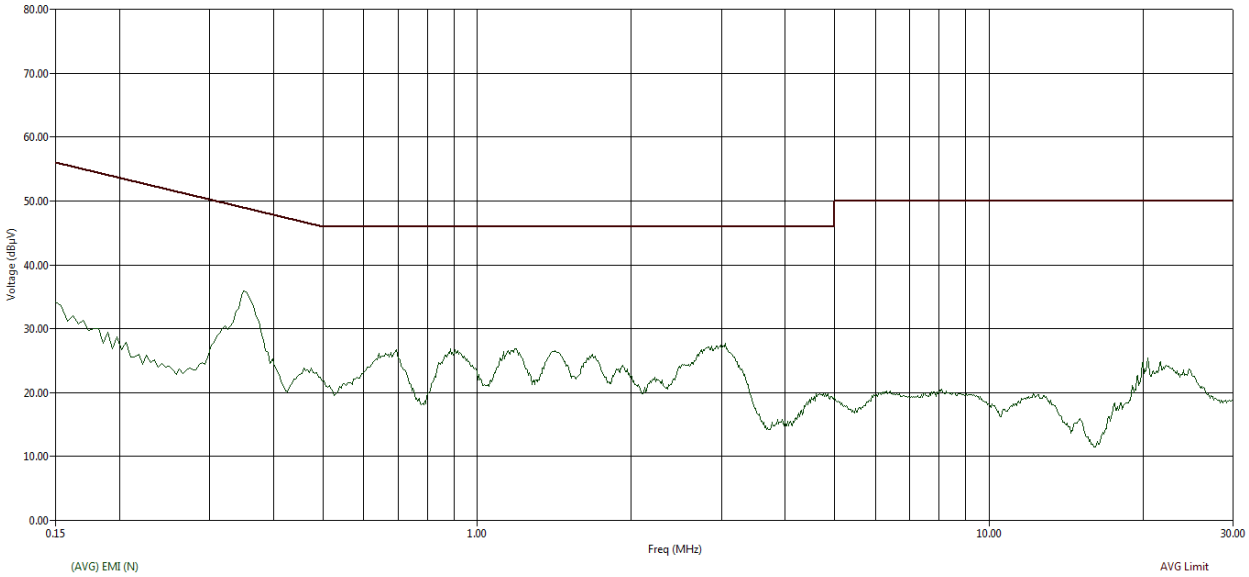

Figure 21: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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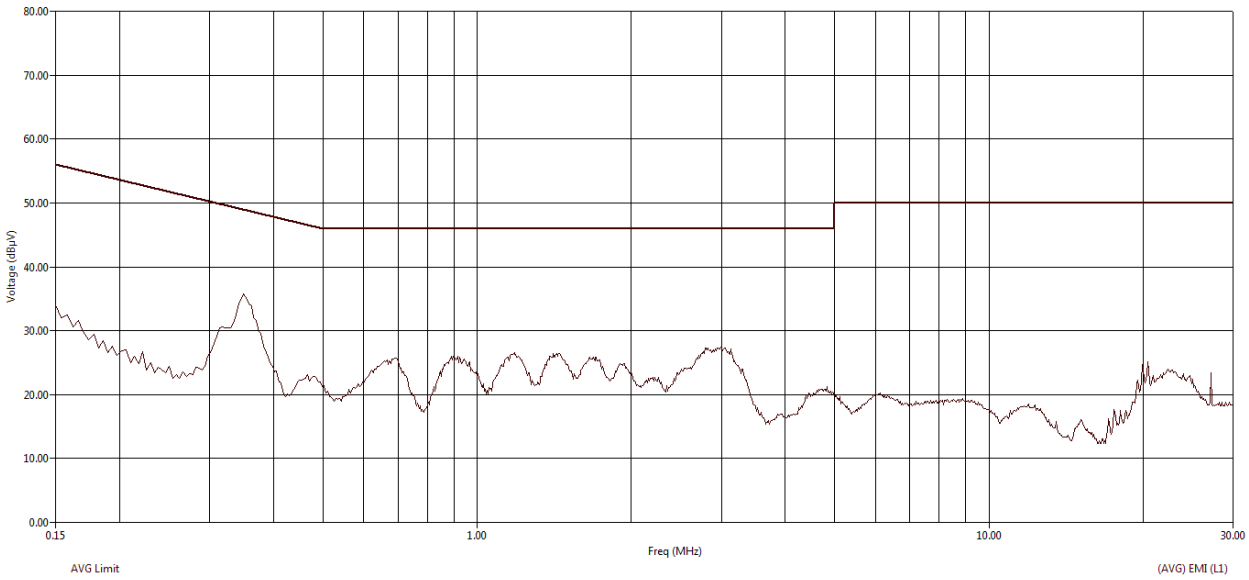

Figure 22: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	22.27	10.11	0.10	0.00	32.48	55.88	-23.41
0.15	0.15	L1	22.12	10.11	0.00	0.07	32.30	55.85	-23.55
0.35	0.35	N	25.93	10.10	0.09	0.00	36.12	49.02	-12.90
0.35	0.34	L1	24.36	10.10	0.00	0.06	34.53	49.12	-14.60
2.97	2.97	N	16.62	10.11	0.13	0.00	26.86	46.00	-19.14
3.02	3.02	L1	16.57	10.11	0.00	0.10	26.78	46.00	-19.22
4.63	4.63	L1	9.84	10.11	0.00	0.12	20.08	46.00	-25.92
11.81	11.81	L1	6.86	10.25	0.00	0.23	17.33	50.00	-32.67
12.91	12.91	N	6.91	10.28	0.28	0.00	17.47	50.00	-32.53
20.43	20.43	L1	13.63	10.41	0.00	0.32	24.36	50.00	-25.64
21.95	21.96	N	11.87	10.45	0.38	0.00	22.69	50.00	-27.31

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

7.1.6.3 High Channel_2477 MHz

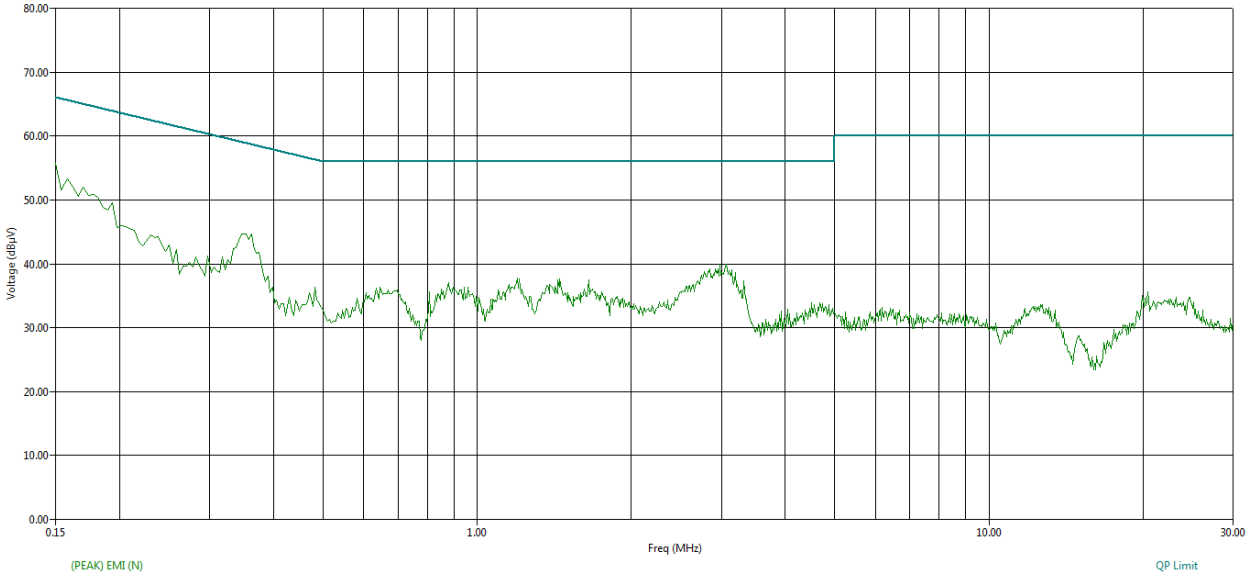

Figure 23: CE graph from 150 kHz to 30MHz using Peak detector - Neutral

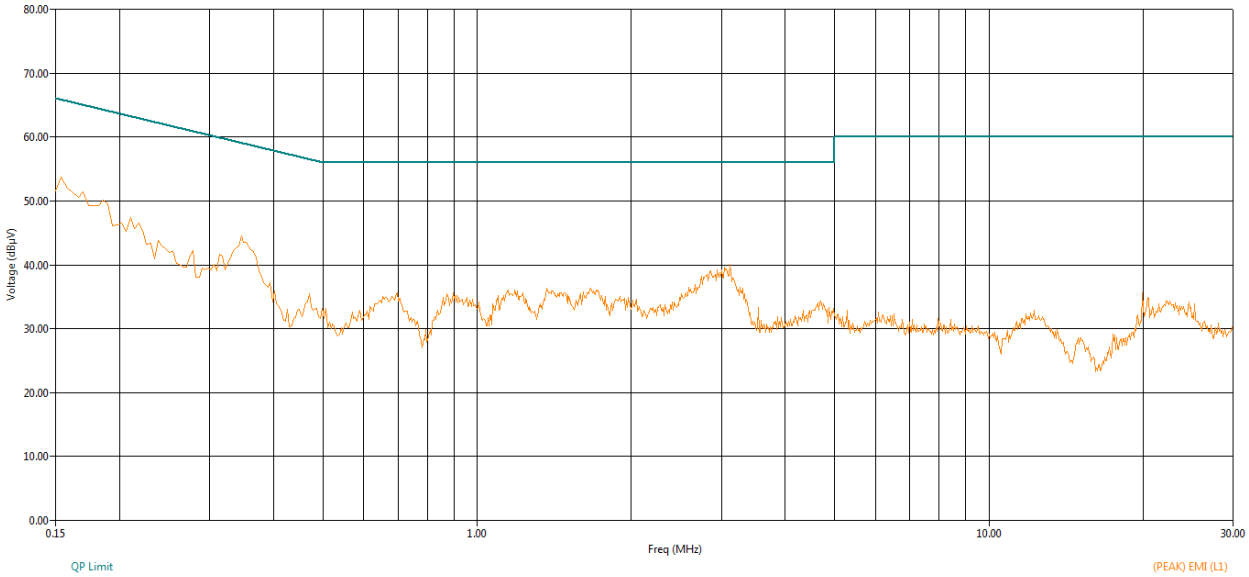

Figure 24: CE graph from 150 kHz to 30MHz using Peak detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(QP) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(QP) EMI (dBµV)	(QP) Limit (dBµV)	(QP) Margin QPL (dB)
0.15	0.15	N	35.85	10.11	0.10	0.00	46.06	65.90	-19.84
0.15	0.15	L1	35.71	10.11	0.00	0.07	45.89	65.94	-20.05
0.35	0.35	L1	31.17	10.10	0.00	0.06	41.33	58.95	-17.62
0.35	0.36	N	30.99	10.10	0.09	0.00	41.19	58.80	-17.62
3.07	3.08	N	23.81	10.11	0.13	0.00	34.06	56.00	-21.94
3.12	3.12	L1	23.31	10.11	0.00	0.10	33.53	56.00	-22.47
12.24	12.23	L1	15.69	10.26	0.00	0.23	26.19	60.00	-33.81
12.73	12.73	N	15.95	10.28	0.28	0.00	26.50	60.00	-33.50
19.94	19.94	L1	20.62	10.40	0.00	0.32	31.34	60.00	-28.66
20.45	20.45	N	20.34	10.41	0.37	0.00	31.12	60.00	-28.88

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

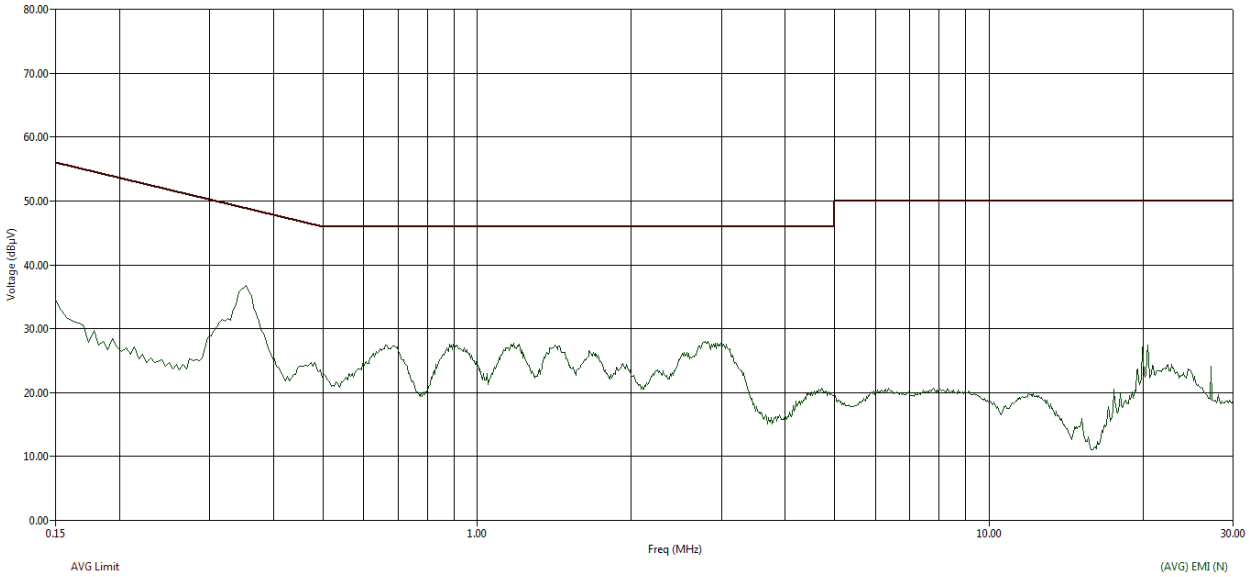

Figure 25: CE graph from 150 kHz to 30MHz using Average detector - Neutral

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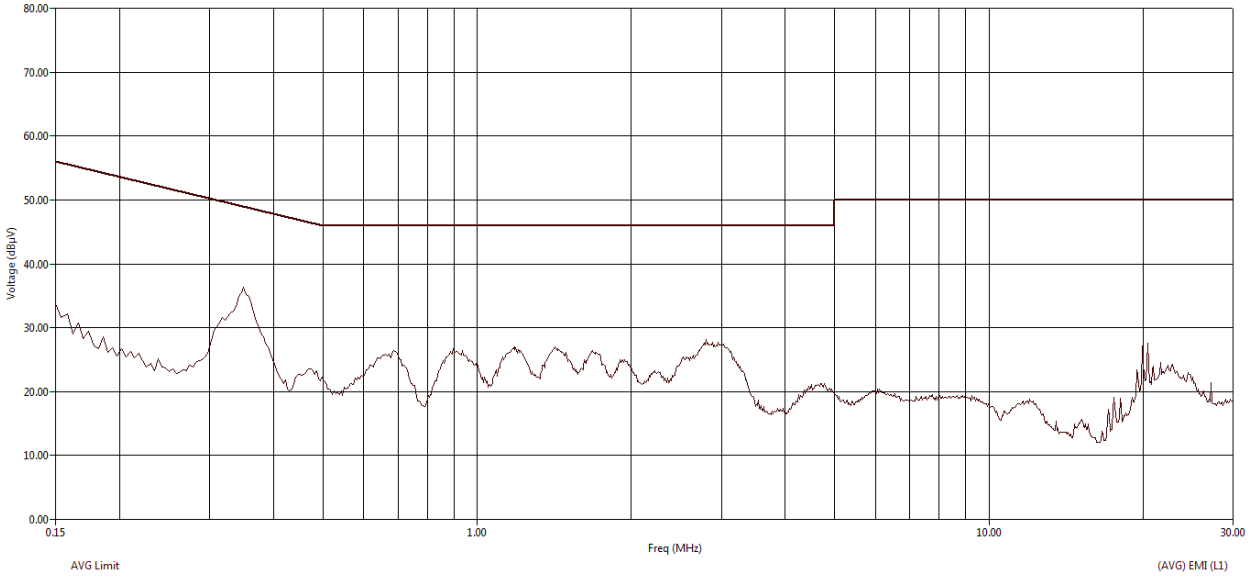

Figure 26: CE graph from 150 kHz to 30MHz using Average detector - Line

Freq (MHz)	Freq (Max) (MHz)	Line	(AVG) Trace (dBµV)	Cable + Pulselimiter (dB)	Transducer N (dB)	Transducer L (dB)	(AVG) EMI (dBµV)	(AVG) Limit (dBµV)	(AVG) Margin AVL (dB)
0.15	0.15	N	21.74	10.11	0.10	0.00	31.95	55.90	-23.95
0.15	0.15	L1	22.19	10.11	0.00	0.07	32.37	55.94	-23.57
0.35	0.35	L1	25.43	10.10	0.00	0.06	35.59	48.95	-13.37
0.35	0.36	N	25.08	10.10	0.09	0.00	35.27	48.80	-13.53
3.07	3.08	N	16.05	10.11	0.13	0.00	26.29	46.00	-19.71
3.12	3.12	L1	15.50	10.11	0.00	0.10	25.72	46.00	-20.28
12.24	12.23	L1	6.50	10.26	0.00	0.23	16.99	50.00	-33.01
12.73	12.73	N	6.98	10.28	0.28	0.00	17.53	50.00	-32.47
19.94	19.94	L1	16.31	10.40	0.00	0.32	27.03	50.00	-22.97
20.45	20.45	N	15.22	10.41	0.37	0.00	26.01	50.00	-23.99

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

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

7.1.7 Result

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

7.2 RADIATED EMISSION

7.2.1 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 8 GHz	8 GHz to 18 GHz	18 GHz to 26.5 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	5 dB	5 dB	5 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			Average		
Input Voltage	120V AC					
Input Frequency	60Hz					
Temperature	23.5ºC		23.0ºC	22.0ºC	23.0ºC	23.0 º C
Humidity	59.4%		58.0%	50.0%	52.0%	55.0 %
Tested By	Arun NC/ Ravi Ranjan		R Kishore / Nishanth	Suresh G.N/ Ravi Ranjan	Narendra / Sandeep	Suresh G.N/ Ravi Ranjan
Test Date	21/04/2015		14/07/2015	04/08/2015	18/07/2015	28/07/2015

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7.2.2 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 8 GHz	8 GHz to 18 GHz	18 GHz to 26.5 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	5 dB	5 dB	5 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			Average		
Input Voltage	120V AC					
Input Frequency	60Hz					
Temperature	23.5ºC		23.0 º C	23.0ºC	23.0 º C	23.0 º C
Humidity	59.4%		58.0 %	58.0%	55.0 %	55.0 %
Tested By	Arun NC/ Ravi Ranjan		R Kishore / Nishanth	Suresh G.N/ Ravi Ranjan	Suresh G.N/ Ravi Ranjan	Suresh G.N/ Ravi Ranjan
Test Date	21/04/2015		15/07/2015	10/08/2015	28/07/2015	28/07/2015

7.2.3 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

Note: *This section specifies the test results for both "Restricted Bands of Operation & General Radiated Emission limits"*

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7.2.4 Test Setup

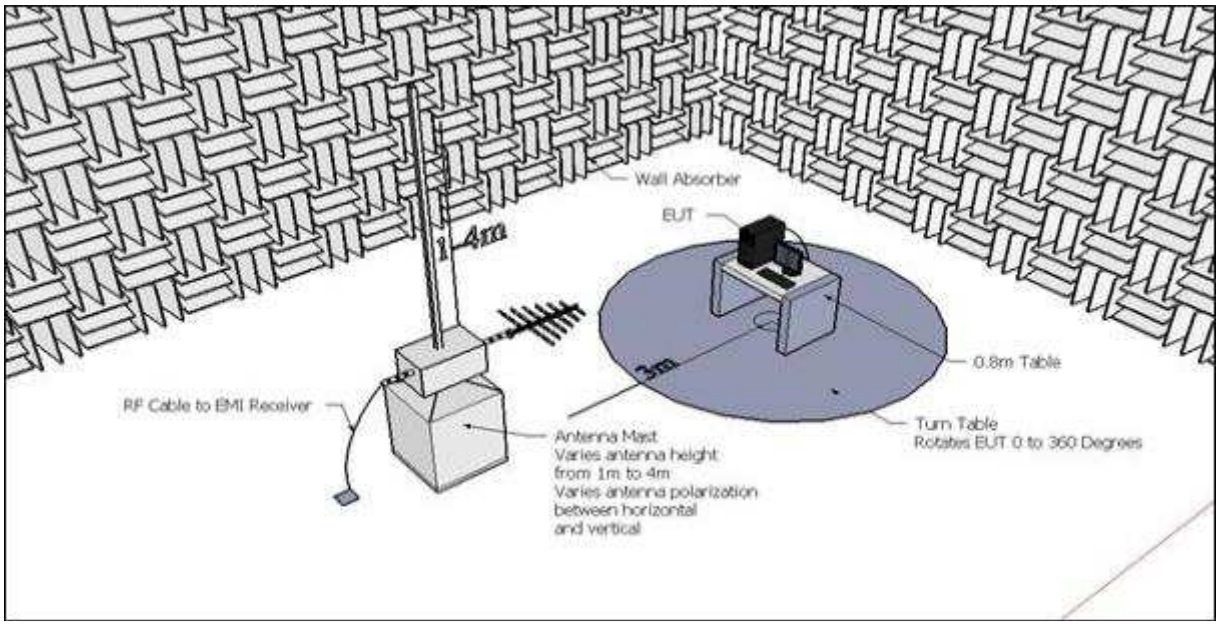

Figure 27: Typical test setup for Radiated Emission test

7.2.5 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 26.5 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 26.5 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.

7.2.6 Result (Supporting Graphs / Data) For 40 MHz Modulation Bandwidth

7.2.6.1 Low Channel_2427 MHz

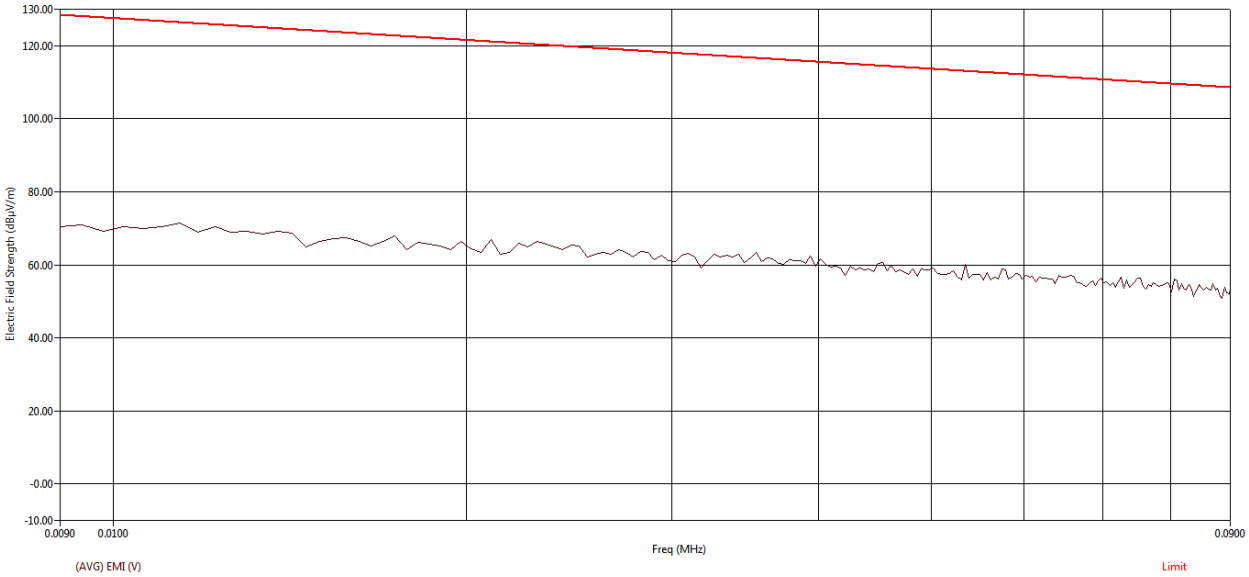

Figure 28: Average RE from 9 kHz to 90 KHz - Parallel

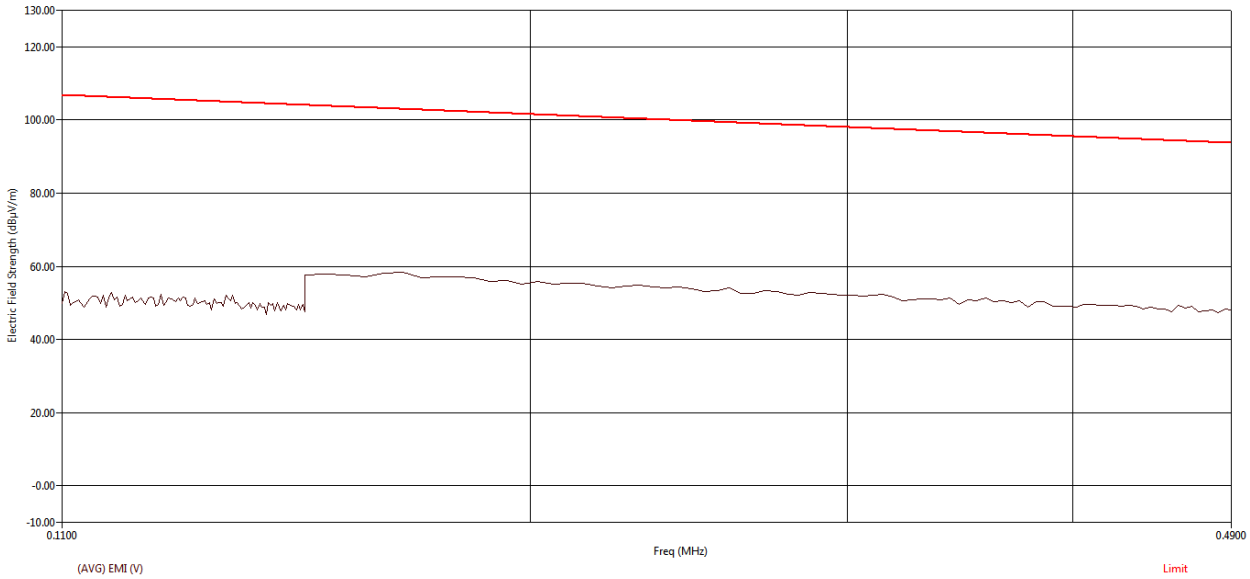

Figure 29: Average RE from 110 kHz to 490 kHz - Parallel

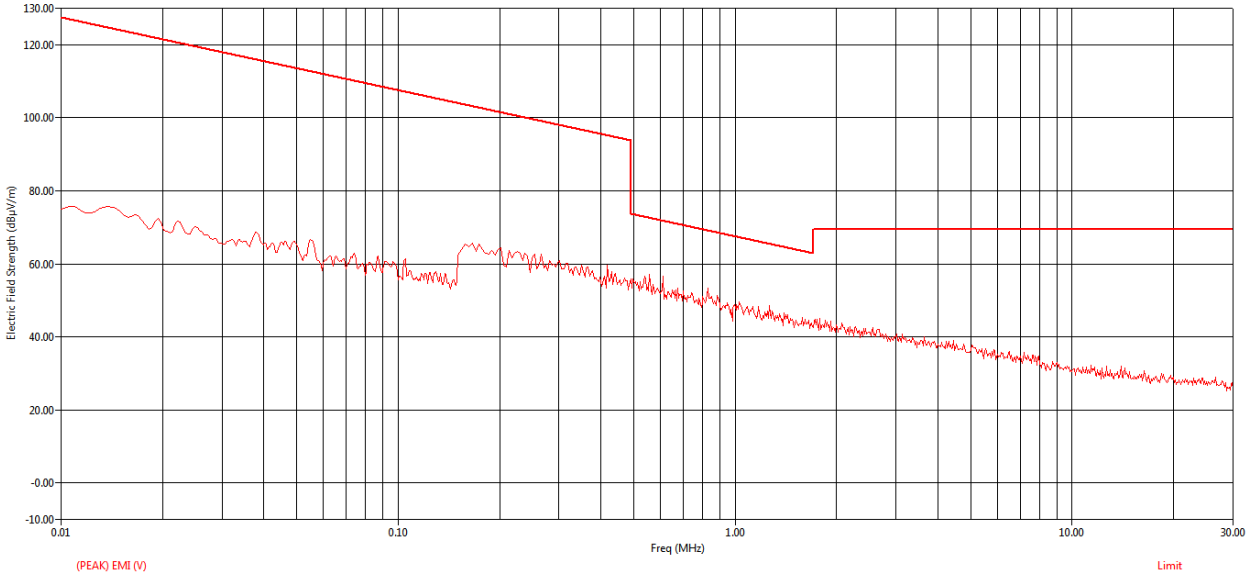

Figure 30: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.61	0.60	V	262.30	33.83	0.23	17.45	51.52	71.99	-20.47
16.40	16.41	V	229.70	4.66	1.44	17.14	23.24	69.54	-46.30

Figure 31: Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

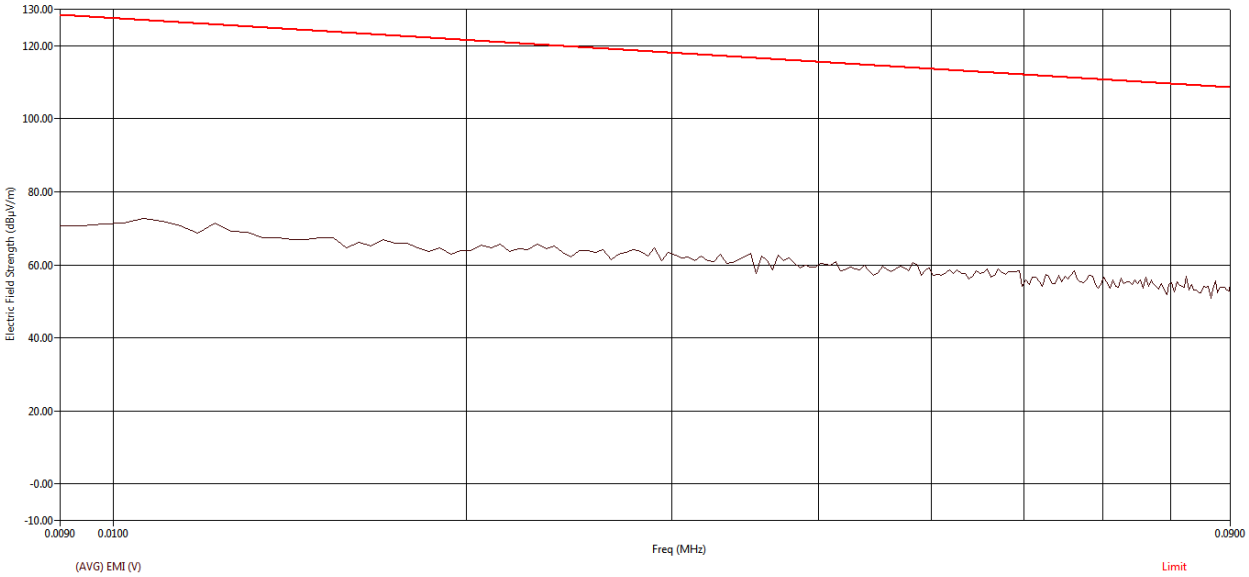

Figure 32: Average RE from 9 kHz to 90 kHz - Perpendicular

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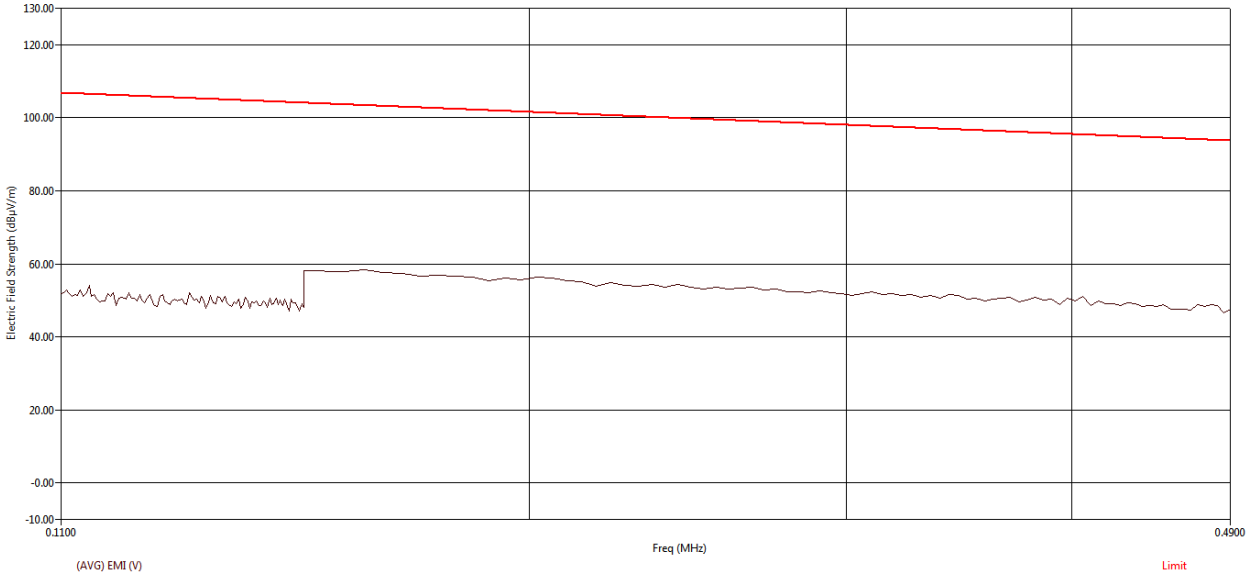

Figure 33: Average RE from 110 kHz to 490 kHz - Perpendicular

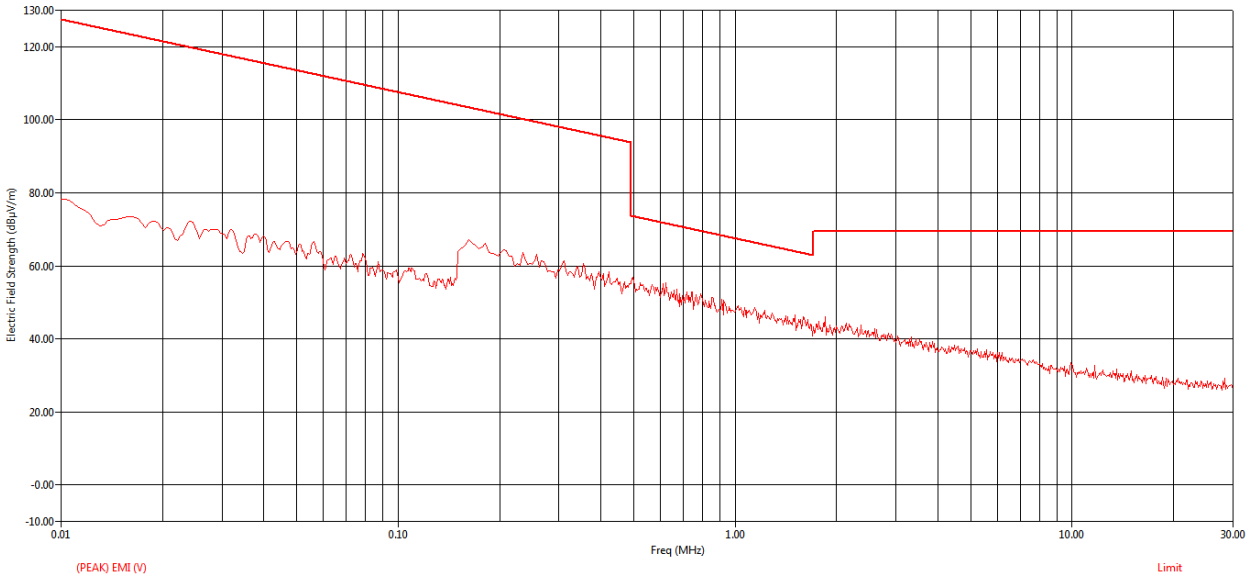

Figure 34: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
1.85	1.86	V	135.20	21.32	0.40	17.78	39.50	69.54	-30.04
28.35	28.35	V	341.60	1.89	1.85	16.42	20.16	69.54	-49.38

Figure 35: Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

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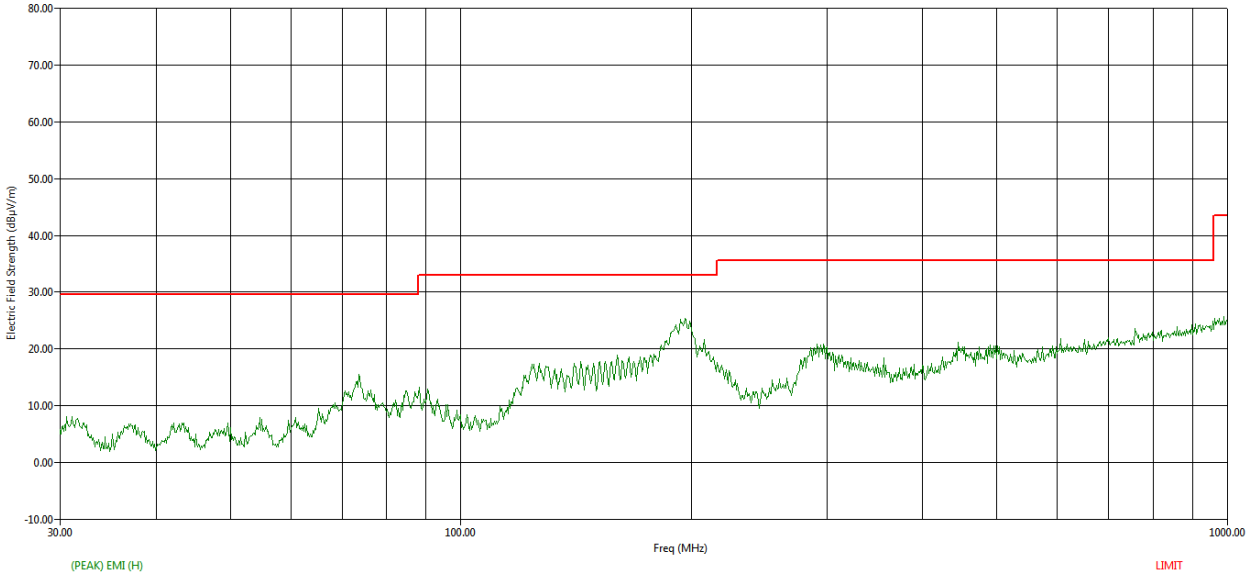

Figure 36: Peak RE from 30MHz to 1GHz - Horizontal polarization

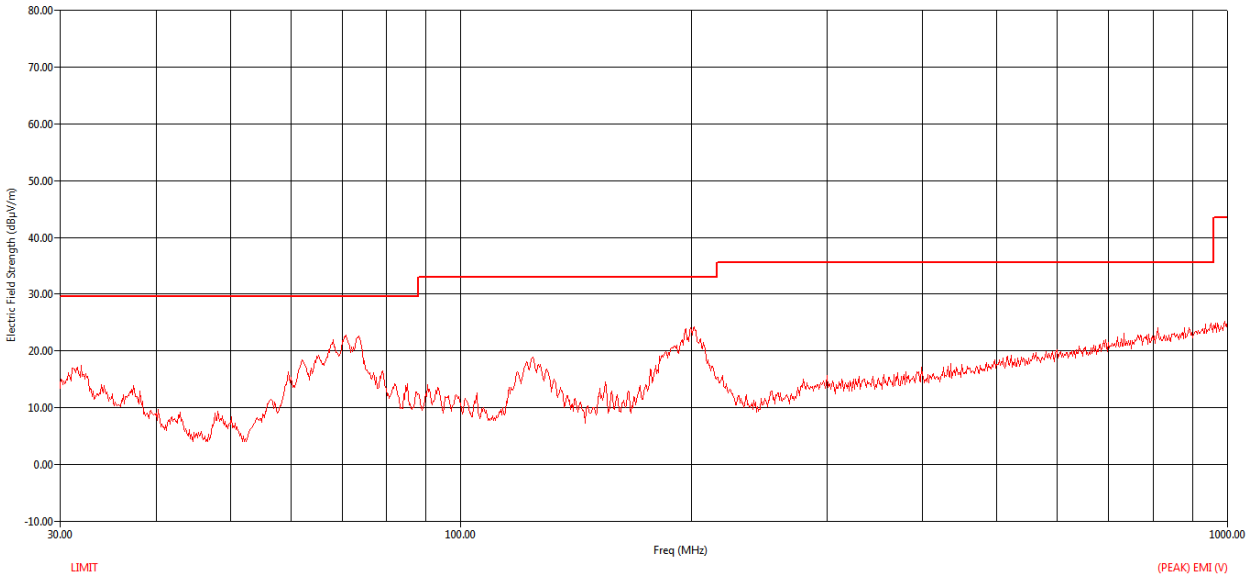

Figure 37: Peak RE from 30MHz to 1GHz - Vertical polarization

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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)
68.16	68.18	V	214.30	201.00	41.49	1.67	9.11	32.41	19.86	29.54	-9.68
70.84	70.87	V	190.40	182.00	42.79	1.68	8.88	32.40	20.95	29.54	-8.59
73.55	73.52	V	216.70	241.00	43.62	1.74	8.63	32.39	21.60	29.54	-7.94
124.04	124.05	V	281.20	164.00	36.44	2.19	10.74	32.24	17.14	33.06	-15.92
193.51	193.63	H	159.00	105.00	31.48	2.72	12.89	32.11	14.98	33.06	-18.08
196.20	196.35	H	168.00	111.00	32.42	2.74	13.04	32.11	16.10	33.06	-16.96
201.44	201.46	V	136.00	280.00	35.43	2.79	13.14	32.10	19.26	33.06	-13.80

Table 13: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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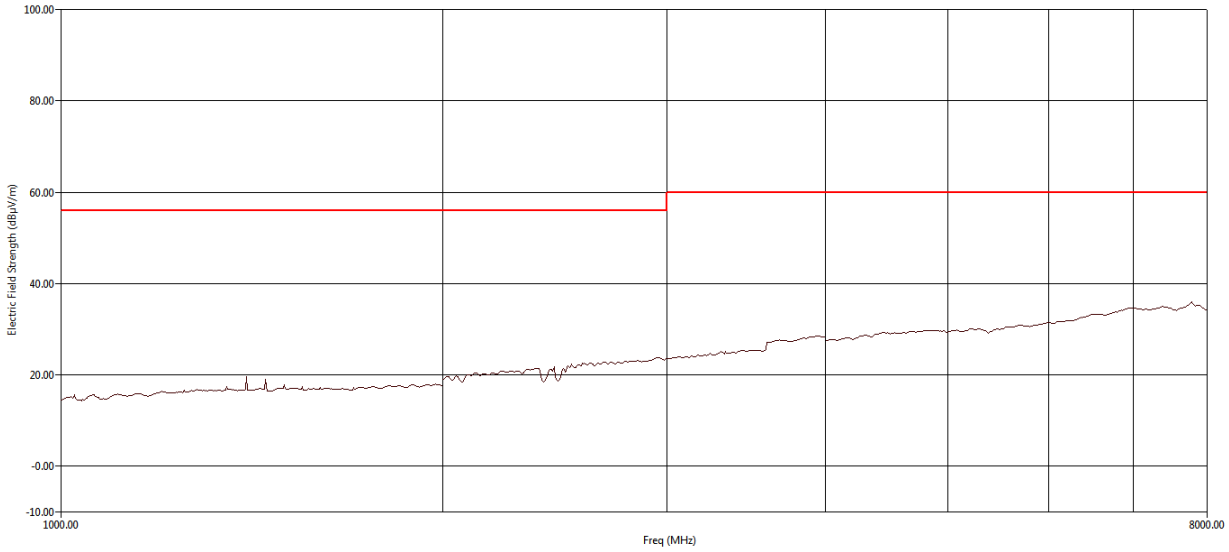

Figure 38: Average RE from 1GHz to 8GHz - Horizontal polarization

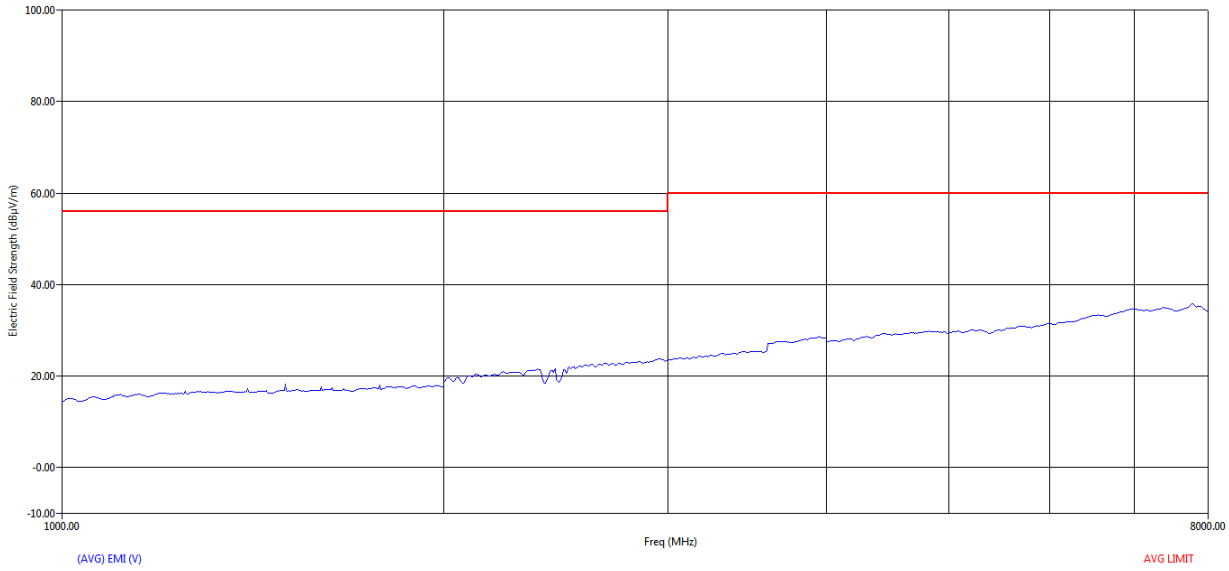

Figure 39: Average RE from 1GHz to 8GHz - Vertical polarization

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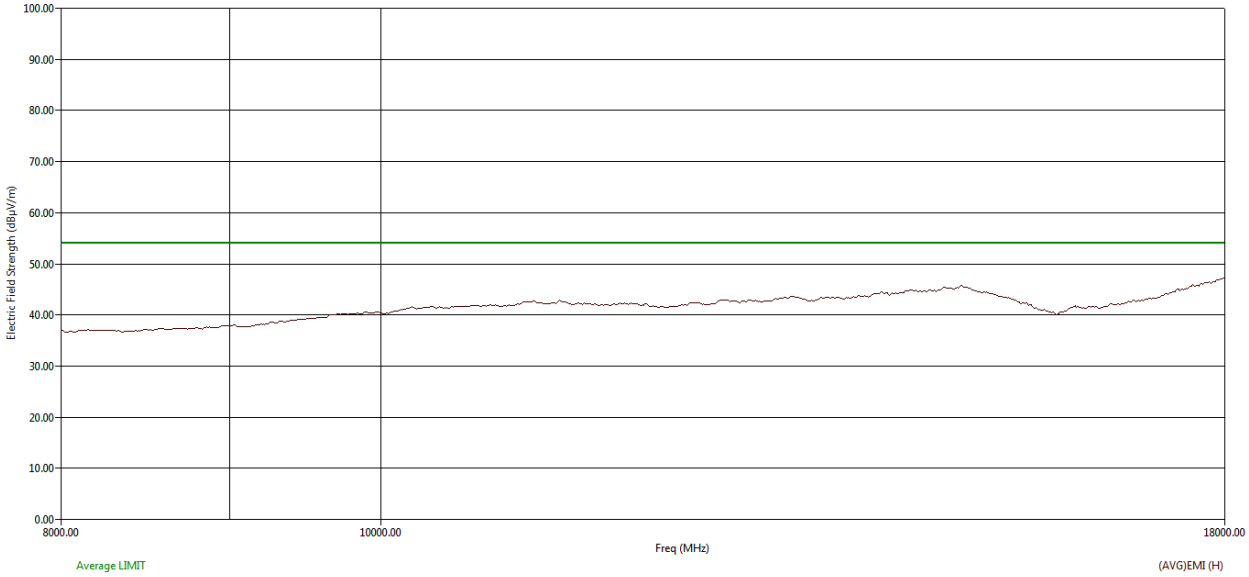

Figure 40: Average RE from 8GHz to 18GHz - Horizontal polarization

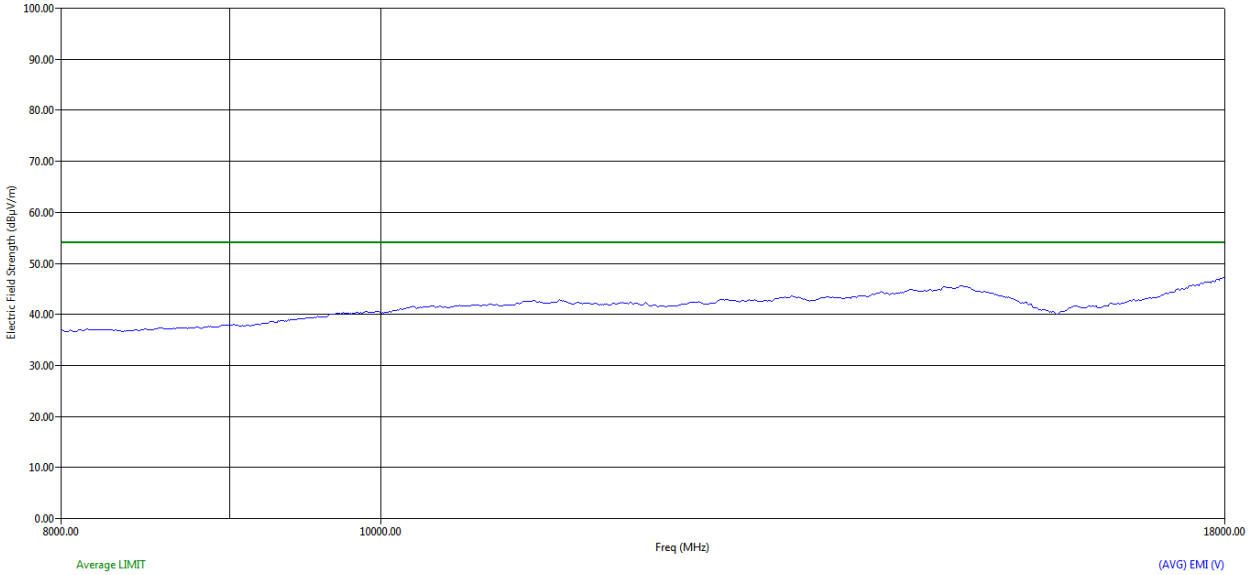

Figure 41: Average RE from 8GHz to 18GHz - Vertical polarization

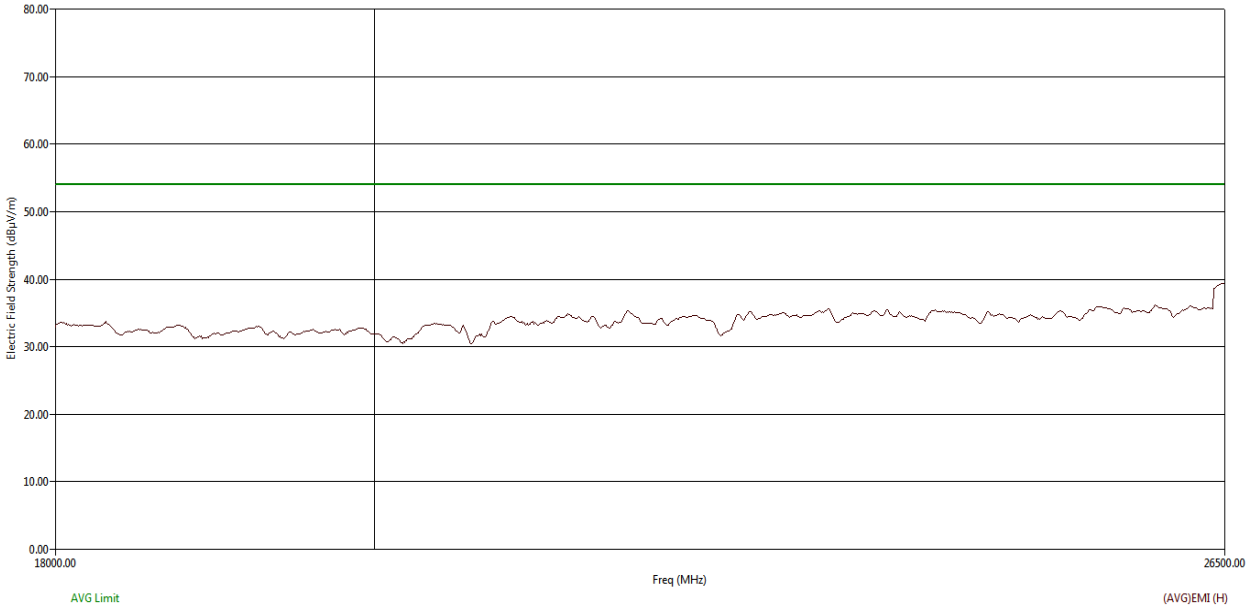

Figure 42: Average RE from 18GHz to 26.5GHz - Horizontal polarization

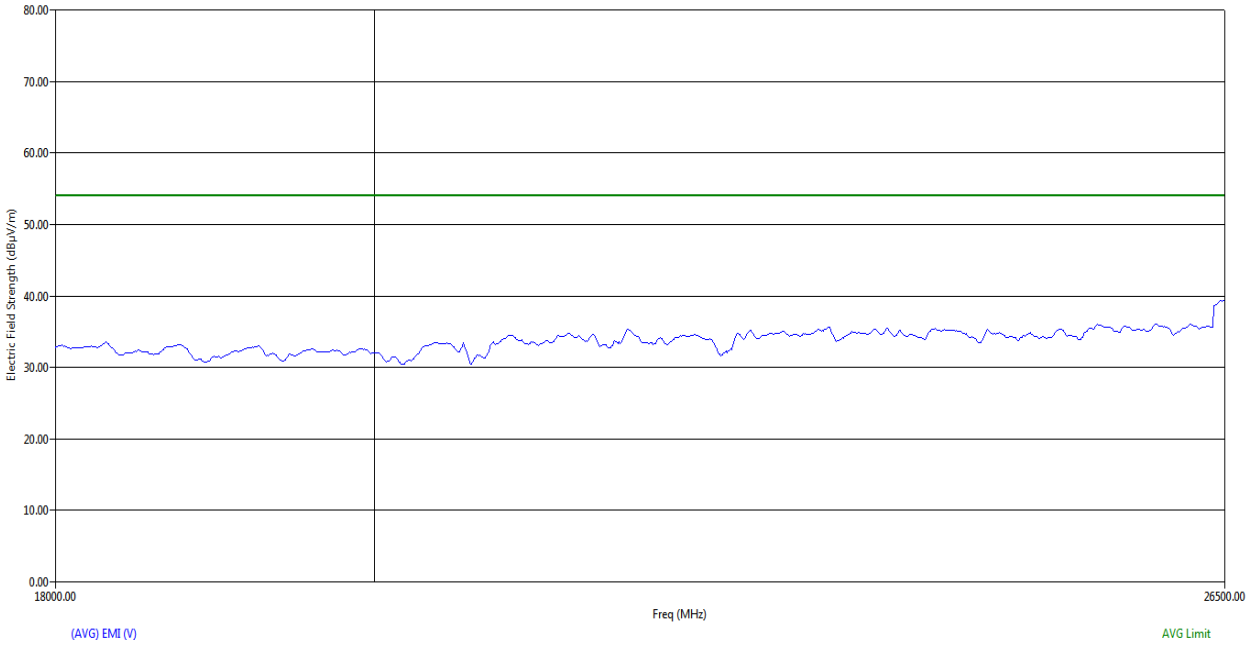

Figure 43: Average RE from 18GHz to 26.5GHz - Vertical polarization

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7.2.6.2 Mid Channel_2442 MHz

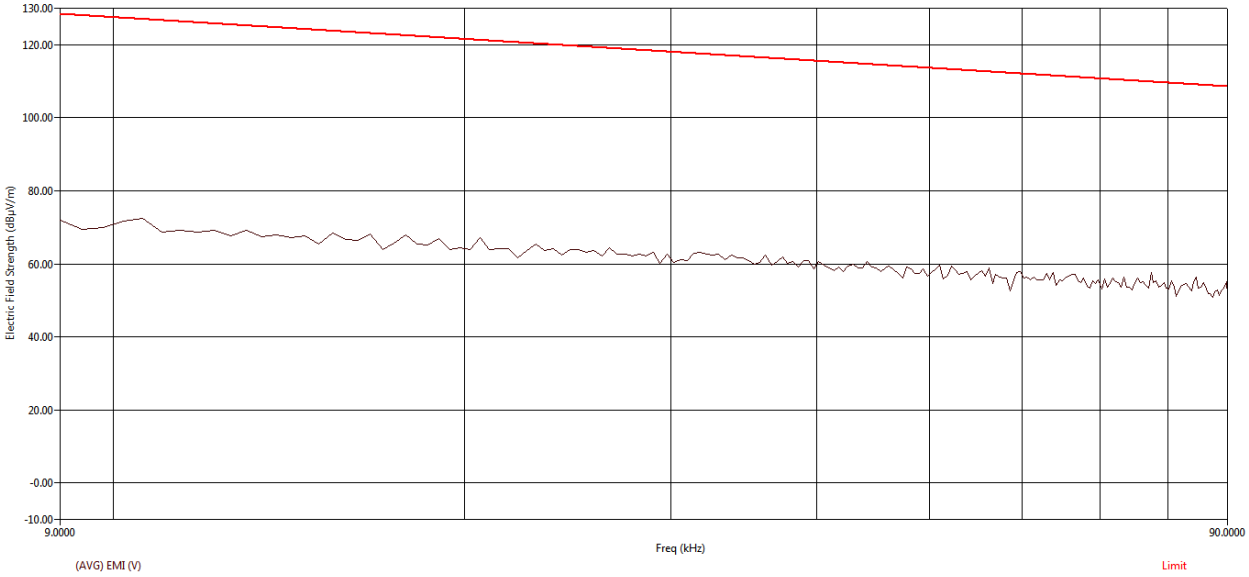

Figure 44: Average RE from 9 kHz to 90 kHz - Parallel

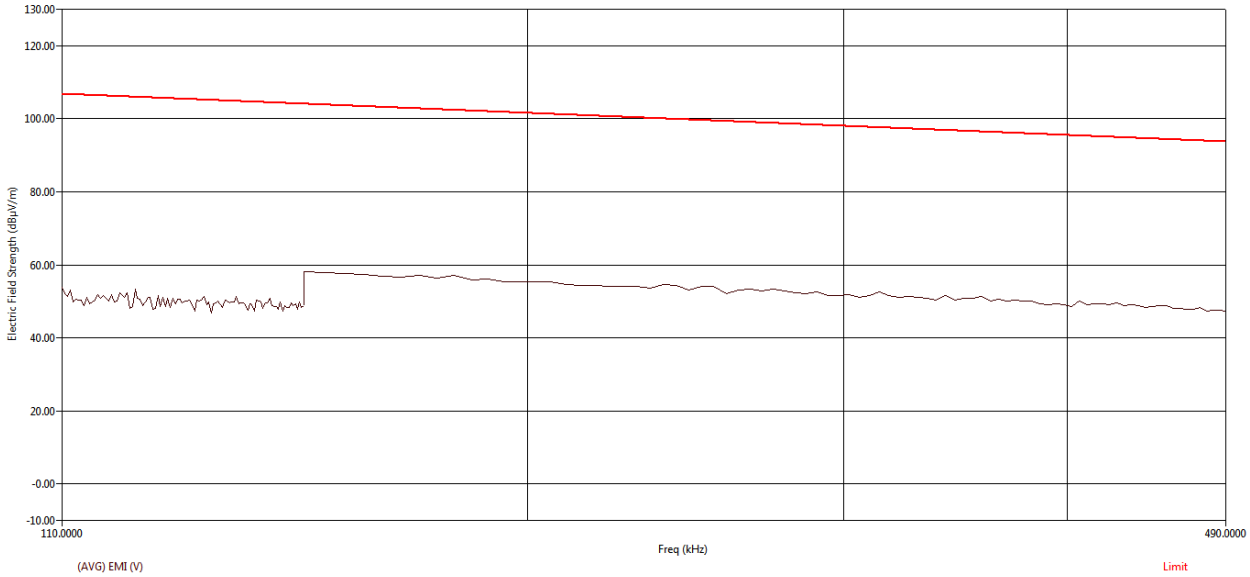

Figure 45: Average RE from 110 kHz to 490 kHz - Parallel

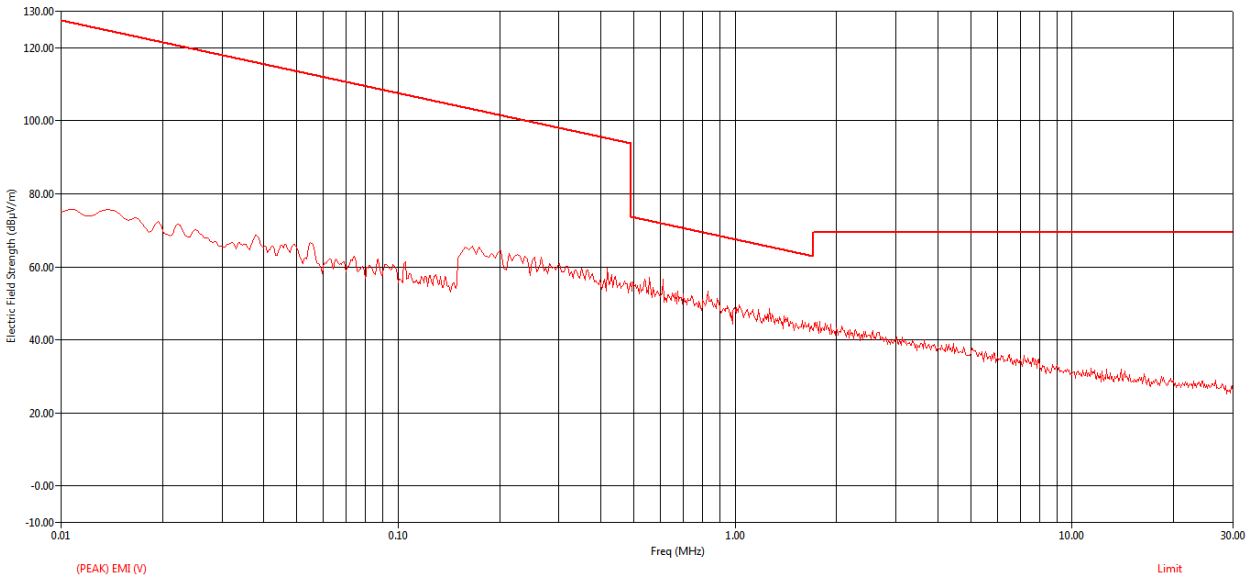

Figure 46: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.16	0.15	V	45.12	0.16	17.60	62.88	104.08	-41.20
0.42	0.41	V	36.46	0.20	17.50	54.16	95.25	-41.09
0.83	0.83	V	29.69	0.26	17.47	47.42	69.24	-21.82

Table 14 Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

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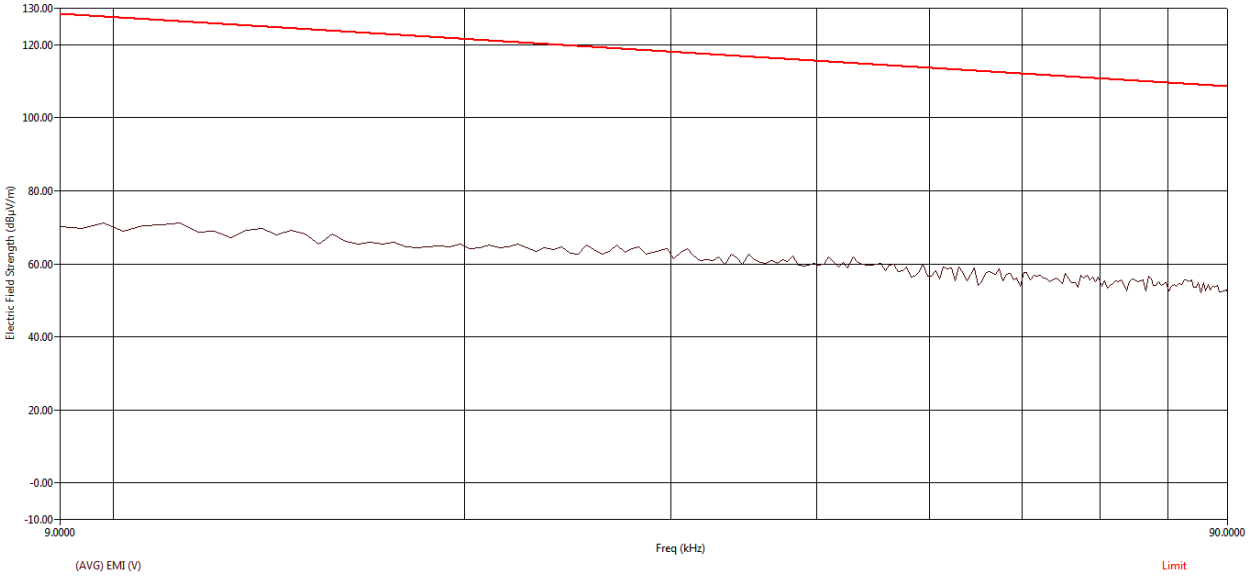

Figure 47: Average RE from 9 kHz to 90 kHz - Perpendicular

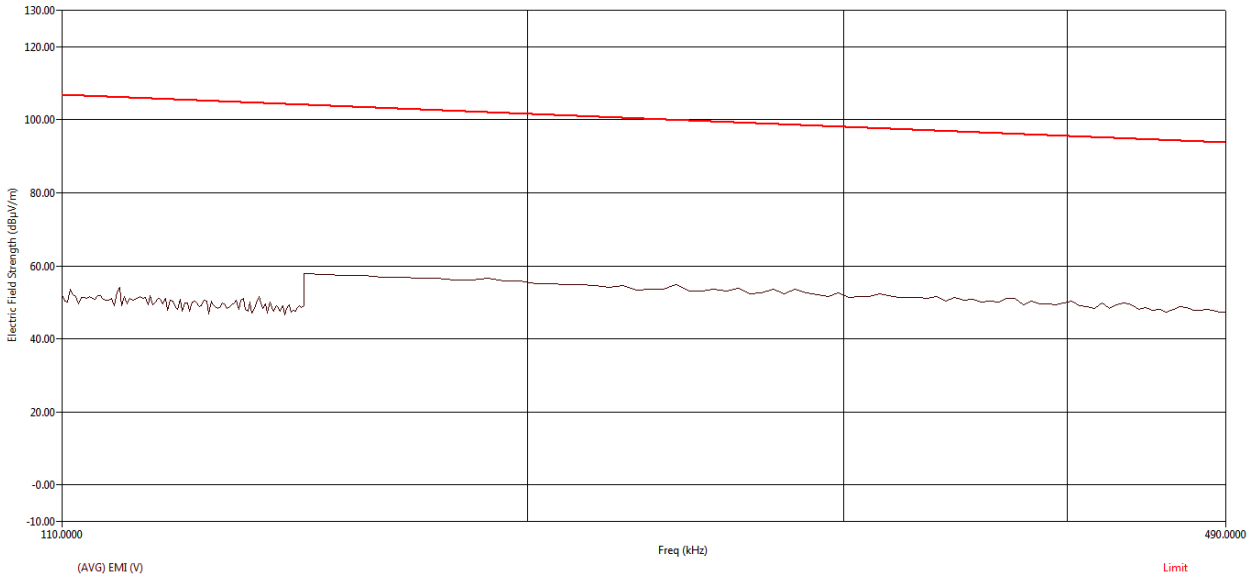

Figure 48: Average RE from 110 kHz to 490 kHz - Perpendicular

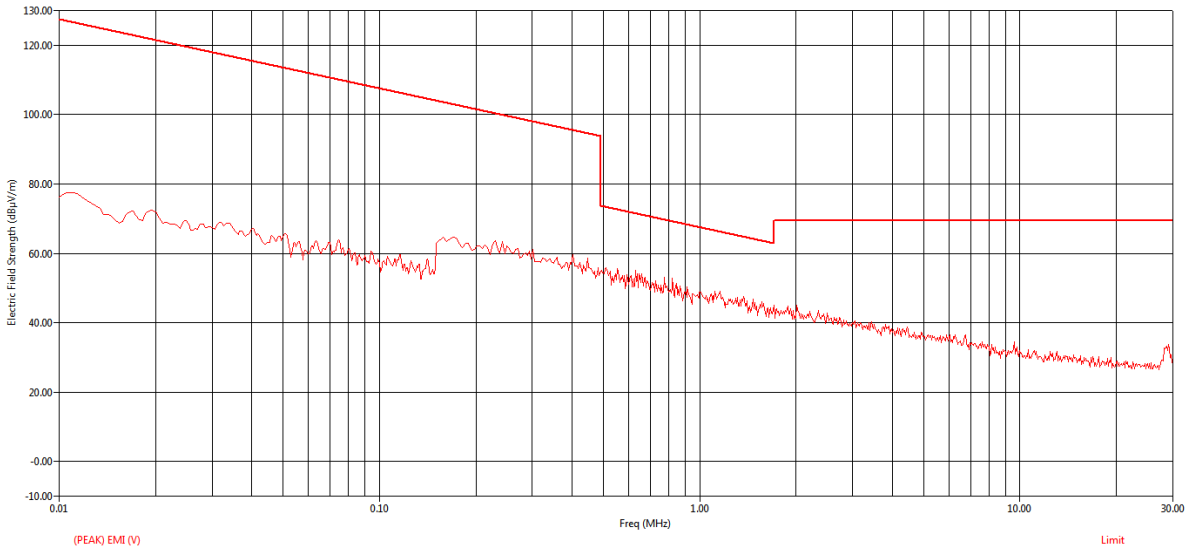

Figure 49: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.17	0.15	V	45.13	0.16	17.60	62.88	103.00	-40.11
0.23	0.24	V	41.39	0.16	17.51	59.06	100.37	-41.31
0.40	0.40	V	36.72	0.20	17.50	54.42	95.56	-41.15

Table 15 Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

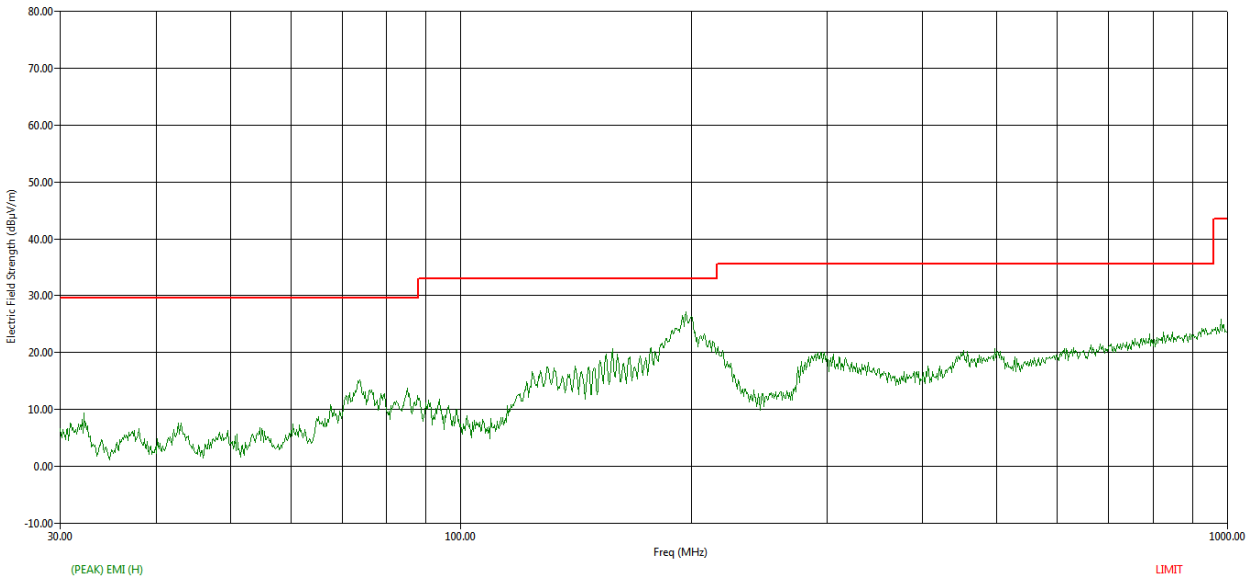

Figure 50: Peak RE from 30MHz to 1GHz - Horizontal polarization

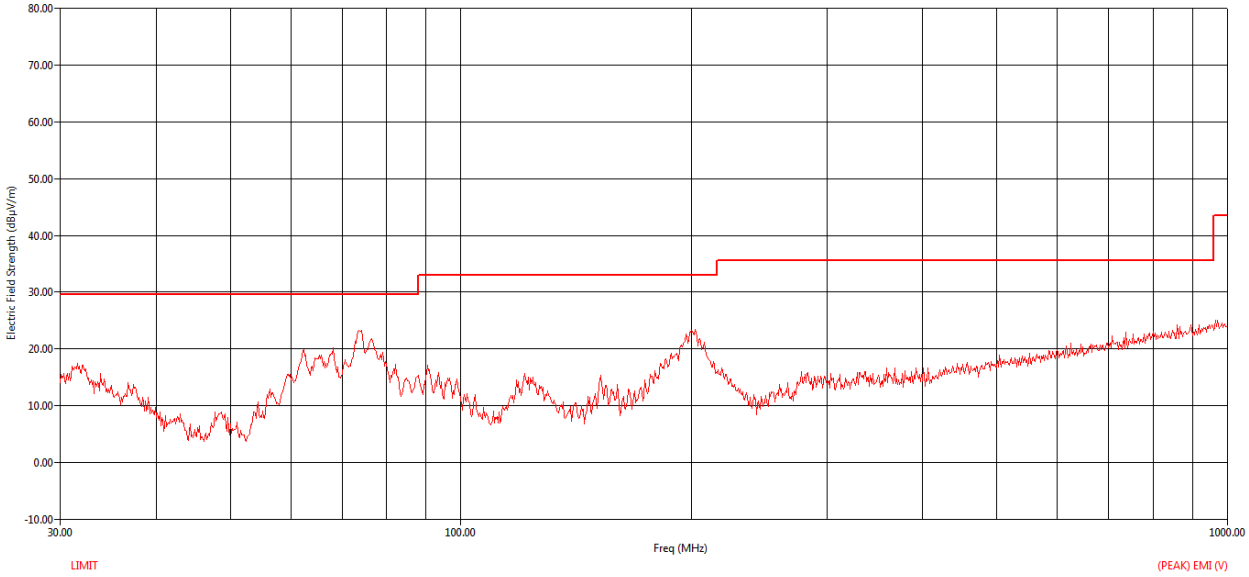

Figure 51: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
73.60	73.66	V	335.90	226.00	38.95	1.74	8.61	32.39	16.91	29.54	-12.63
76.27	76.32	V	279.50	102.00	39.17	1.76	8.37	32.38	16.93	29.54	-12.61
196.68	196.59	H	129.50	243.00	37.28	2.74	13.05	32.10	20.96	33.06	-12.10
199.16	199.16	H	149.70	281.00	38.17	2.77	13.19	32.10	22.03	33.06	-11.03
199.18	199.10	V	184.70	272.00	28.20	2.77	13.18	32.10	12.05	33.06	-21.01
202.04	201.99	V	109.80	175.00	38.01	2.79	13.11	32.10	21.81	33.06	-11.25

Table 16: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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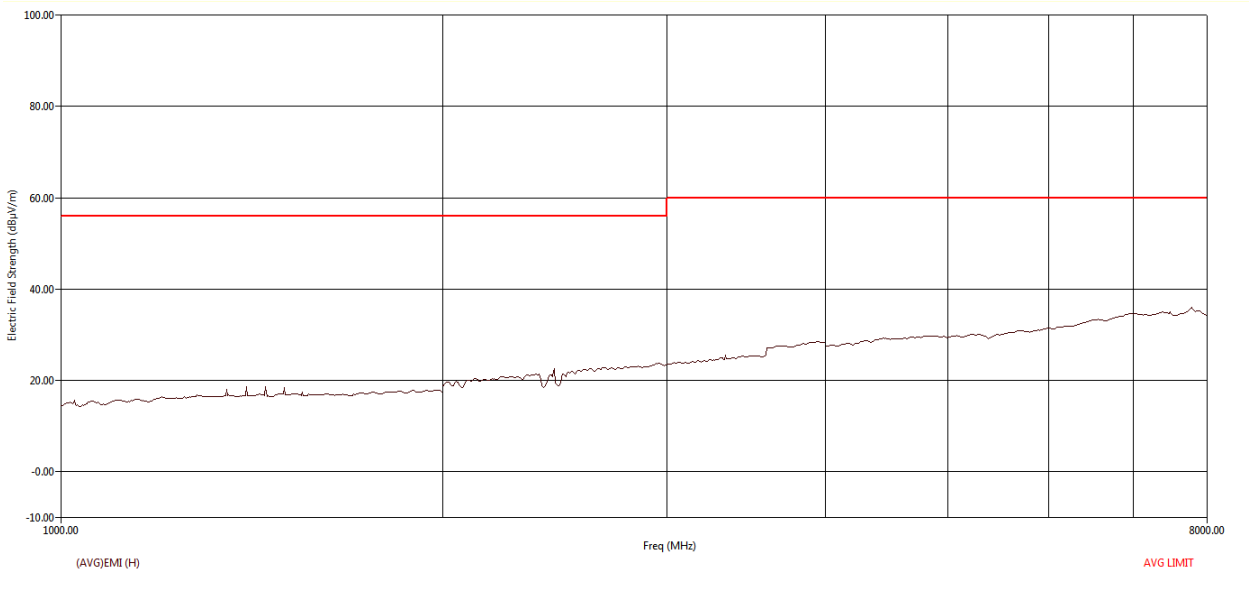

Figure 52: Average RE from 1GHz to 8GHz - Horizontal polarization

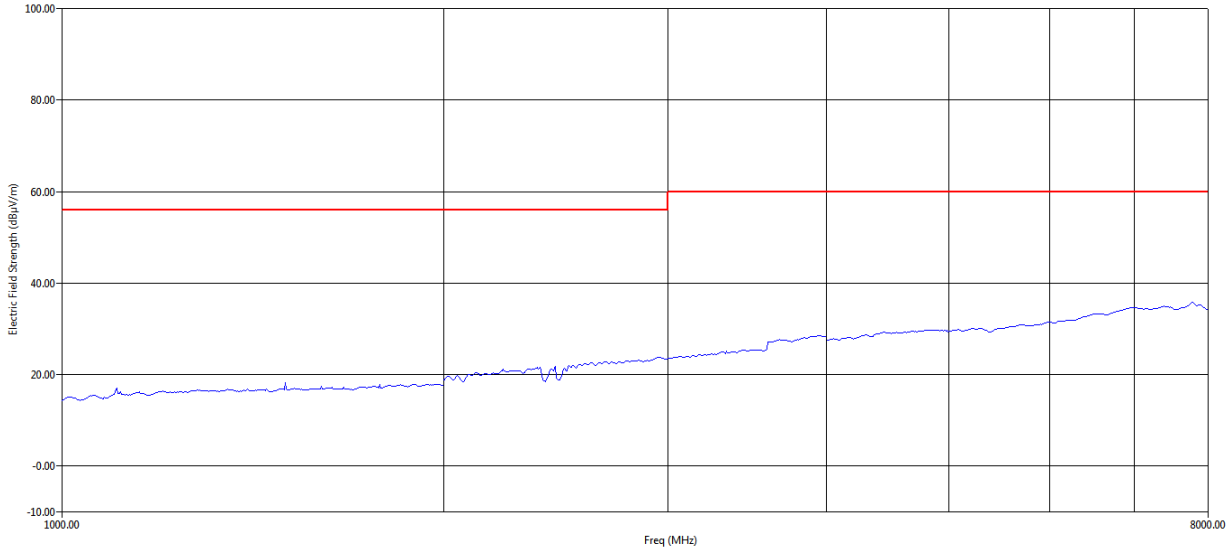

Figure 53: Average RE from 1GHz to 8GHz - Vertical polarization

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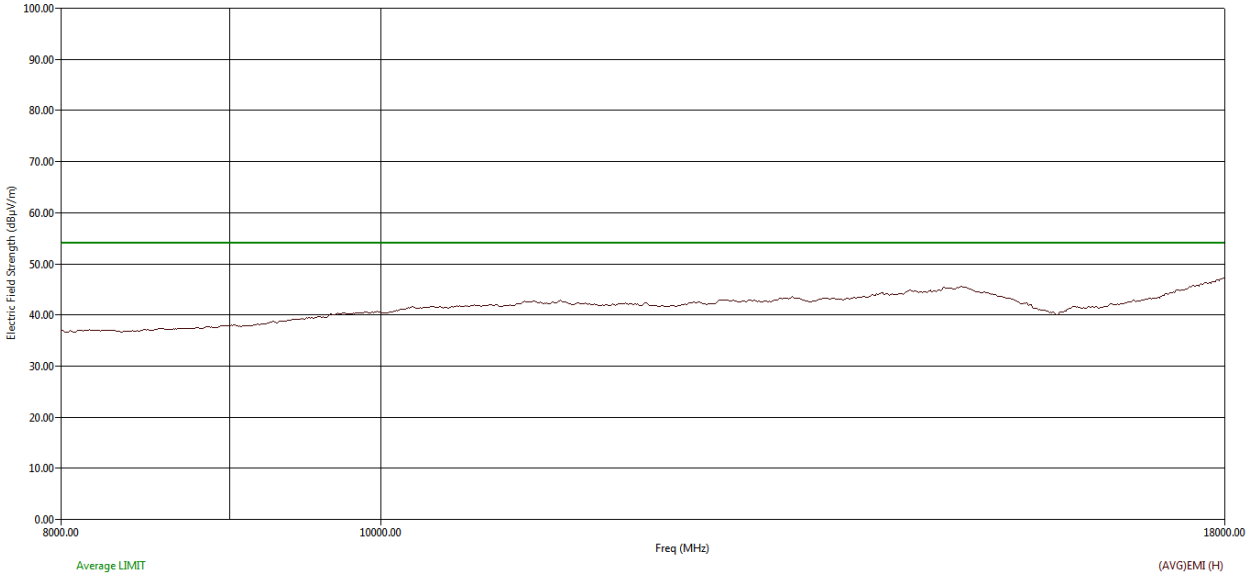

Figure 54: Average RE from 8GHz to 18GHz - Horizontal polarization

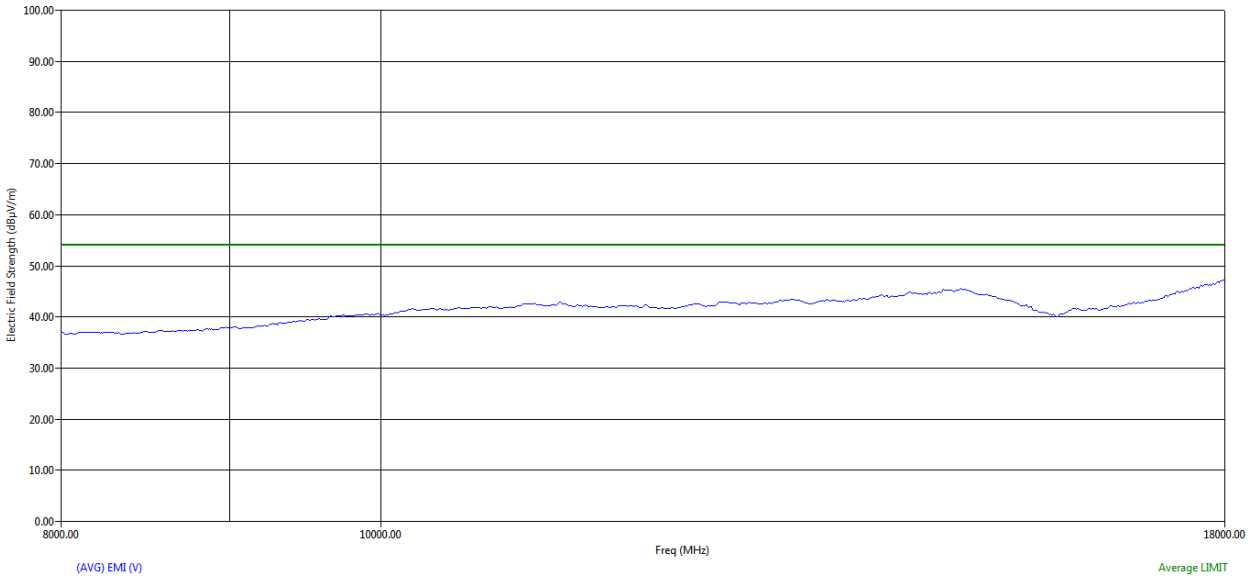

Figure 55: Average RE from 8GHz to 18GHz - Vertical polarization

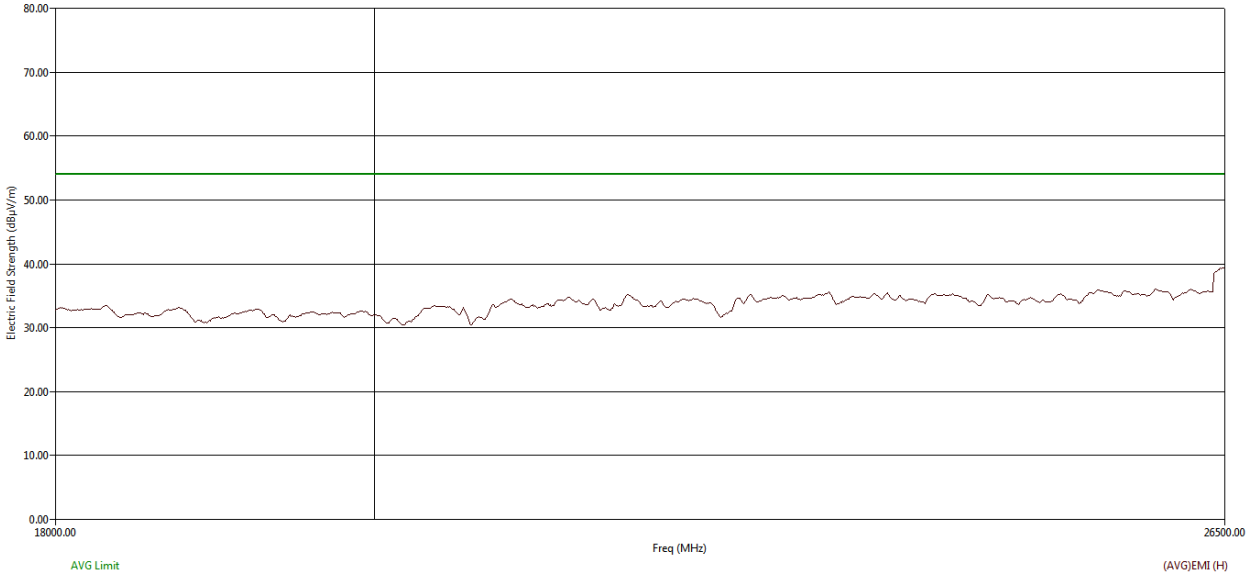

Figure 56: Average RE from 18GHz to 26.5GHz - Horizontal polarization

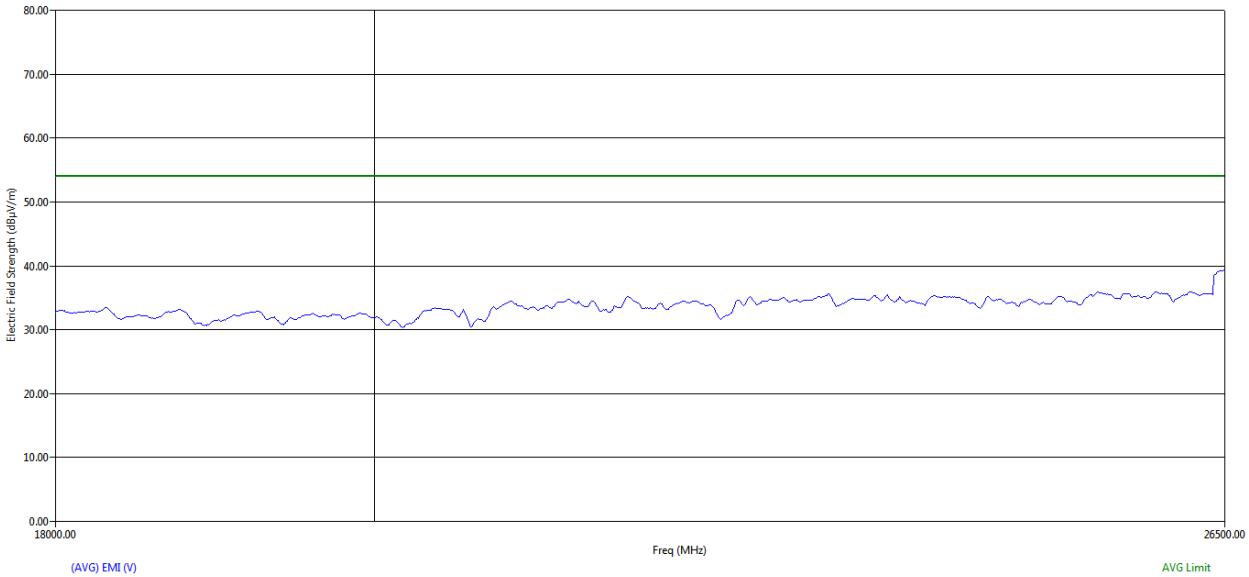

Figure 57: Average RE from 18GHz to 26.5GHz - Vertical polarization

7.2.6.3 High Channel_2462 MHz

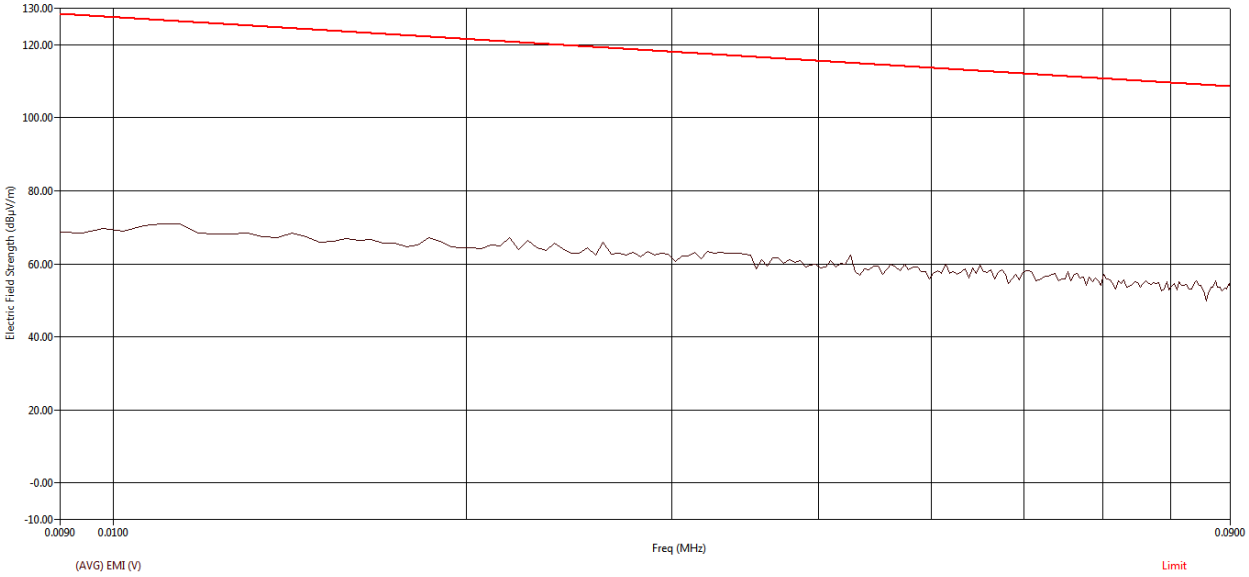

Figure 58: Average RE from 9 kHz to 90 kHz - Parallel

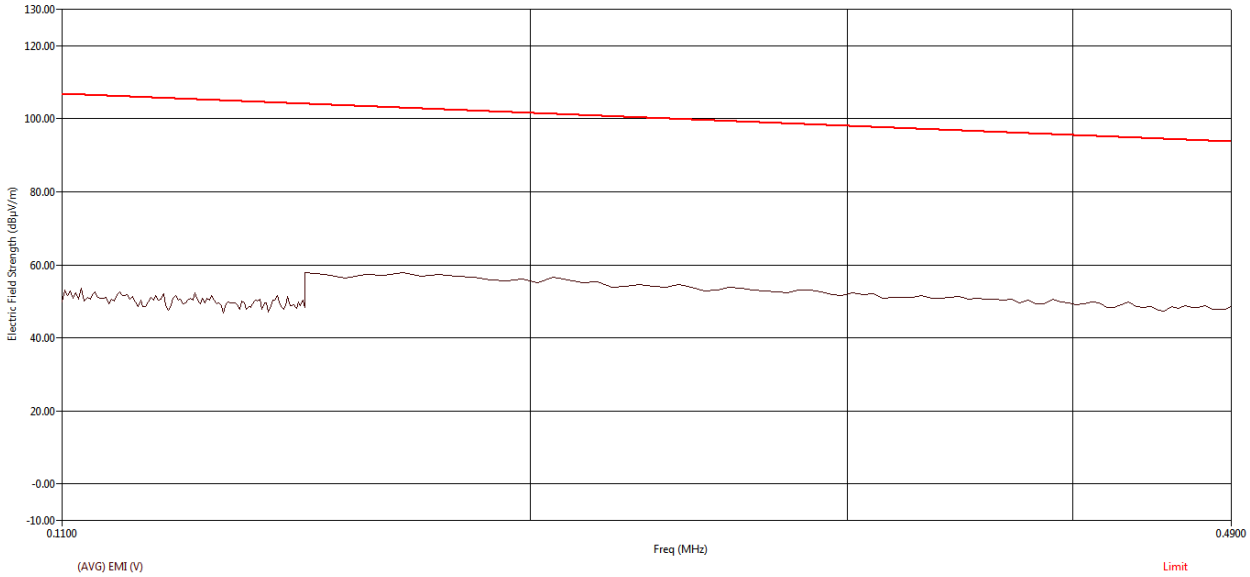

Figure 59: Average RE from 110 kHz to 490 kHz - Parallel

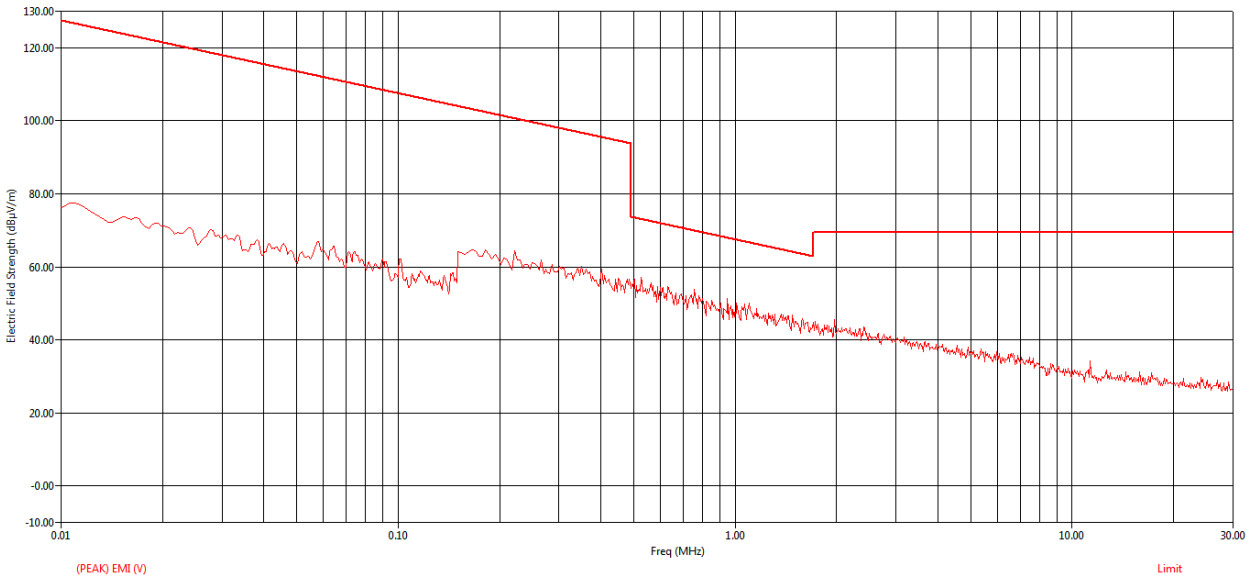

Figure 60: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.75	0.75	V	154.70	30.75	0.25	17.40	48.40	70.13	-21.73
11.31	11.31	V	197.60	7.07	1.21	17.20	25.48	69.54	-44.06

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

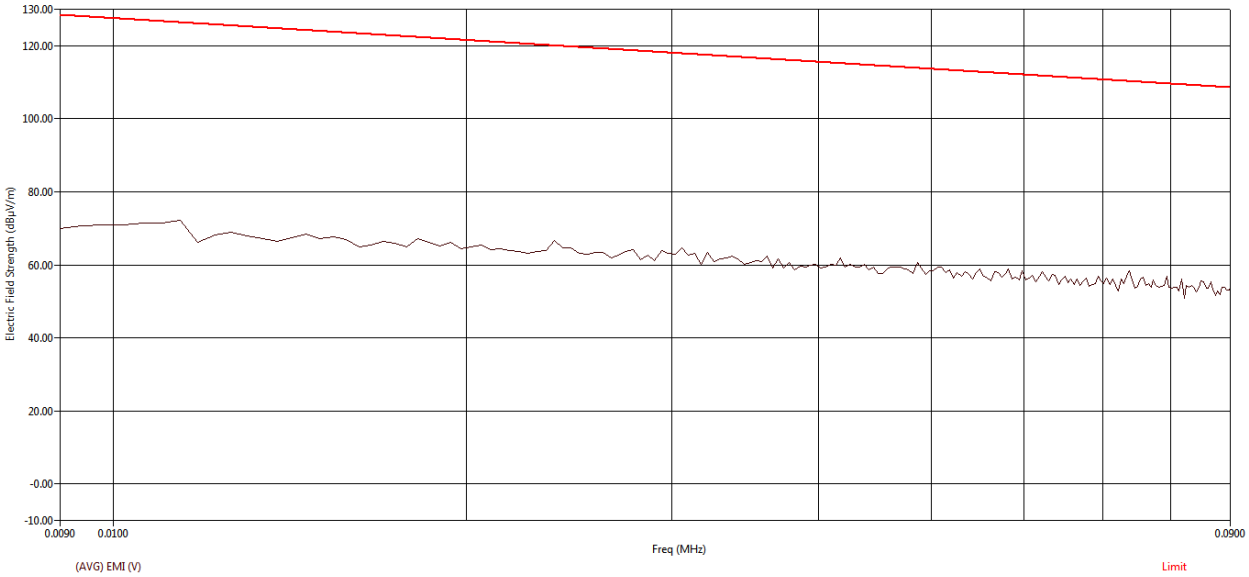

Figure 61: Average RE from 9 kHz to 90 kHz - Perpendicular

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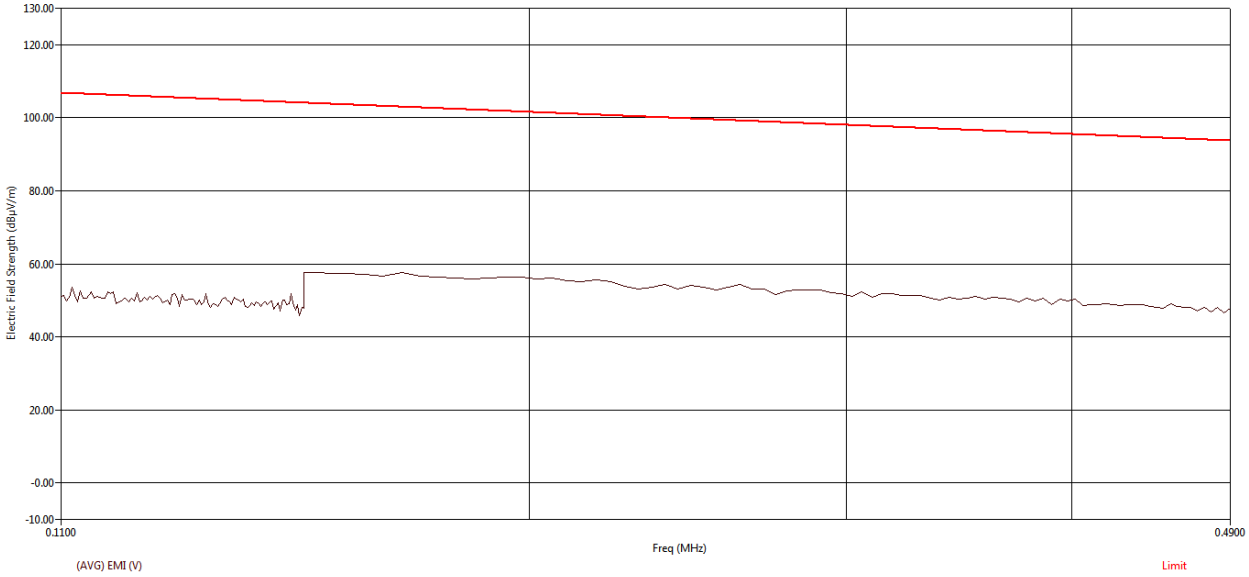

Figure 62: Average RE from 110 kHz to 490 kHz - Perpendicular

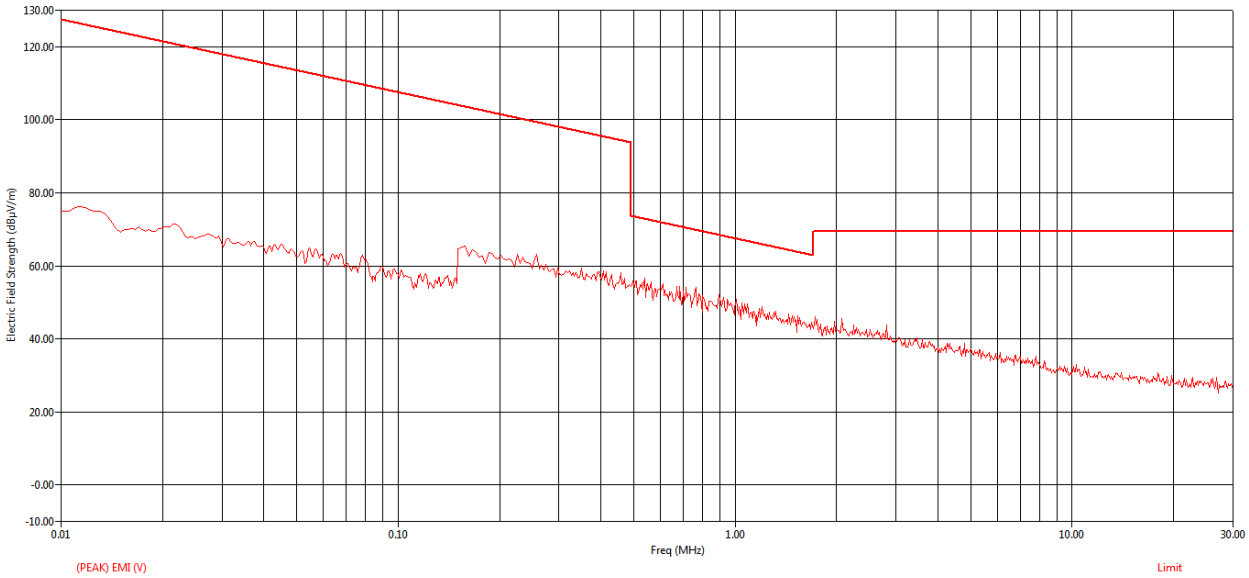

Figure 63: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.54	0.53	V	175.80	34.20	0.22	17.49	51.91	73.11	-21.20
18.07	18.06	V	64.80	4.04	1.50	17.07	22.61	69.54	-46.93

Table 18 Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

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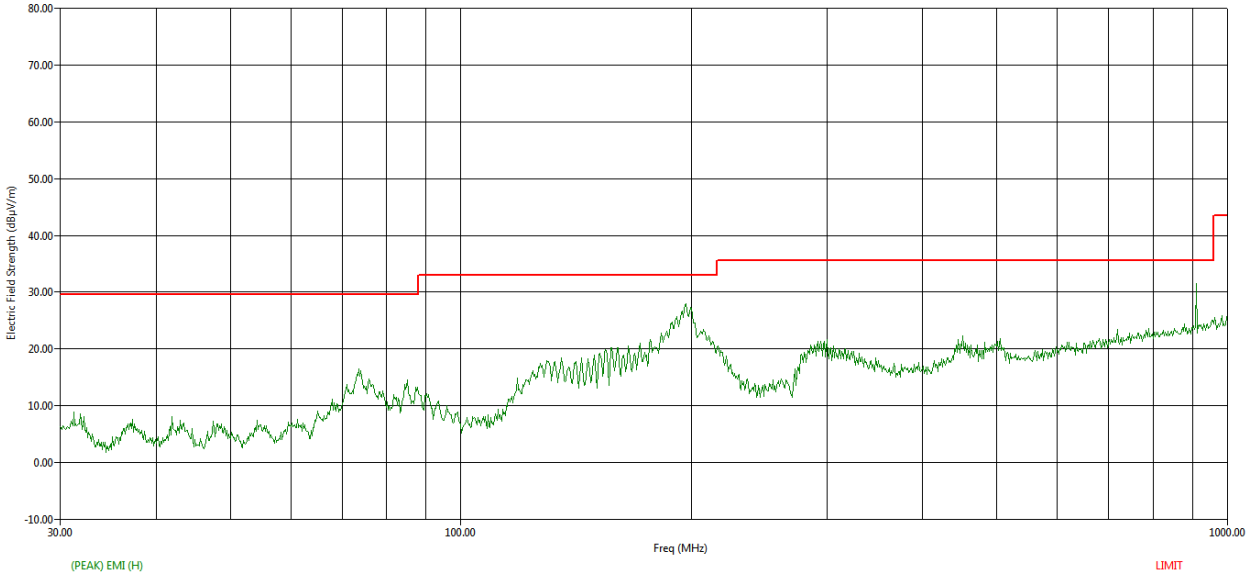

Figure 64: Peak RE from 30MHz to 1GHz - Horizontal polarization

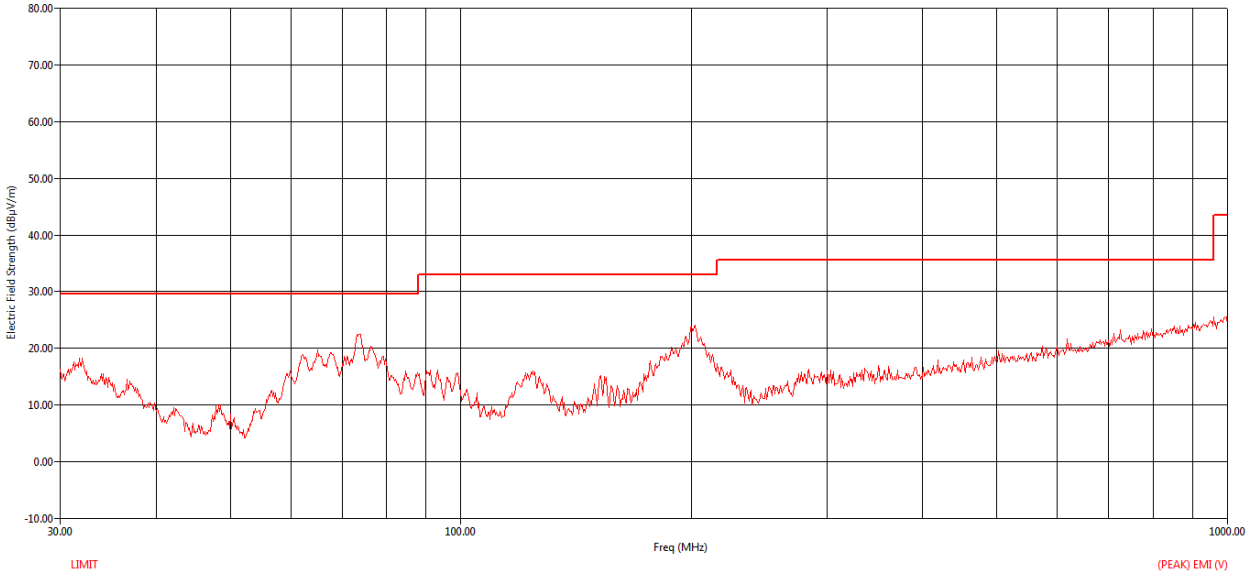

Figure 65: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
73.60	73.52	V	65.00	234.00	40.23	1.74	8.63	32.39	18.21	29.54	-11.33
76.27	76.27	V	55.40	265.00	39.56	1.76	8.38	32.38	17.32	29.54	-12.22
196.68	196.56	H	292.20	101.00	28.78	2.74	13.05	32.10	12.46	33.06	-20.60
199.16	199.06	H	161.90	400.00	40.16	2.77	13.18	32.10	24.01	33.06	-9.05
199.18	199.25	V	105.40	127.00	36.81	2.78	13.19	32.10	20.68	33.06	-12.38
202.04	202.02	V	93.40	245.00	37.77	2.80	13.10	32.10	21.57	33.06	-11.49

Table 19: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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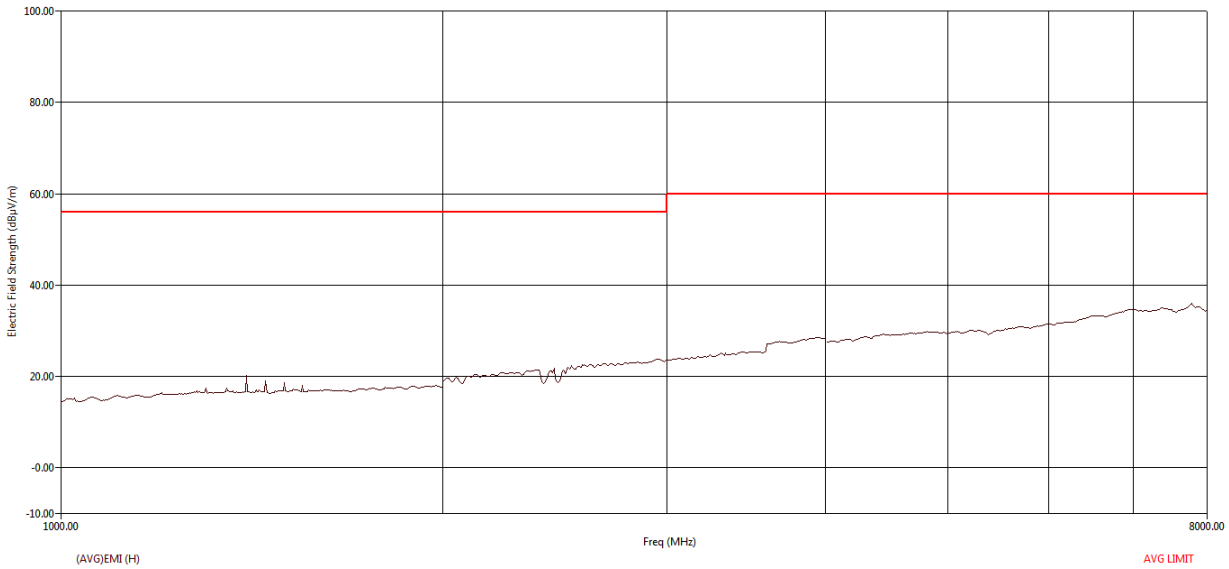

Figure 66: Average RE from 1GHz to 8GHz - Horizontal polarization

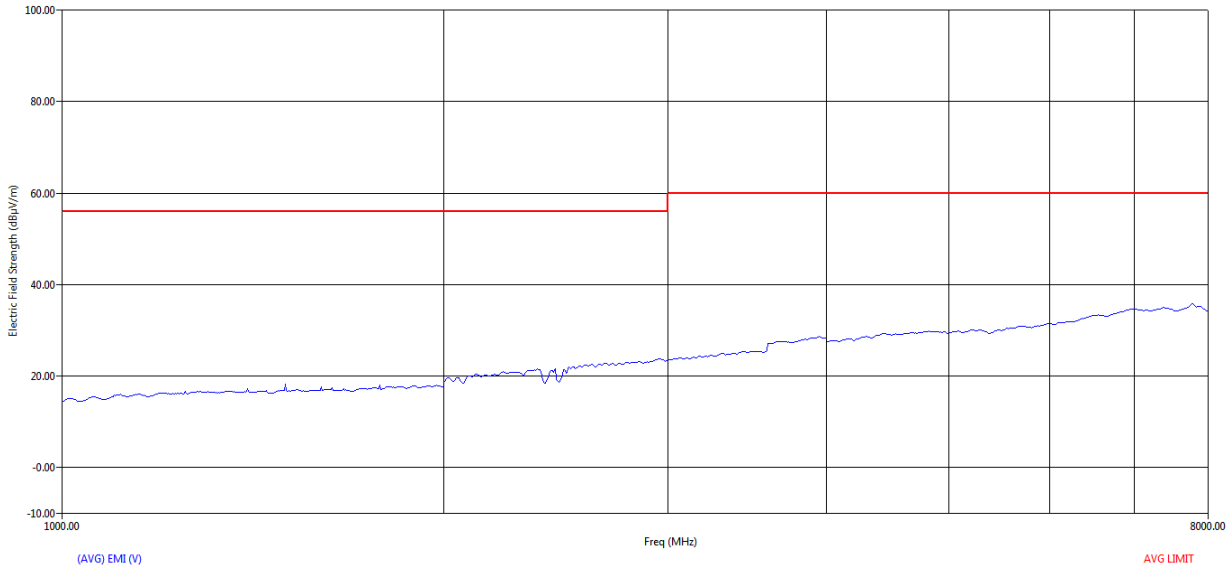

Figure 67: Average RE from 1GHz to 8GHz - Vertical polarization

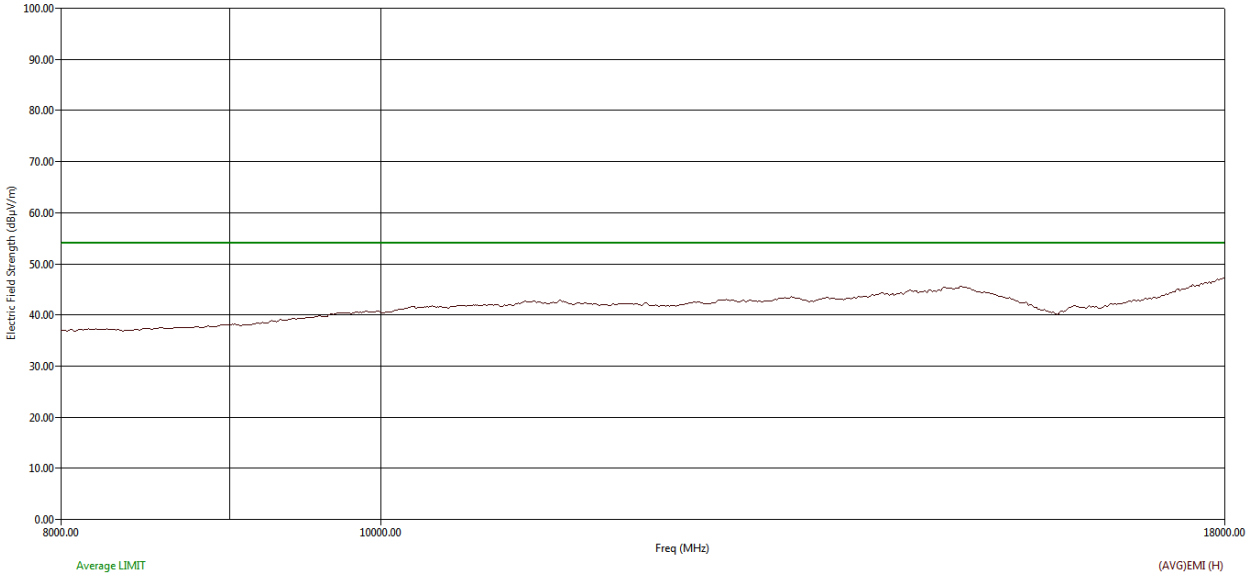

Figure 68: Average RE from 8GHz to 18GHz - Horizontal polarization

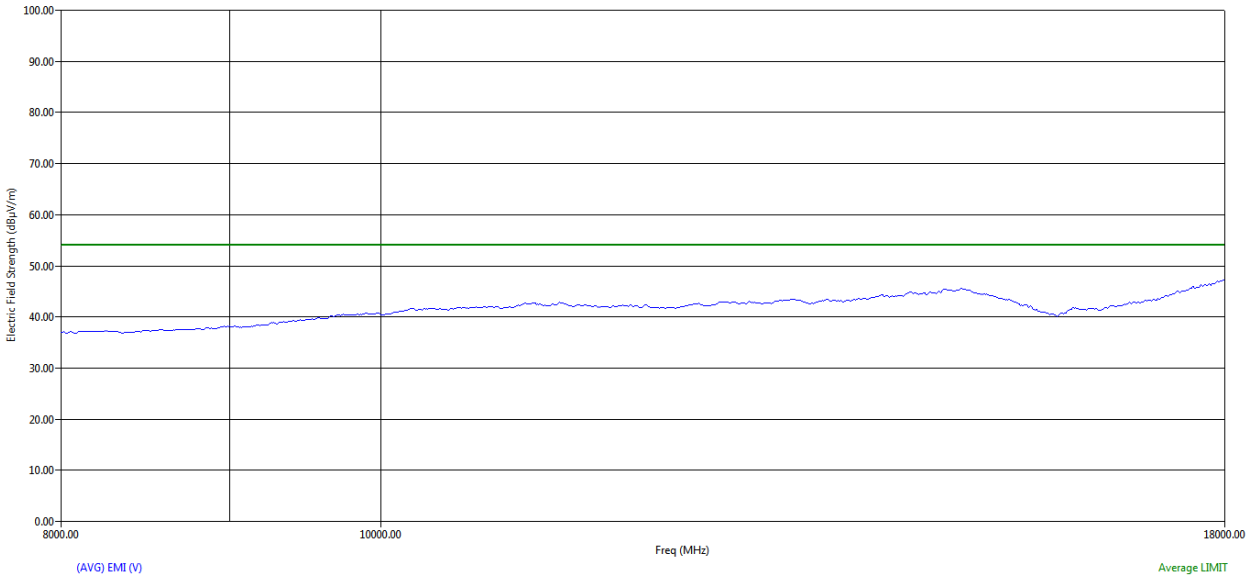

Figure 69: Average RE from 8GHz to 18GHz - Vertical polarization

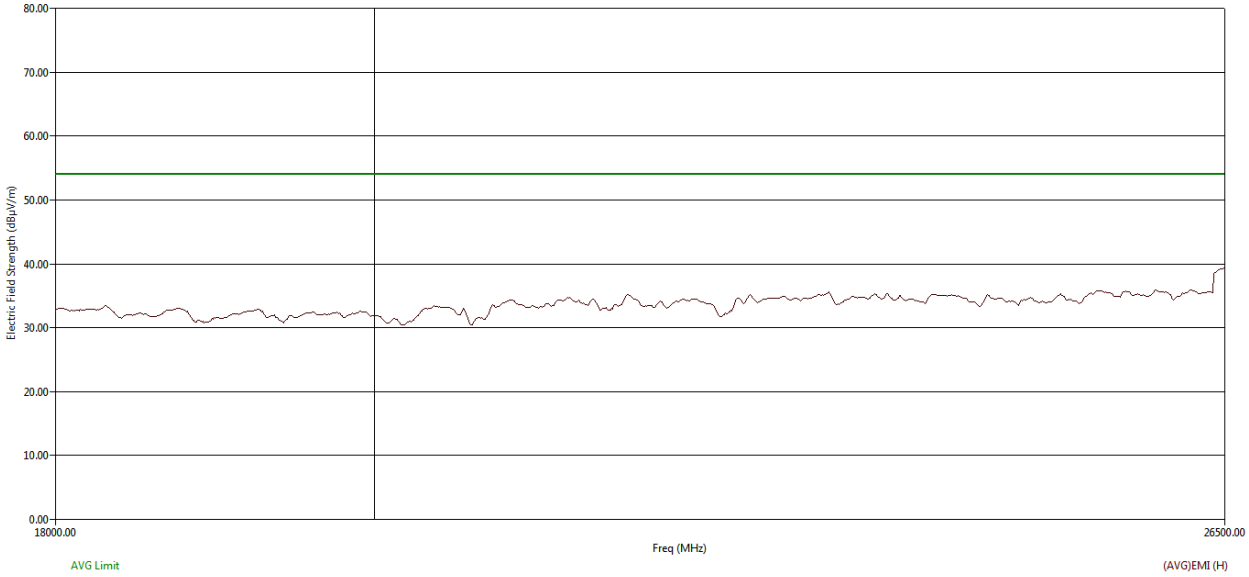

Figure 70: Average RE from 18GHz to 26.5GHz - Horizontal polarization

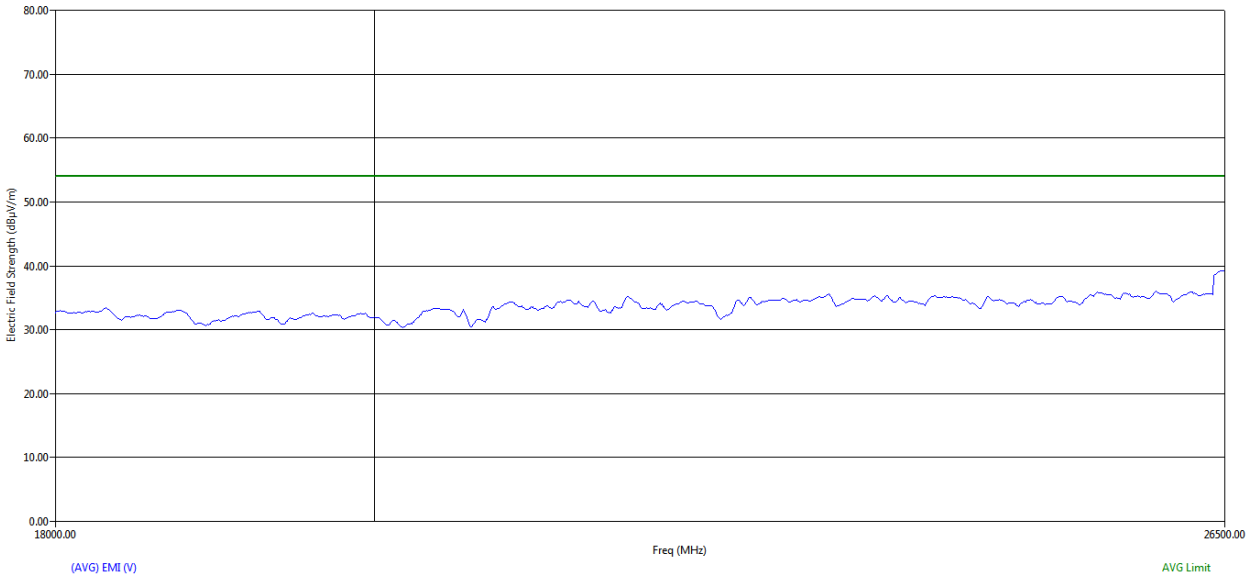

Figure 71: Average RE from 18GHz to 26.5GHz - Vertical polarization

7.2.7 Result (Supporting Graphs / Data) For 5 MHz Modulation Bandwidth

7.2.7.1 Low Channel_2412 MHz

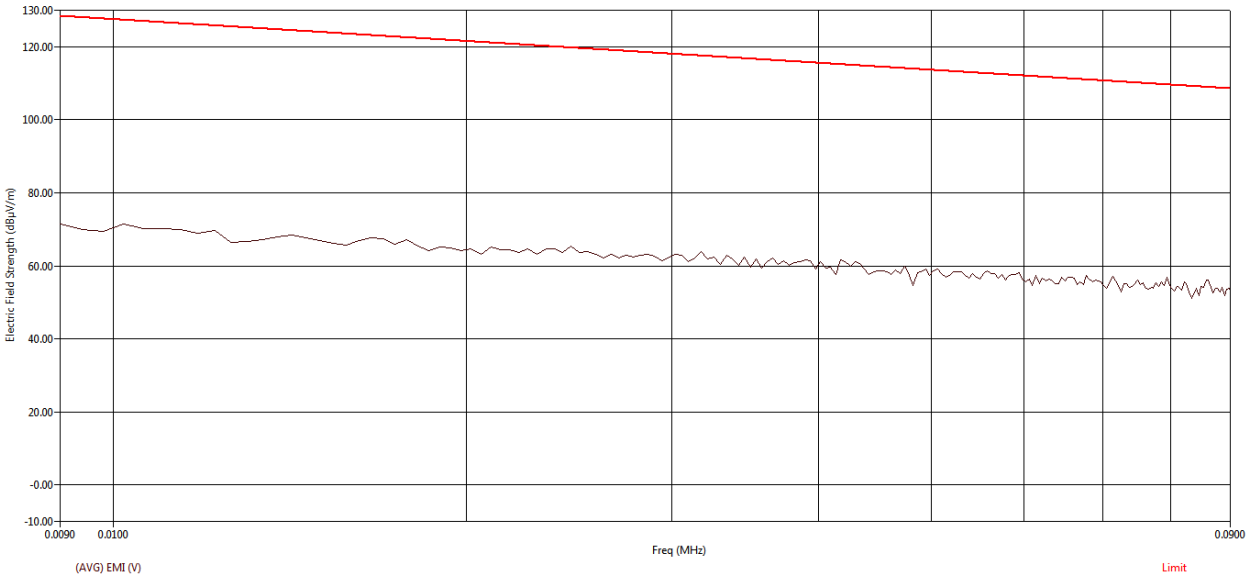

Figure 72: Average RE from 9 kHz to 90 kHz - Parallel

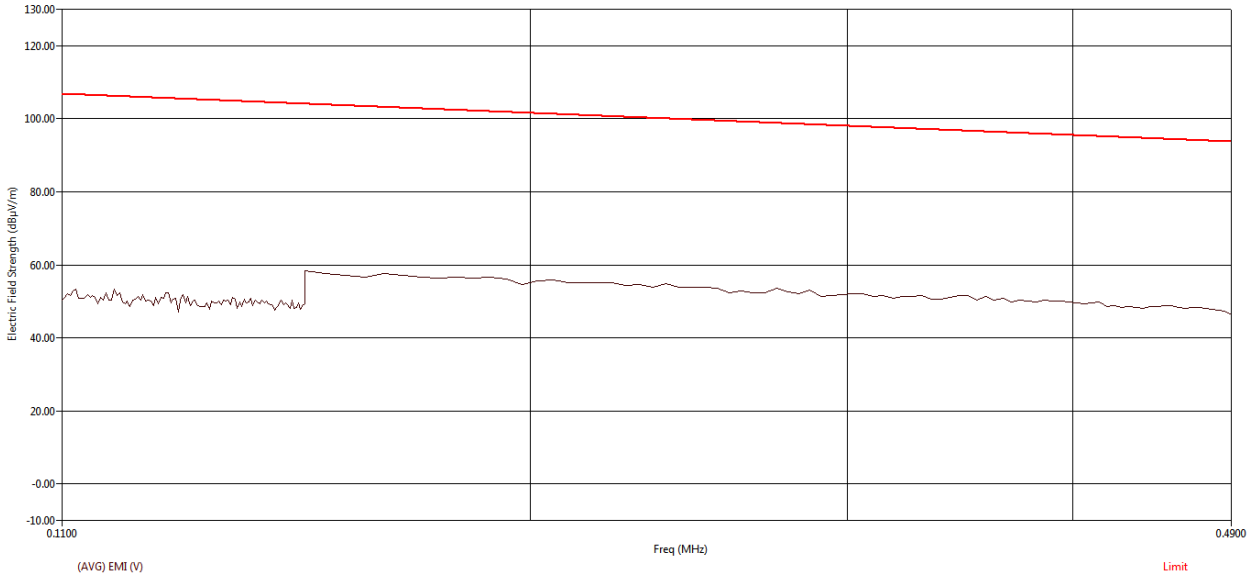

Figure 73: Average RE from 110 kHz to 490 kHz - Parallel

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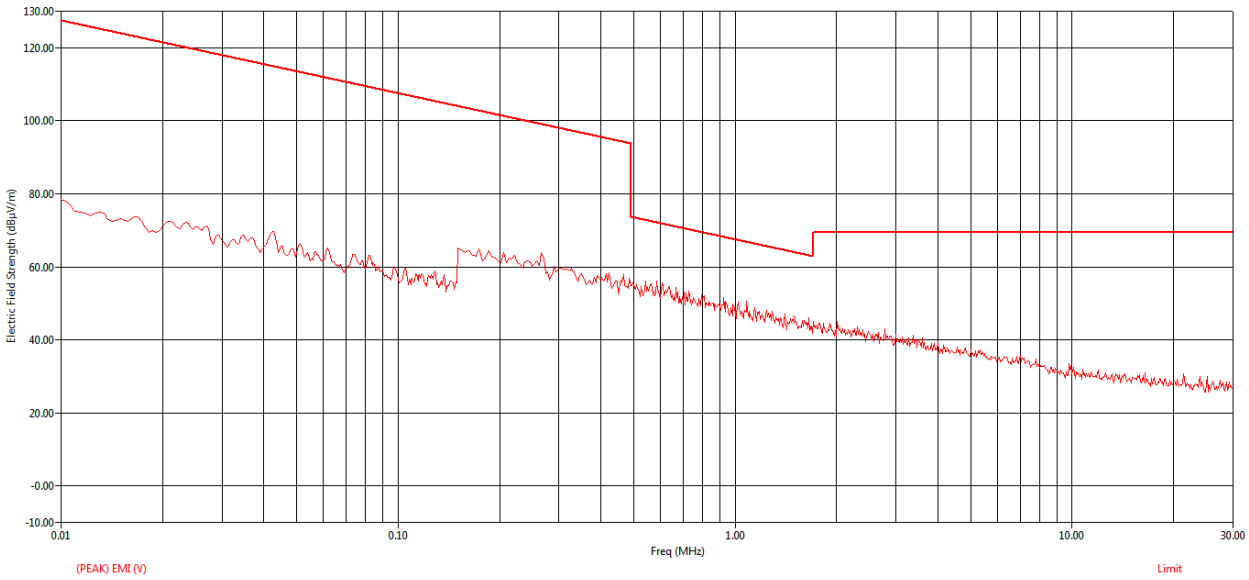

Figure 74: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
21.46	21.46	V	184.60	2.92	1.62	16.91	21.44	69.54	-48.10
25.18	25.17	V	43.80	5.19	1.75	16.68	23.63	69.54	-45.91

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

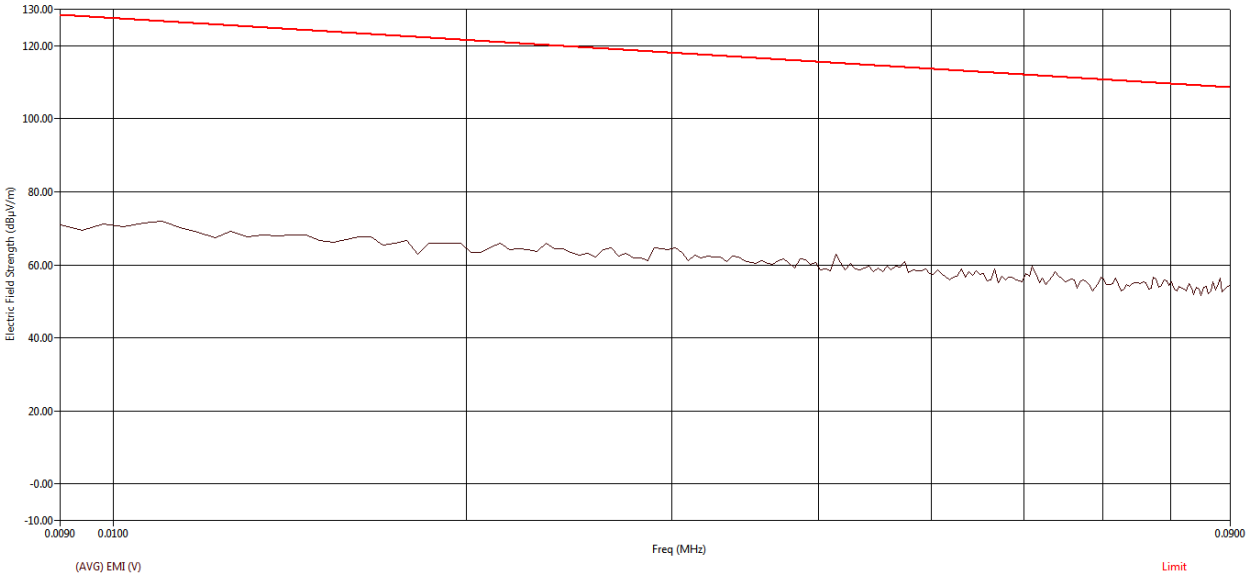

Figure 75: Average RE from 9 kHz to 90 kHz - Perpendicular

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

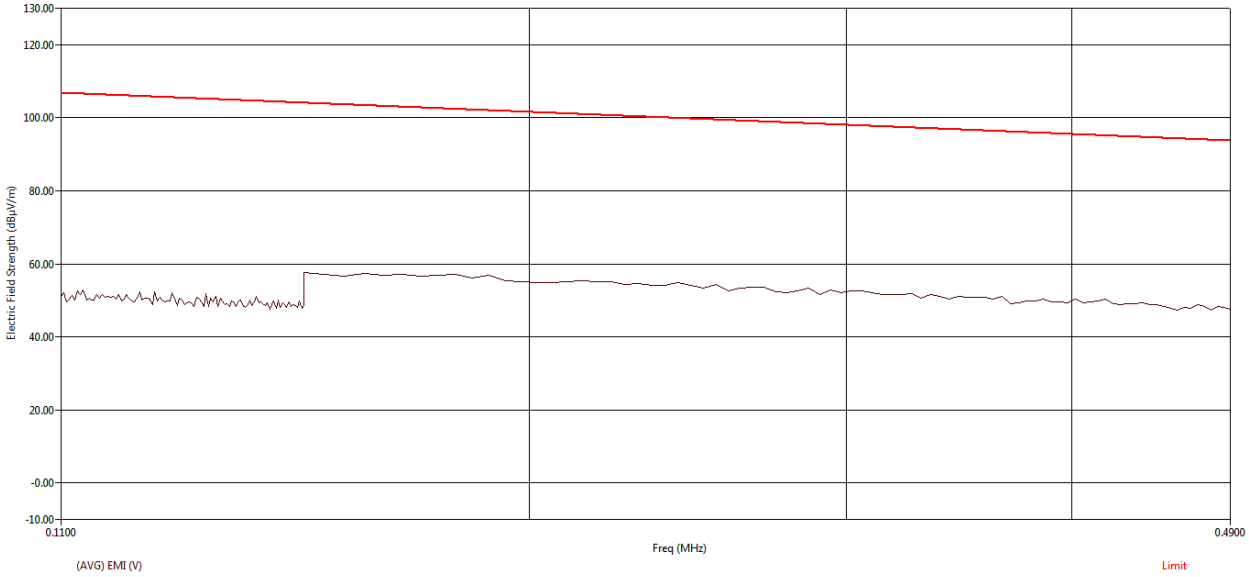

Figure 76: Average RE from 110 kHz to 490 kHz - Perpendicular

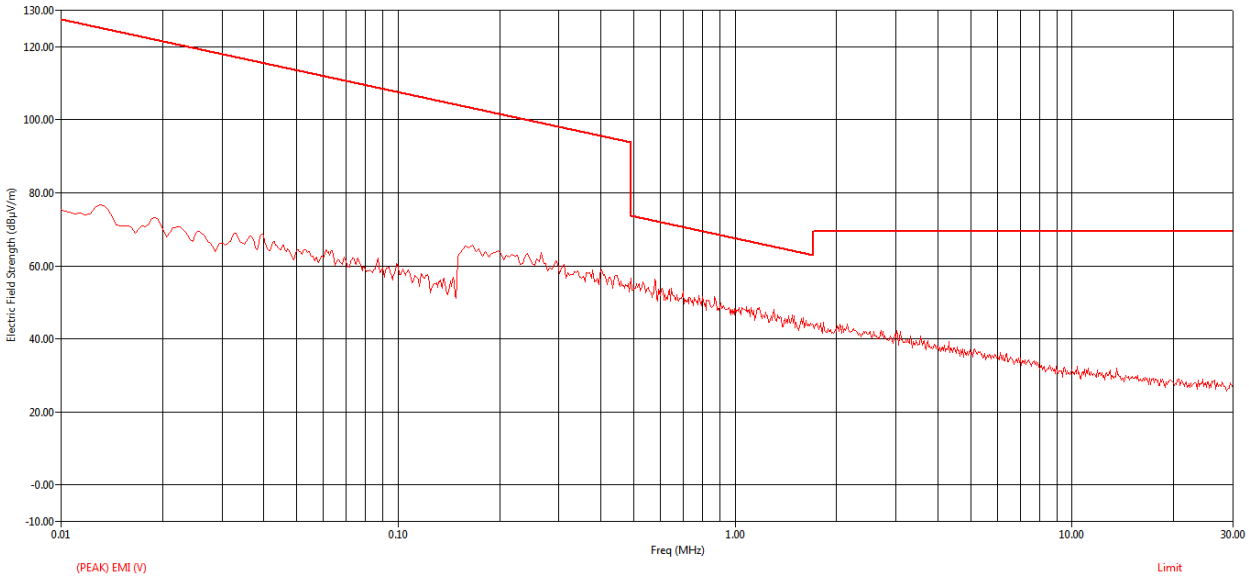

Figure 77: Peak RE from 9 kHz to 30MHz - Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.58	0.57	V	299.80	33.48	0.23	17.47	51.18	72.43	-21.25
13.55	13.56	V	282.70	7.39	1.32	17.20	25.92	69.54	-43.62

Table 21 Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

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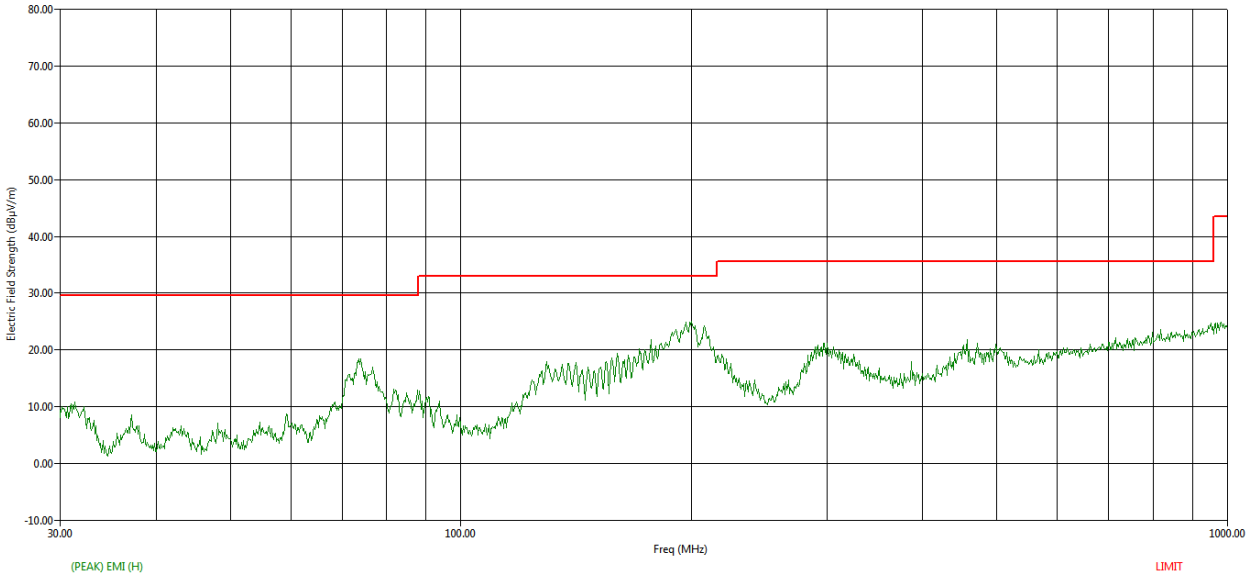

Figure 78: Peak RE from 30MHz to 1GHz - Horizontal polarization

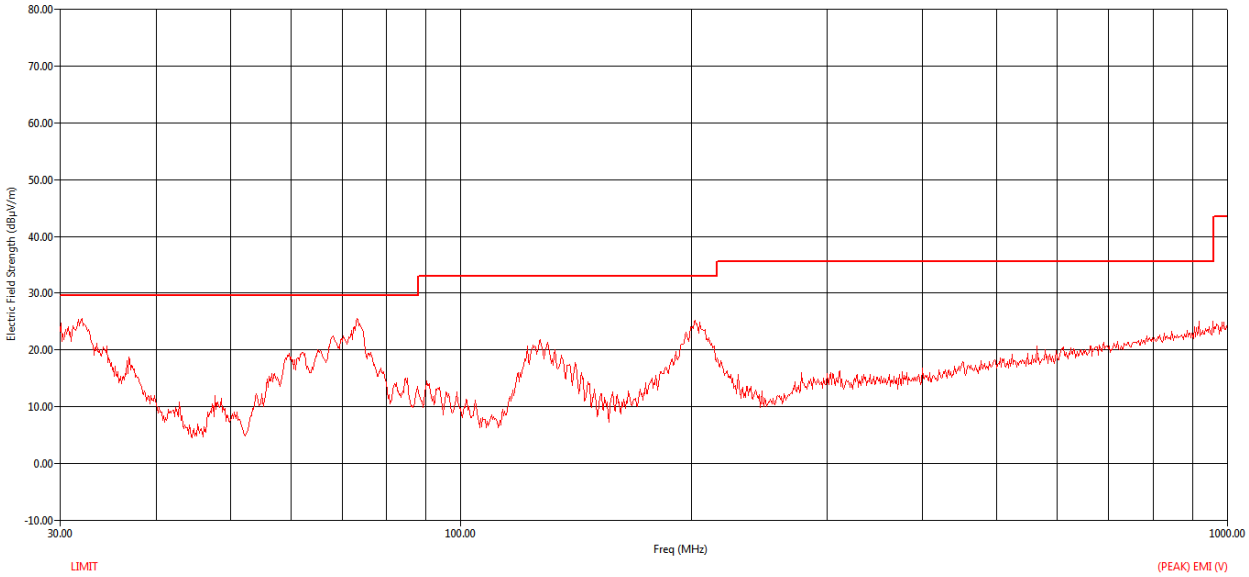

Figure 79: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
32.84	32.95	V	173.80	196.00	25.65	1.16	10.04	32.53	4.32	29.54	-25.22
55.01	55.05	V	251.00	166.00	22.93	1.50	9.93	32.47	1.88	29.54	-27.66
90.96	91.05	H	34.90	204.00	22.50	1.89	8.16	32.33	0.23	33.06	-32.83
122.57	122.60	H	241.10	252.00	22.24	2.20	10.75	32.24	2.95	33.06	-30.11

Table 22: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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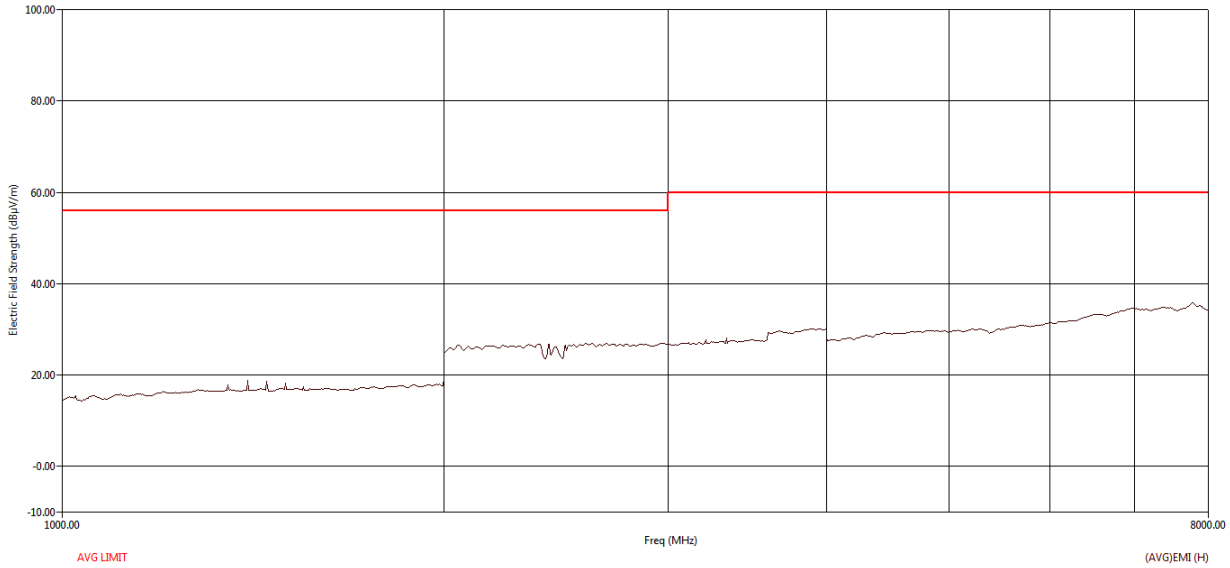

Figure 80: Average RE from 1GHz to 8GHz - Horizontal polarization

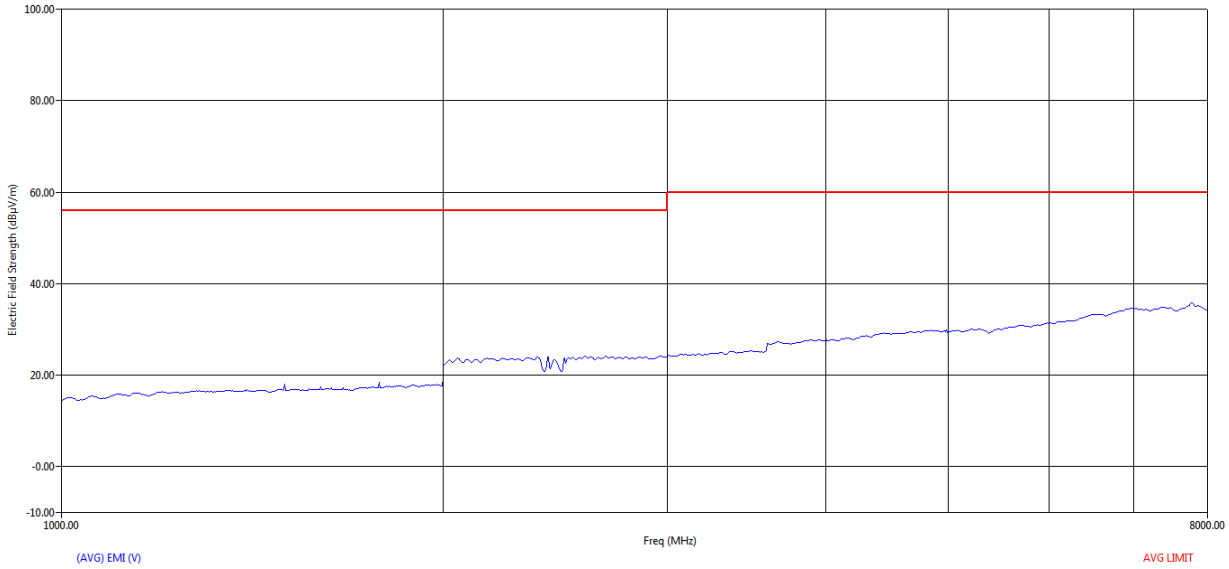

Figure 81: Average RE from 1GHz to 8GHz - Vertical polarization

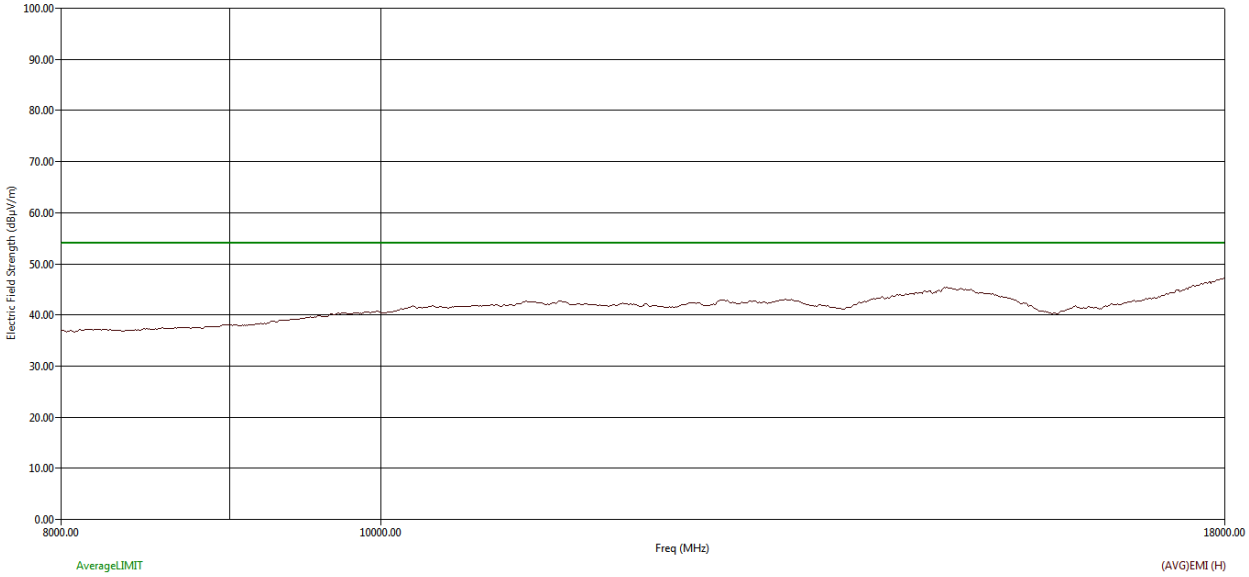

Figure 82: Average RE from 8GHz to 18GHz - Horizontal polarization

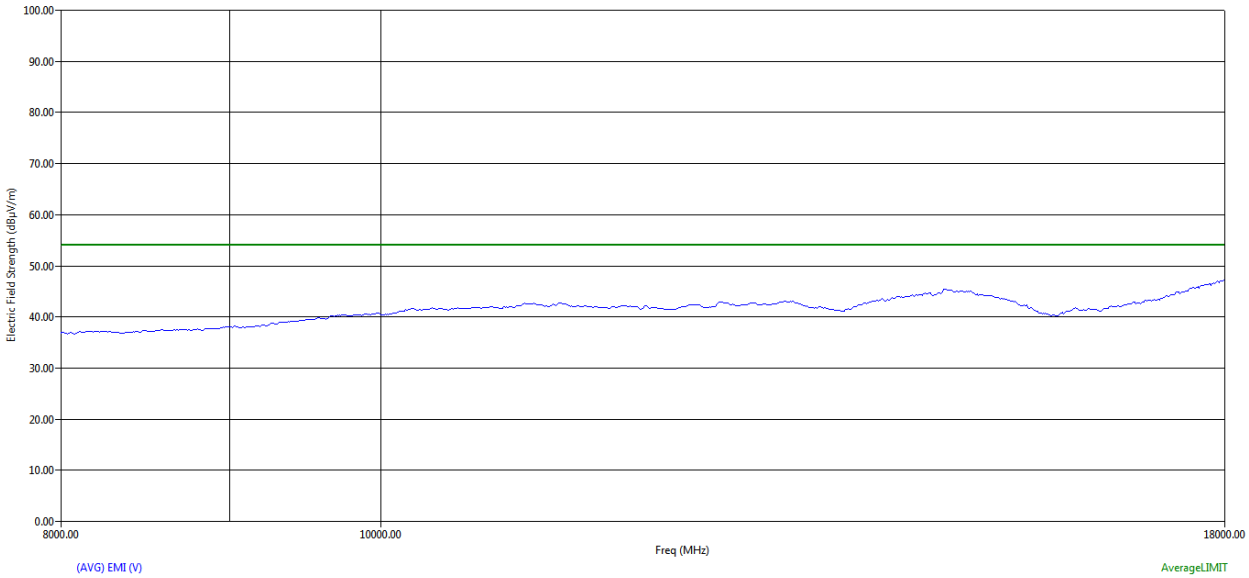

Figure 83: Average RE from 8GHz to 18GHz - Vertical polarization

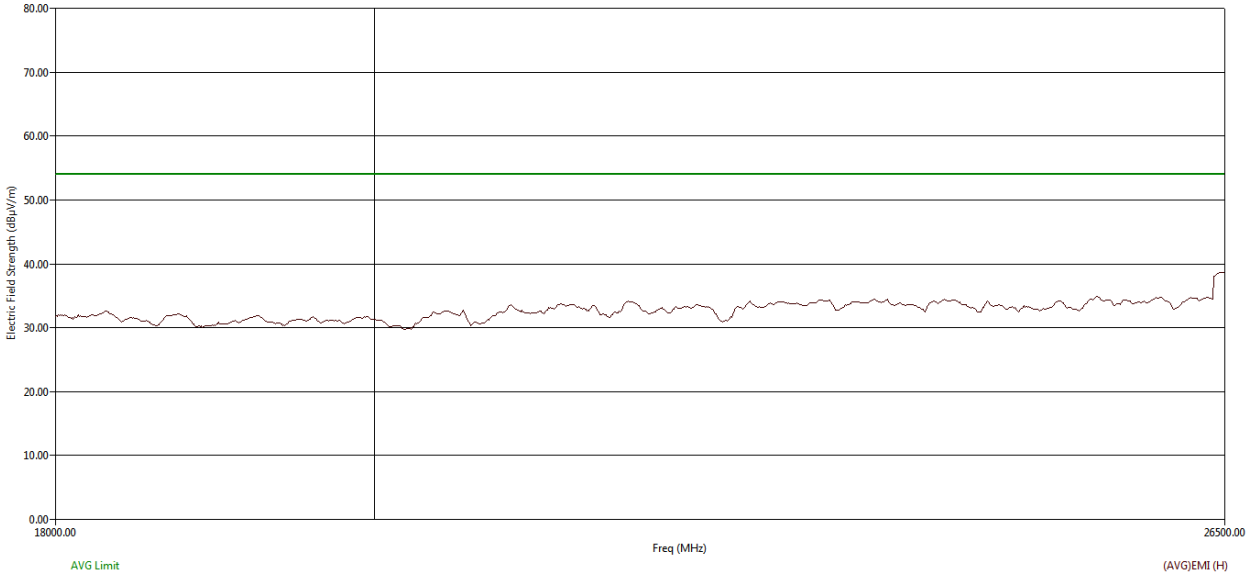

Figure 84: Average RE from 18GHz to 26.5GHz - Horizontal polarization

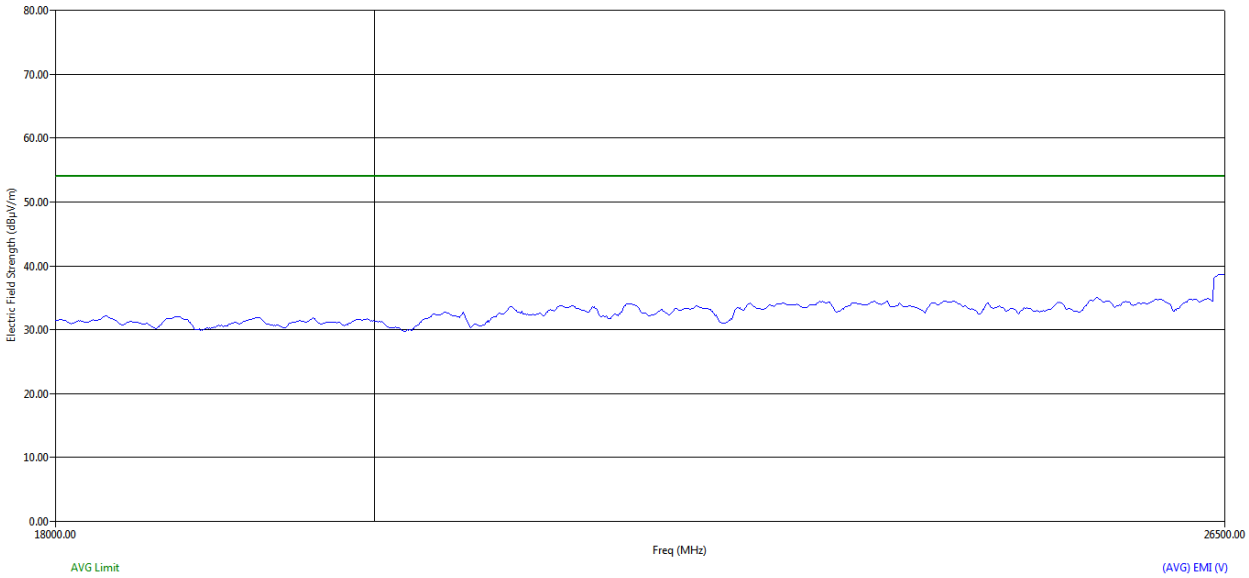

Figure 85: Average RE from 18GHz to 26.5GHz - Vertical polarization

7.2.7.2 Mid Channel_2442 MHz

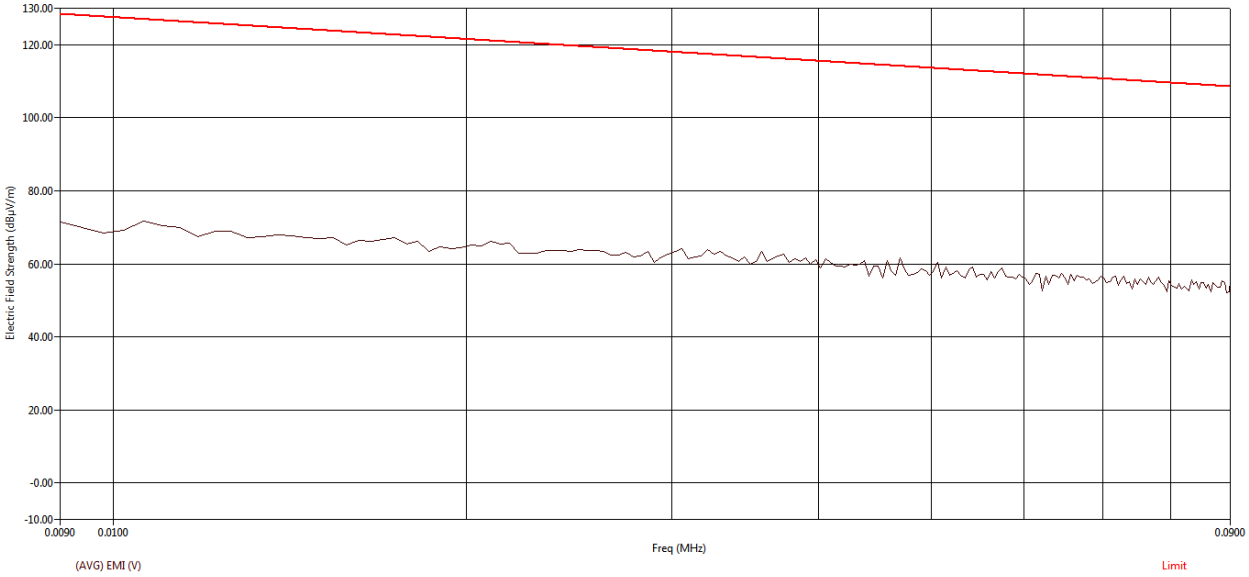

Figure 86: Average RE from 9 kHz to 90 kHz - Parallel

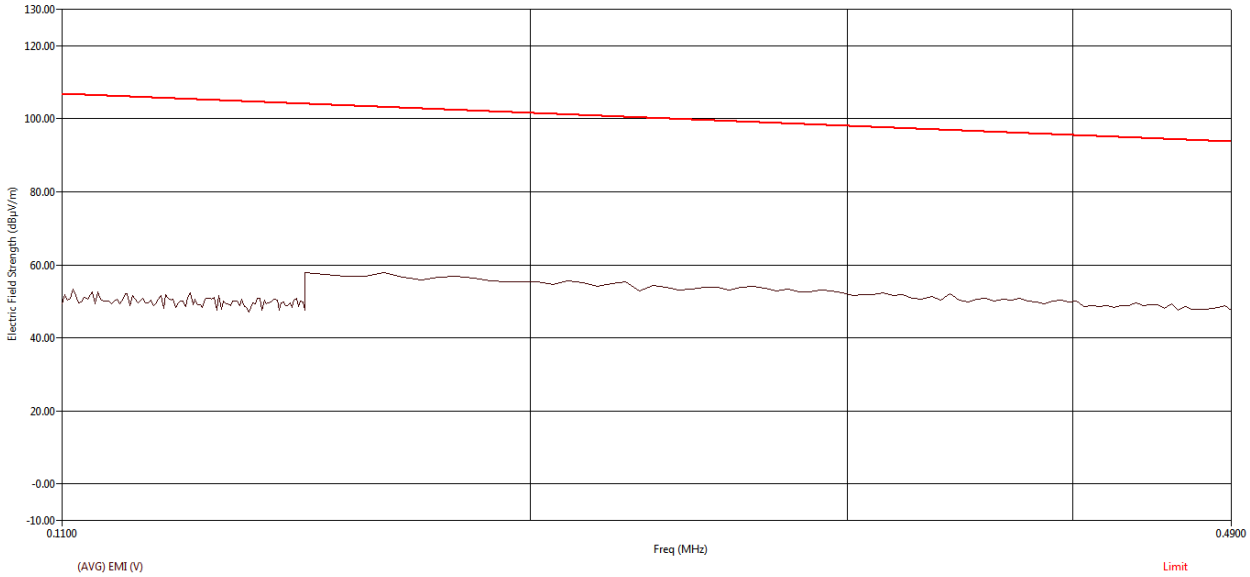

Figure 87: Average RE from 110 kHz to 490 kHz - Parallel

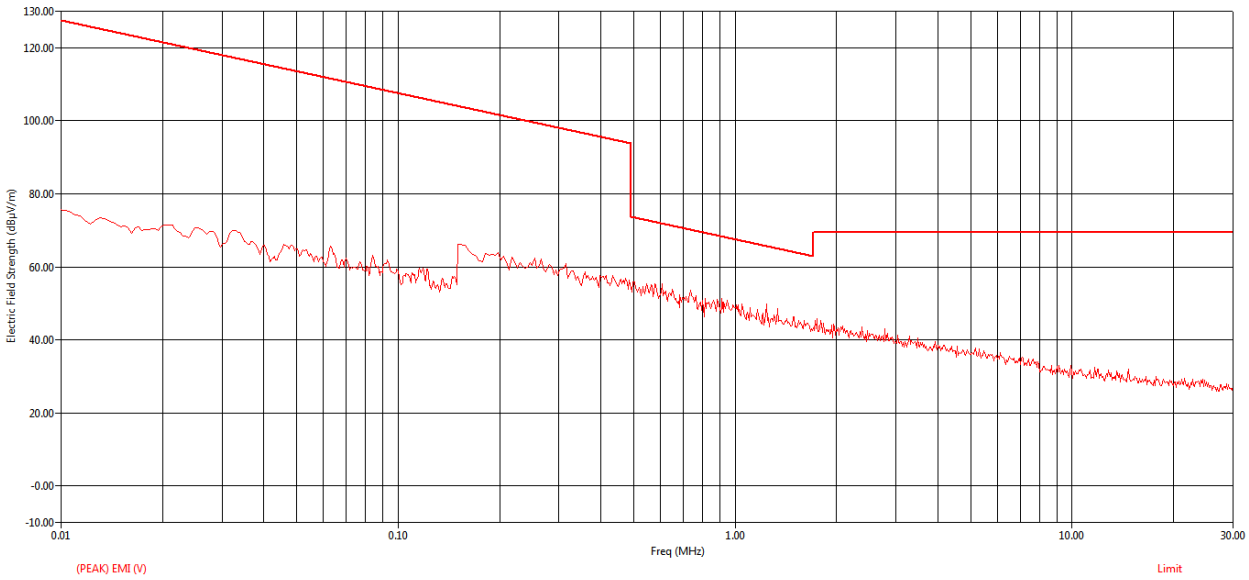

Figure 88: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.50	0.50	V	127.60	34.68	0.22	17.50	52.39	73.56	-21.17
14.70	14.71	V	45.30	5.31	1.37	17.20	23.88	69.54	-45.66

Table 23 Quasi Peak table for RE from 9 kHz to 30MHz - Parallel

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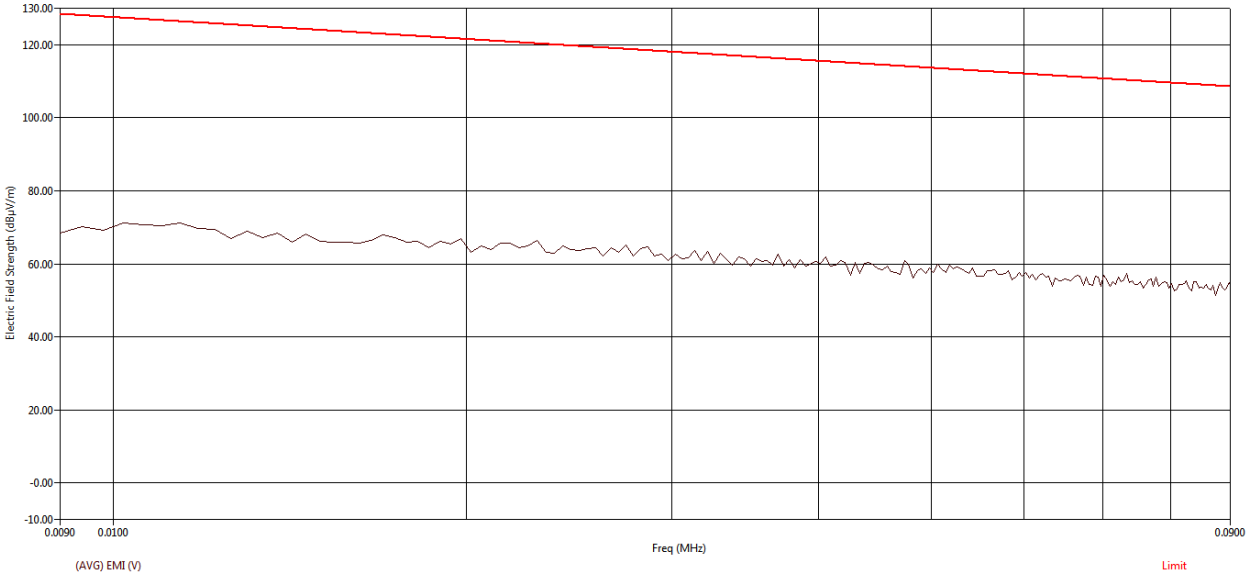

Figure 89: Average RE from 9 kHz to 90 kHz - Perpendicular

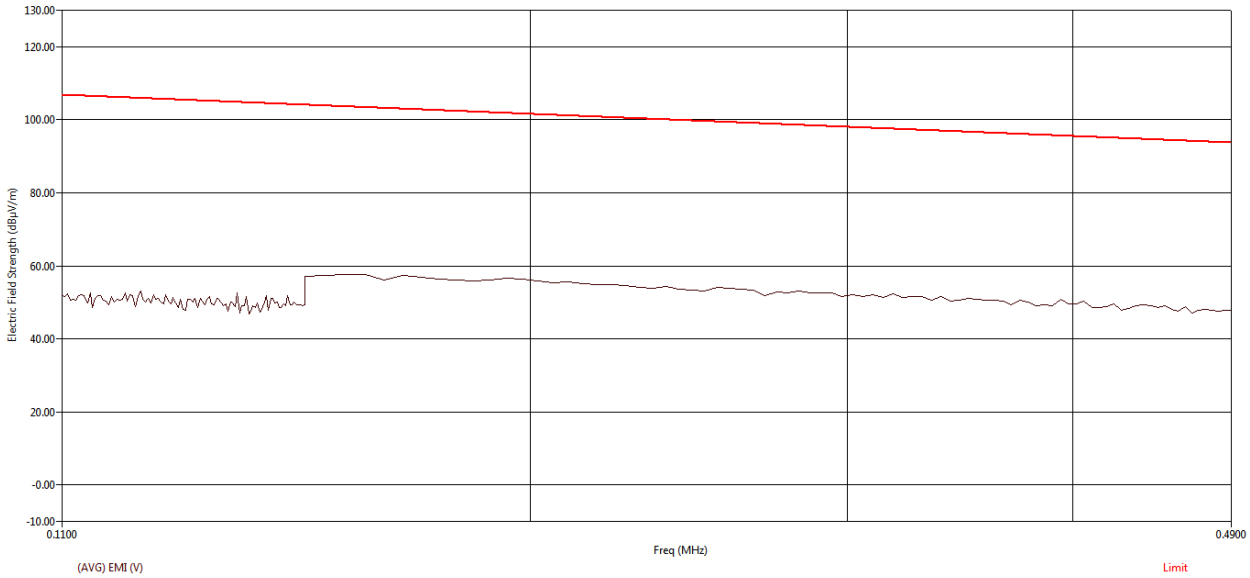

Figure 90: Average RE from 110 kHz to 490 kHz - Perpendicular

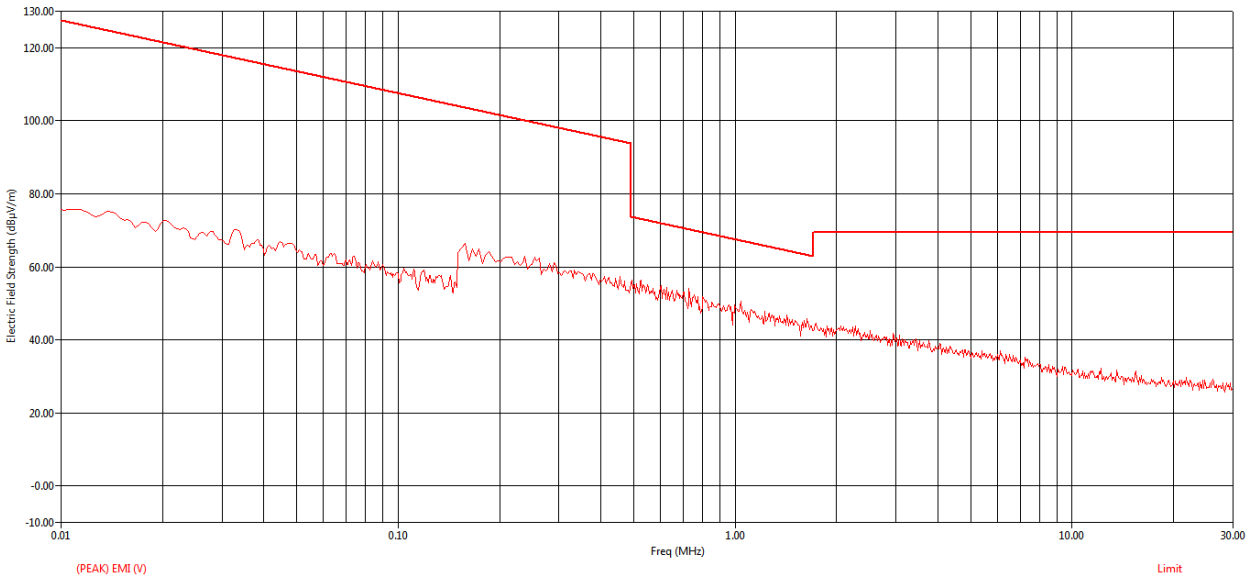

Figure 91: Peak RE from 9 kHz to 30MHz-Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.73	0.72	V	81.00	31.13	0.25	17.41	48.79	70.41	-21.63
15.45	15.45	V	334.30	5.02	1.40	17.18	23.60	69.54	-45.94

Table 24 Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

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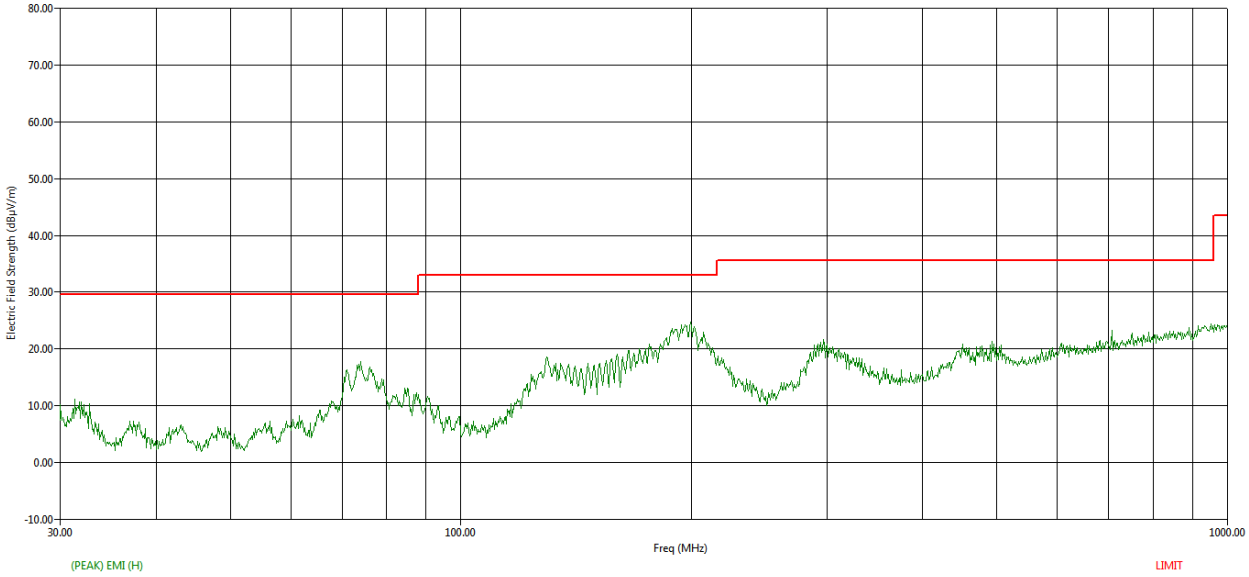

Figure 92: Peak RE from 30MHz to 1GHz - Horizontal polarization

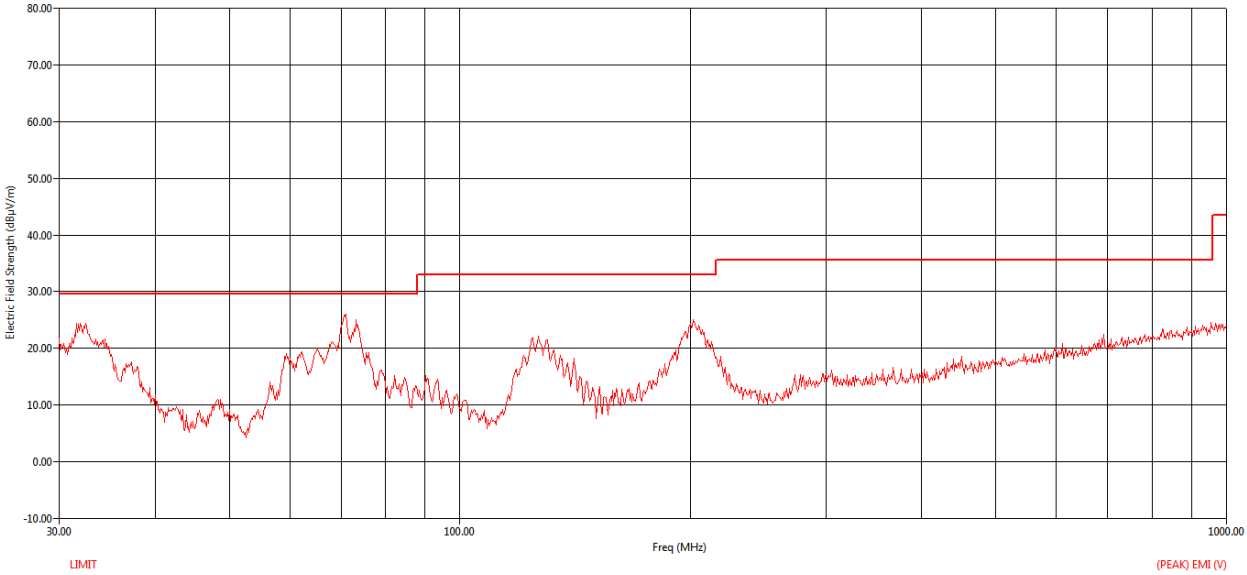

Figure 93: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
32.00	32.06	V	301.60	156.00	39.72	1.17	10.11	32.53	18.46	29.54	-11.08
70.96	70.90	V	235.40	377.00	38.86	1.68	8.87	32.40	17.01	29.54	-12.53
74.00	73.89	H	162.00	362.00	32.83	1.74	8.59	32.39	10.77	29.54	-18.77
126.40	126.44	V	309.40	190.00	37.49	2.24	10.73	32.23	18.23	33.06	-14.83
199.36	199.42	H	206.90	261.00	35.42	2.78	13.20	32.10	19.30	33.06	-13.76
201.76	201.79	V	158.50	219.00	39.66	2.79	13.12	32.10	23.47	33.06	-9.59

Table 25: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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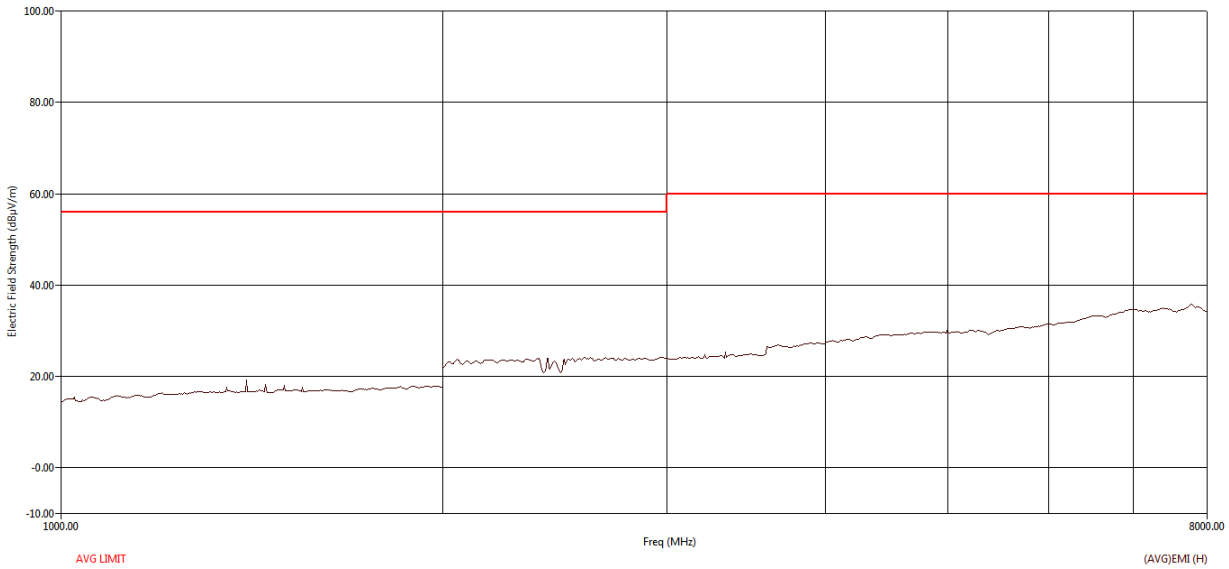

Figure 94: Average RE from 1GHz to 8GHz - Horizontal polarization

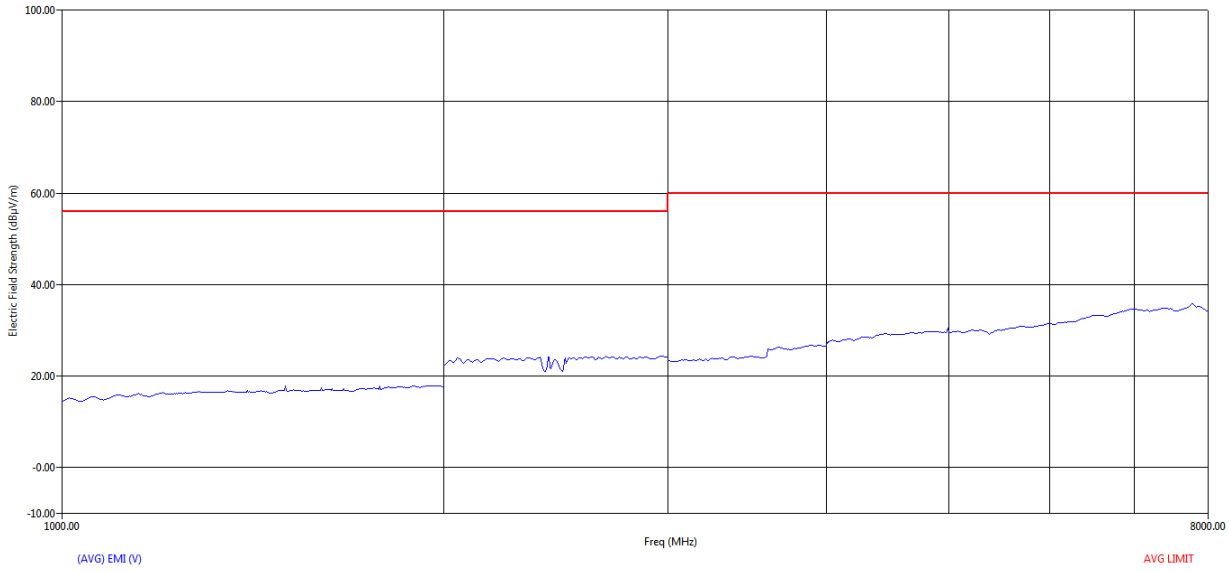

Figure 95: Average RE from 1GHz to 8GHz - Vertical polarization

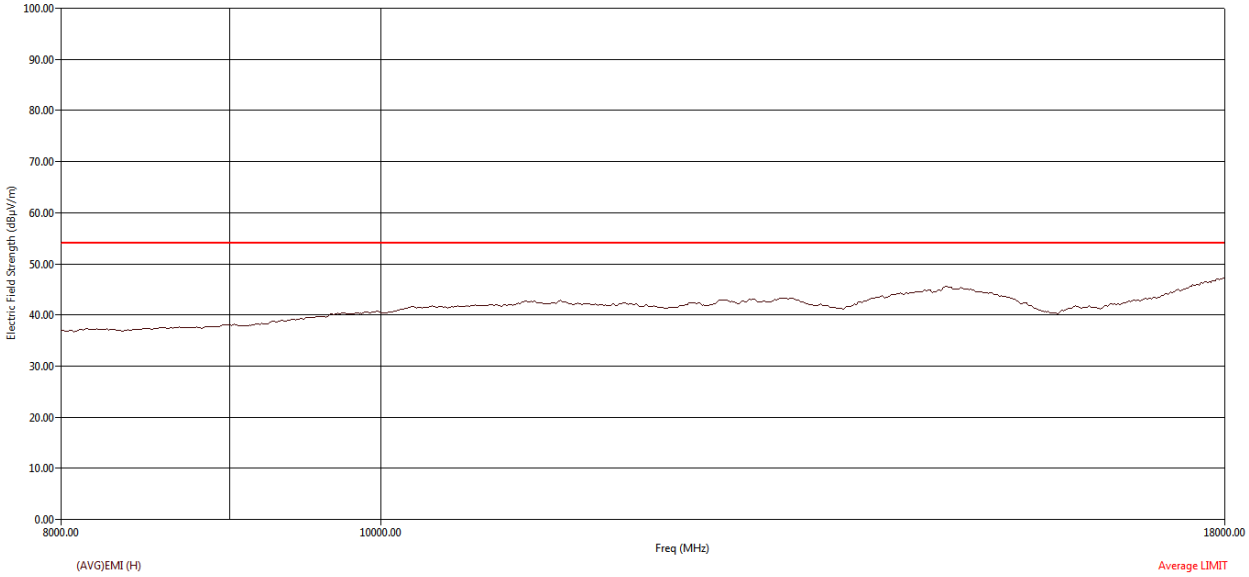

Figure 96: Average RE from 8GHz to 18GHz - Horizontal polarization

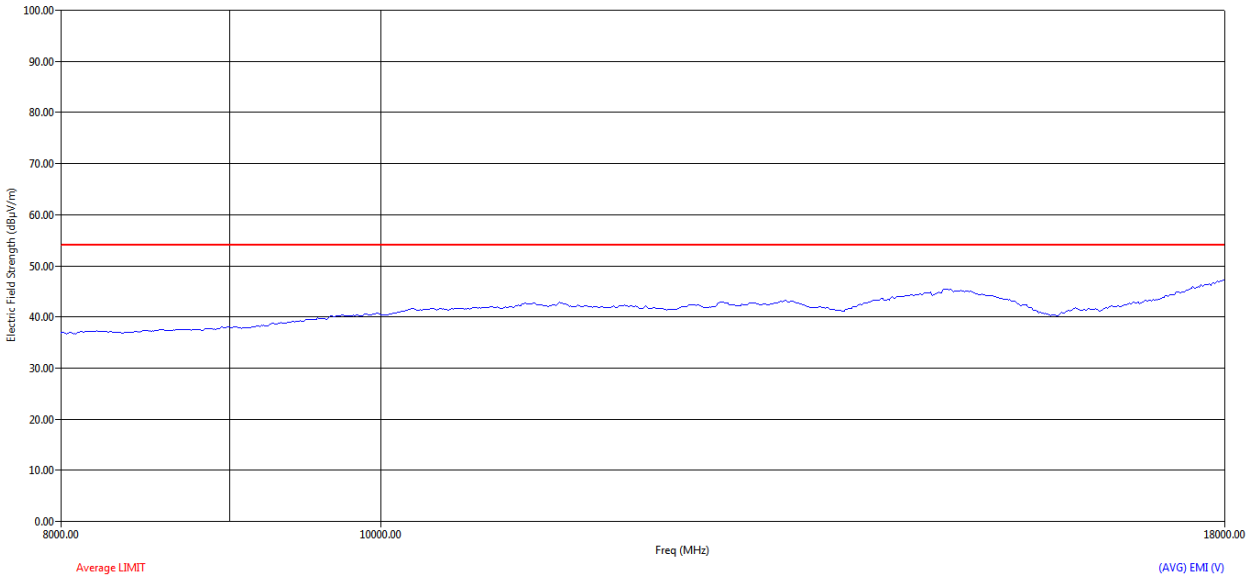

Figure 97: Average RE from 8GHz to 18GHz - Vertical polarization

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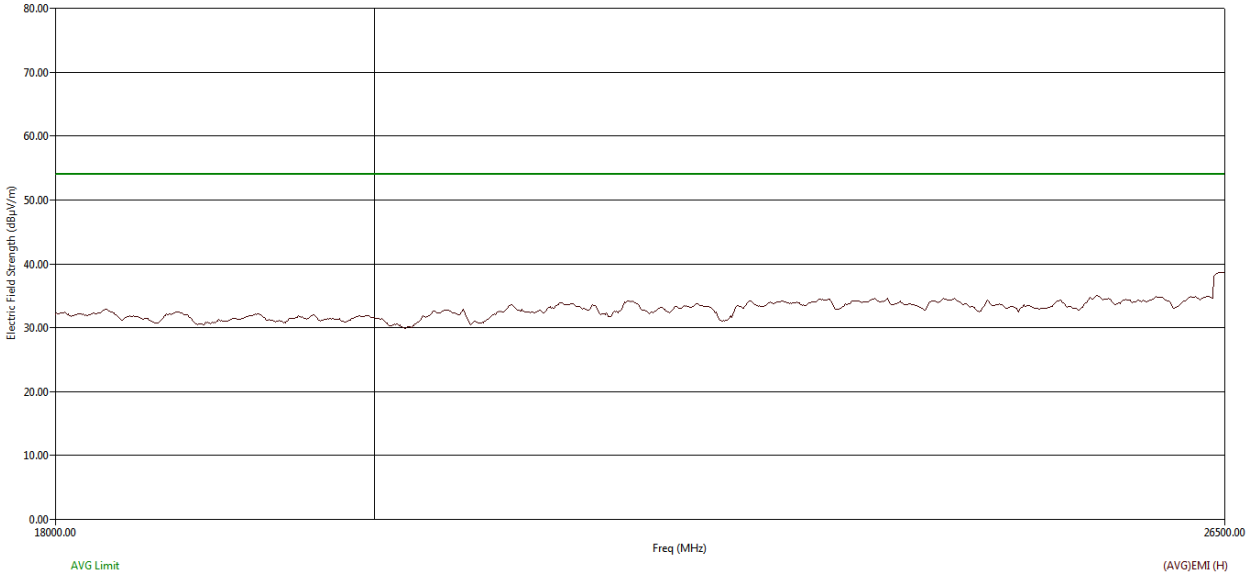

Figure 98: Average RE from 18GHz to 26.5GHz - Horizontal polarization

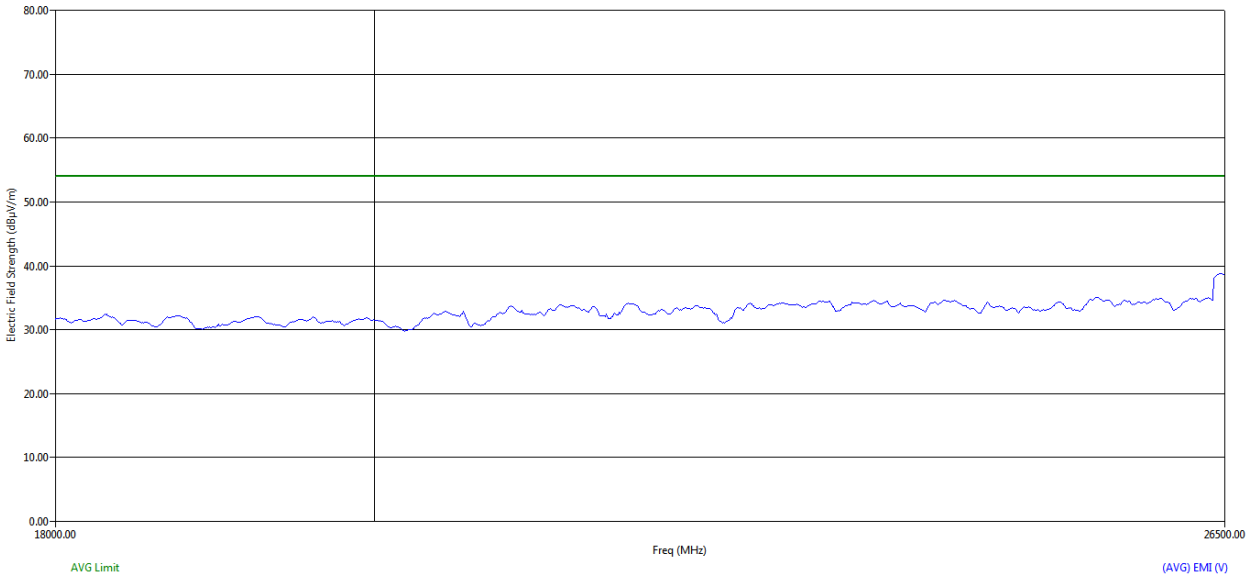

Figure 99: Average RE from 18GHz to 26.5GHz - Vertical polarization

7.2.7.3 High Channel_2477 MHz

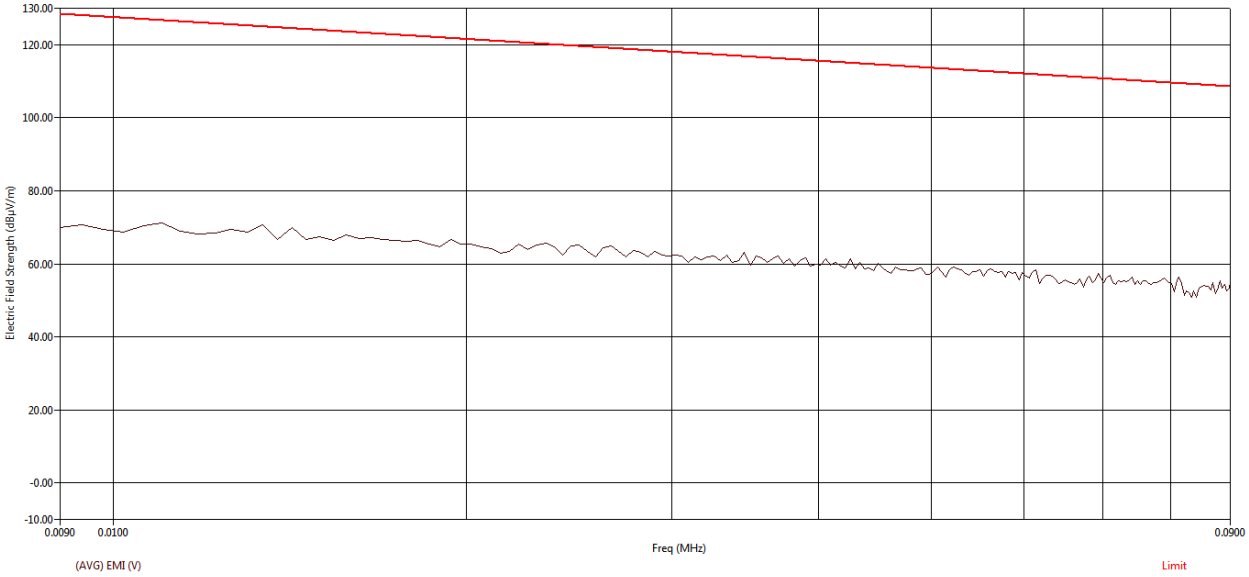

Figure 100: Average RE from 9 kHz to 90 kHz - Parallel

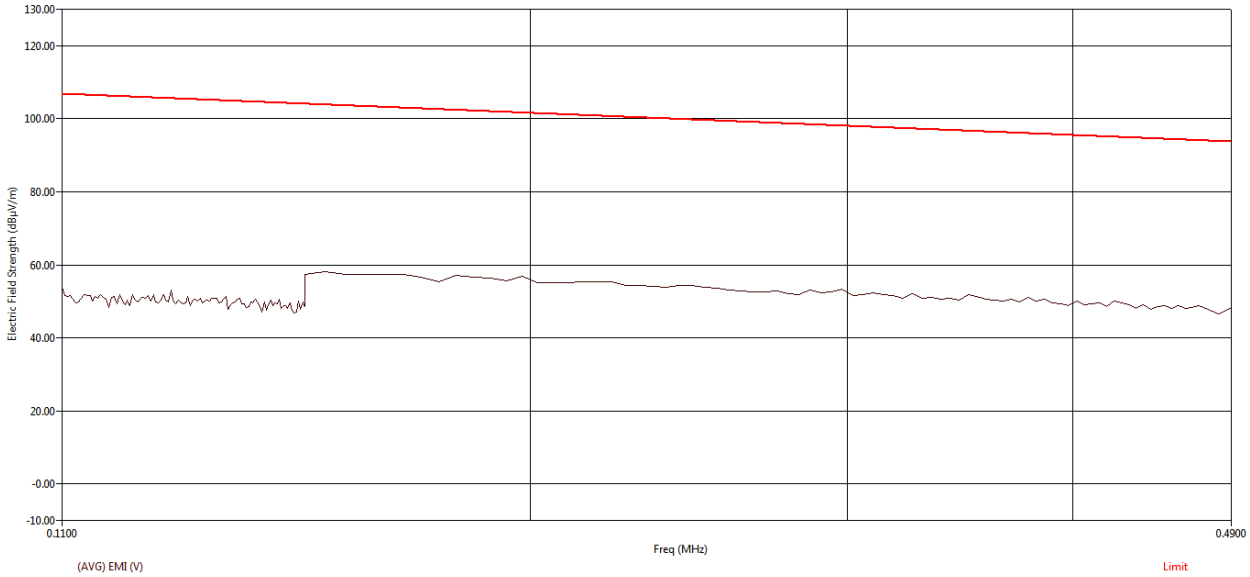

Figure 101: Average RE from 110 kHz to 490 kHz - Parallel

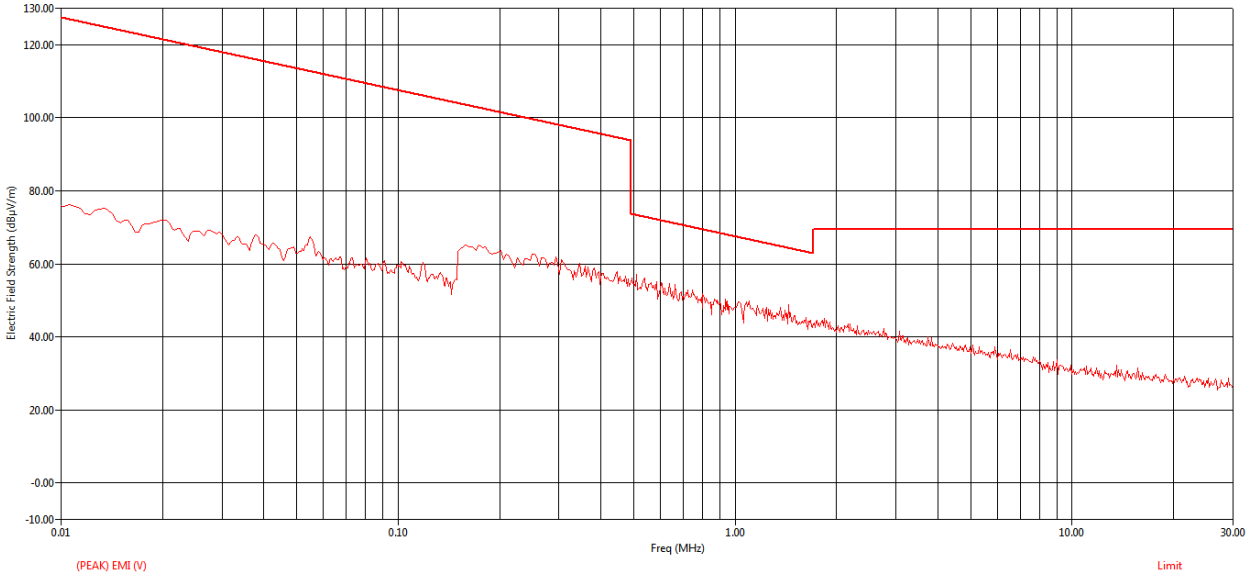

Figure 102: Peak RE from 9 kHz to 30MHz - Parallel

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.84	0.84	V	191.20	29.56	0.27	17.48	47.30	69.13	-21.83
13.56	13.56	V	17.50	9.13	1.32	17.20	27.65	69.54	-41.89

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

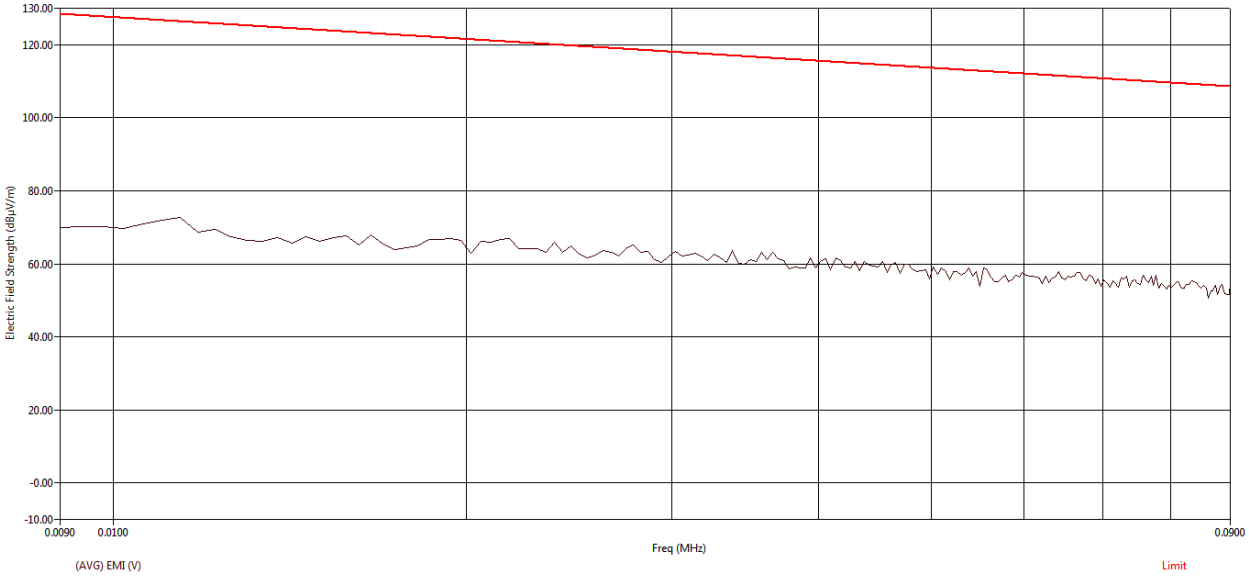

Figure 103: Average RE from 9 kHz to 90 kHz - Perpendicular

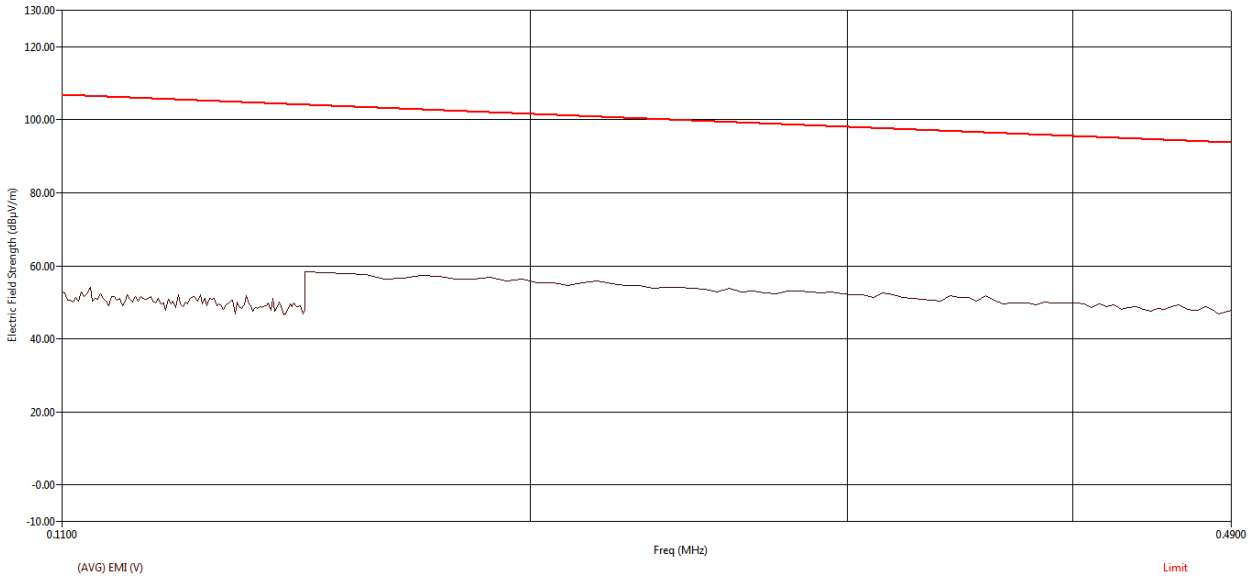

Figure 104: Average RE from 110 kHz to 490 kHz - Perpendicular

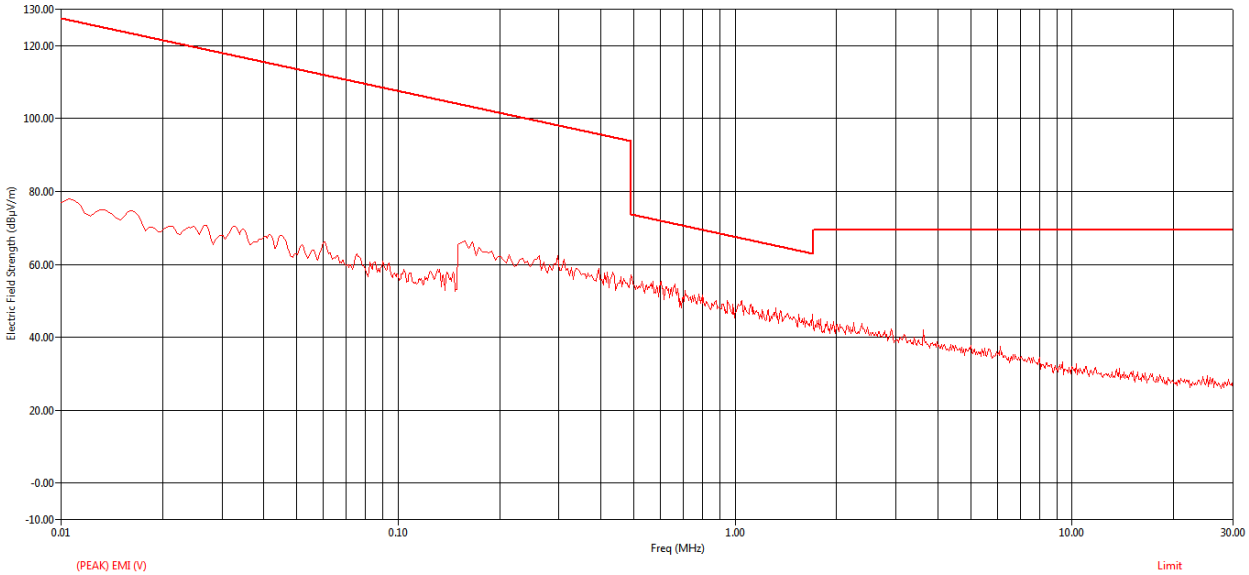

Figure 105: Peak RE from 9 kHz to 30MHz – Perpendicular

Freq (MHz)	Freq (Max) (MHz)	Pol	EUT Ttbl Agl (deg)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)
0.66	0.66	V	62.30	32.11	0.24	17.43	49.78	71.24	-21.46
3.61	3.61	V	189.90	15.47	0.62	17.84	33.92	69.54	-35.62

Table 27 Quasi Peak table for RE from 9 kHz to 30MHz - Perpendicular

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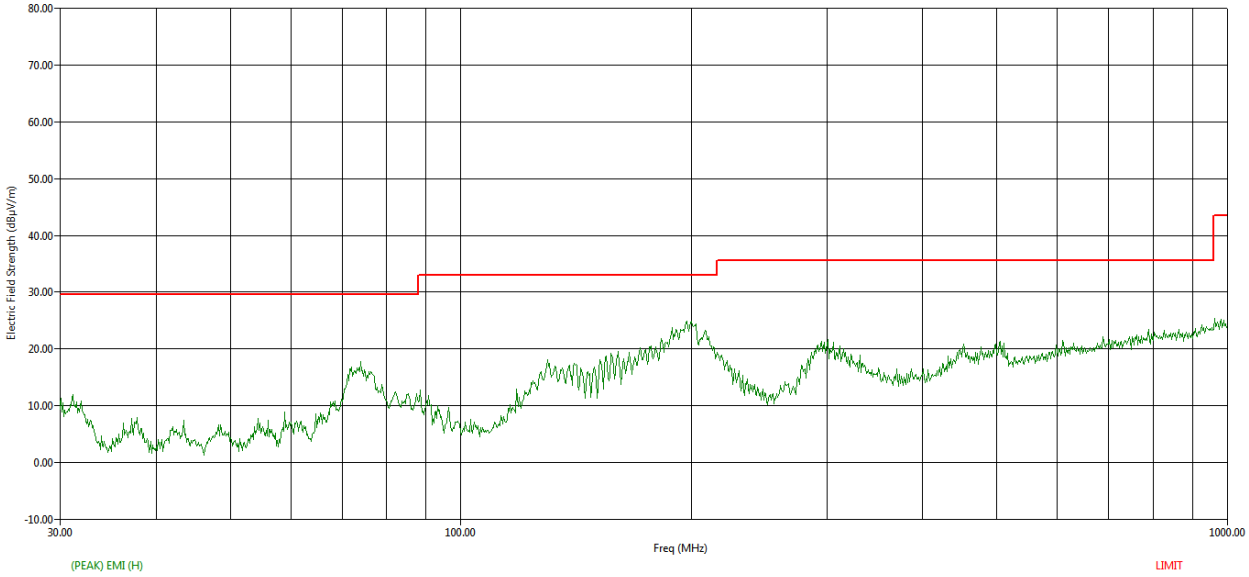

Figure 106: Peak RE from 30MHz to 1GHz - Horizontal polarization

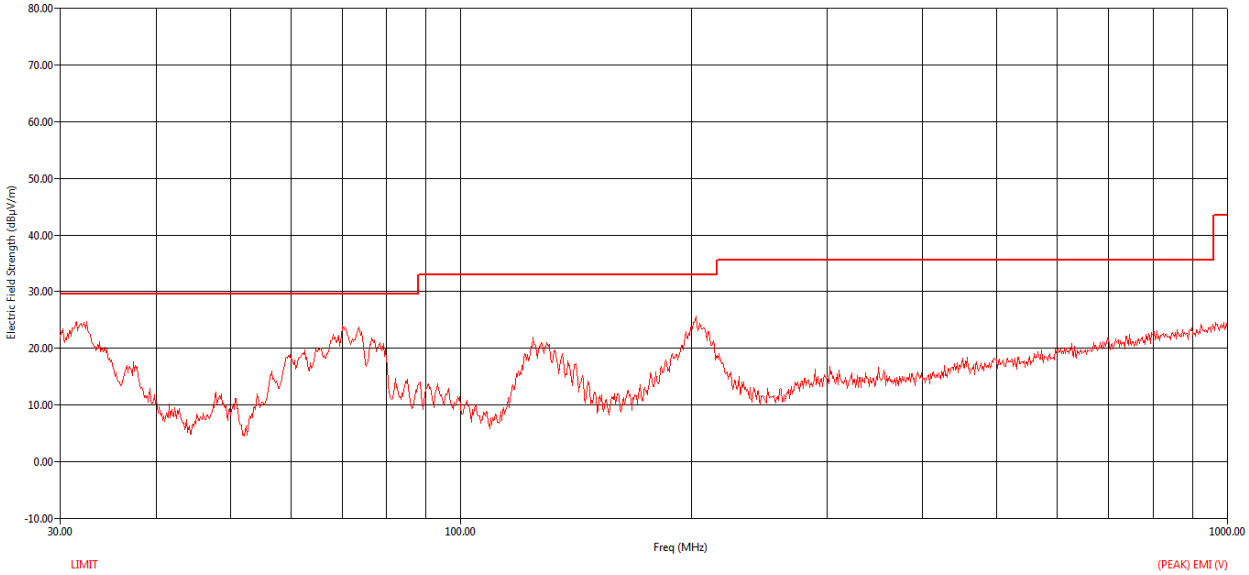

Figure 107: Peak RE from 30MHz to 1GHz - Vertical polarization

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)
32.52	32.63	V	164.60	305.00	41.71	1.16	10.06	32.53	20.41	29.54	-9.13
70.12	70.02	V	97.70	140.00	38.58	1.69	8.96	32.40	16.83	29.54	-12.71
73.92	73.88	H	169.10	101.00	37.61	1.74	8.59	32.39	15.56	29.54	-13.98
124.16	124.23	V	255.90	248.00	35.99	2.19	10.74	32.24	16.69	33.06	-16.37
199.60	199.64	H	252.70	201.00	30.29	2.78	13.21	32.10	14.18	33.06	-18.88
202.60	202.64	V	110.80	100.00	39.71	2.81	13.06	32.10	23.49	33.06	-9.57

Table 28: Radiated Emission – Quasi Peak table – 30 MHz to 1 GHz

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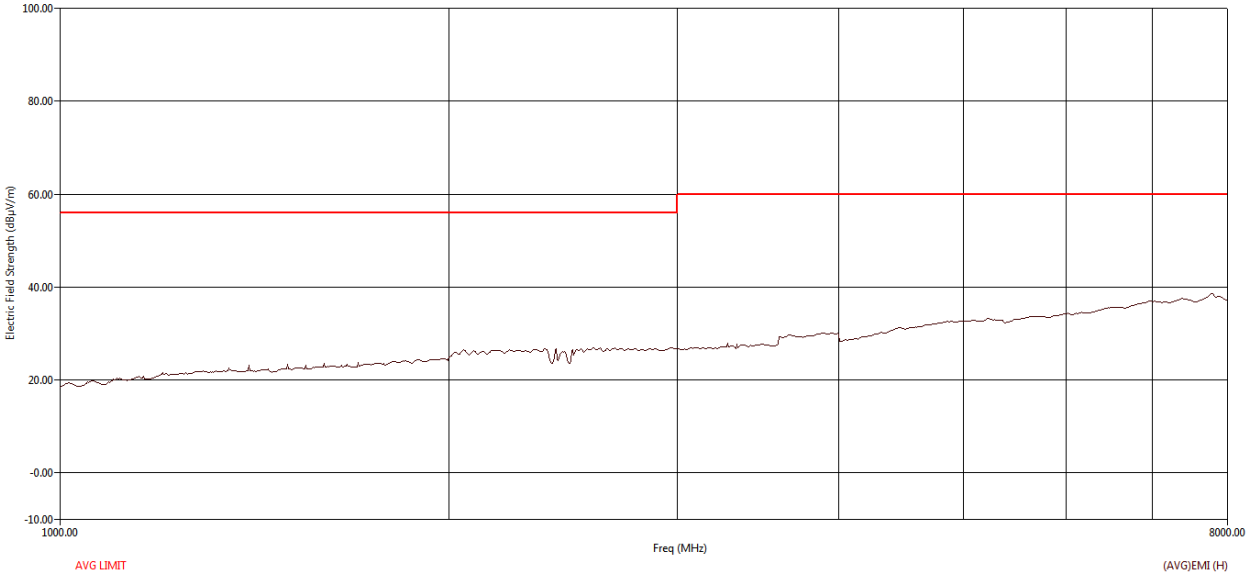

Figure 108: Average RE from 1GHz to 8GHz - Horizontal polarization

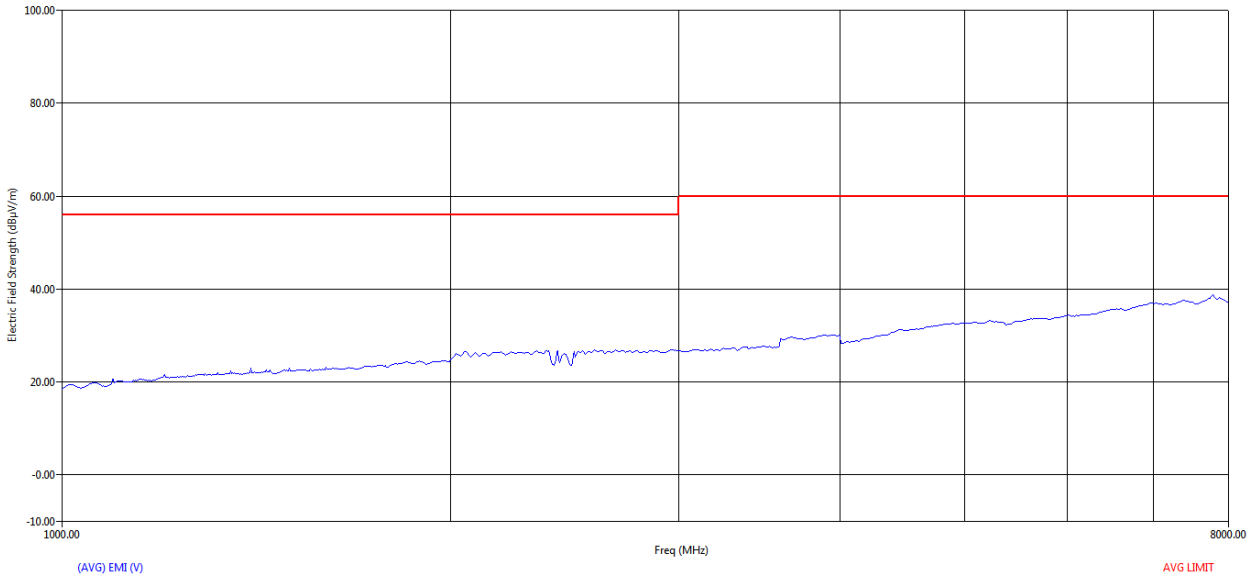

Figure 109: Average RE from 1GHz to 8GHz - Vertical polarization

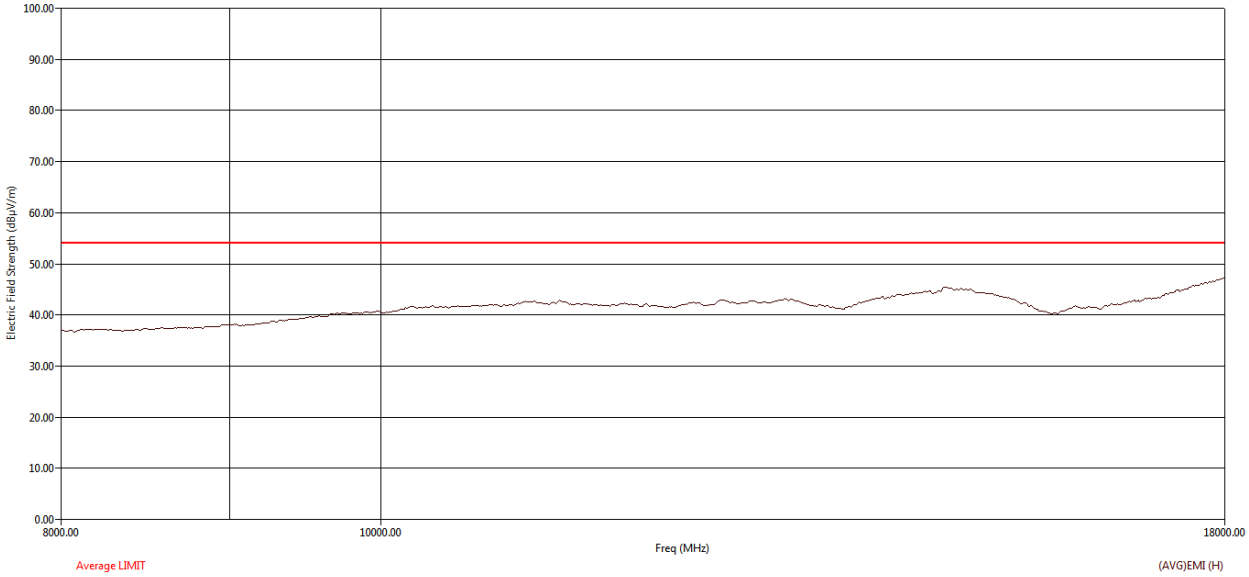

Figure 110: Average RE from 8GHz to 18GHz - Horizontal polarization

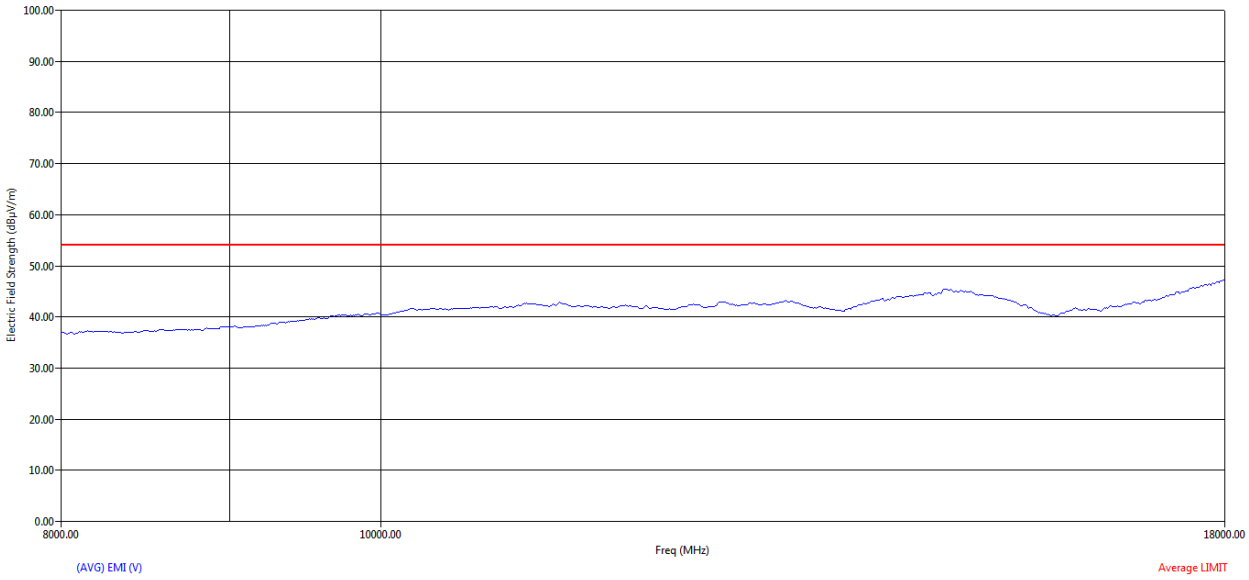

Figure 111: Average RE from 8GHz to 18GHz - Vertical polarization

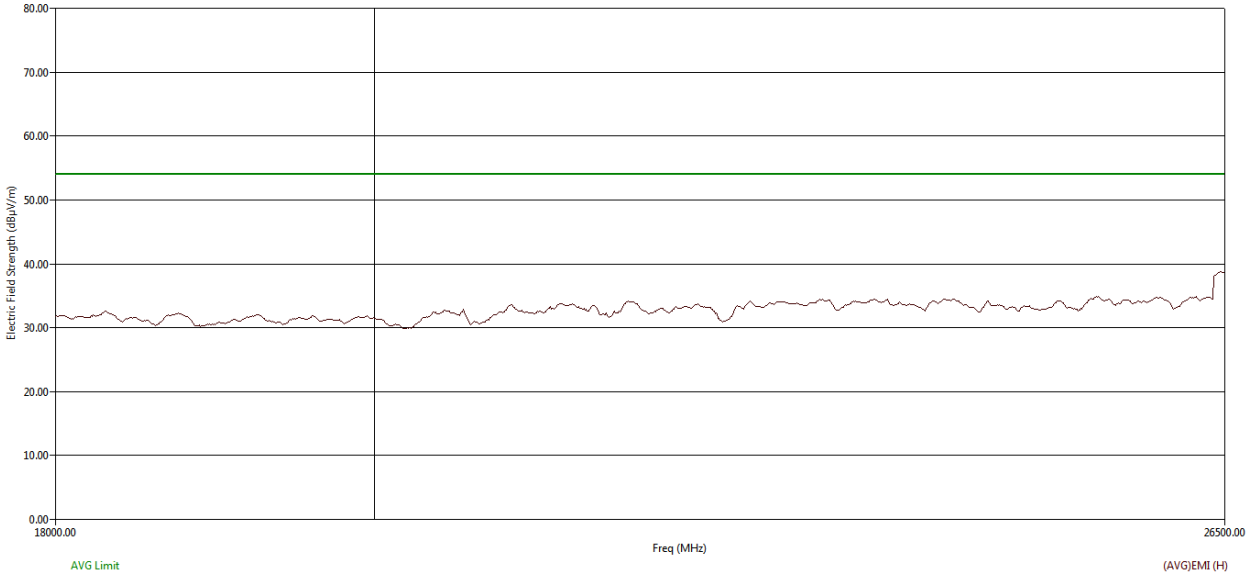

Figure 112: Average RE from 18GHz to 26.5GHz - Horizontal polarization

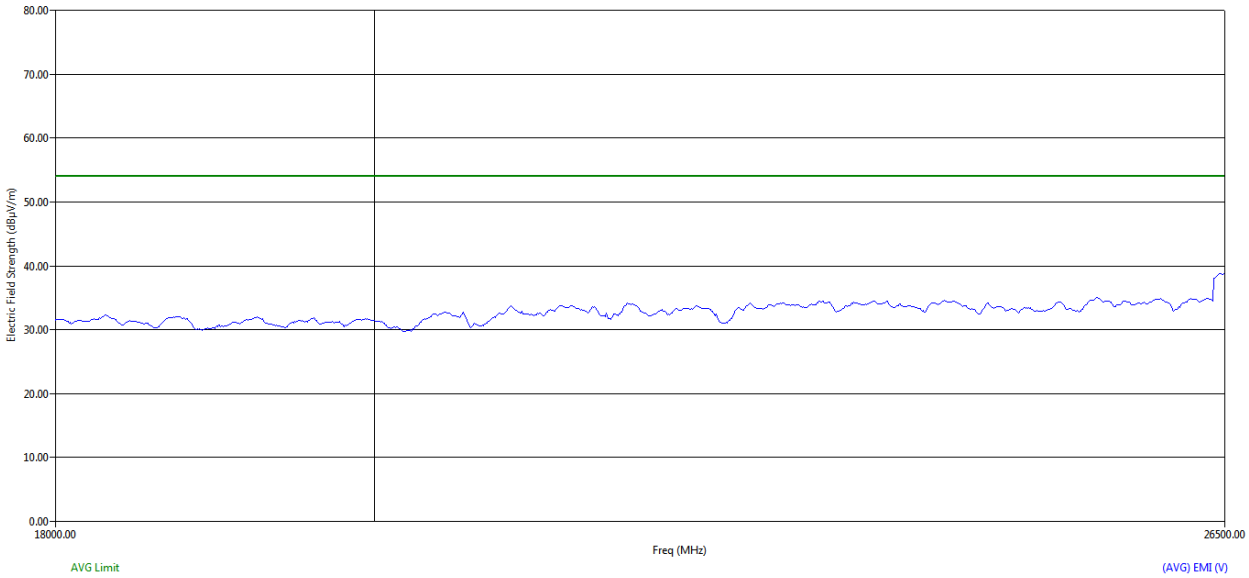

Figure 113: Average RE from 18GHz to 26.5GHz - Vertical polarization

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)

7.2.8 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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