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EMC TEST REPORT

COMPANY: ELTAV Wireless Monitoring Limited
PRODUCT: Tunnelling Valve Device Router (TVDR)

REPORT NO: 100923093LHD-001

WRITTEN BY:	**G Aldridge**	
REVIEWED BY:	**D Legge**	
TEST ENGINEER:	**G Aldridge**	

ISSUE: 3 **DATE: 12th February 2014** **TOTAL PAGES: 167**

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TABLES

GRAPHS

1. JOB DESCRIPTION

Equipment: Tunnelling Valve Device Router

Equipment Model Name: TVDR

PCB Serial No.: 9311120143

Phase: Compliance

Customer: ELTAV Wireless Monitoring Limited
15 Hatassia Street
43654 Ranana
Israel

Test Plan Reference: -

Test Standards: CFR 47 Part 15:109
CFR 47 Part 15:205
CFR 47 Part 15:249
RSS 210 Issue 8
RSS-Gen Issue 3

FCC Ident: X2VVDR000XX

IC Ident: 8876A-VDR000XX

Test Location: Intertek Testing & Certification Ltd
Unit D, Imperial Park
Randalls Way
Leatherhead
Surrey KT22 7TA

Test Work Started: 18th February 2013

Test Work Completed: 25th January 2014

2. TEST SUMMARY

2.1. Standard: CRF 47 Part 15:249

TEST STANDARD	TEST	COMMENT
FCC CFR47 Part 15.107	Conducted Emissions	Note 1
FCC CFR47 Part 15.109	Radiated Emissions	Pass
FCC CFR47 Part 15.205	Restricted Bands of Operation	Pass
FCC CFR47 Part 15.249	Radiated Emissions	Pass

Note 1: This test is not applicable as the EUT is powered by dc in the range 7 – 36V.

2.2. RSS210 Issue 8 & RSS-Gen Issue 3

TEST STANDARD	TEST	COMMENT
RSS-210: A8.2 (a)	-6dB Bandwidth	Pass
RSS-210: A8.2 (b)	Power Spectral Density	Pass
RSS-210: A8.4 (4)	Transmitter Maximum Output Power	Pass
RSS-210: A8.5	Out of Band Emissions	Pass
RSS-Gen: 4.6.1	Occupied Bandwidth	Pass

All of the above tests have been carried out to meet the requirements of ANSI C63.4:2009.

2.3. Modifications

No modifications were carried out on the EUT during testing

3. EQUIPMENT UNDER TEST (EUT)

3.1. Description of the EUT

The TVDR is a wireless router using the ZigBee frequency band. It provides the ability to monitor several devices such as a WKVD QTR reporting its valve position, status etc which is then sent to a PC via the Ethernet cable connected to the TVDR.

The TVDR is powered using 7V dc to 36V dc (24V Nominal used for tests) which is supplied from an external source such as a dc distribution network. In addition to the external supply the TVDR also has an internal battery of 4V dc.

The EUT has an external antenna only and was tested with a FT-RF OA-242503S-NM 3dBi gain omni directional antenna and is the antenna used when installed. The system and antenna are professionally installed on site and tested by the manufacturer.

The EUT was tested as received with no external visible signs of damage and was of production quality.

3.2. EUT Modes of Operation

1) Receive Mode:

- Continuously receiving in the following states

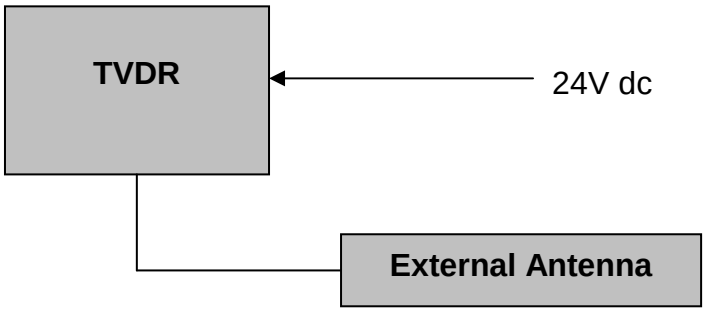
Channel	Transmission	Frequency (GHz)
11	Receive Data – Mode 1	2.405
18	Receive Data – Mode 2	2.440
26	Receive Data – Mode 3	2.480

2) Transmit Mode:

- Continuously transmitting in the following states:-

Channel	Transmission	Frequency (GHz)
11	Streaming Data – Mode 4	2.405
18	Streaming Data – Mode 5	2.440
26	Streaming Data – Mode 6	2.480

3.3. EUT Configuration Diagram



3.4. EUT Support Equipment

None.

3.5. Cables Associated With the EUT

EUT PORT	Cable Description	LENGTH (m)	TERMINATION/LOAD
Antenna Port	-	-	3dBi Antenna

4. RADIATED EMISSIONS

4.1. Radiated Emissions Test Method

The testing was performed in accordance with ANSI C63.4:2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

Testing was conducted in a semi-anechoic chamber which meets the NSA requirements of CISPR 16 and CISPR 22. An emissions signature was obtained with the measuring antenna placed 3m from the EUT. Final measurements were carried out at frequencies falling within 10dB of the limit line.

4.2. Radiated Emissions Test Results

The results are given in Tables 1 to 24 and Graphs 1 to 120.

4.3. Radiated Emissions Conclusions

The EUT complied with the limits of FCC part 15, clause 109 Class B and part 15 clause 249.

4.4. Measurement Uncertainty

30MHz to 25GHz ±5.7dB

The measurement uncertainties have been determined at a confidence level of not less than 95%.

Table 1 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: DbµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	120 MHz	29.85	-13.66
1 Quasi Peak	152.84 MHz	30.63	-12.88
1 Quasi Peak	196.64 MHz	33.45	-10.06
1 Quasi Peak	240 MHz	43.67	-2.34
1 Quasi Peak	264 MHz	41.69	-4.32
1 Quasi Peak	288 MHz	41.31	-4.70
1 Quasi Peak	625 MHz	31.26	-14.75
1 Quasi Peak	876 MHz	32.82	-13.19

Graph 1 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal.

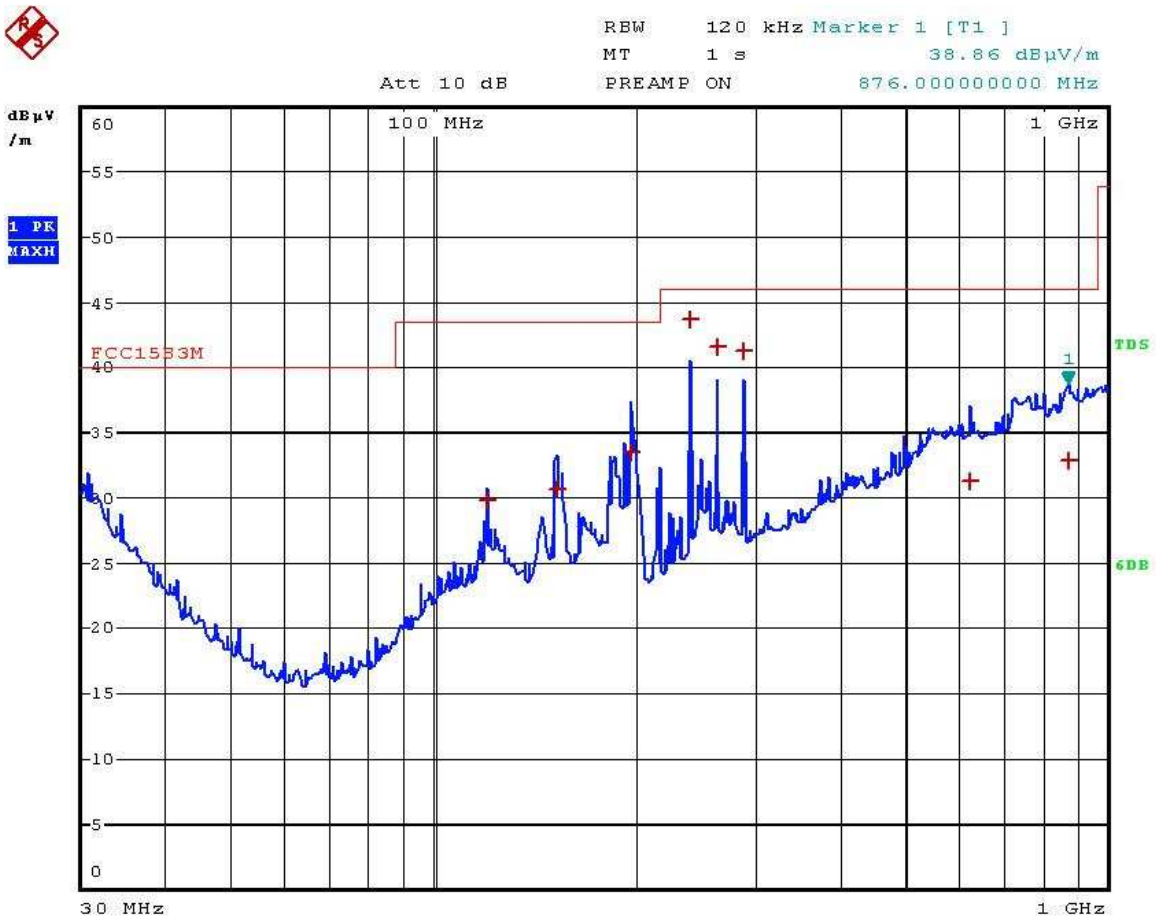


Table 2 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: DbµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	44.6 MHz	17.53	-22.46
1 Quasi Peak	172.88 MHz	33.35	-10.16
1 Quasi Peak	196.68 MHz	37.47	-6.04
1 Quasi Peak	240 MHz	39.14	-6.87
1 Quasi Peak	264 MHz	35.40	-10.61
1 Quasi Peak	500 MHz	35.83	-10.19
1 Quasi Peak	928.28 MHz	32.87	-13.14

Graph 2 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical.

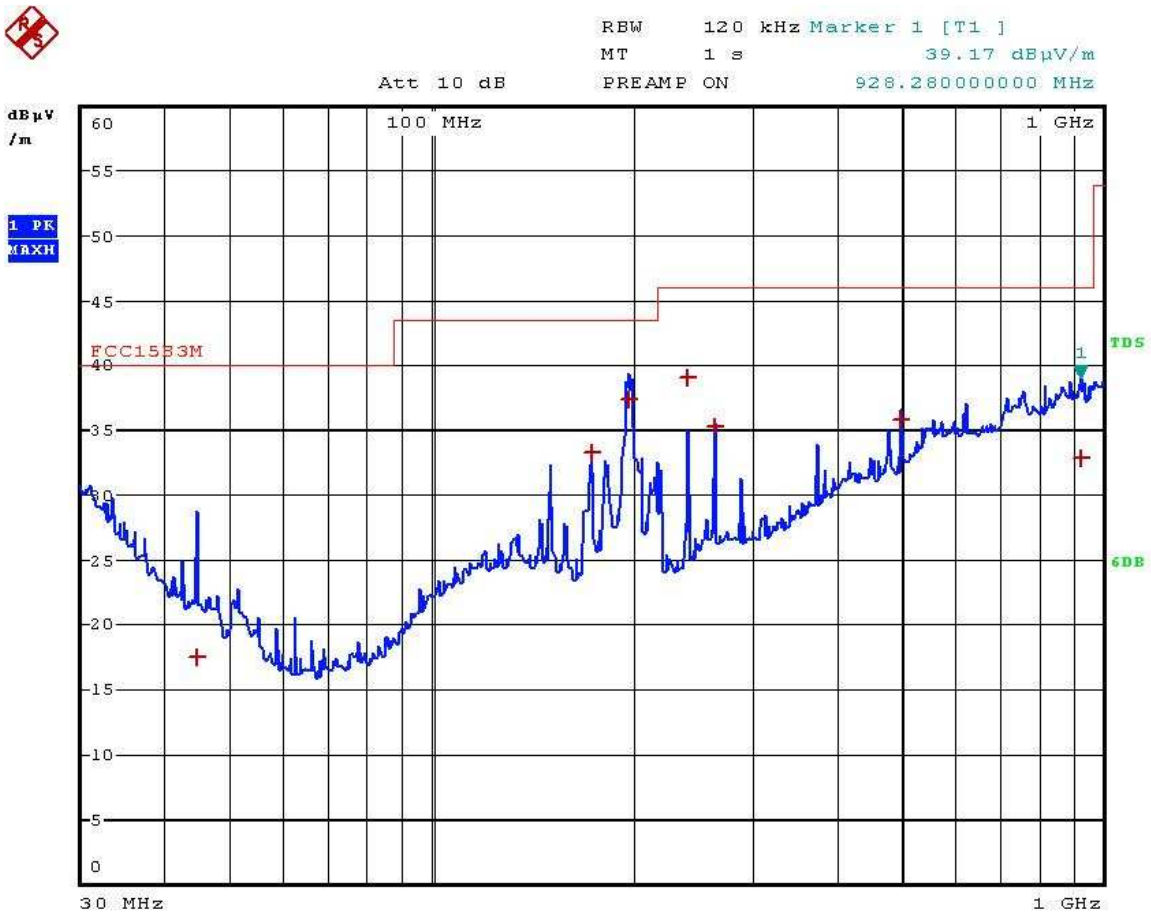


Table 3 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

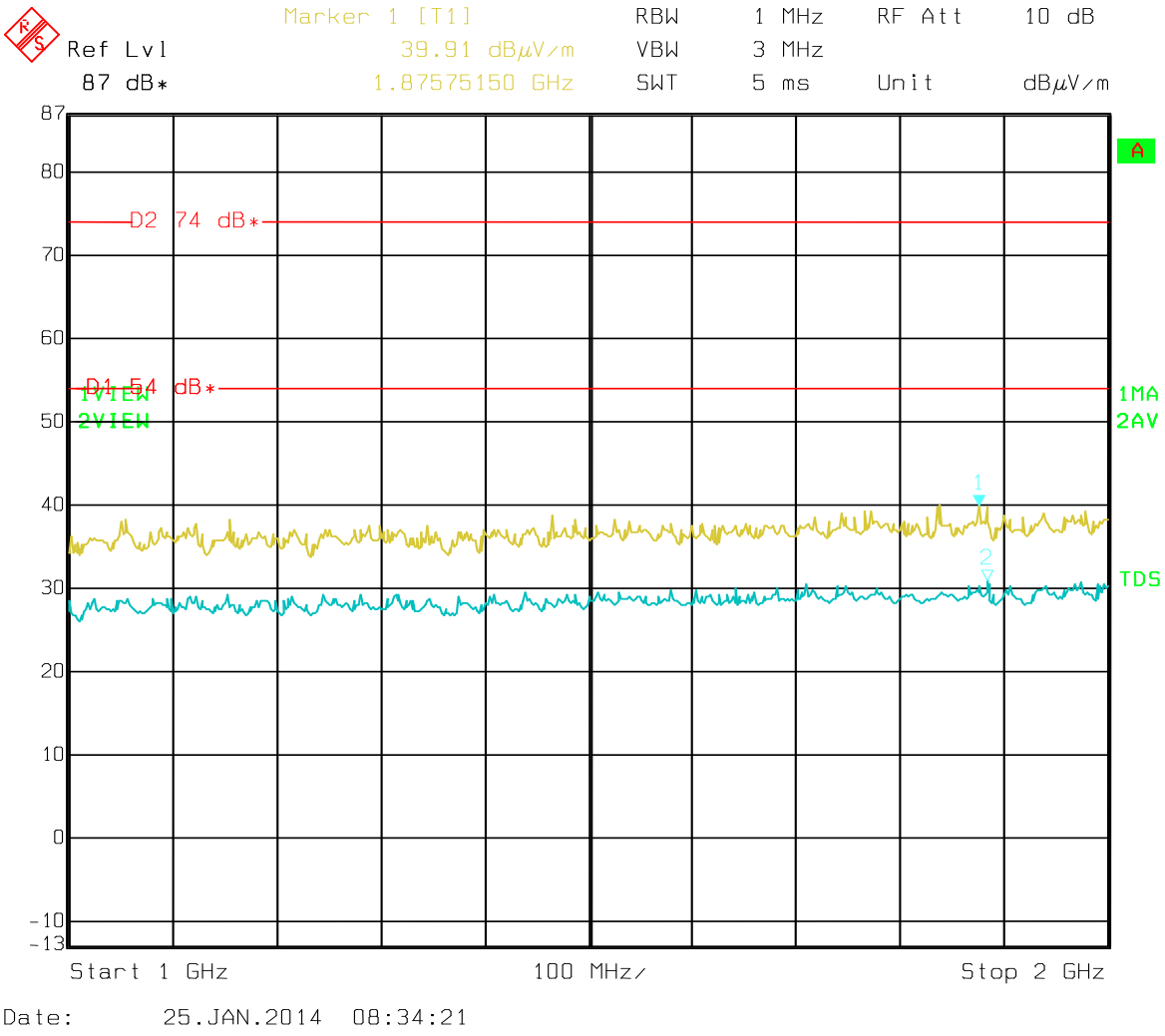
Units of measurement:

Frequency: GHz Amplitude: DbµV/m

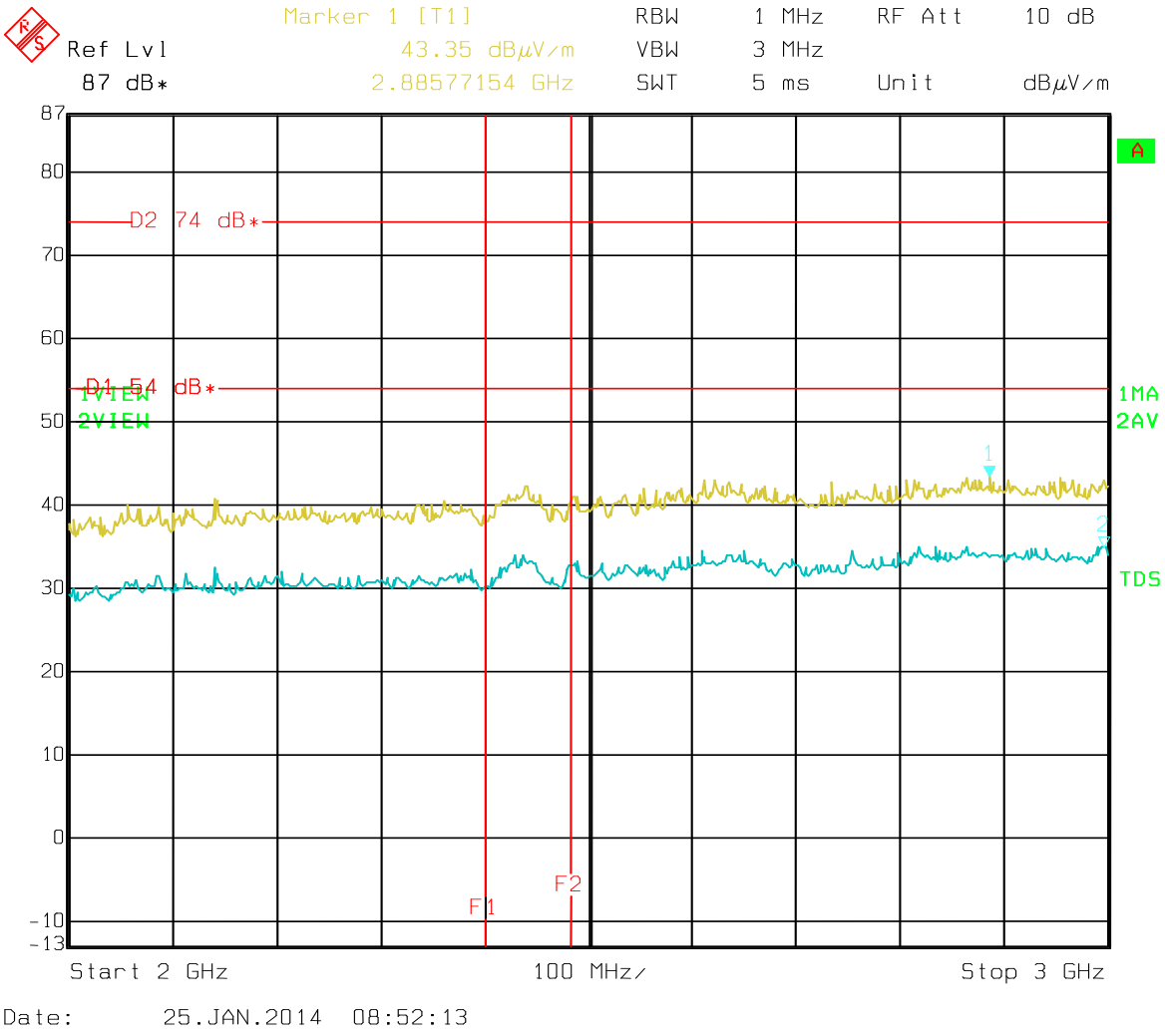
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

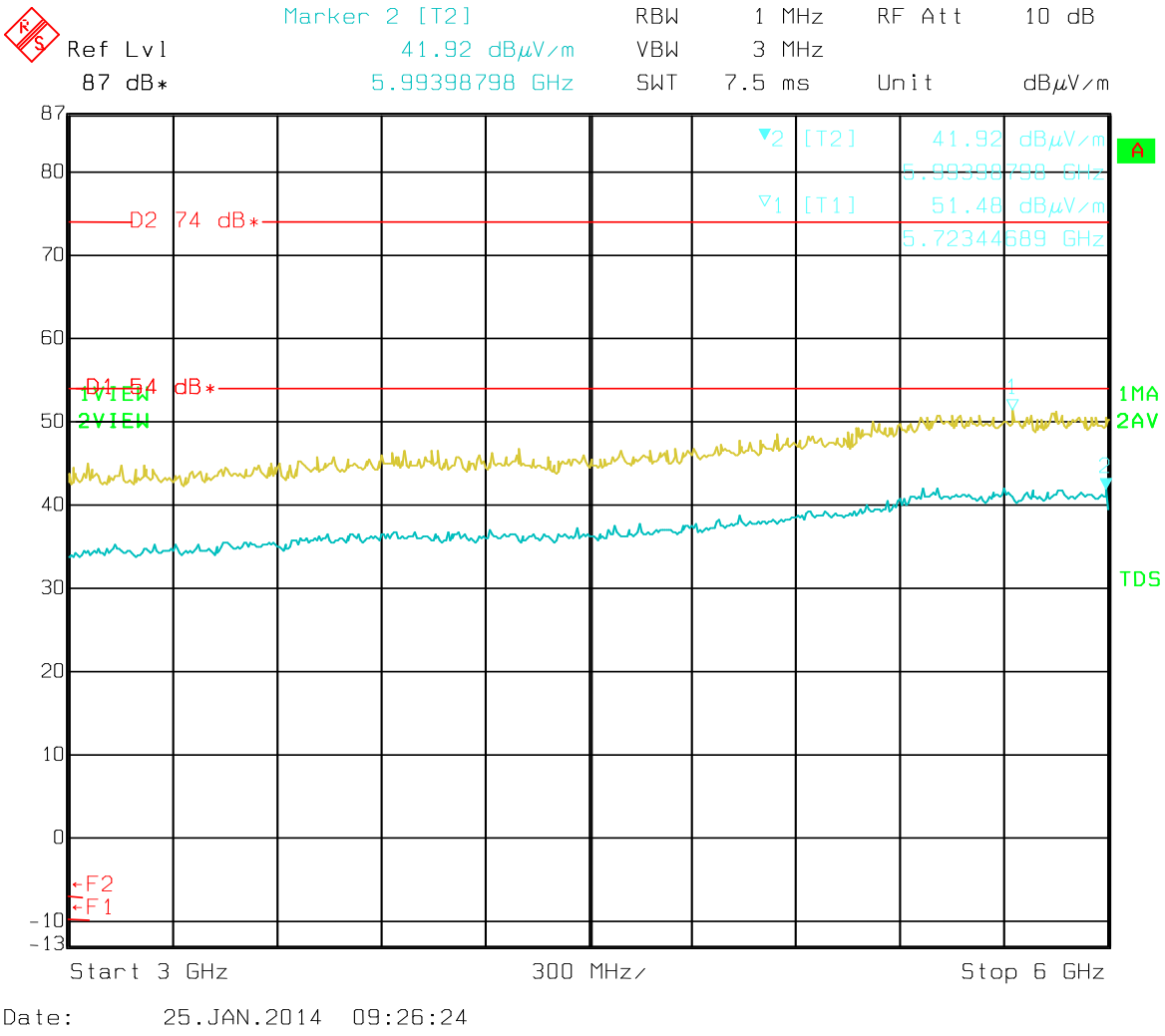
Graph 3 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 1 to 2GHz.



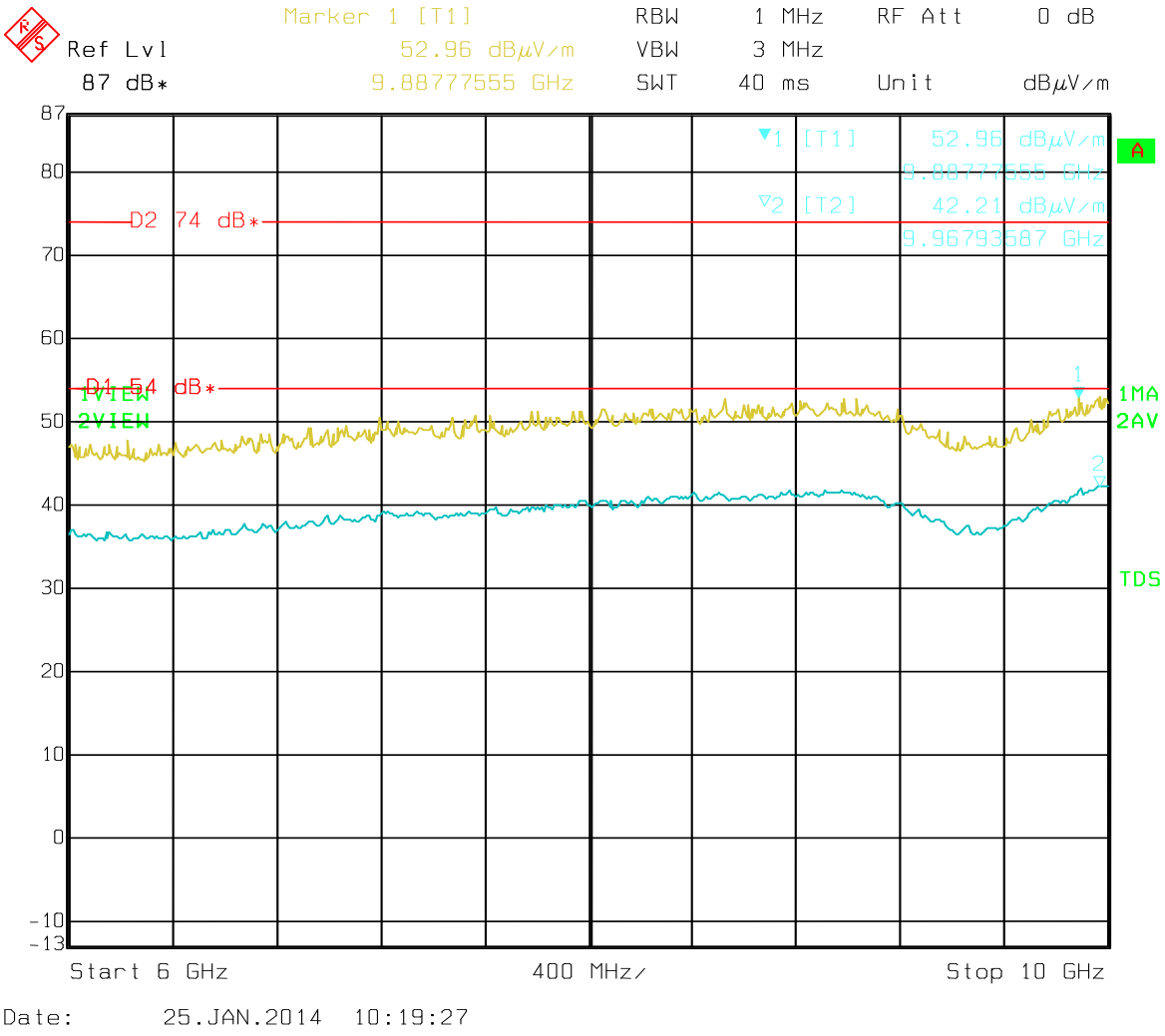
Graph 4 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 2 to 3GHz.



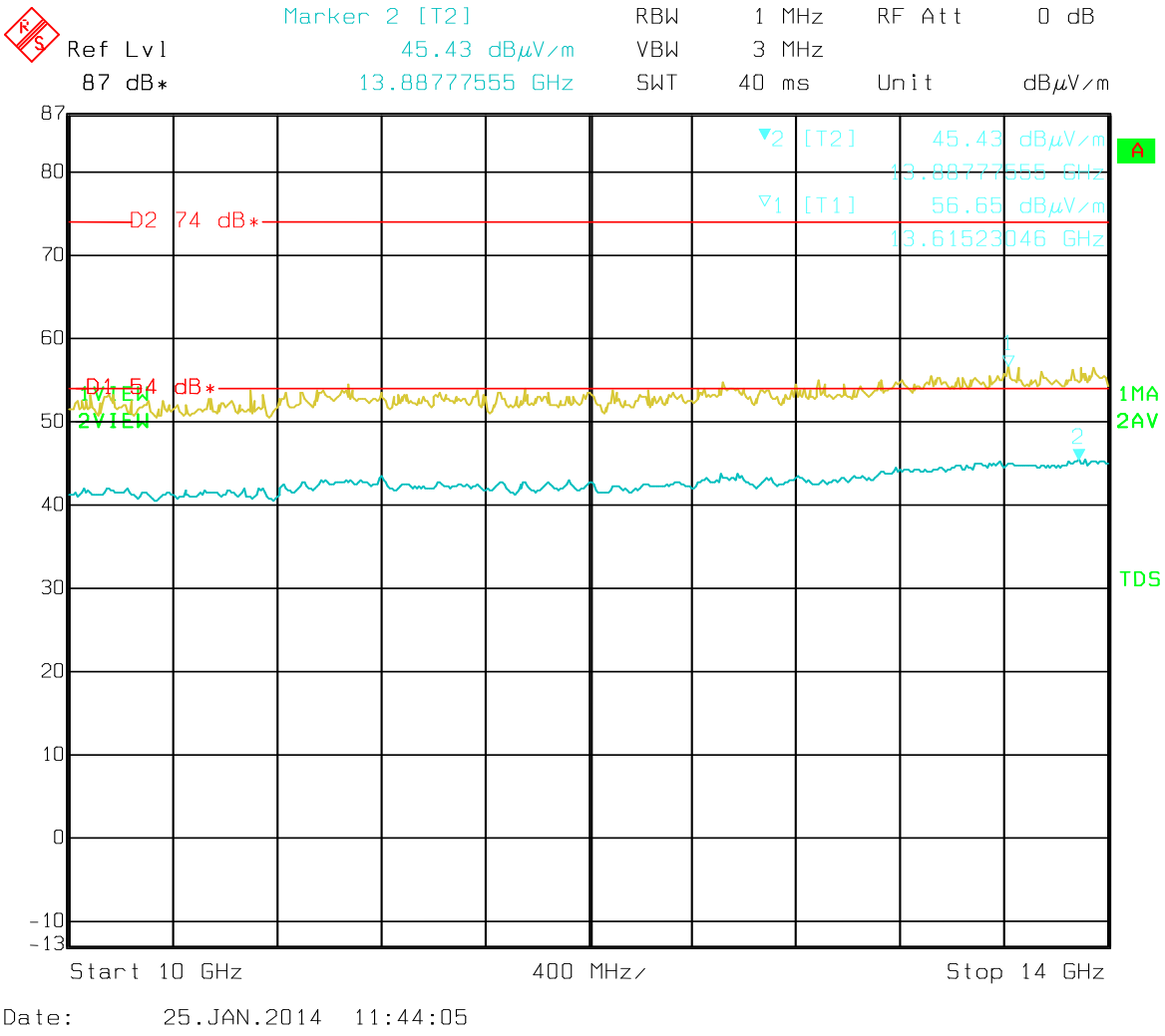
Graph 5 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 3 to 6GHz.



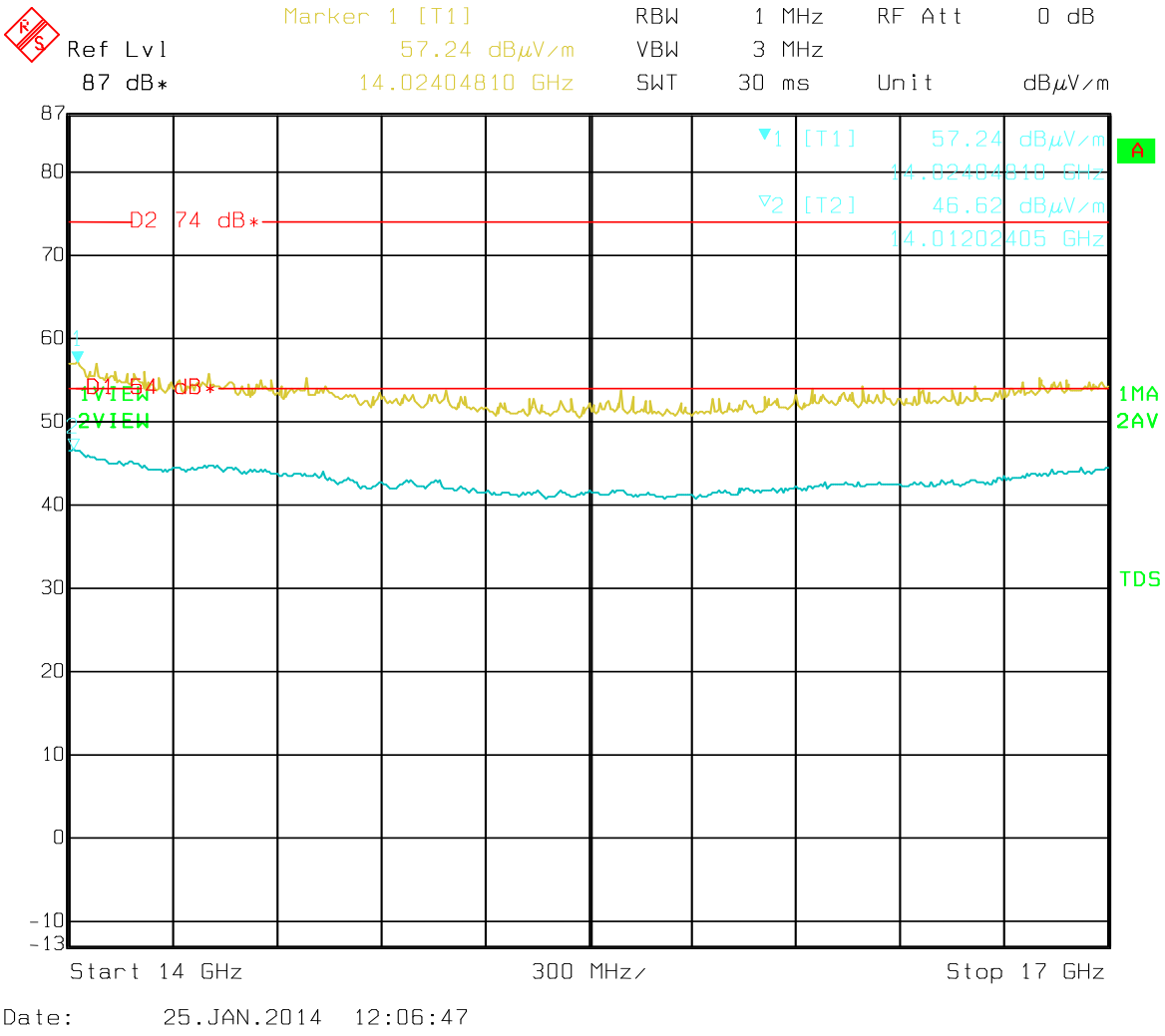
Graph 6 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 6 to 10GHz.



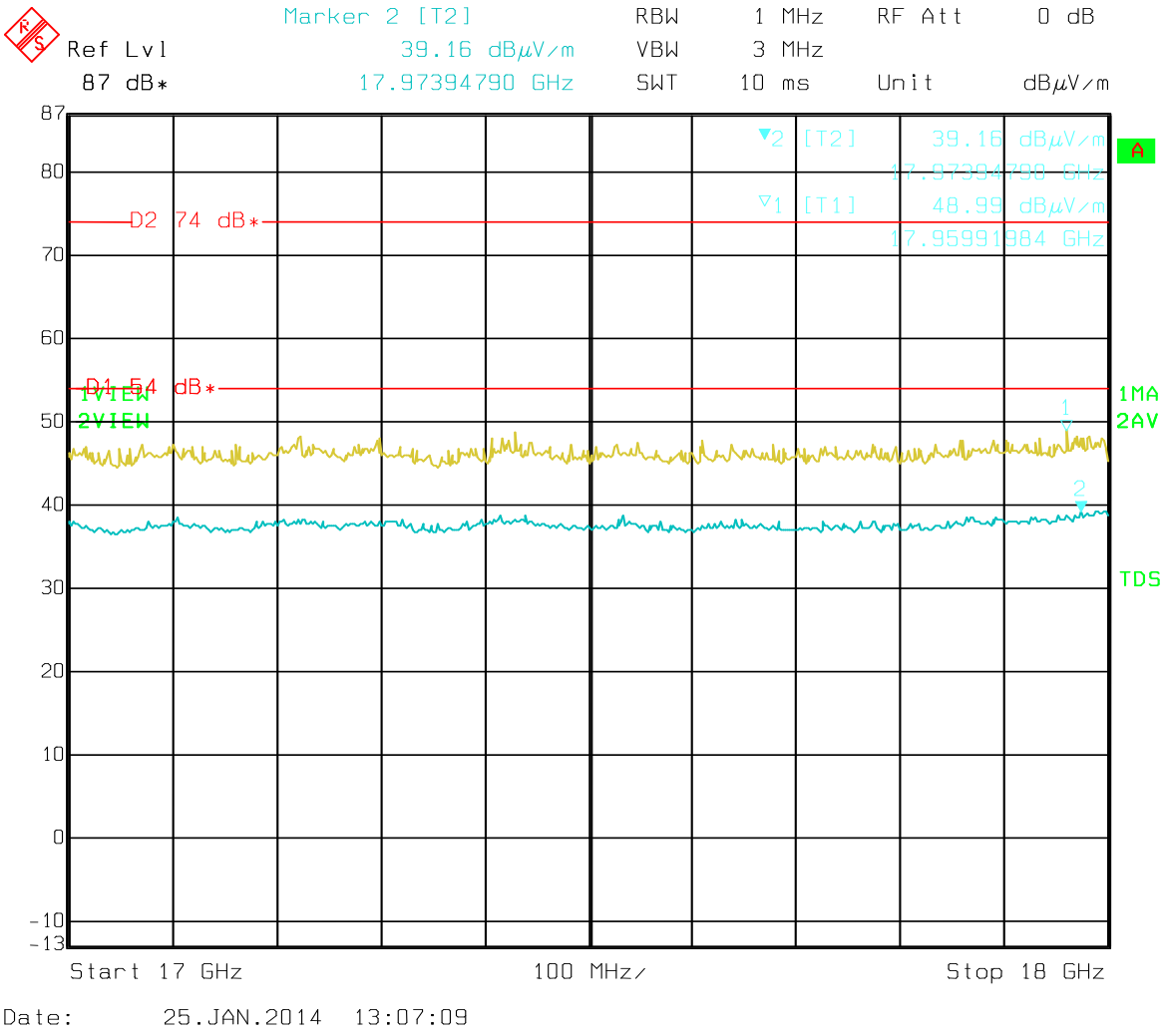
Graph 7 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 10 to 14GHz.



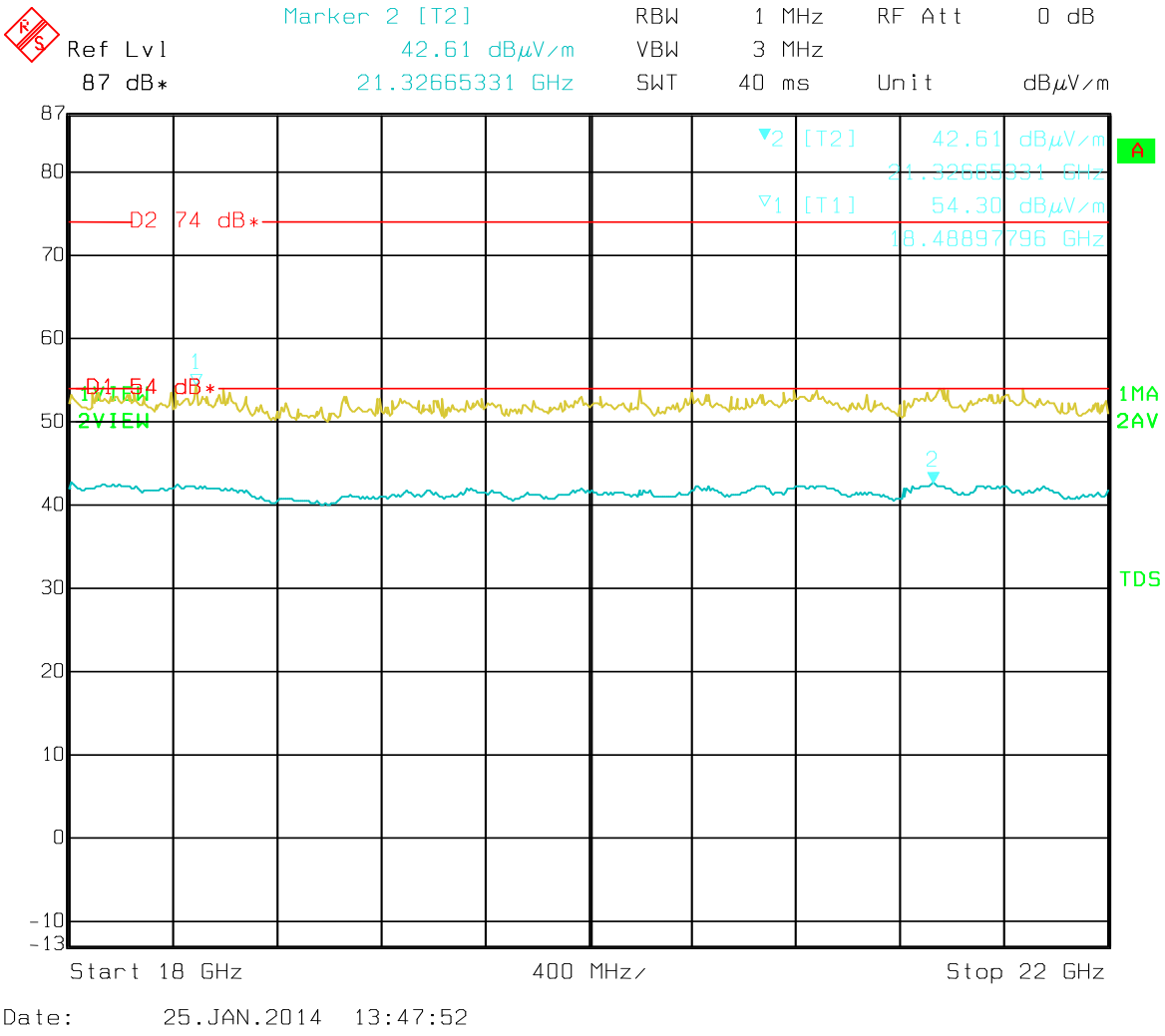
Graph 8 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 14 to 17GHz.



Graph 9 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 17 to 18GHz.



Graph 10 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 18 to 22GHz.



Graph 11 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Horizontal – 22 to 25GHz.

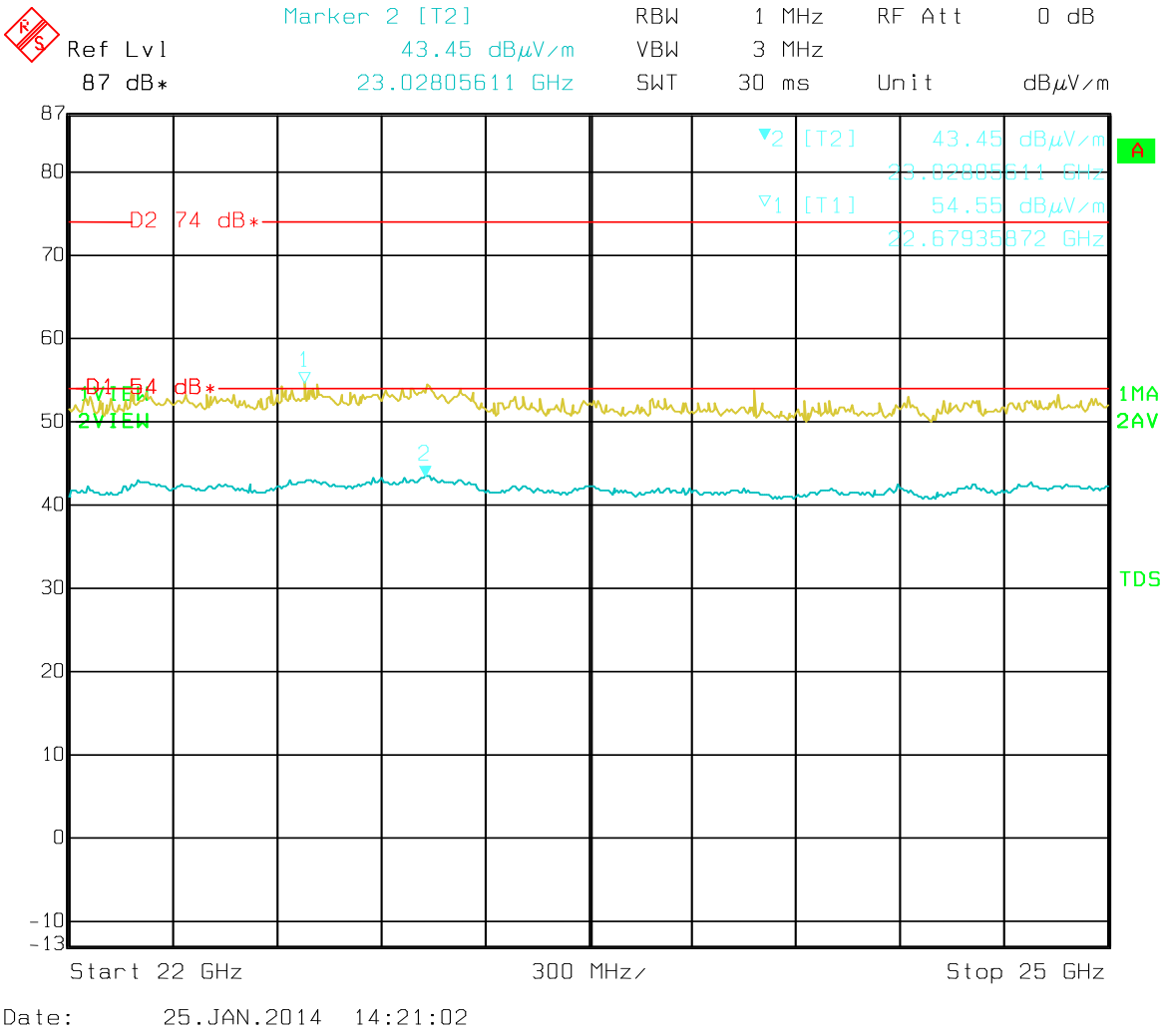


Table 4 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

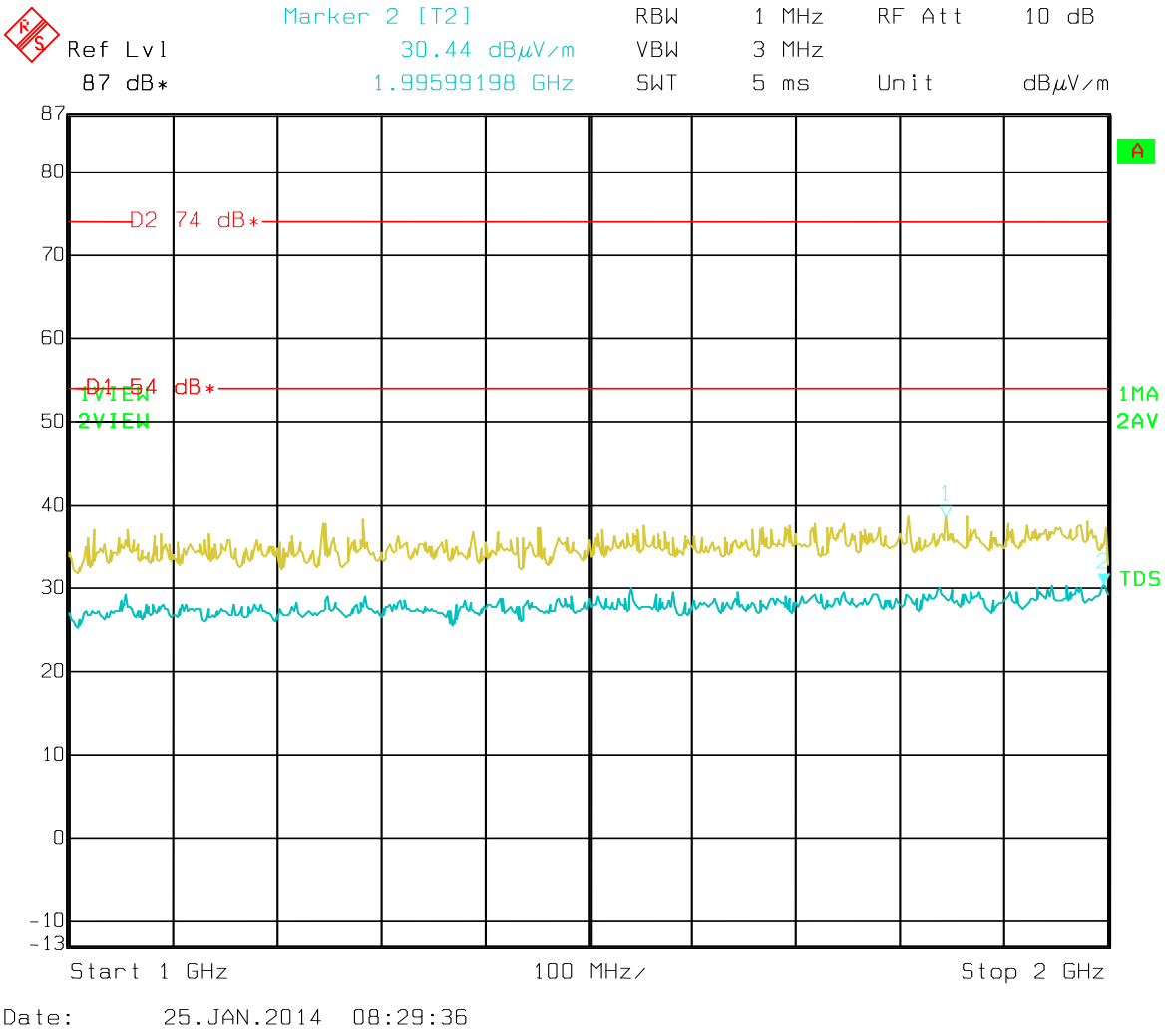
Units of measurement:

Frequency: GHz Amplitude: dBμV/m

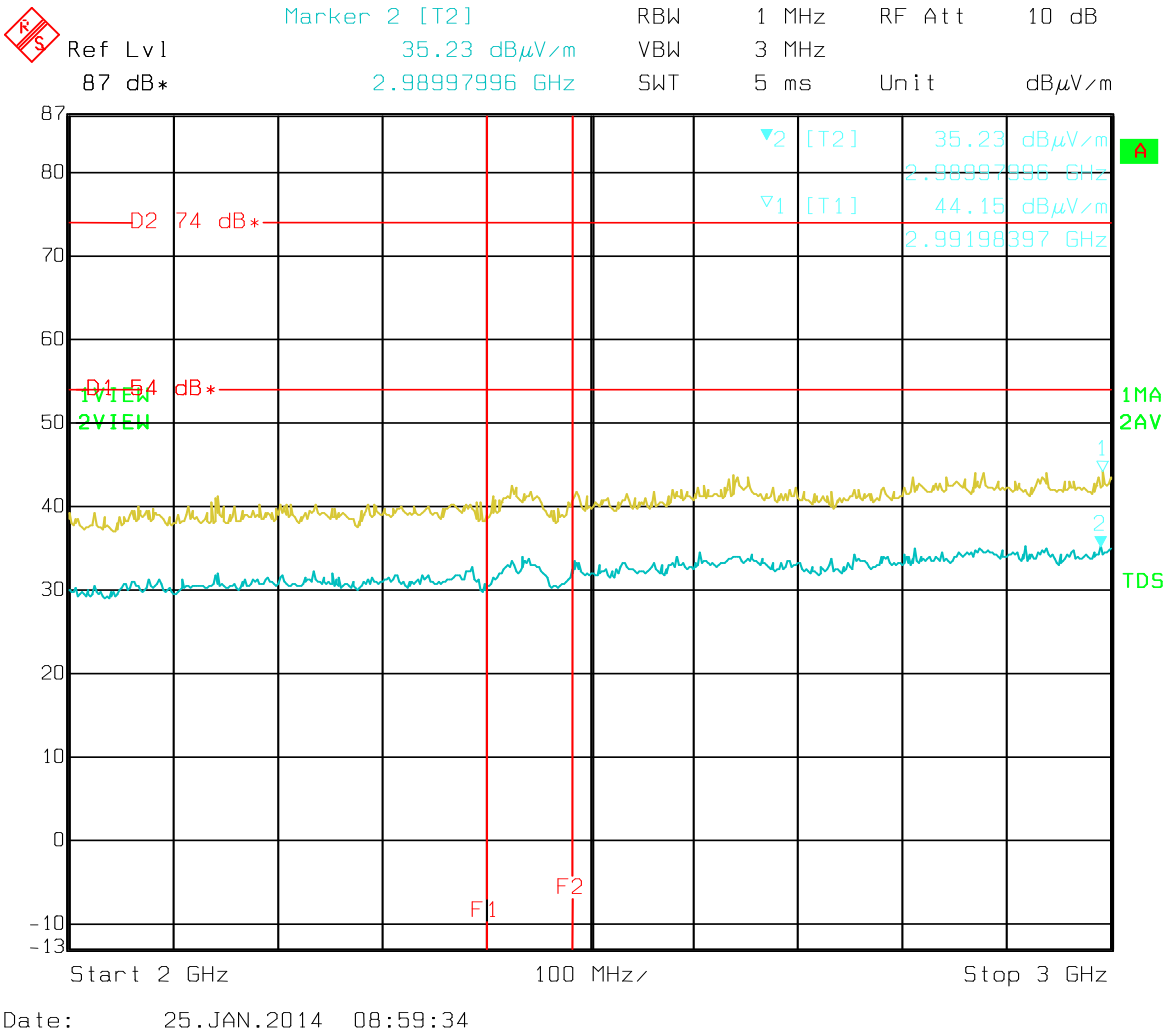
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

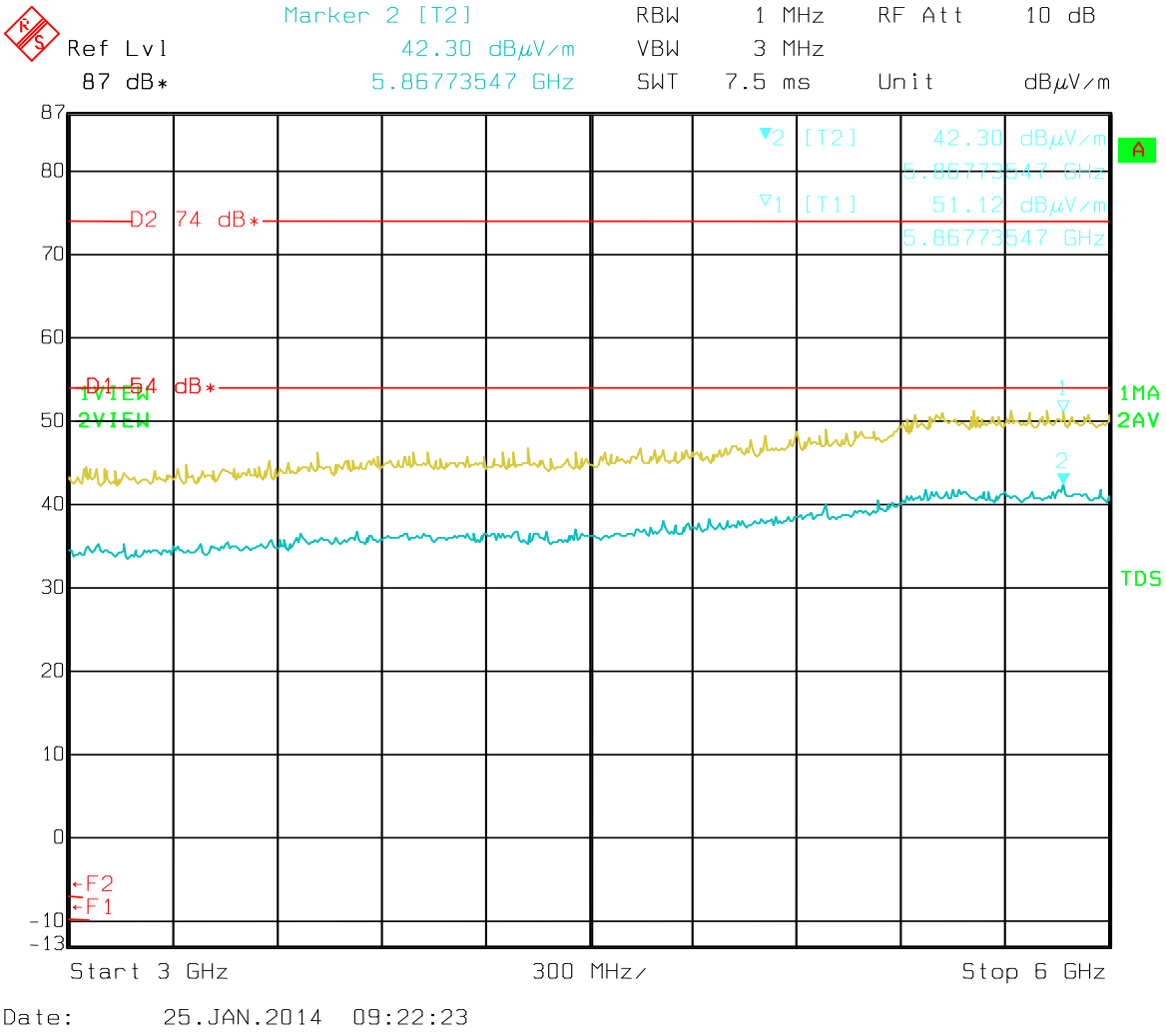
Graph 12 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 1 to 2GHz.



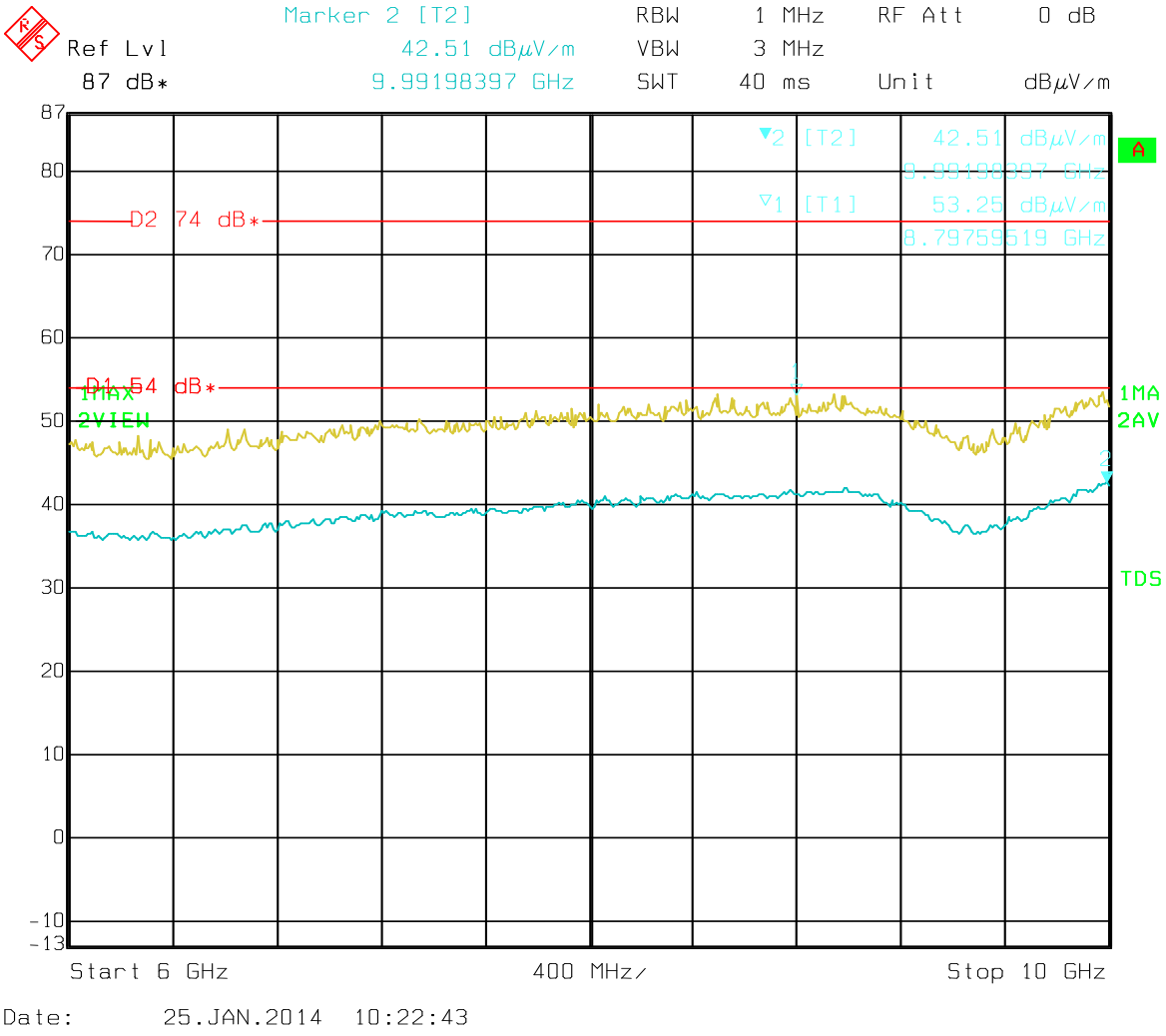
Graph 13 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 2 to 3GHz.



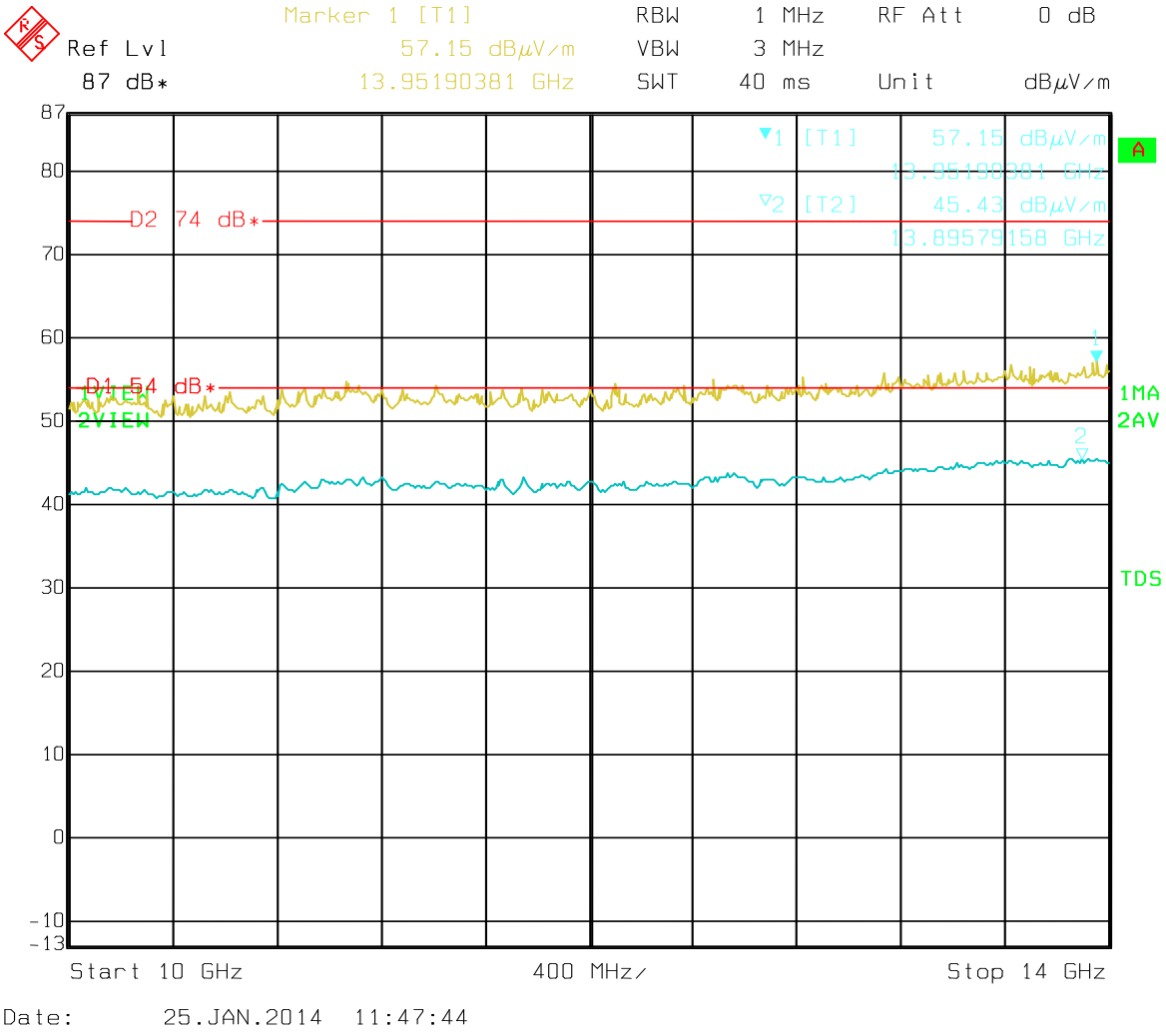
Graph 14 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 3 to 6GHz.



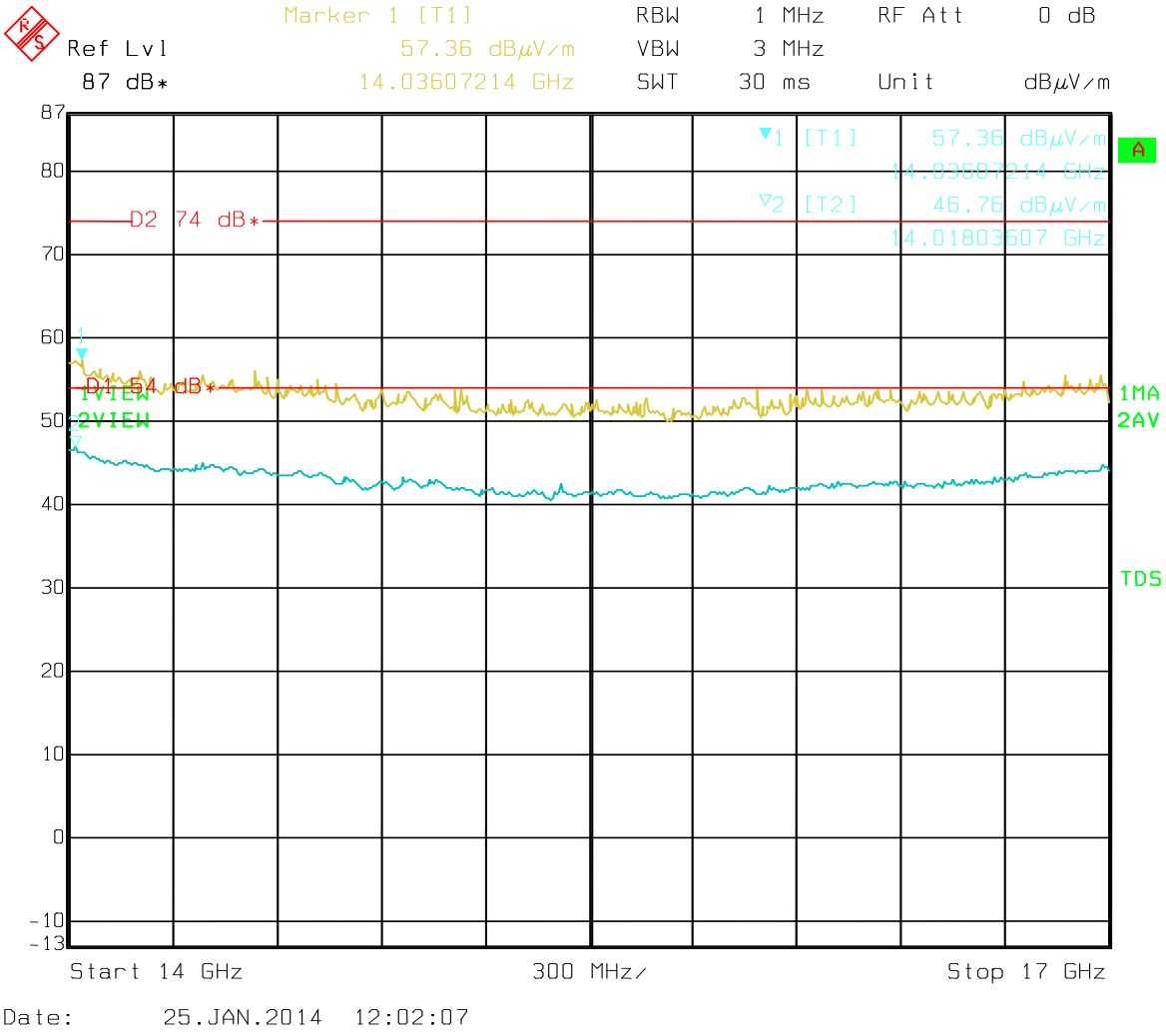
Graph 15 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 6 to 10GHz.



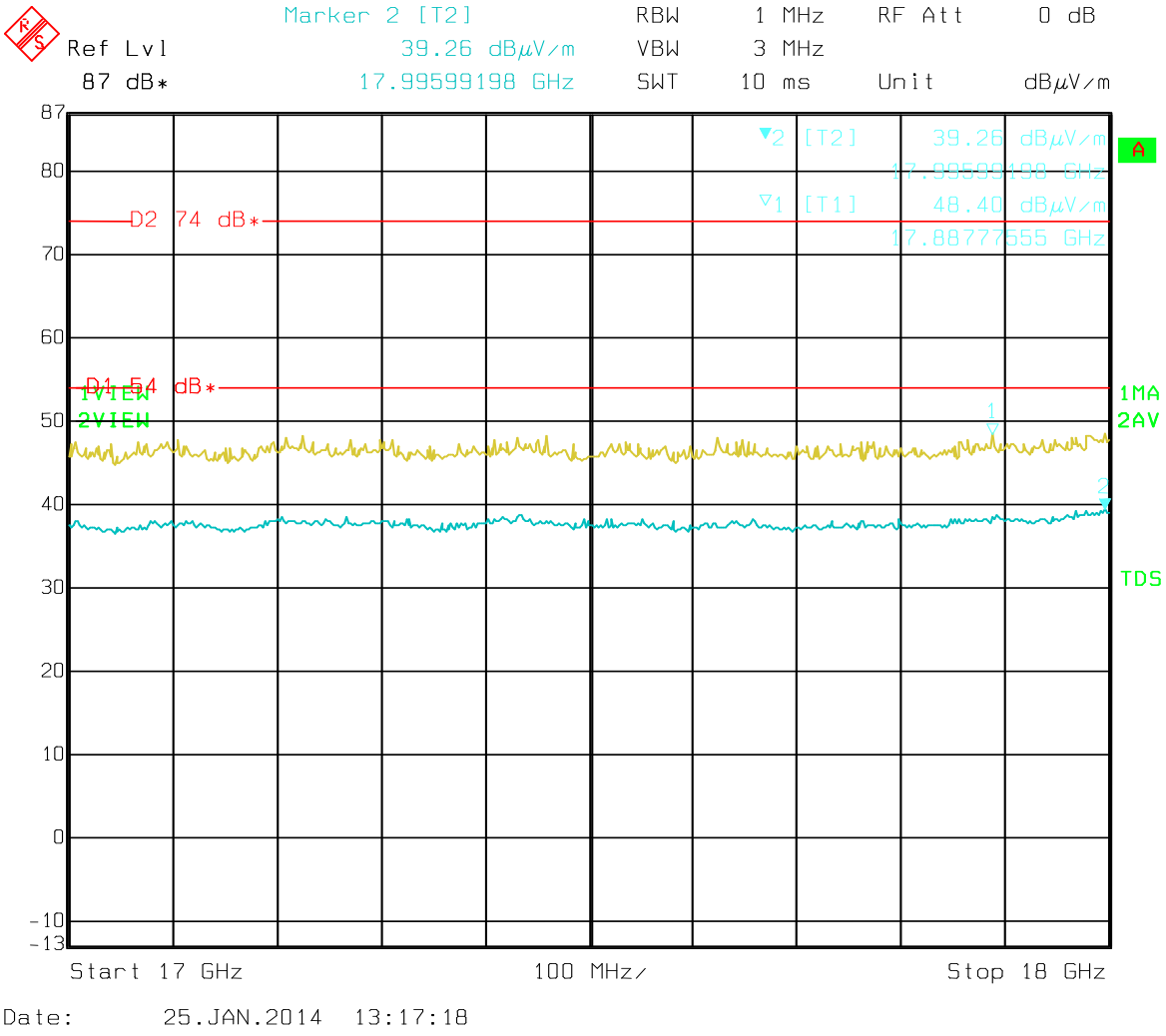
Graph 16 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 10 to 14GHz.



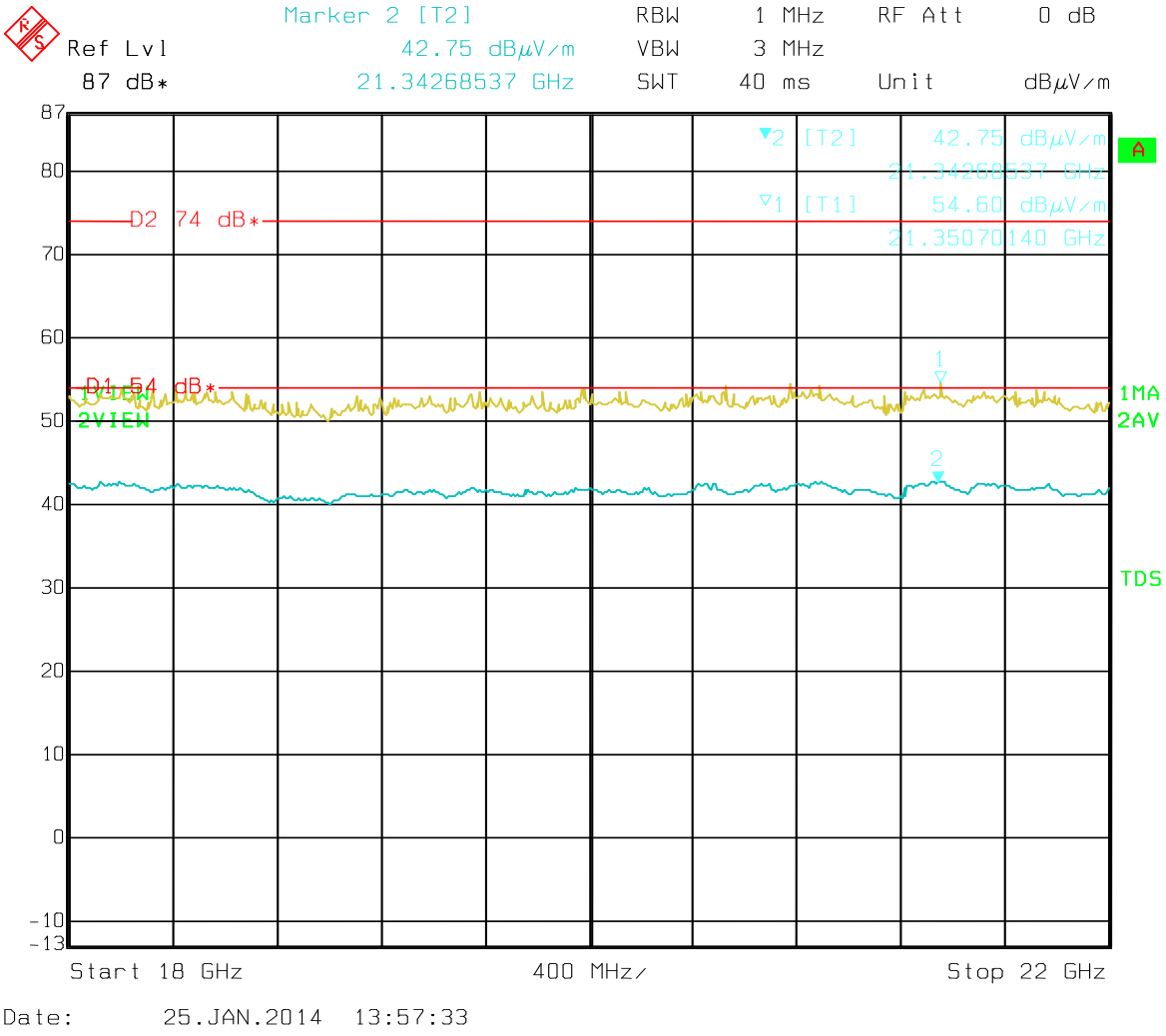
Graph 17 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 14 to 17GHz.



Graph 18 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 17 to 18GHz.



Graph 19 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 18 to 22GHz.



Graph 20 Radiated Emissions Test Results – Mode 1 – Receive Ch11 – Vertical – 22 to 25GHz.

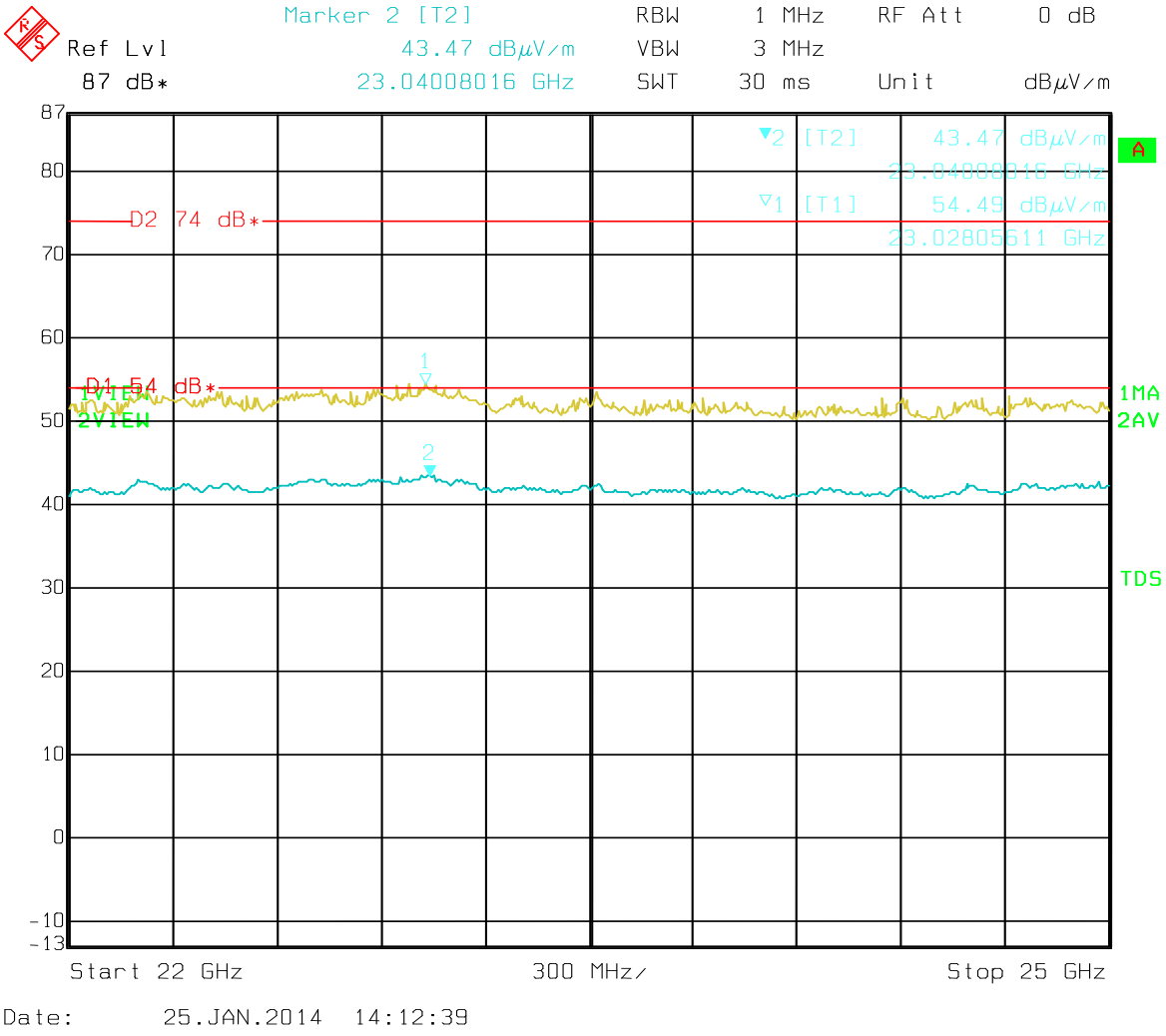


Table 5 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 30 to 1GHz.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.96 MHz	26.19	-13.80
1 Quasi Peak	195.44 MHz	34.29	-9.22
1 Quasi Peak	240 MHz	42.45	-3.56
1 Quasi Peak	288 MHz	37.52	-8.49
1 Quasi Peak	375 MHz	35.79	-10.22
1 Quasi Peak	934.72 MHz	33.02	-12.99

Graph 21 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 30 to 1GHz.

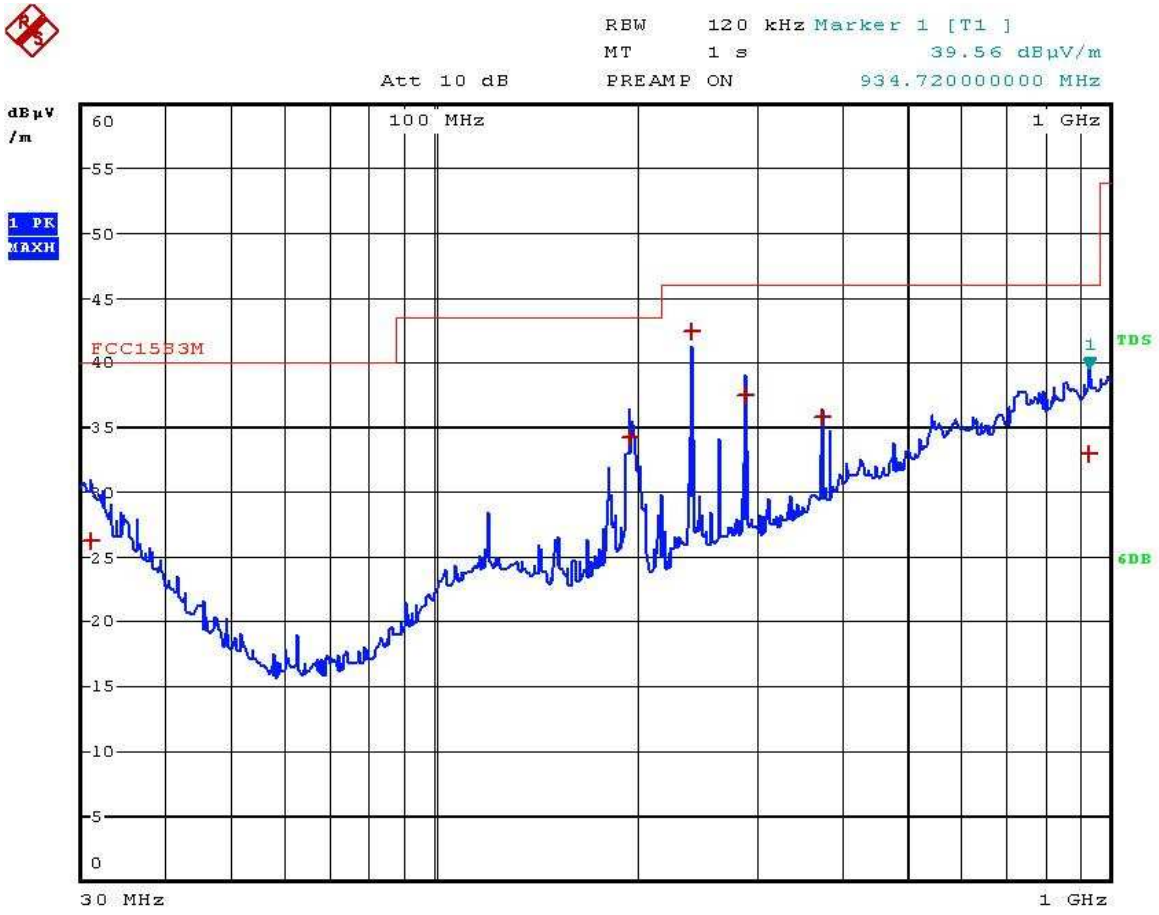


Table 6 Radiated Emissions Test Results – Mode 2 – Receive Ch18

Vertical – 30 to 1GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:

Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.4 MHz	26.54	-13.45
1 Quasi Peak	171.64 MHz	32.37	-11.14
1 Quasi Peak	197.96 MHz	37.33	-6.18
1 Quasi Peak	216 MHz	35.35	-10.66
1 Quasi Peak	240 MHz	35.95	-10.06
1 Quasi Peak	958.48 MHz	33.22	-12.79

Graph 22 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 30 to 1GHz.

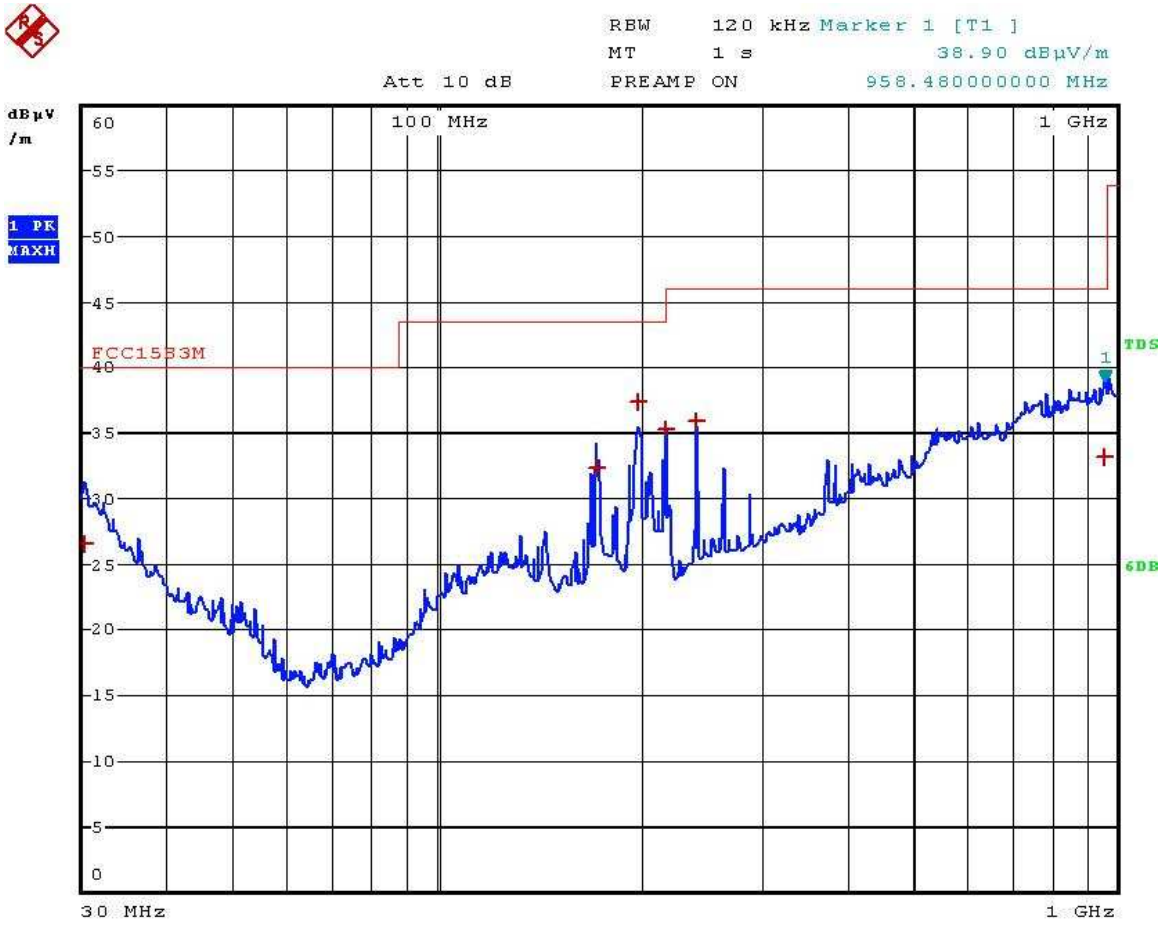


Table 7 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

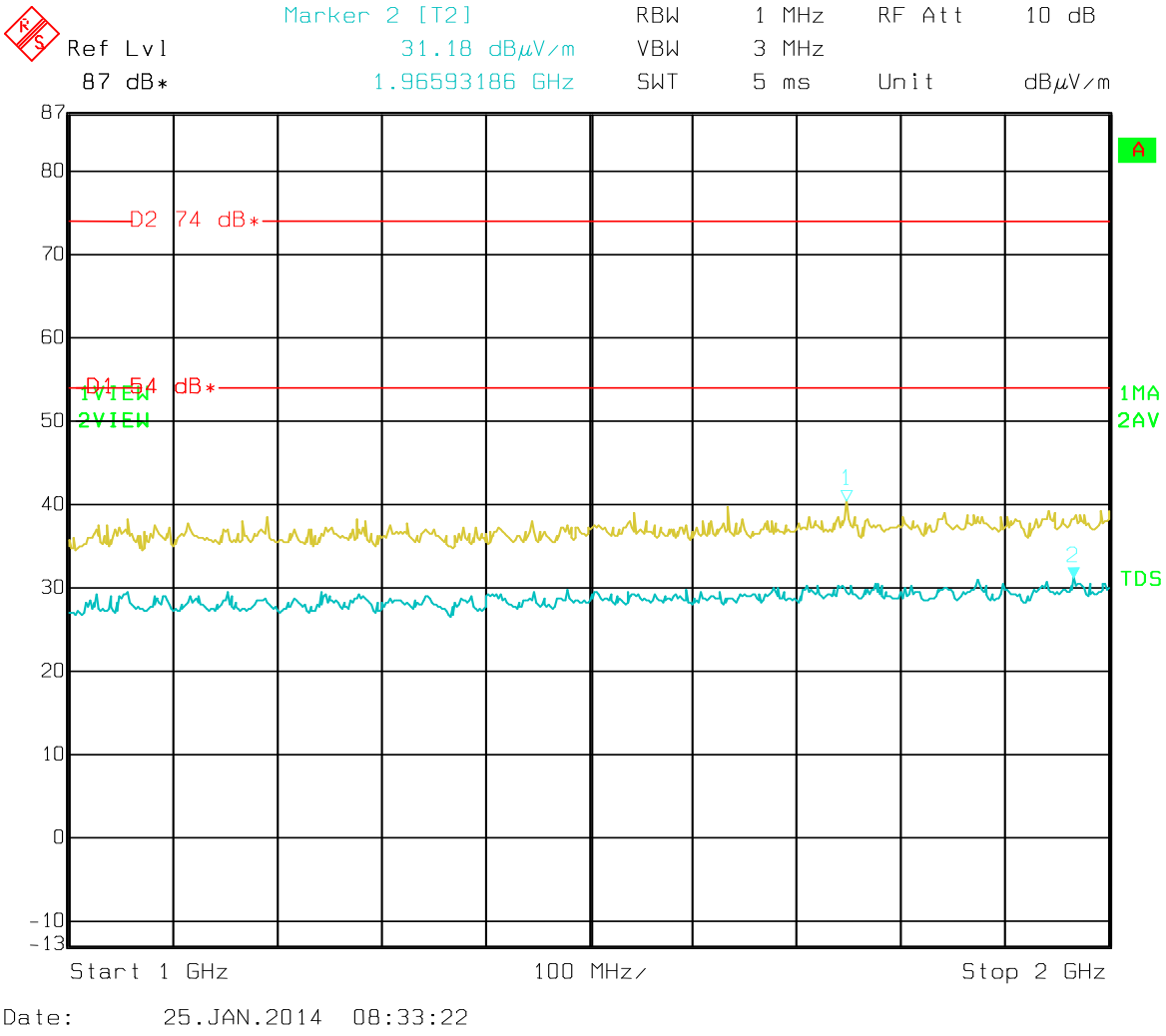
Units of measurement:

Frequency: GHz Amplitude: dBμV/m

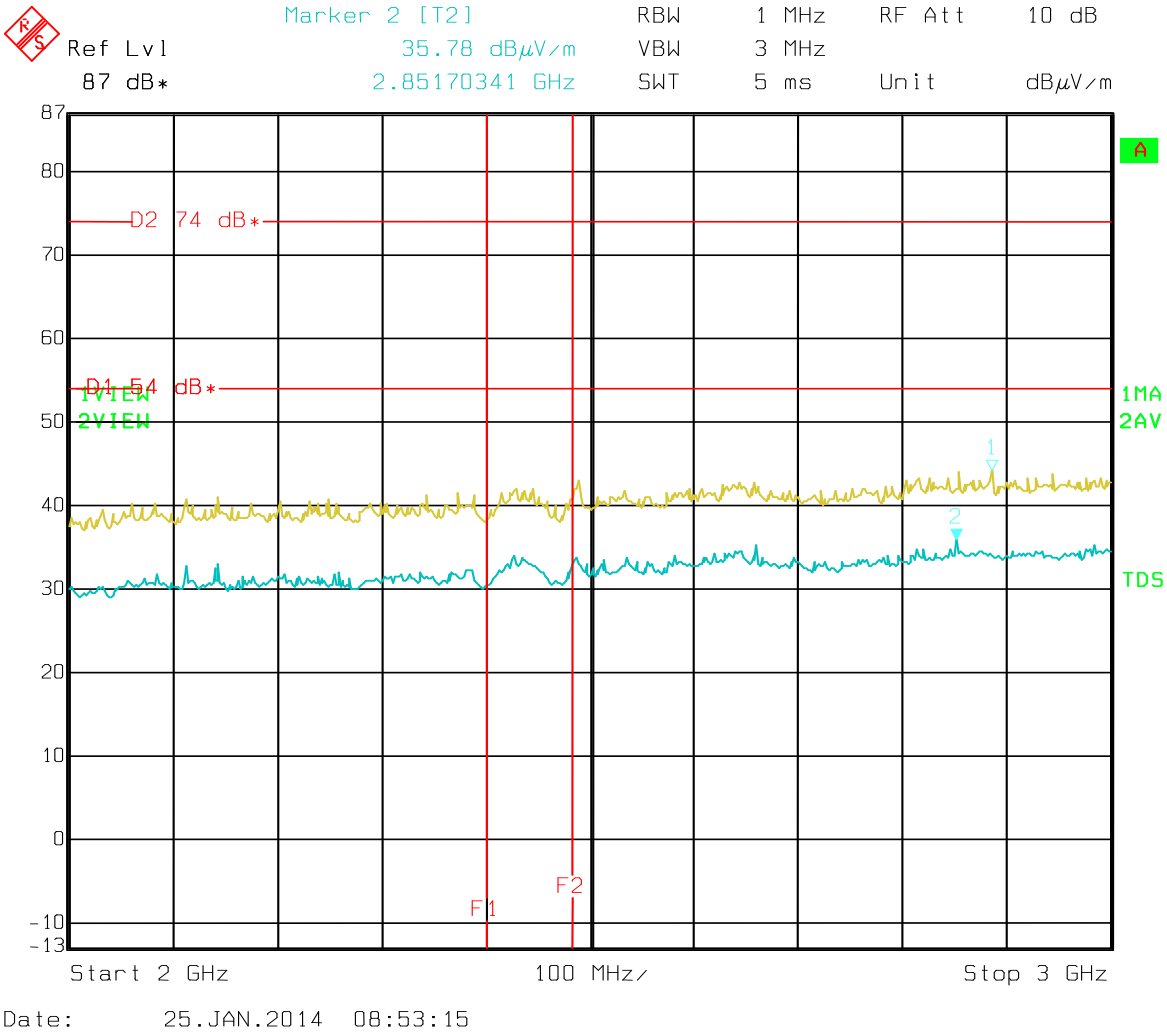
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

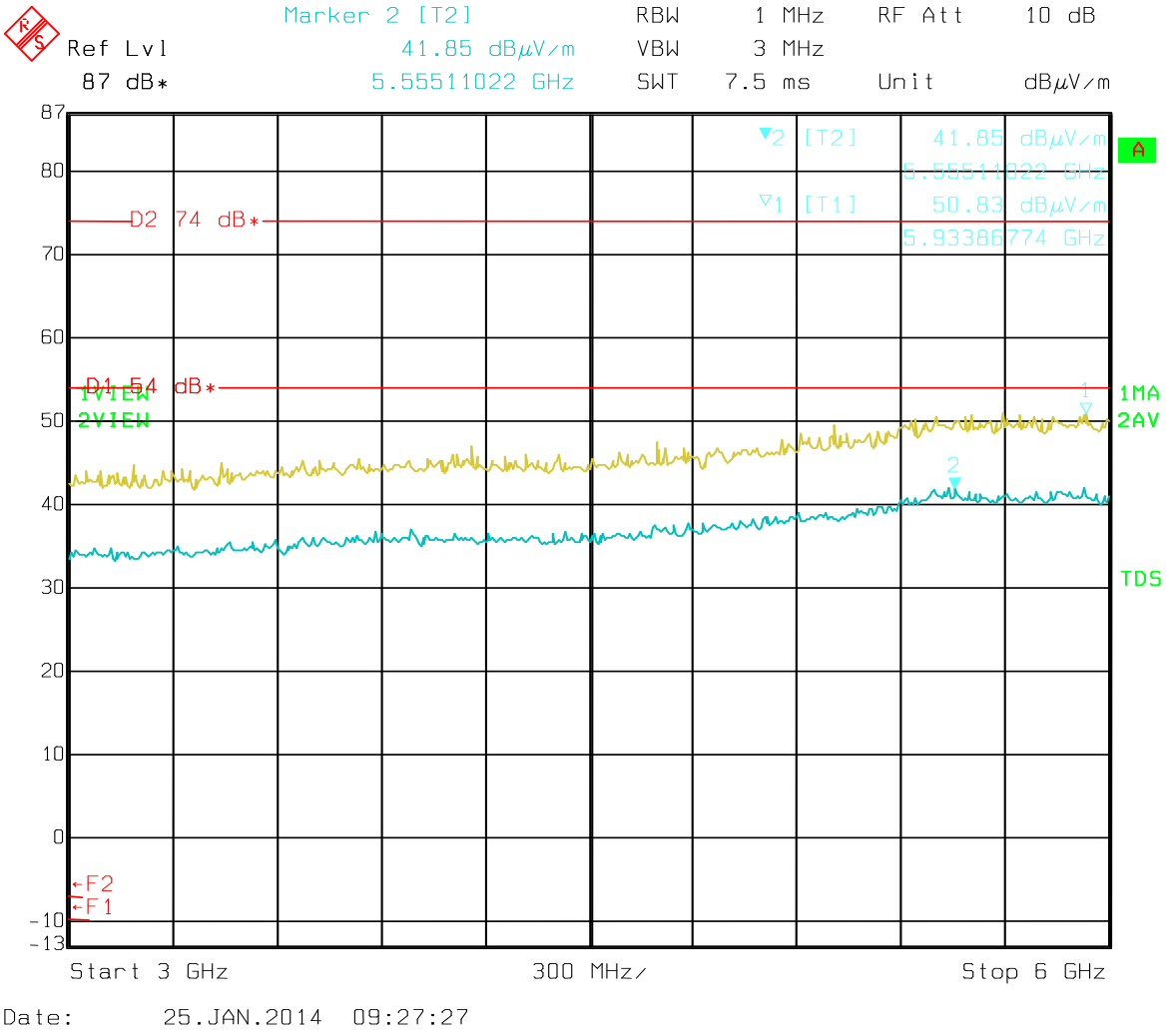
Graph 23 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 1 to 2GHz.



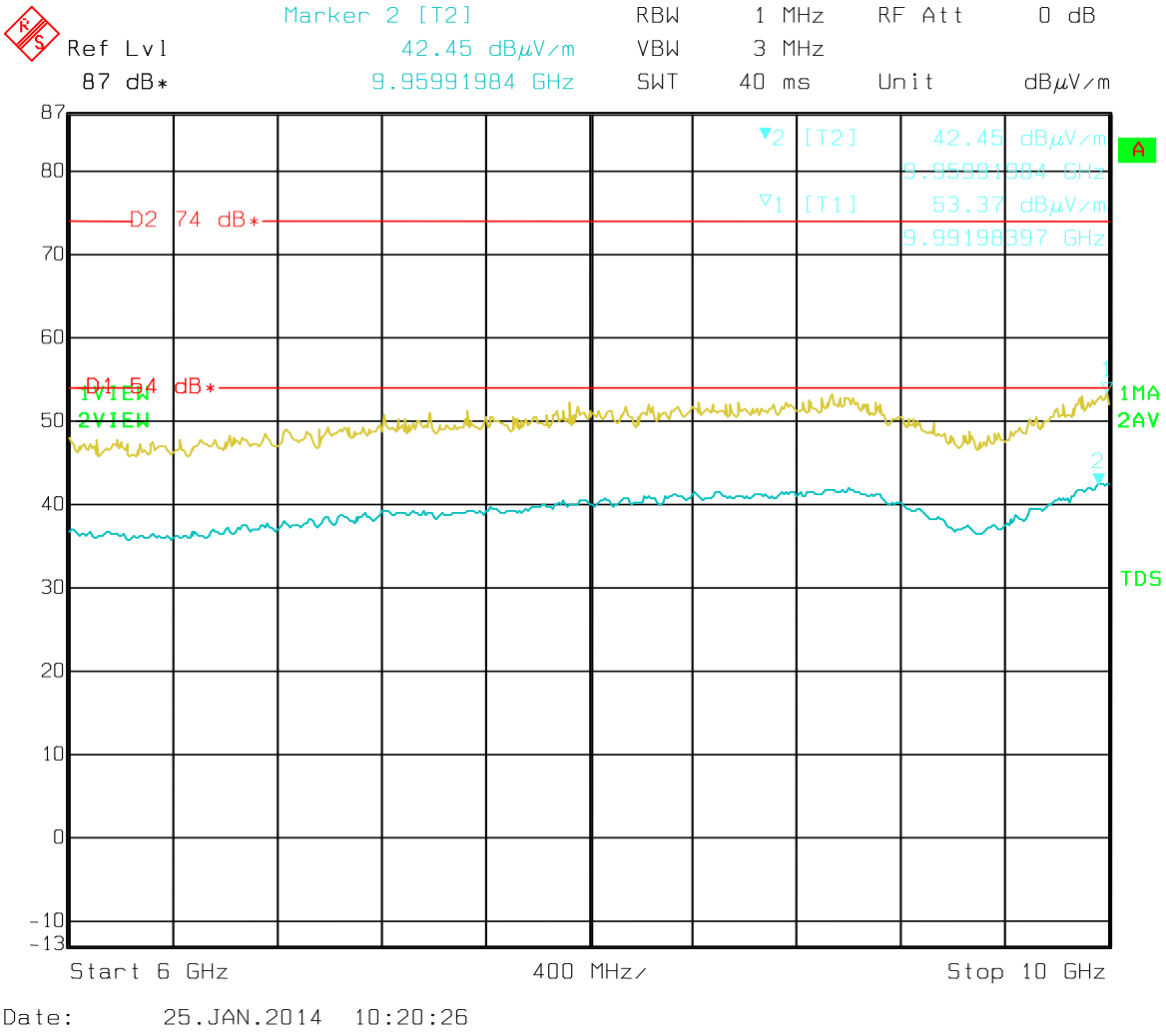
Graph 24 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 2 to 3GHz.



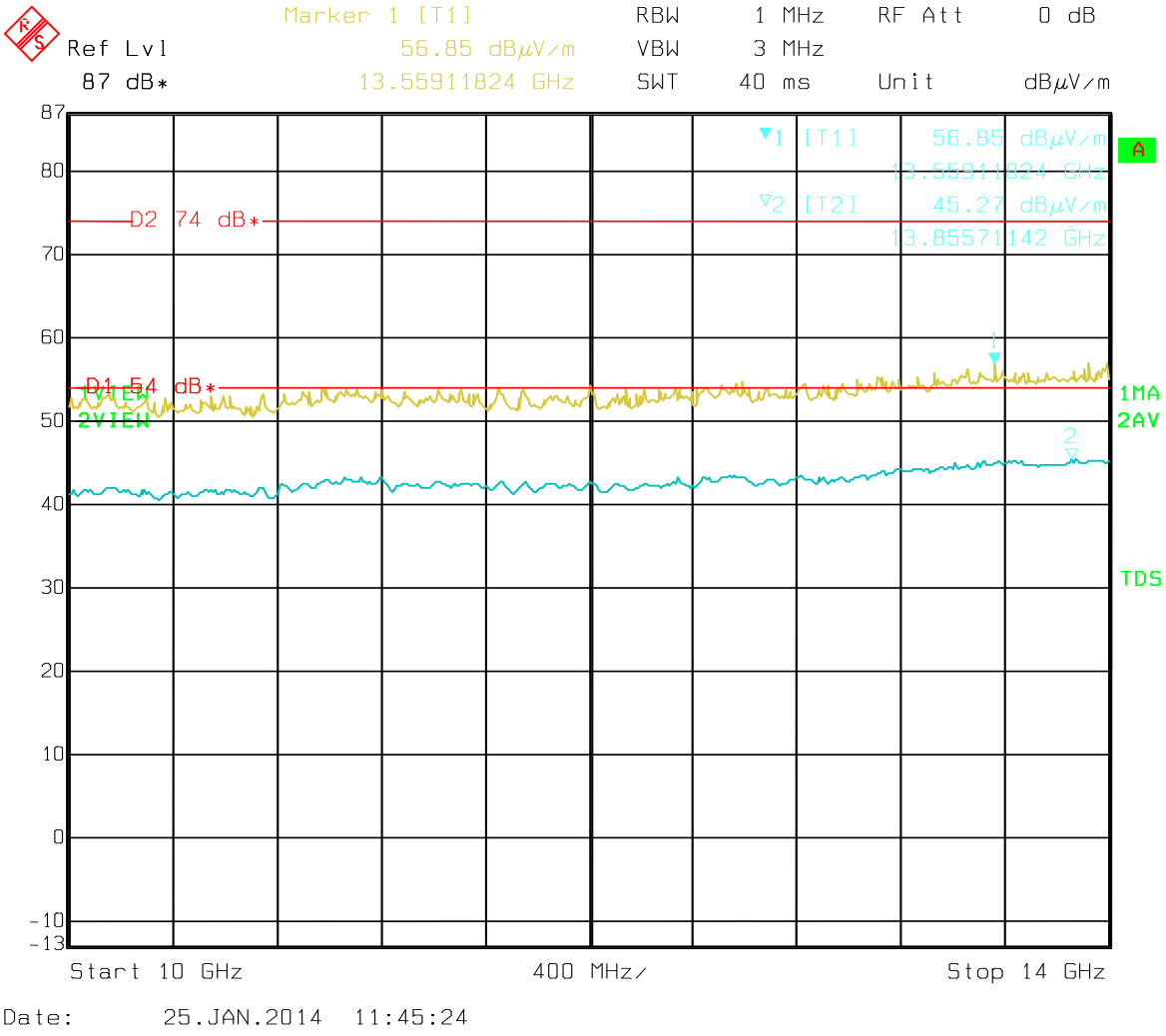
Graph 25 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 3 to 6GHz.



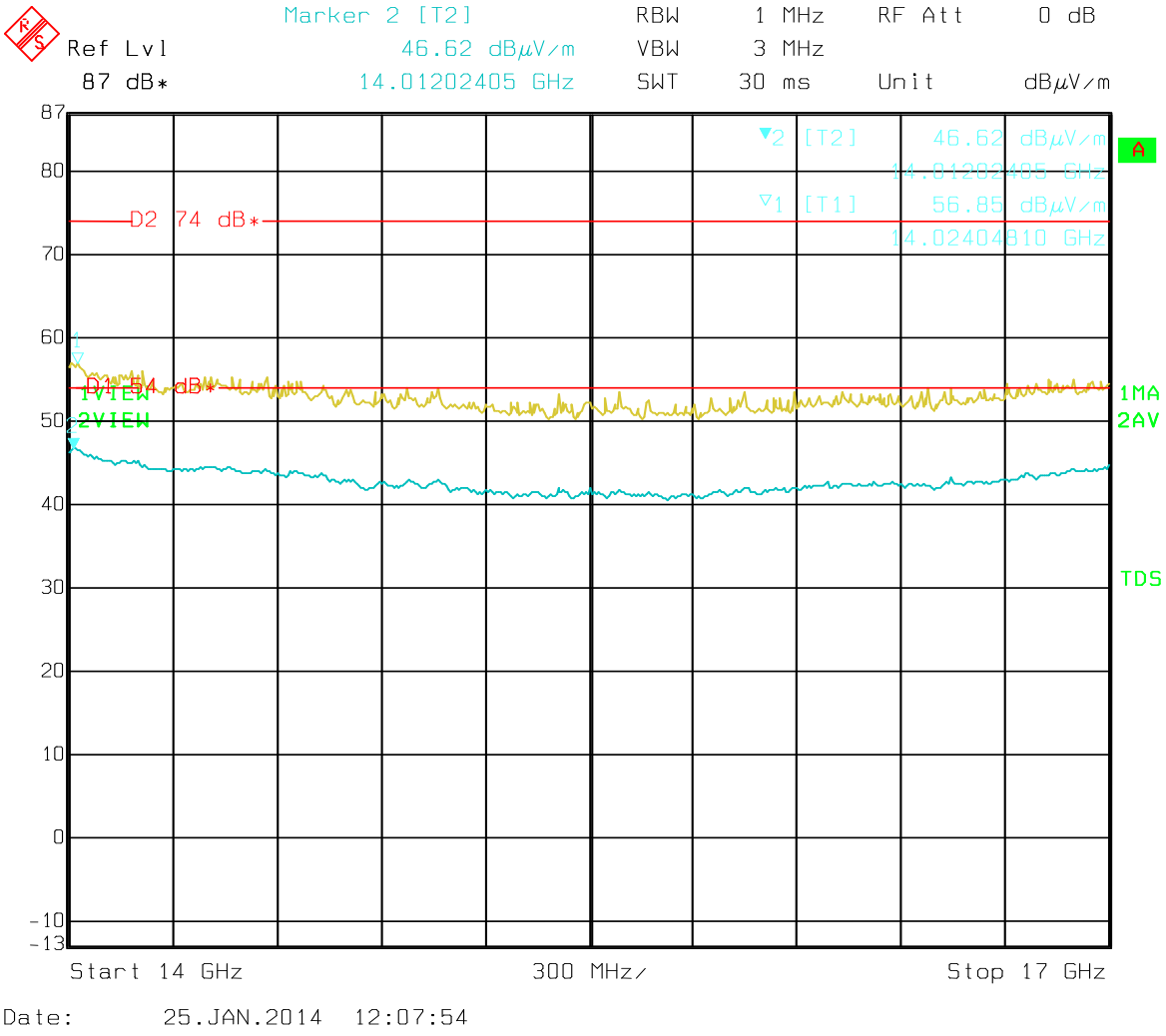
Graph 26 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 6 to 10GHz.



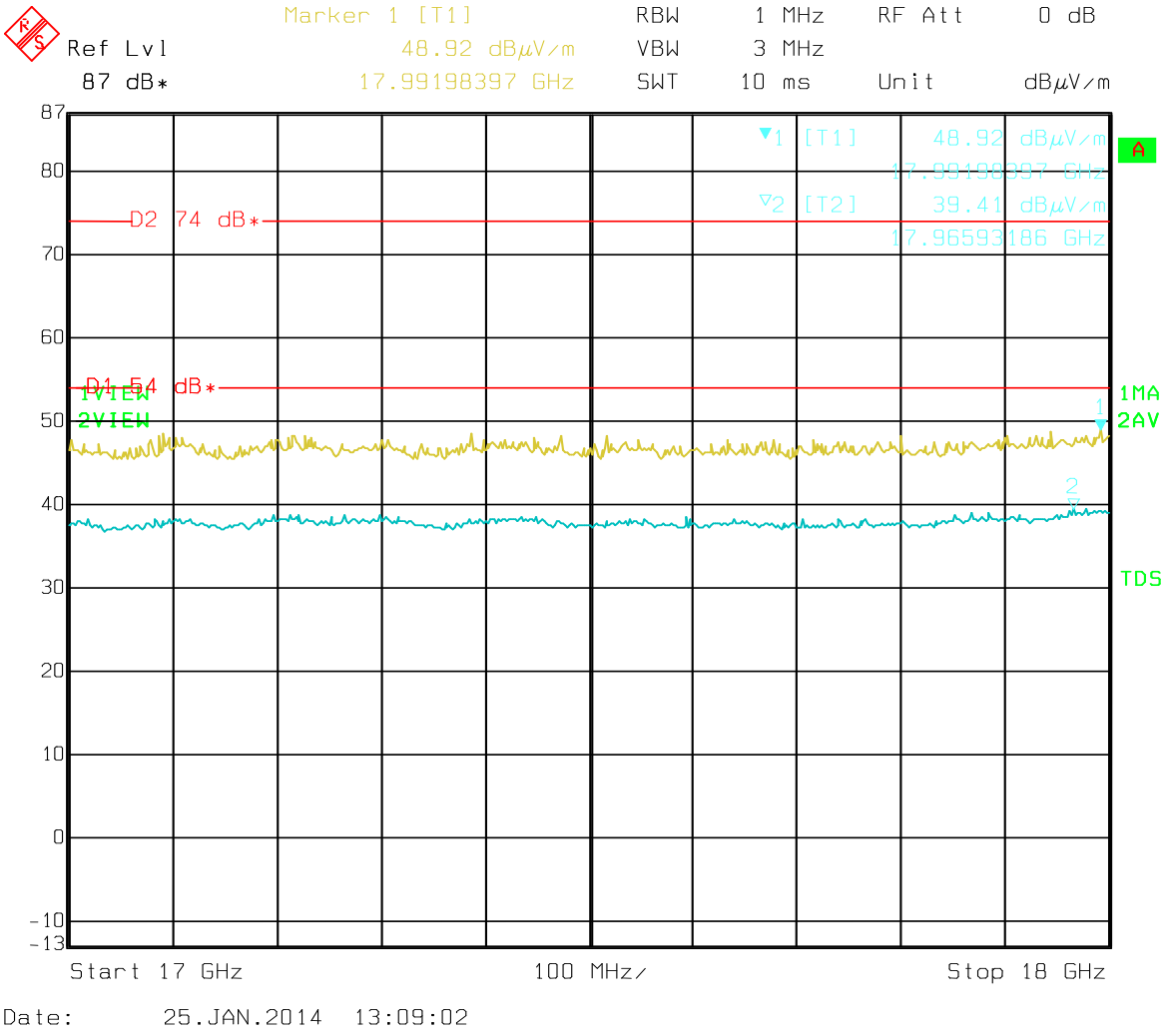
Graph 27 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 10 to 14GHz.



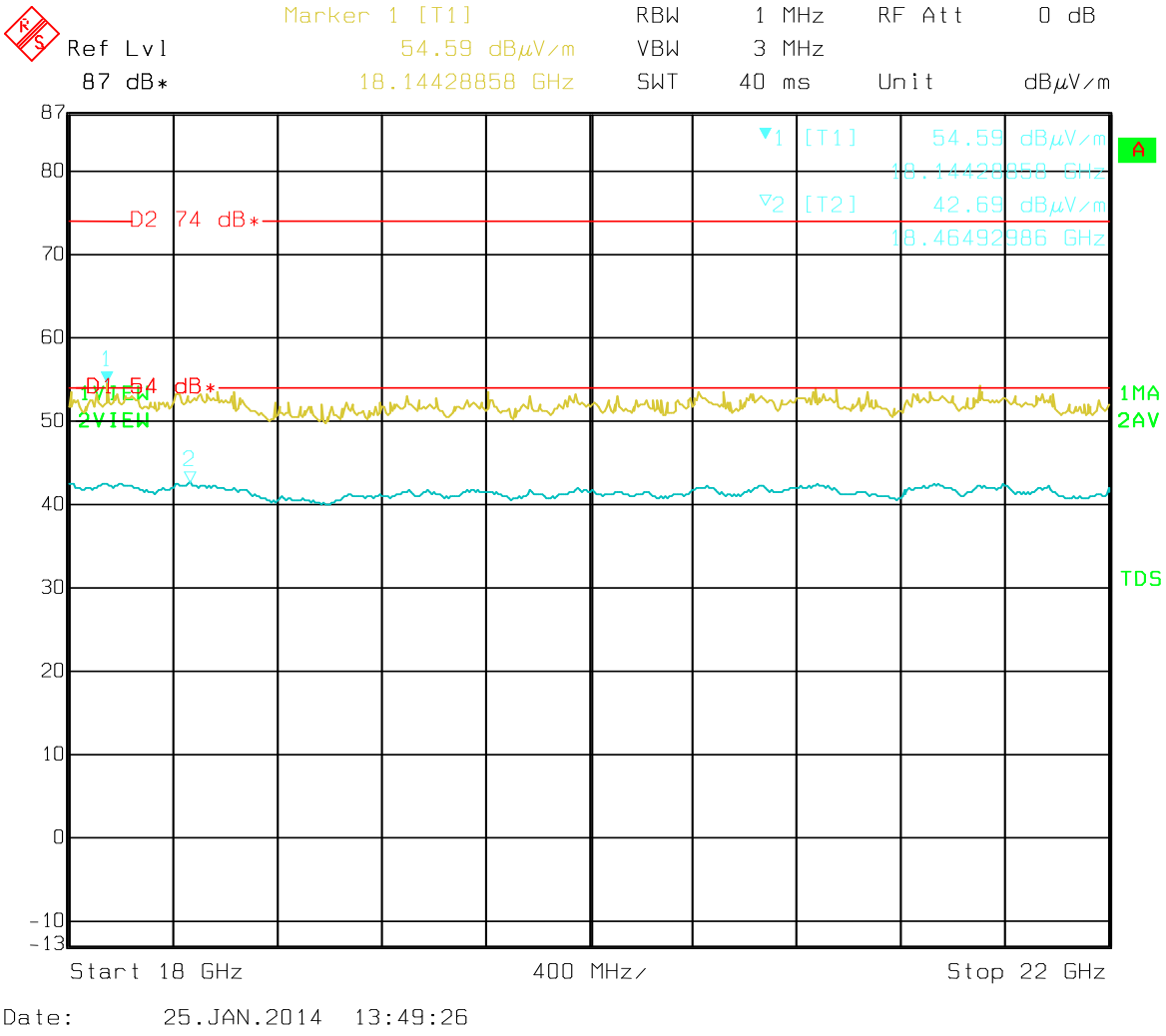
Graph 28 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 16 to 17GHz.



Graph 29 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 17 to 18GHz.



Graph 30 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 18 to 22GHz.



Graph 31 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Horizontal – 22 to 25GHz.

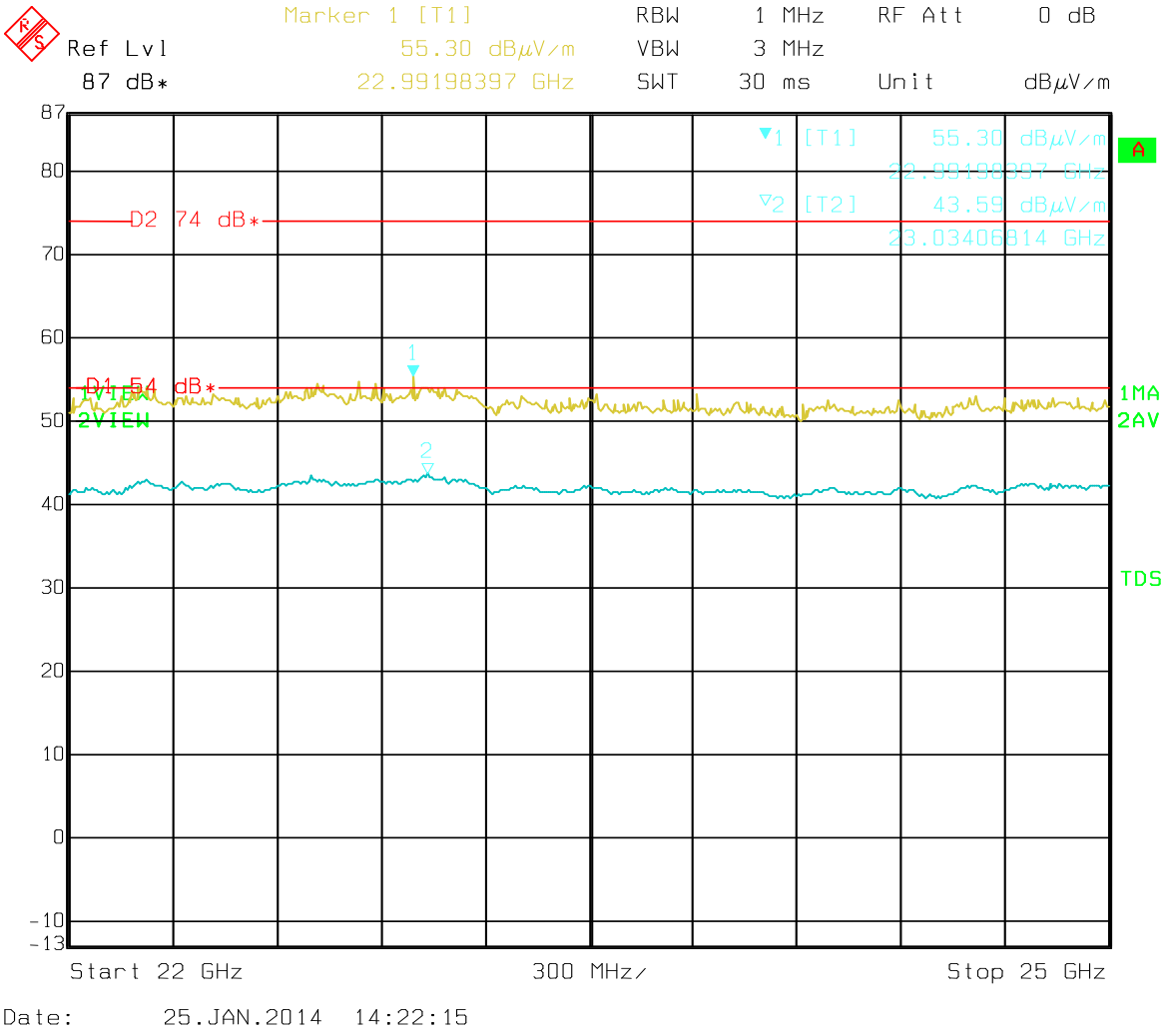


Table 8 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

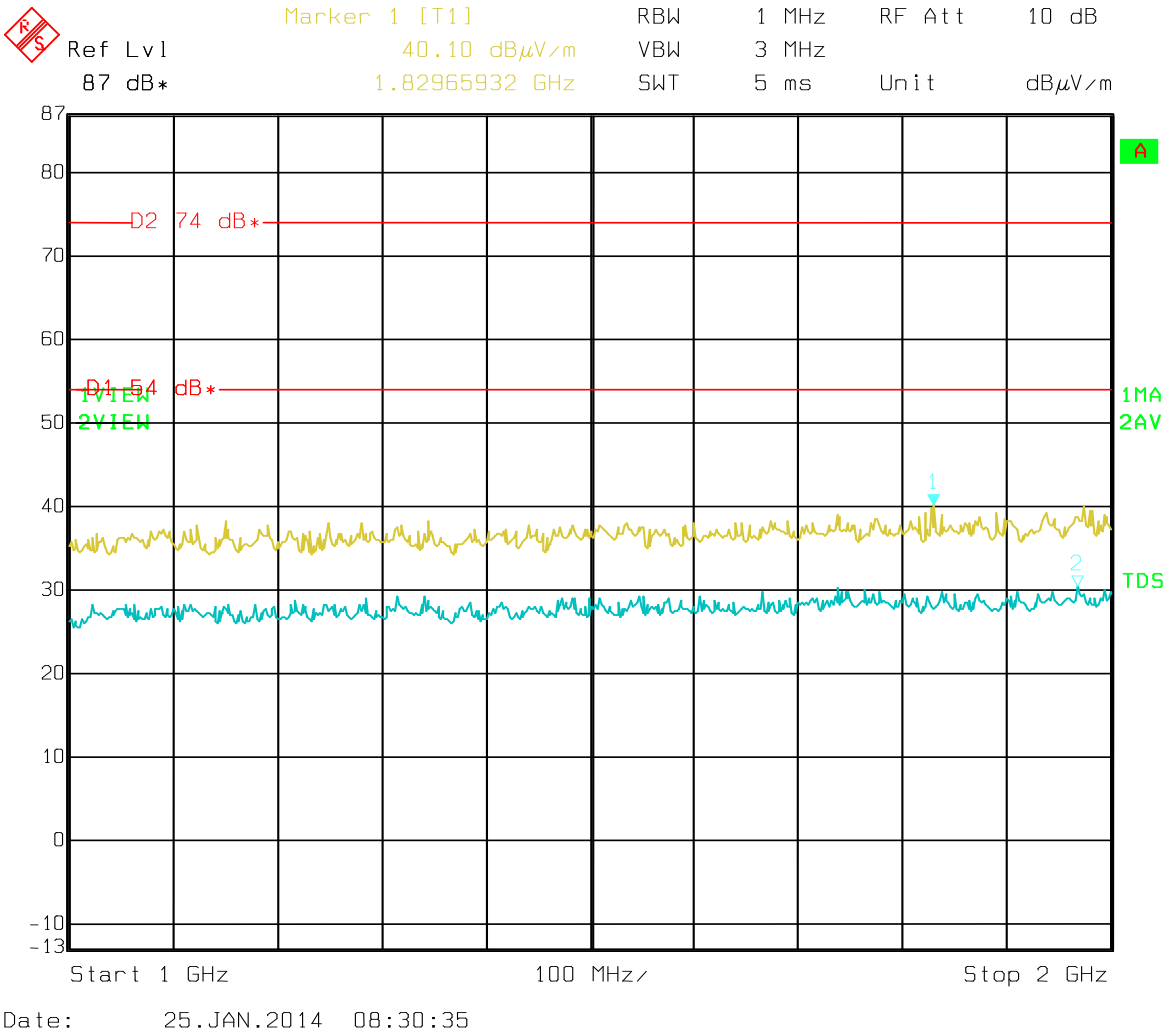
Units of measurement:

Frequency: GHz Amplitude: dBμV/m

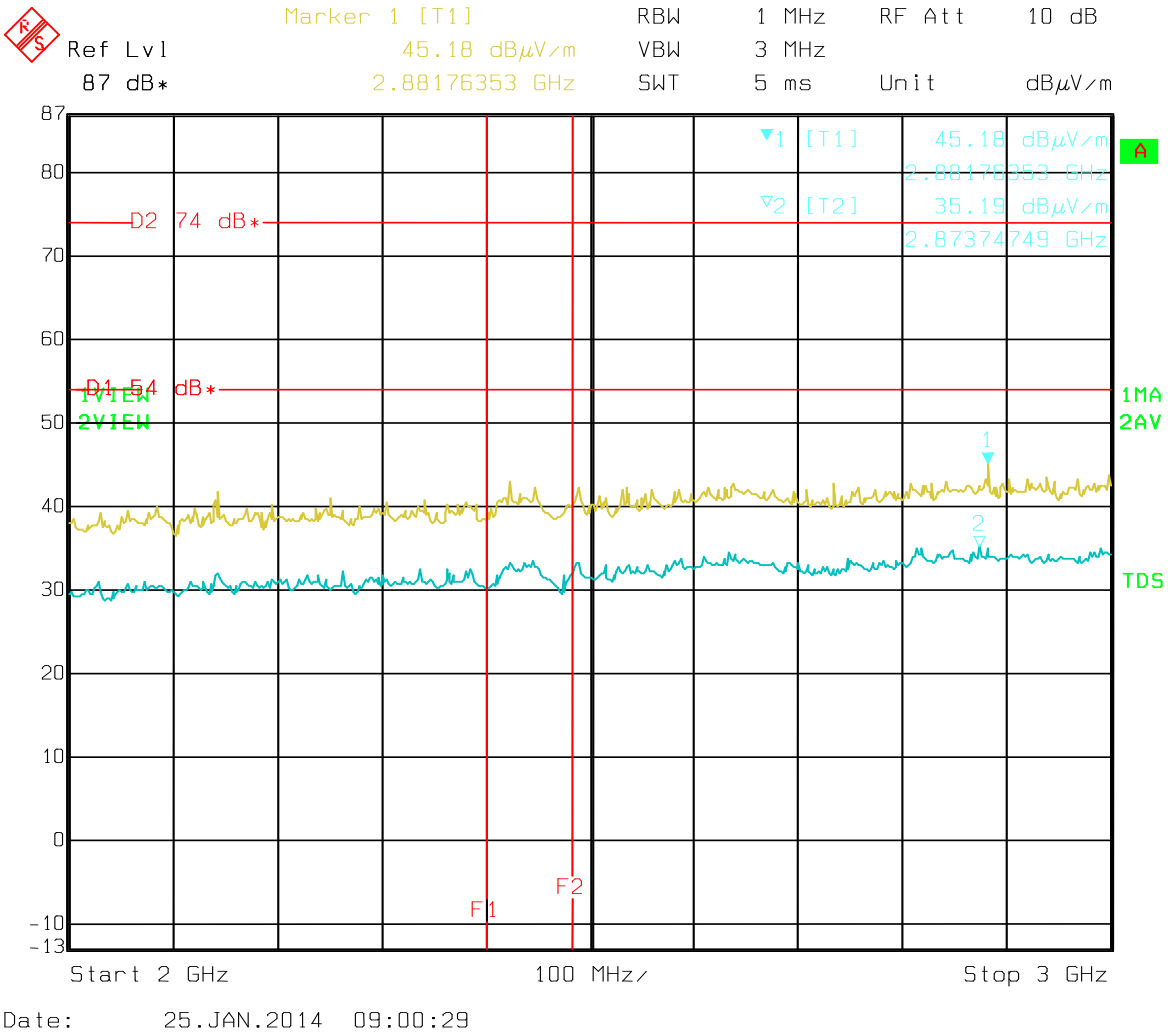
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

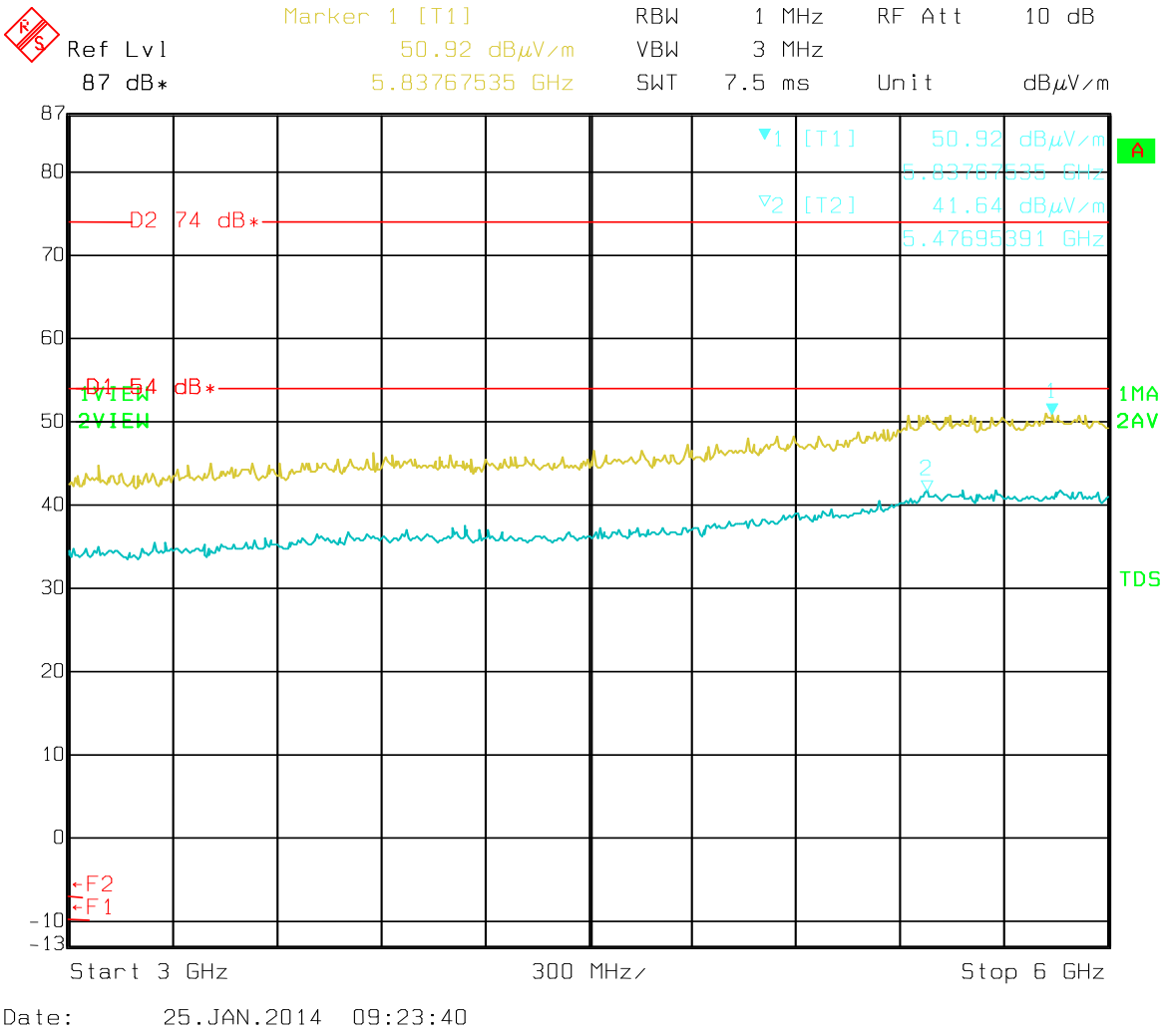
Graph 32 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 1 to 2GHz.



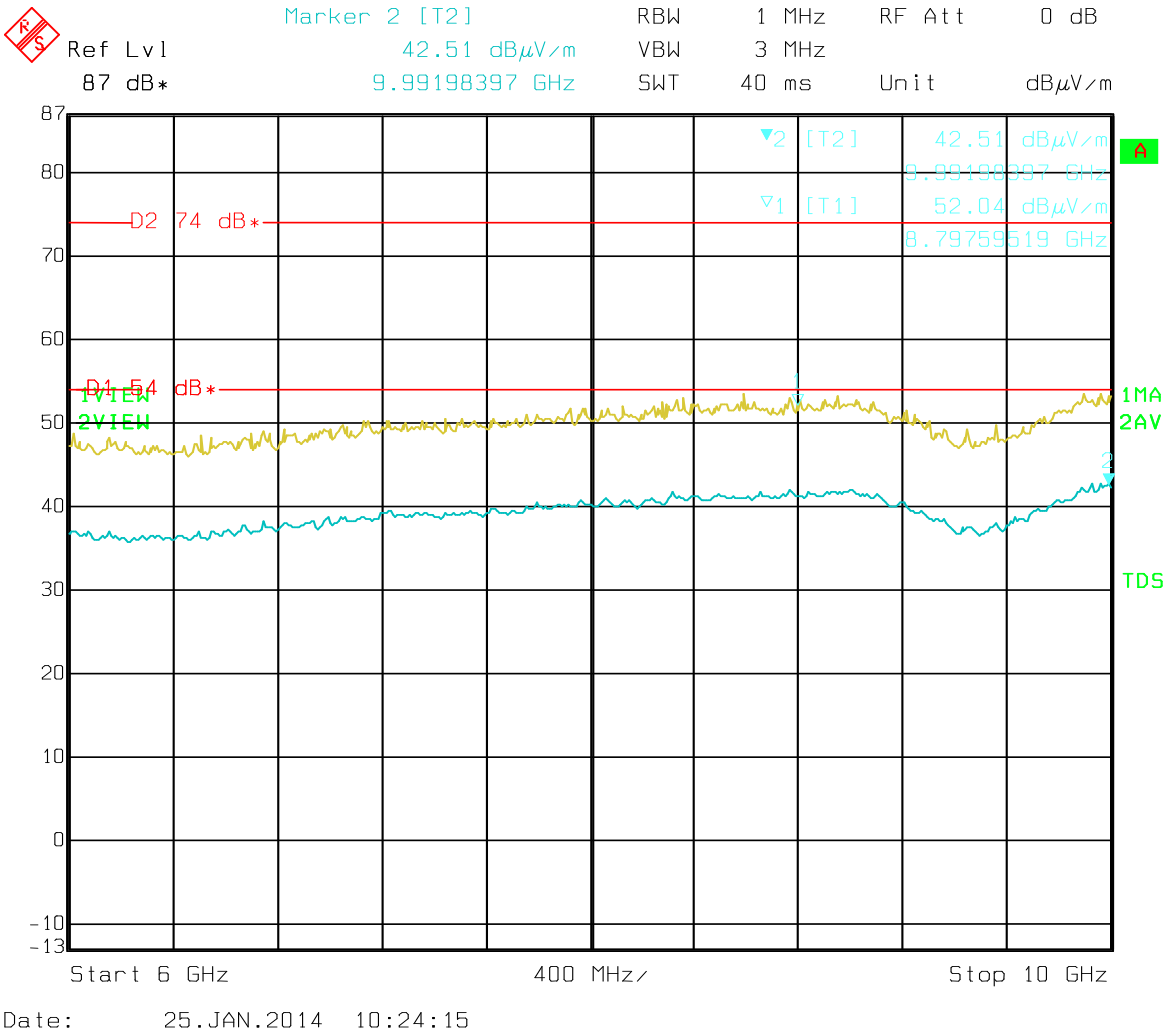
Graph 33 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 2 to 3GHz.



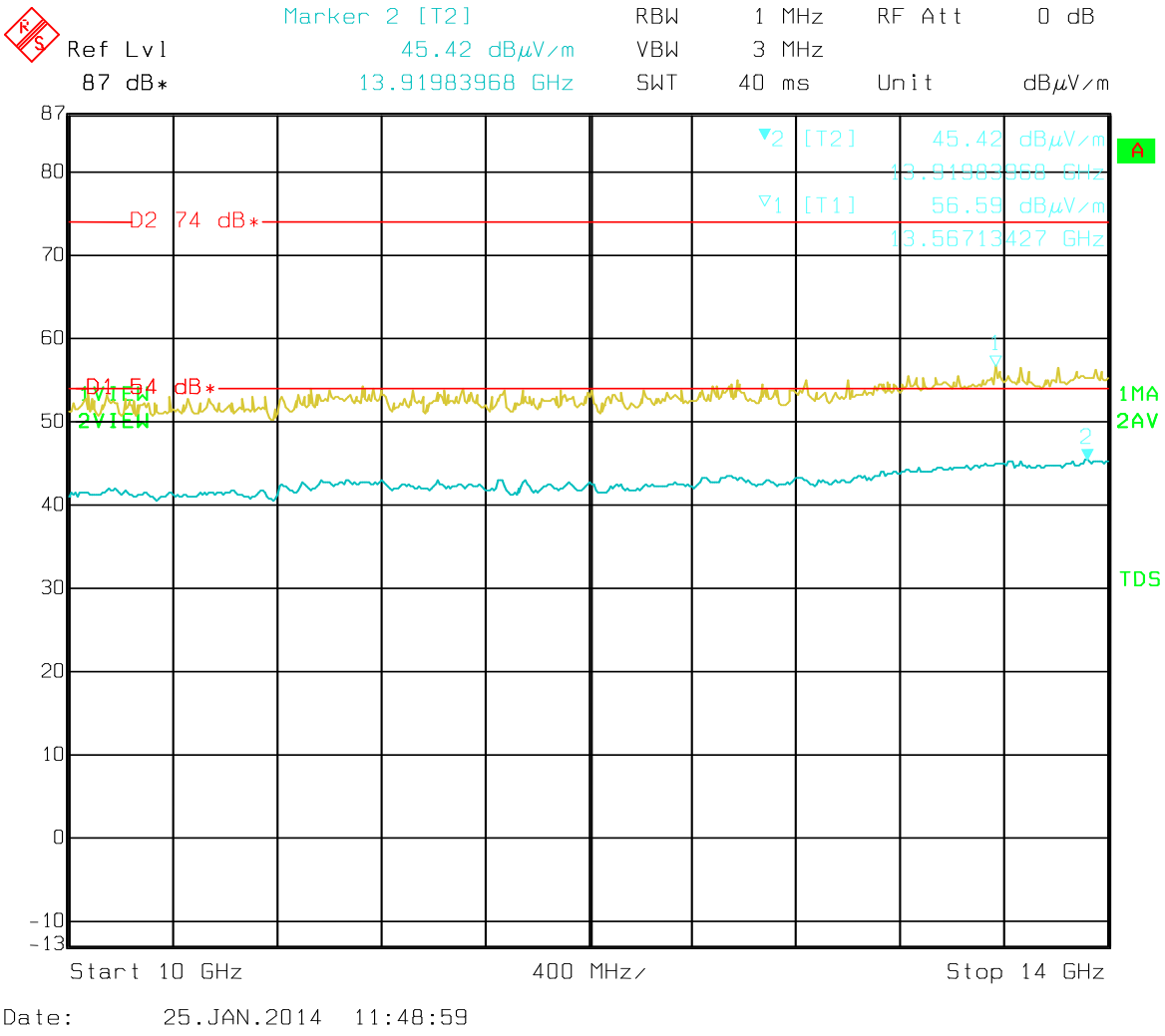
Graph 34 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 3 to 6GHz.



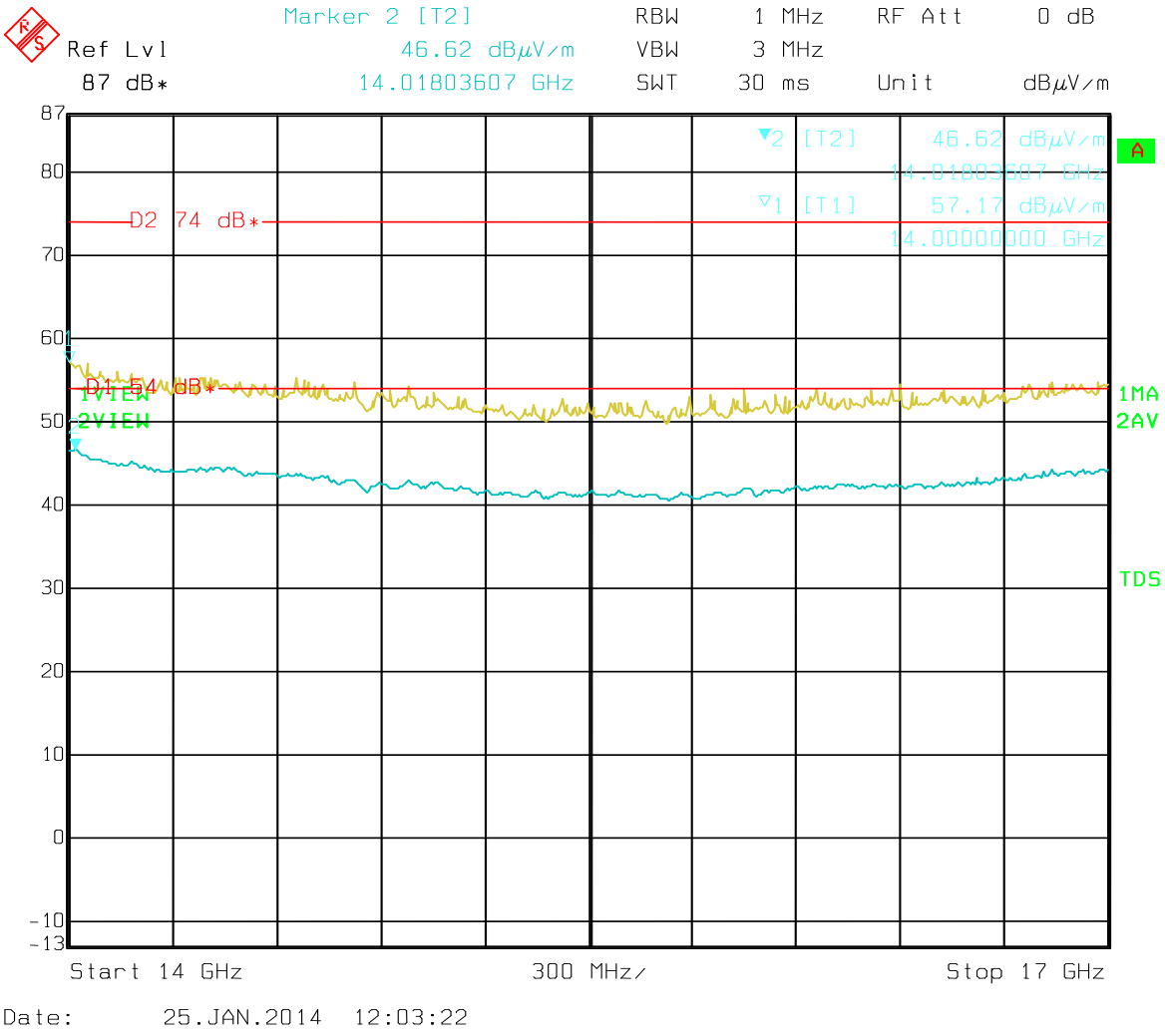
Graph 35 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 6 to 10GHz.



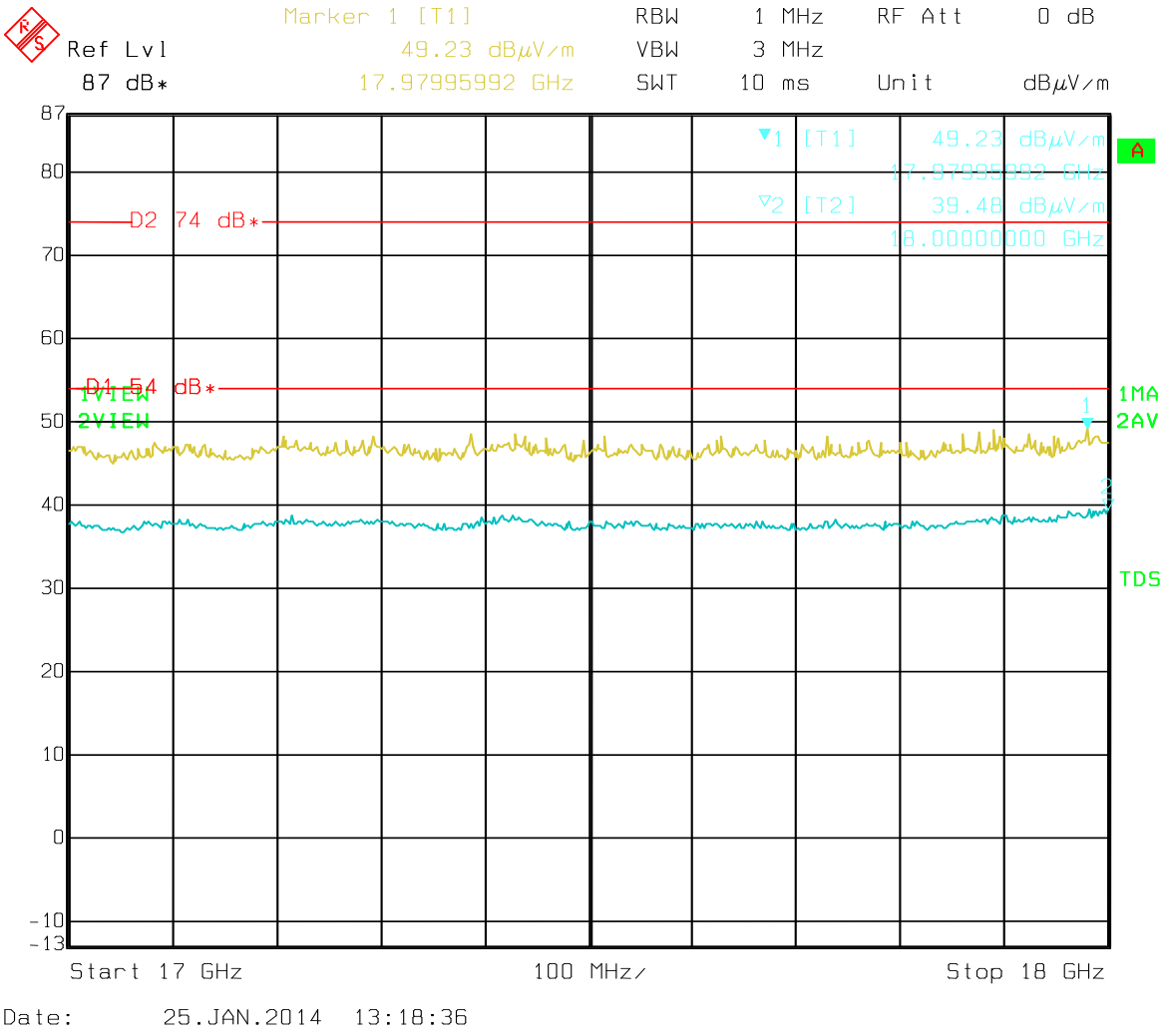
Graph 36 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 10 to 14GHz.



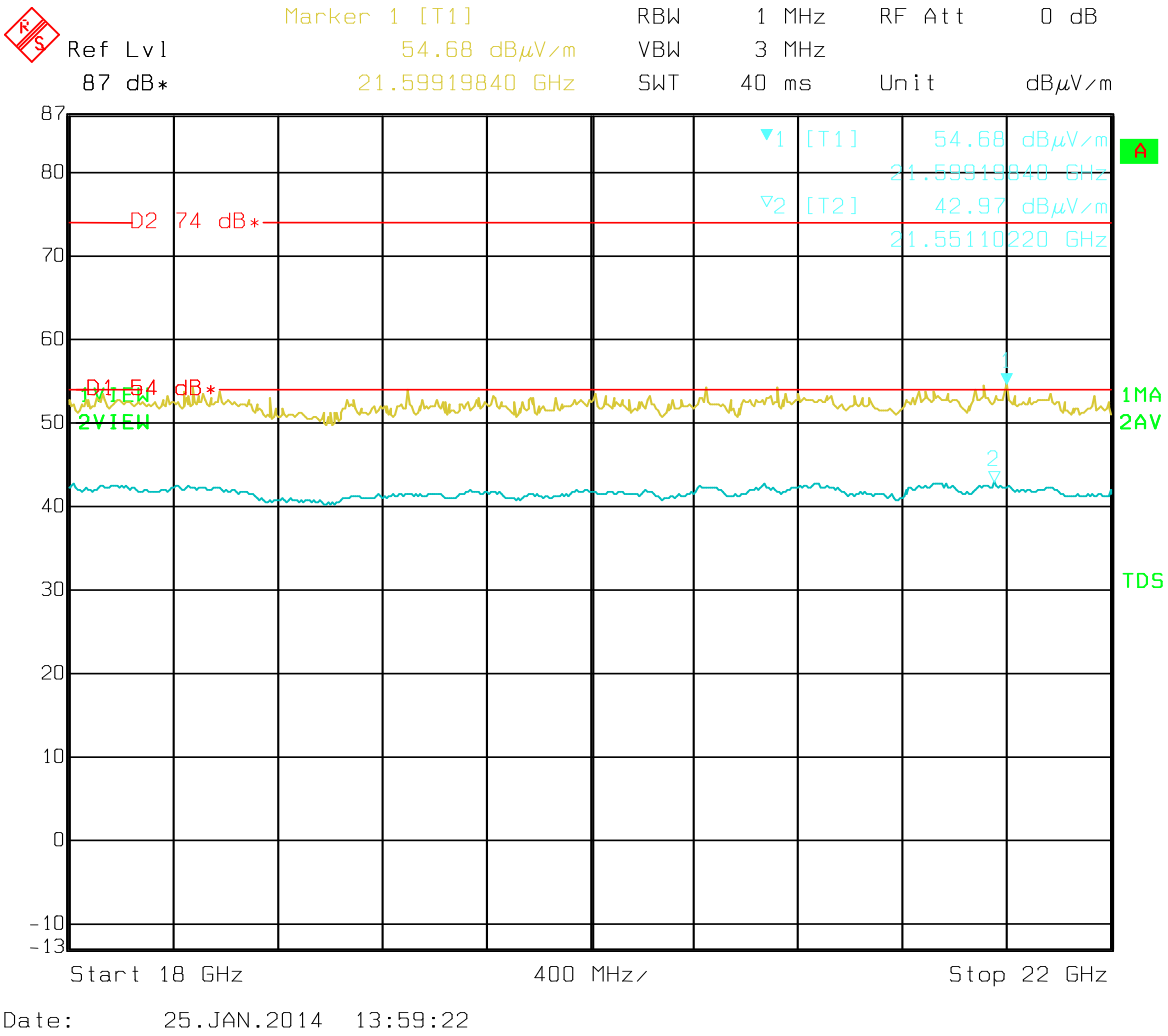
Graph 37 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 14 to 17GHz.



Graph 38 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 17 to 18GHz.



Graph 39 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 18 to 22GHz.



Graph 40 Radiated Emissions Test Results – Mode 2 – Receive Ch18 – Vertical – 22 to 25GHz.

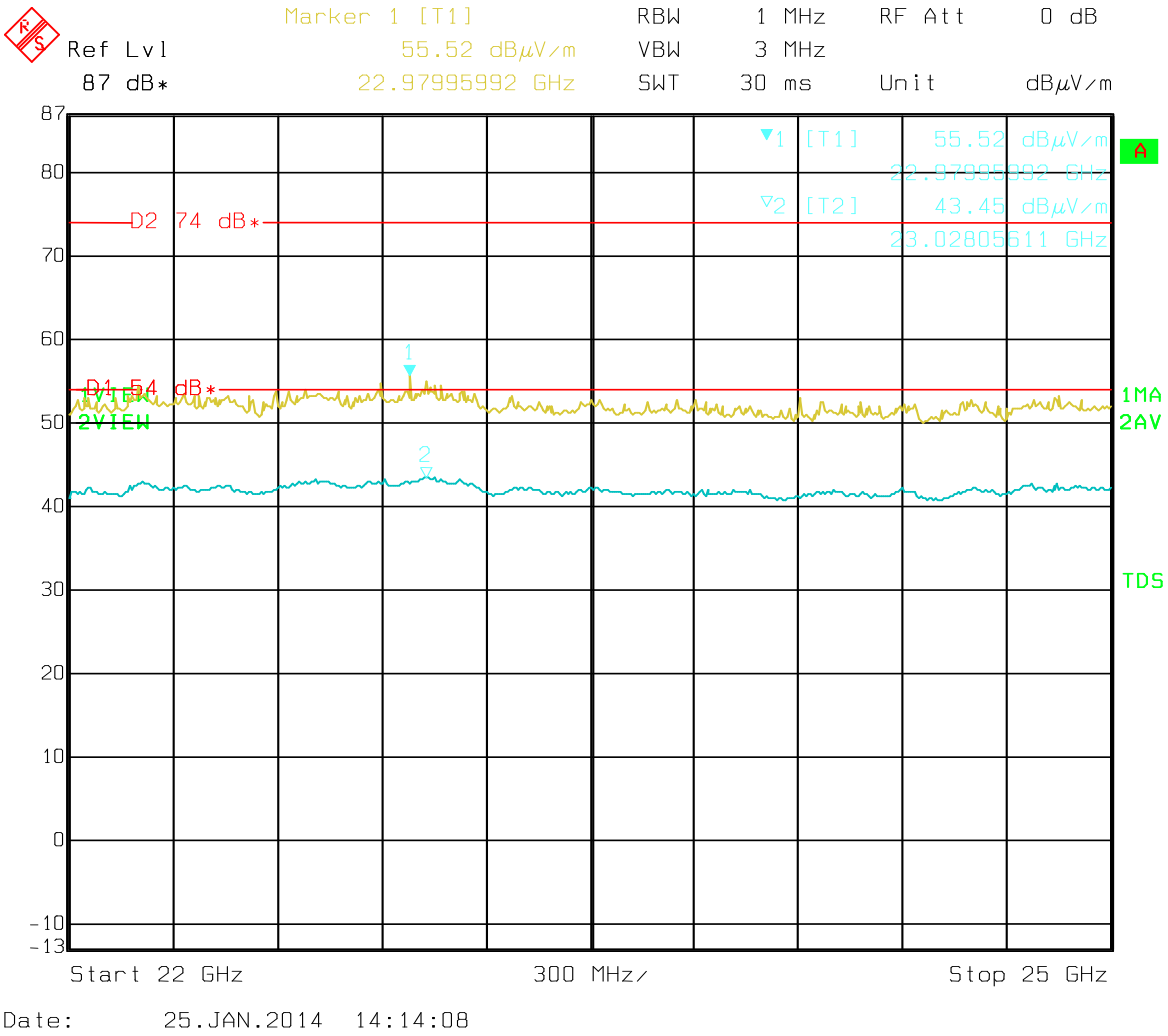


Table 9 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.72 MHz	26.32	-13.67
1 Quasi Peak	240 MHz	39.48	-6.53
1 Quasi Peak	288 MHz	38.45	-7.56
1 Quasi Peak	375 MHz	36.18	-9.83
1 Quasi Peak	750 MHz	37.19	-8.82
1 Quasi Peak	956.16 MHz	33.19	-12.82

Graph 41 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal.

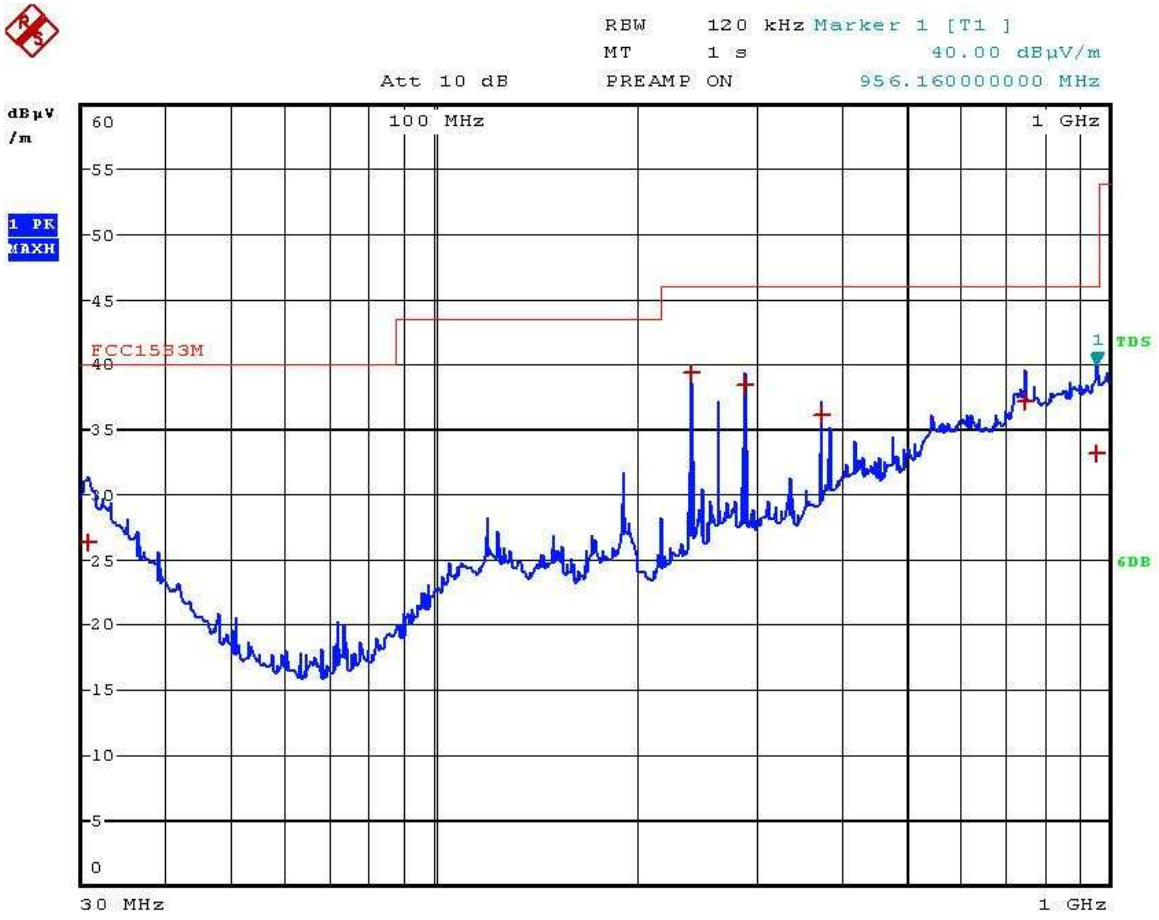


Table 10 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.48 MHz	26.47	-13.52
1 Quasi Peak	216 MHz	32.47	-13.54
1 Quasi Peak	240 MHz	35.18	-10.84
1 Quasi Peak	375 MHz	33.46	-12.55
1 Quasi Peak	565.4 MHz	30.14	-15.87
1 Quasi Peak	880.68 MHz	32.84	-13.17

Graph 42 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical.

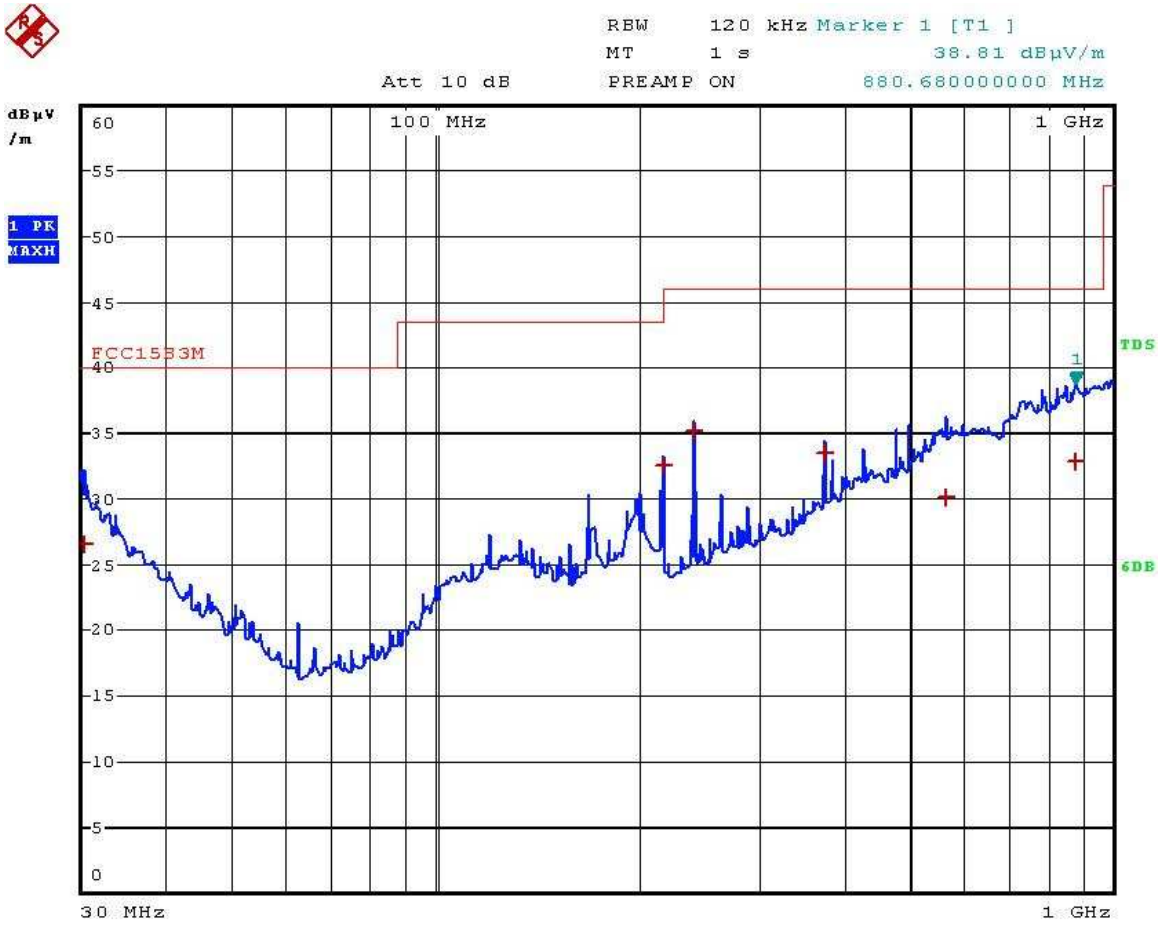


Table 11 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

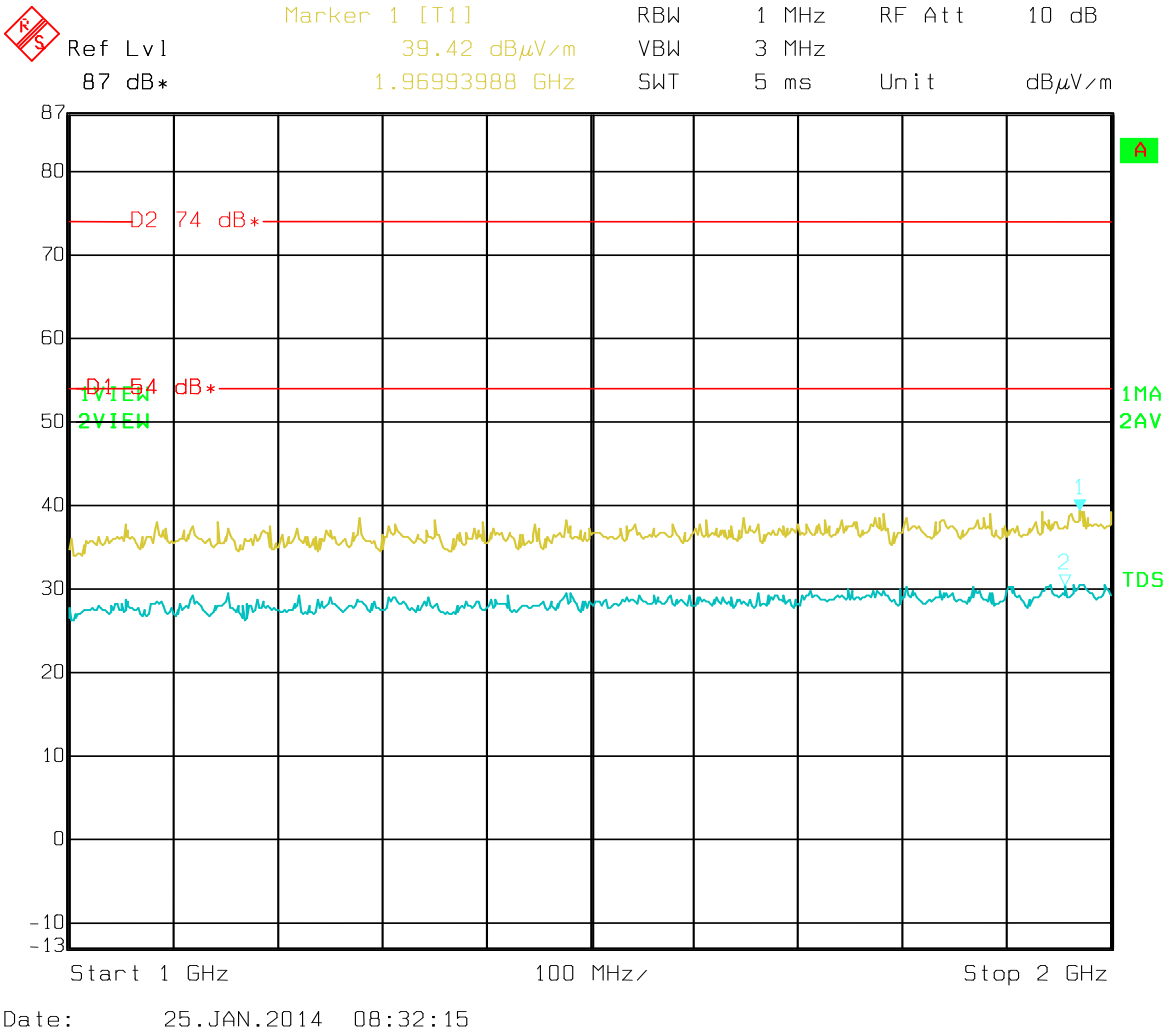
Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBµV/m

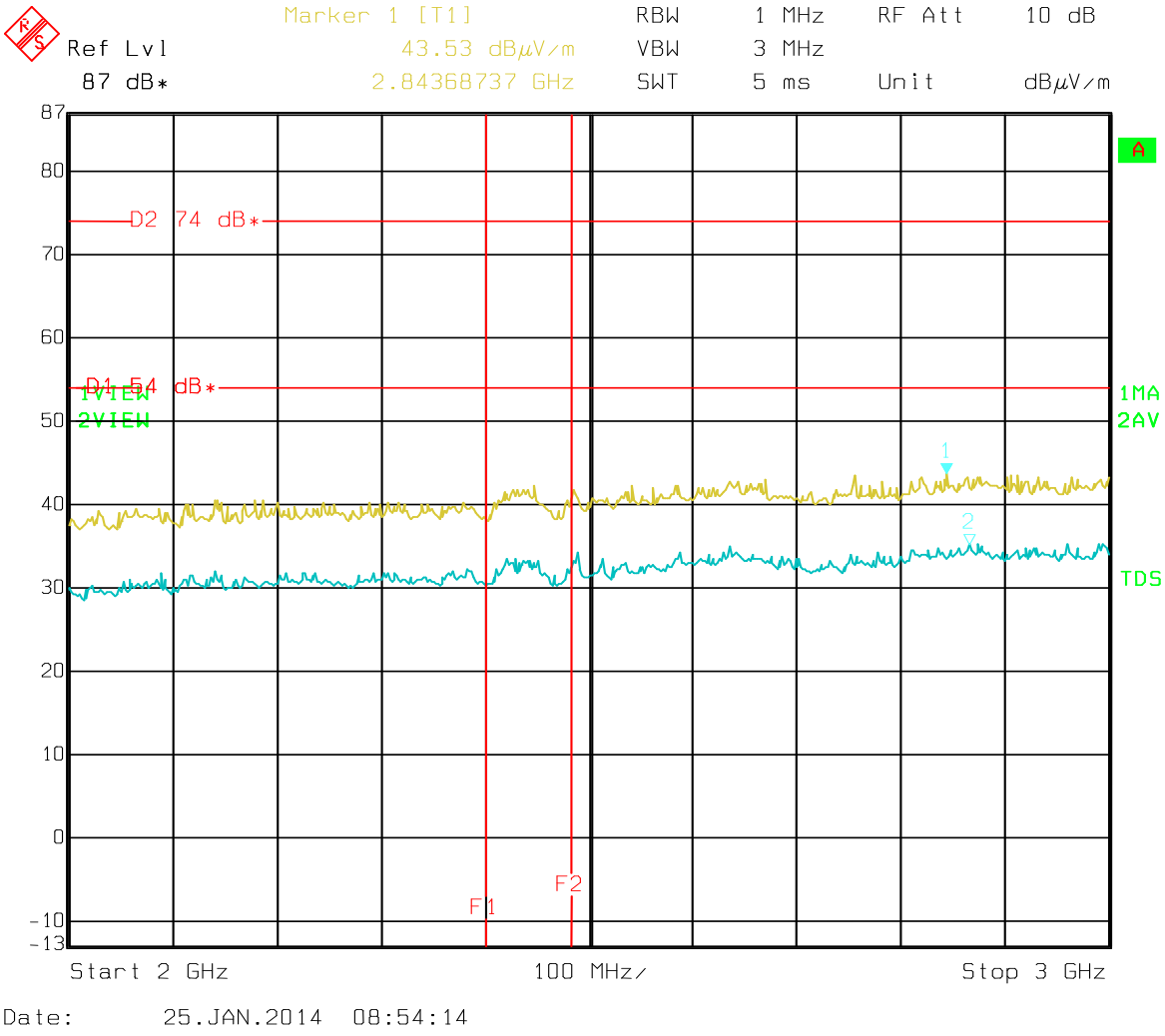
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

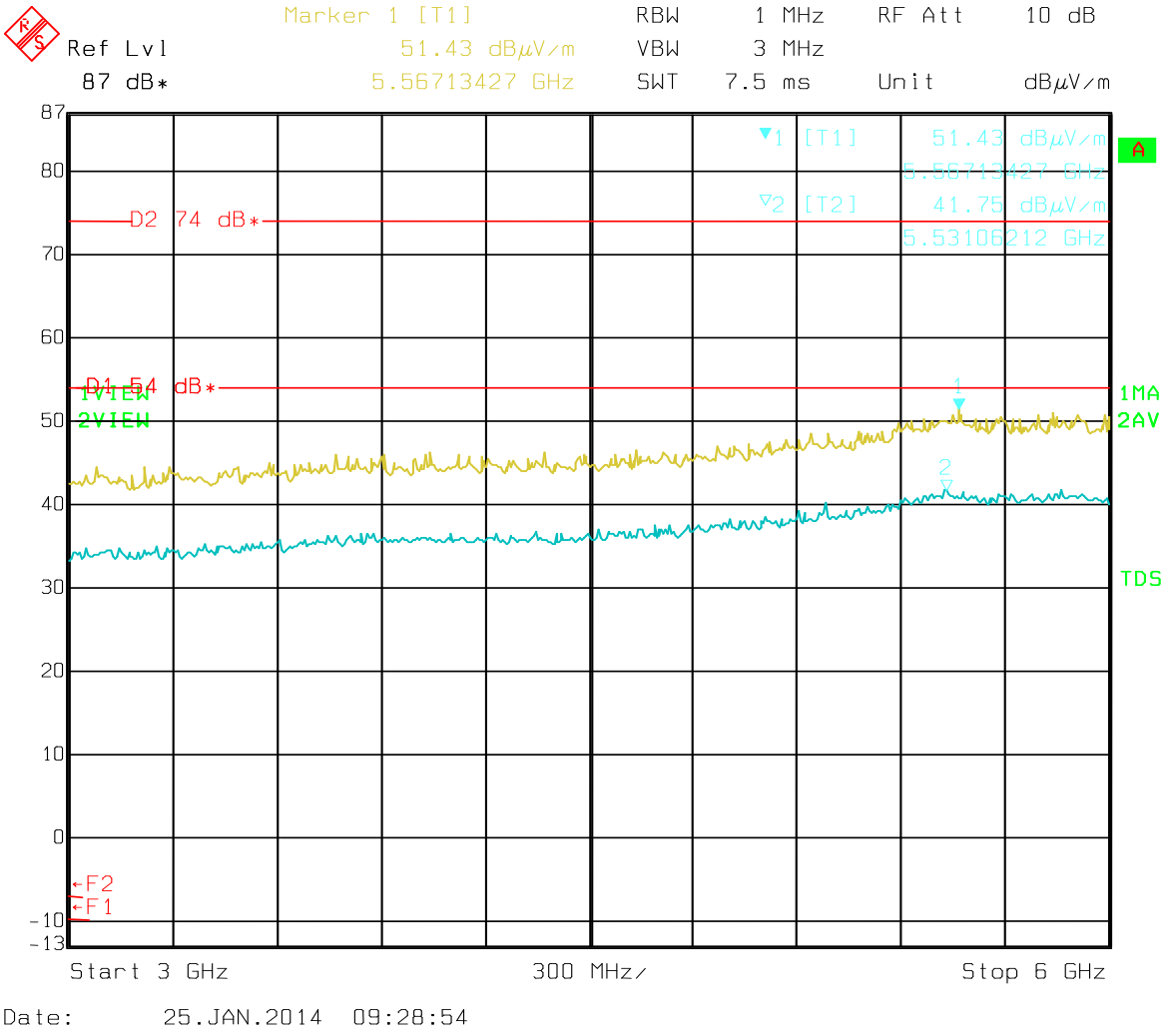
Graph 43 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 1 to 2GHz.



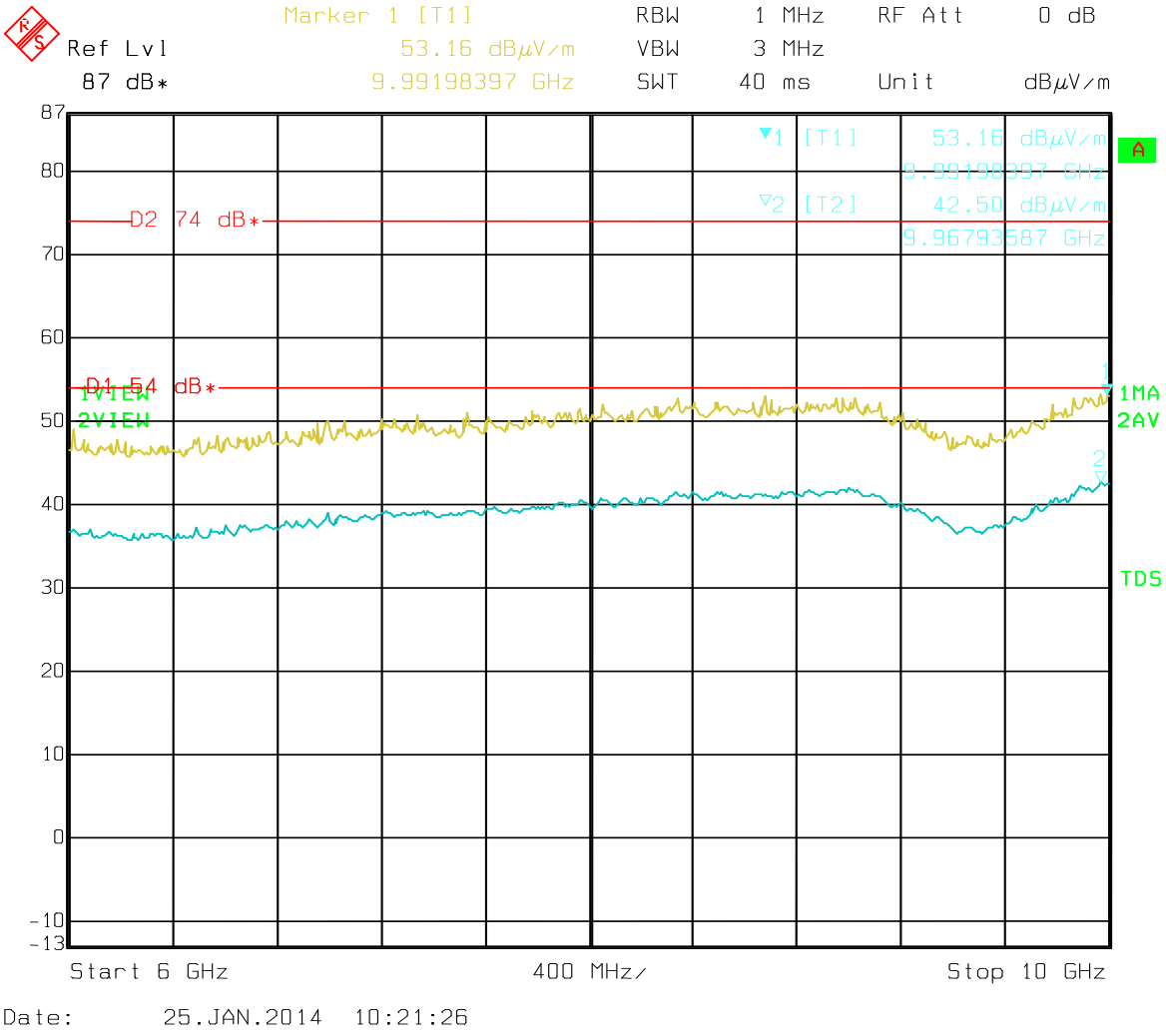
Graph 44 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 2 to 3GHz.



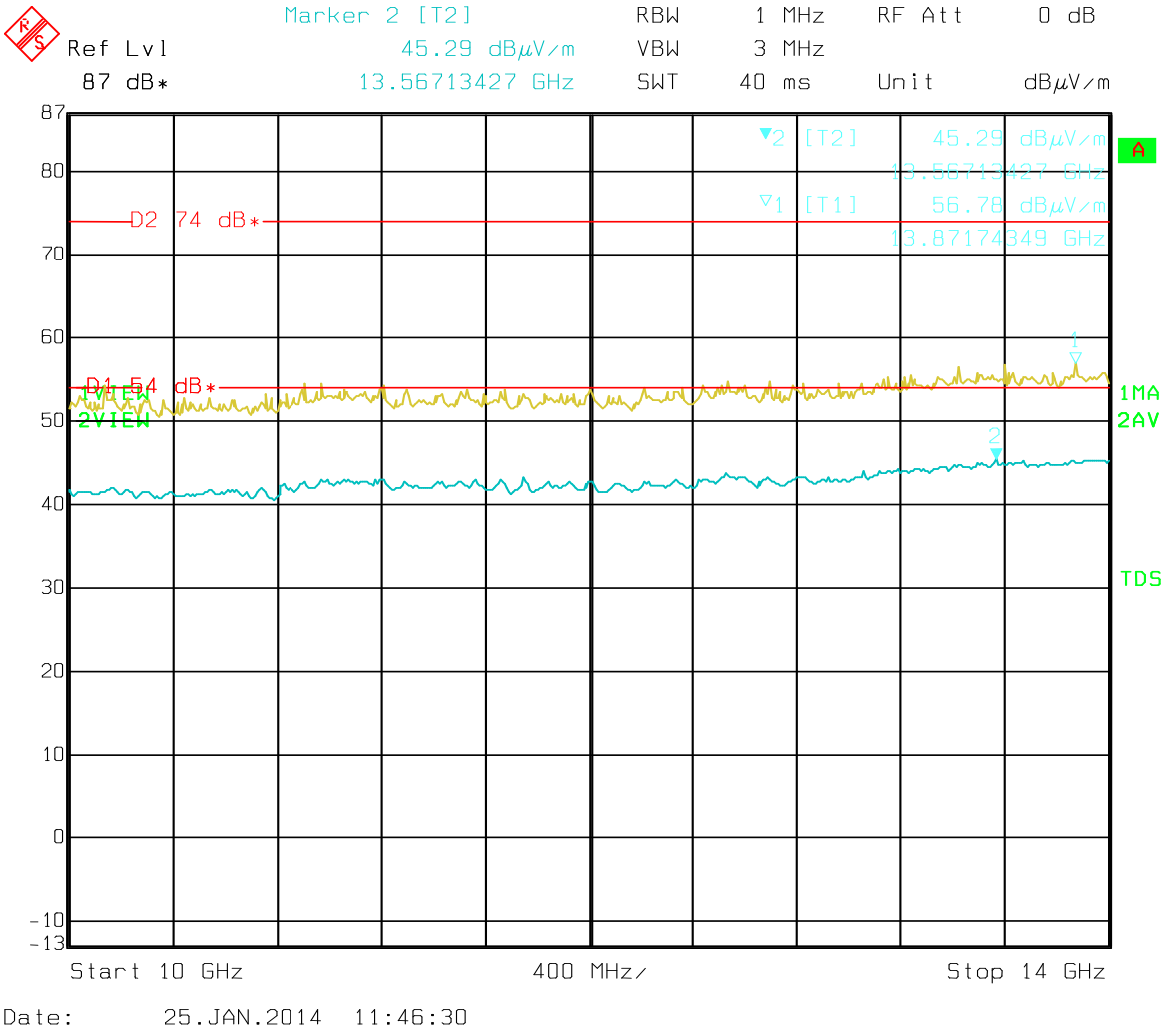
Graph 45 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 3 to 6GHz.



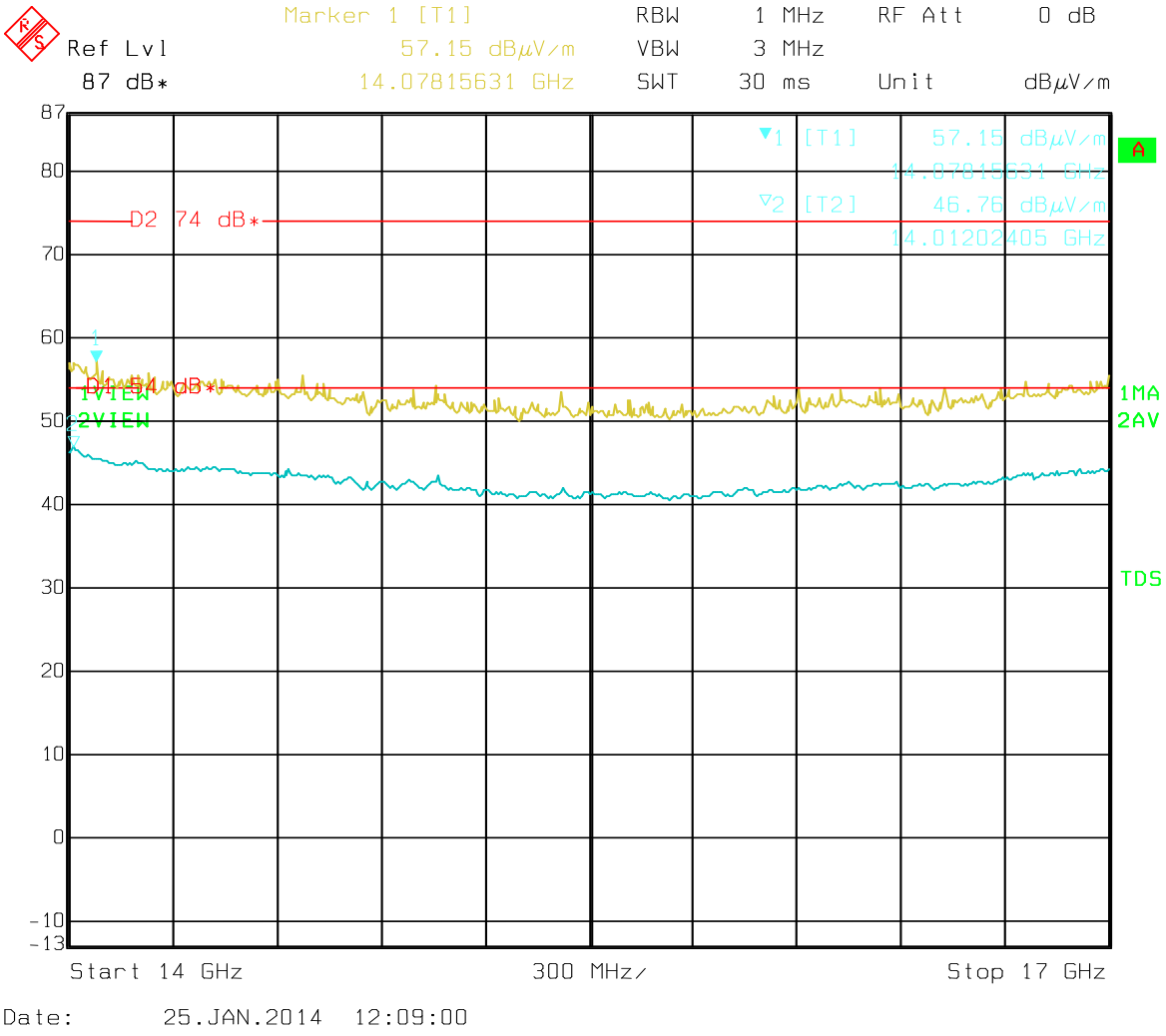
Graph 46 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 6 to 10GHz.



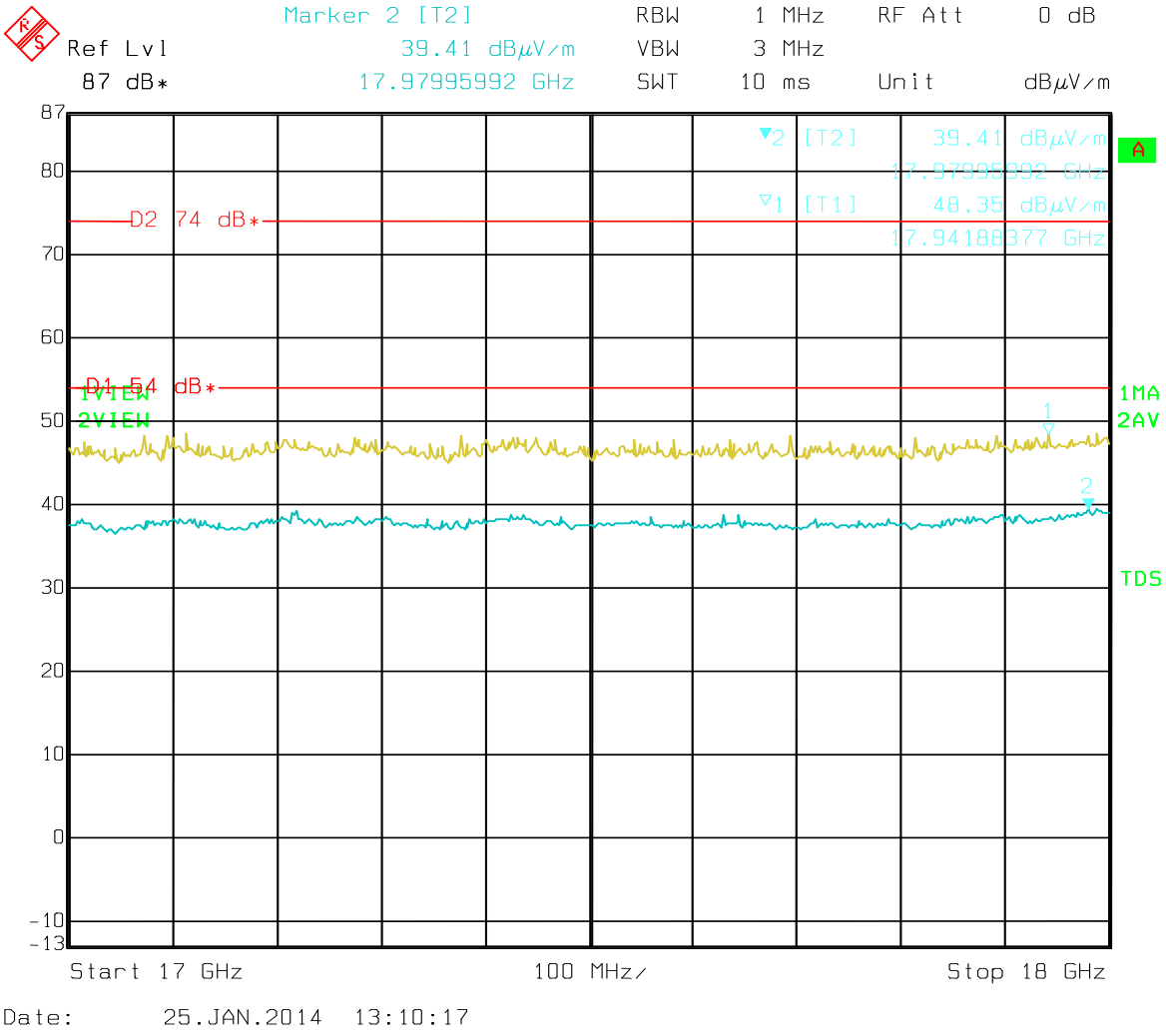
Graph 47 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 10 to 14GHz.



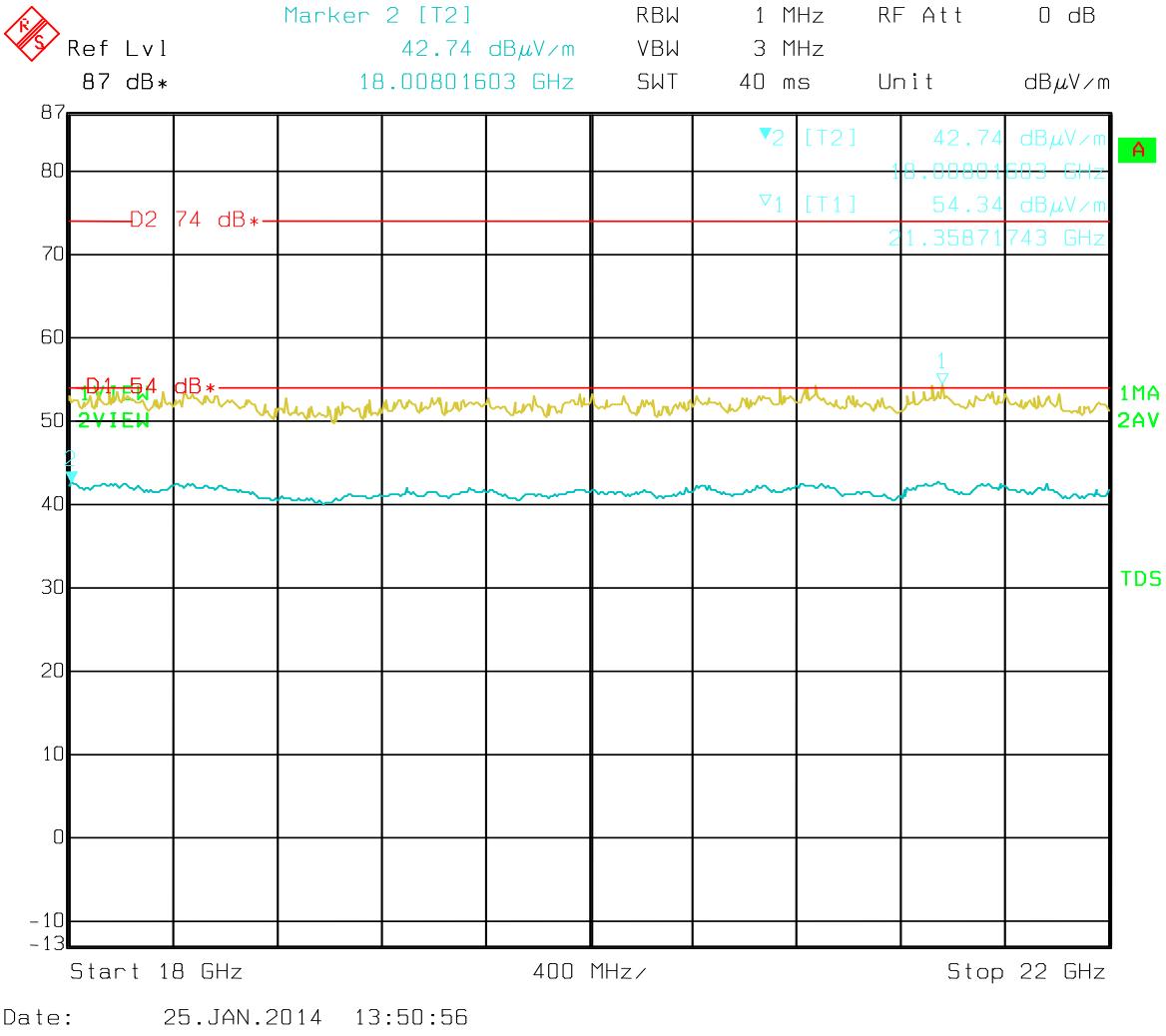
Graph 48 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 14 to 17GHz.



Graph 49 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 17 to 18GHz.



Graph 50 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 18 to 22GHz.



Graph 51 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Horizontal – 22 to 25GHz.

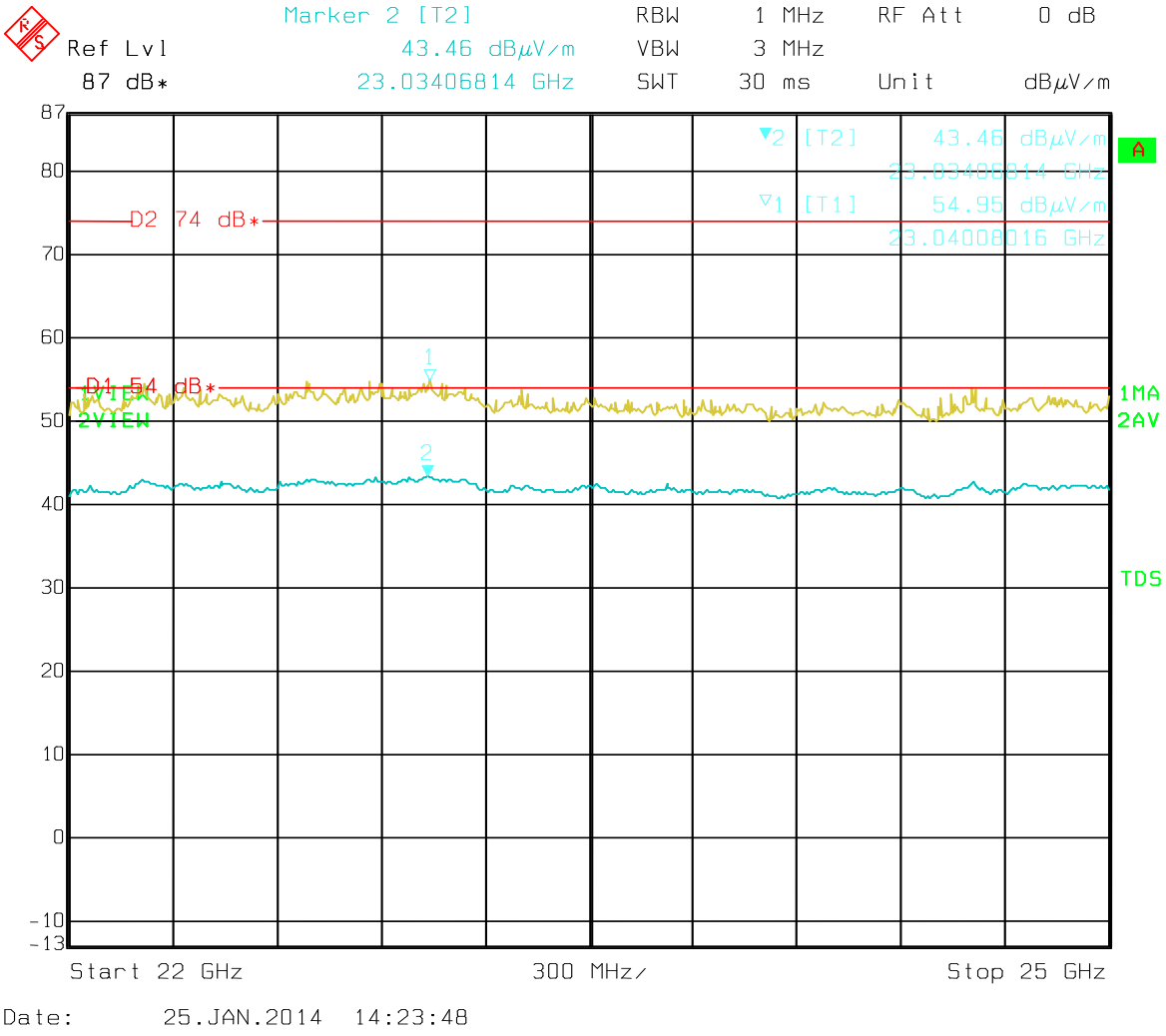


Table 12 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

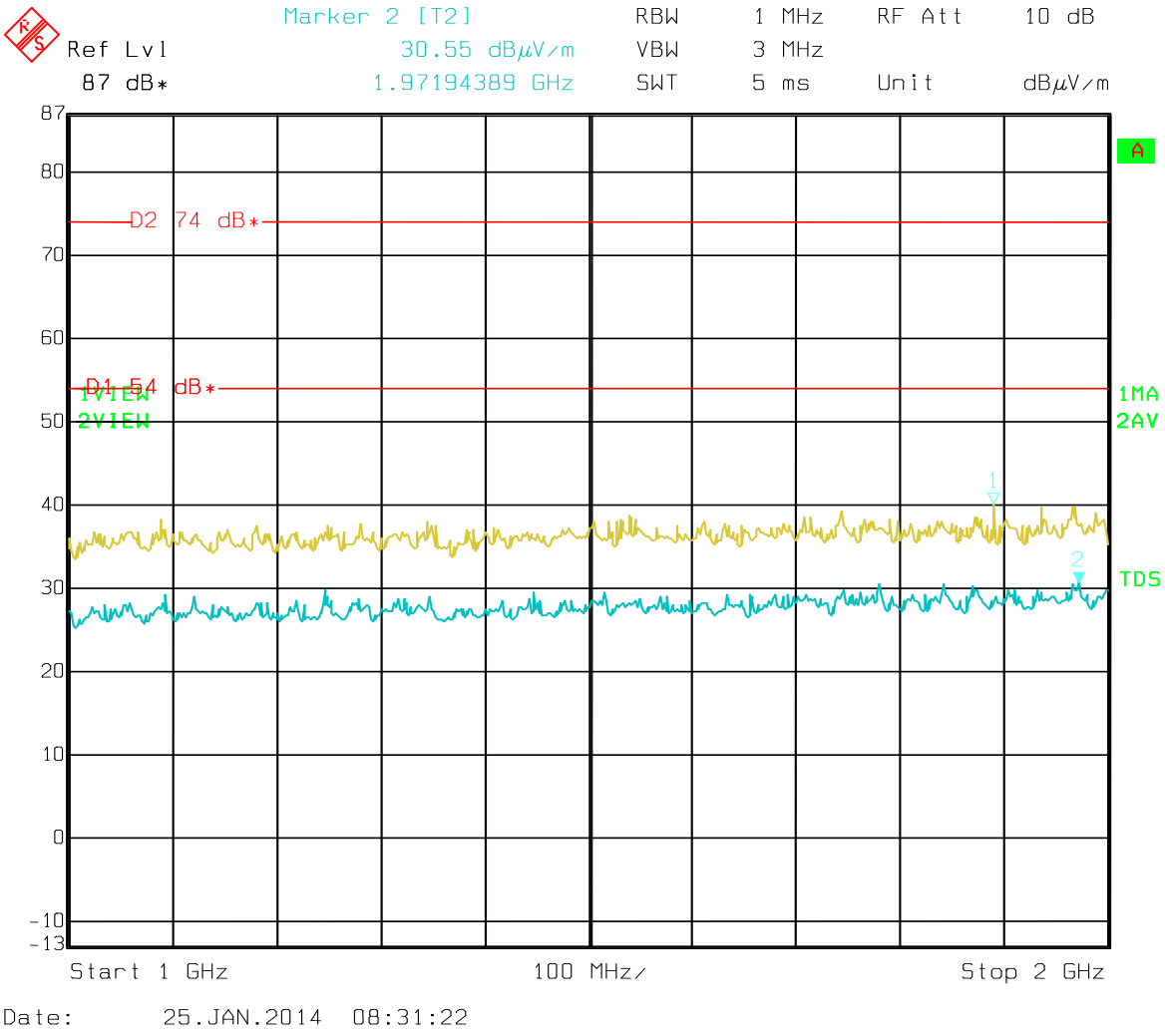
Units of measurement:

Frequency: GHz Amplitude: dBµV/m

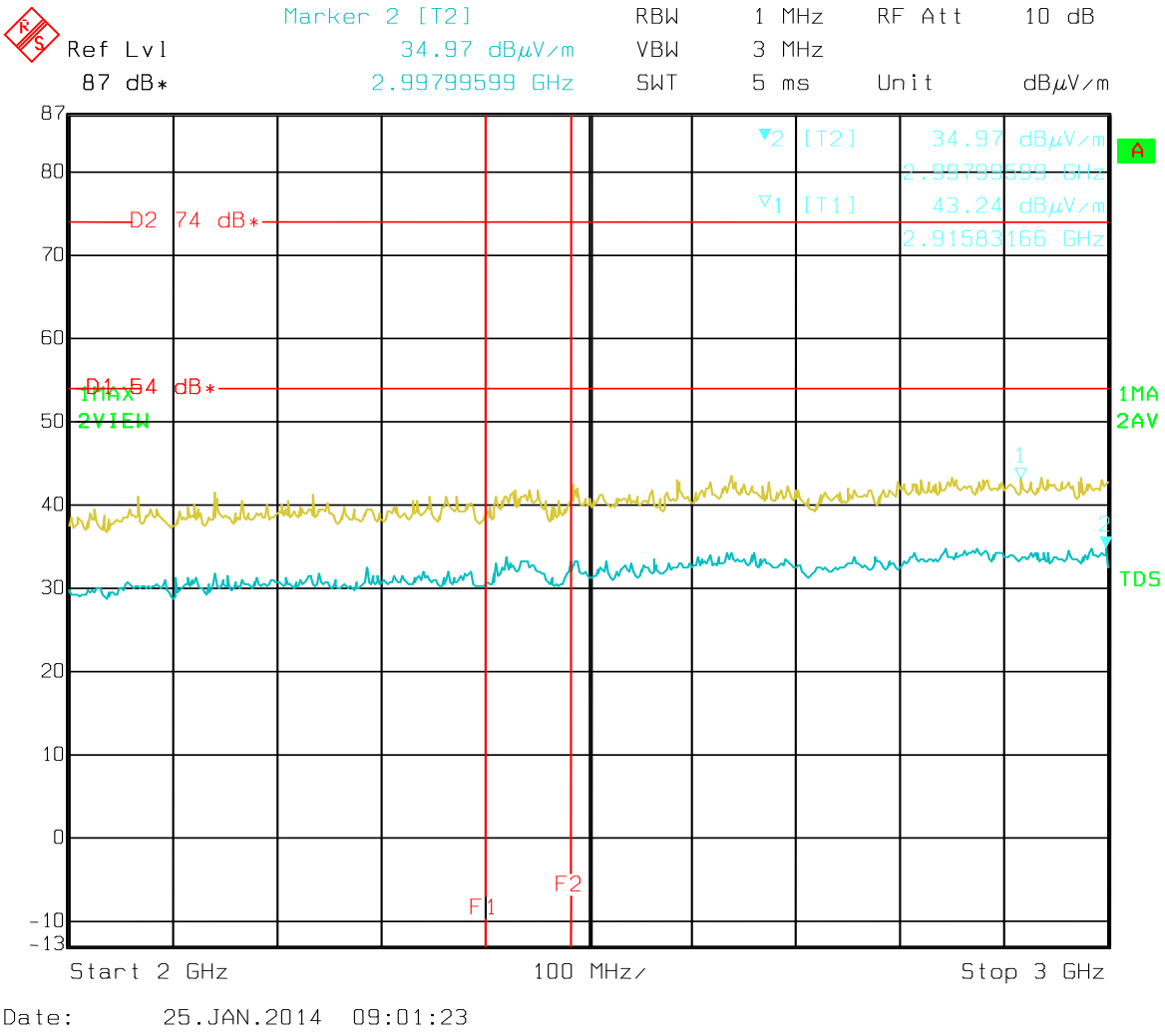
Bandwidth: 1MHz

No emissions were detected within 6dB of the limit line.

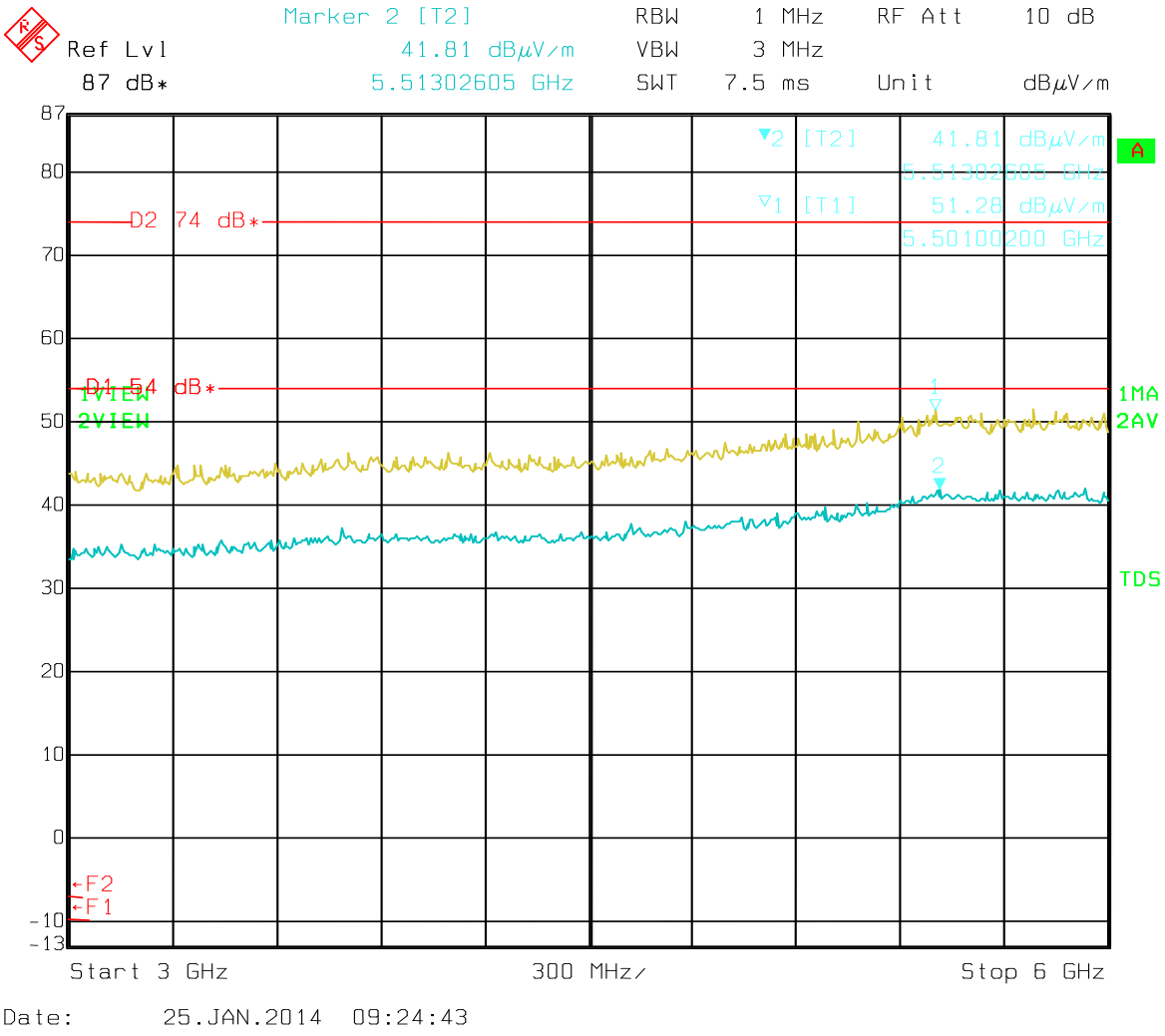
Graph 52 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 1 to 2GHz.



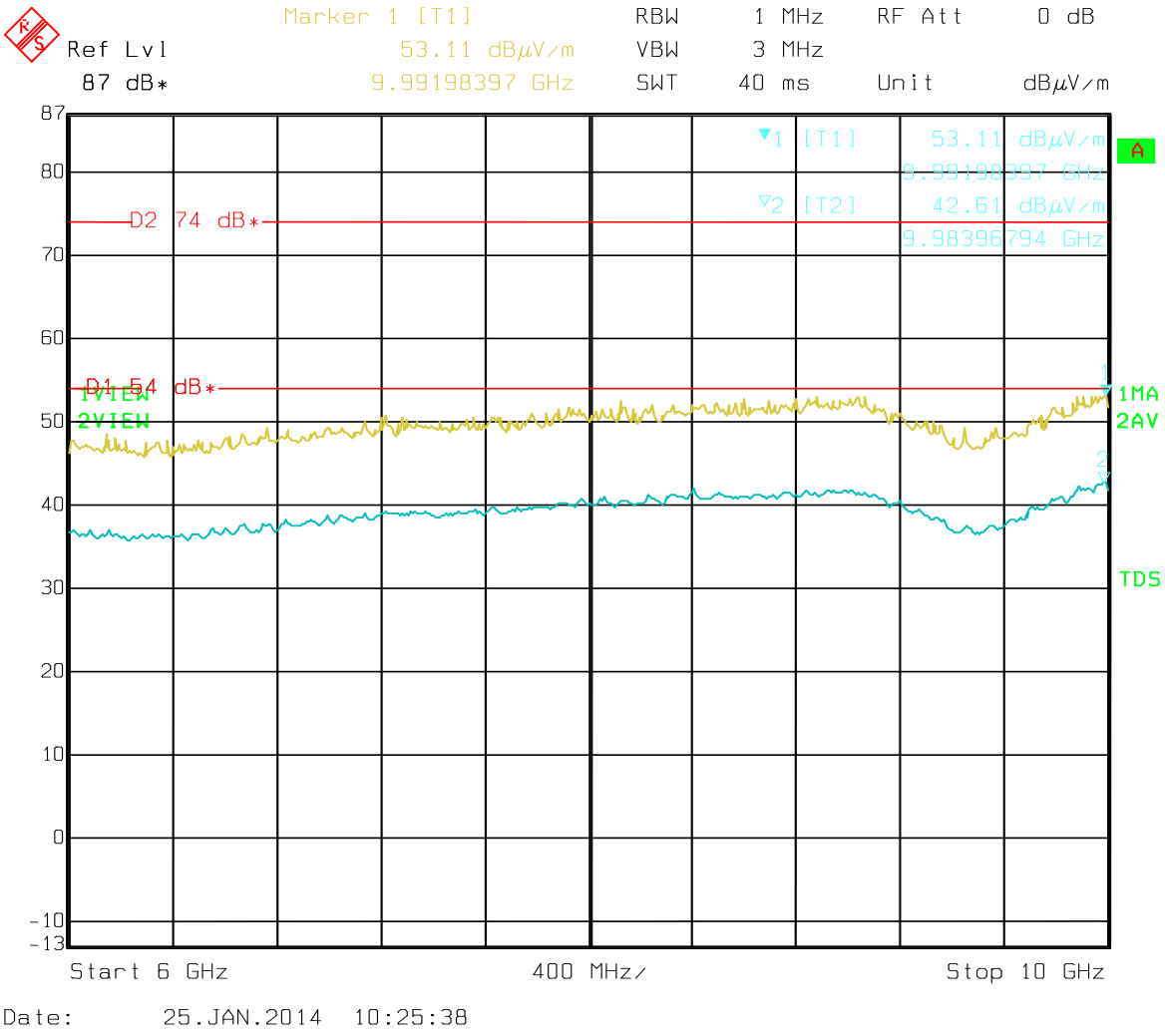
Graph 53 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 2 to 3GHz.



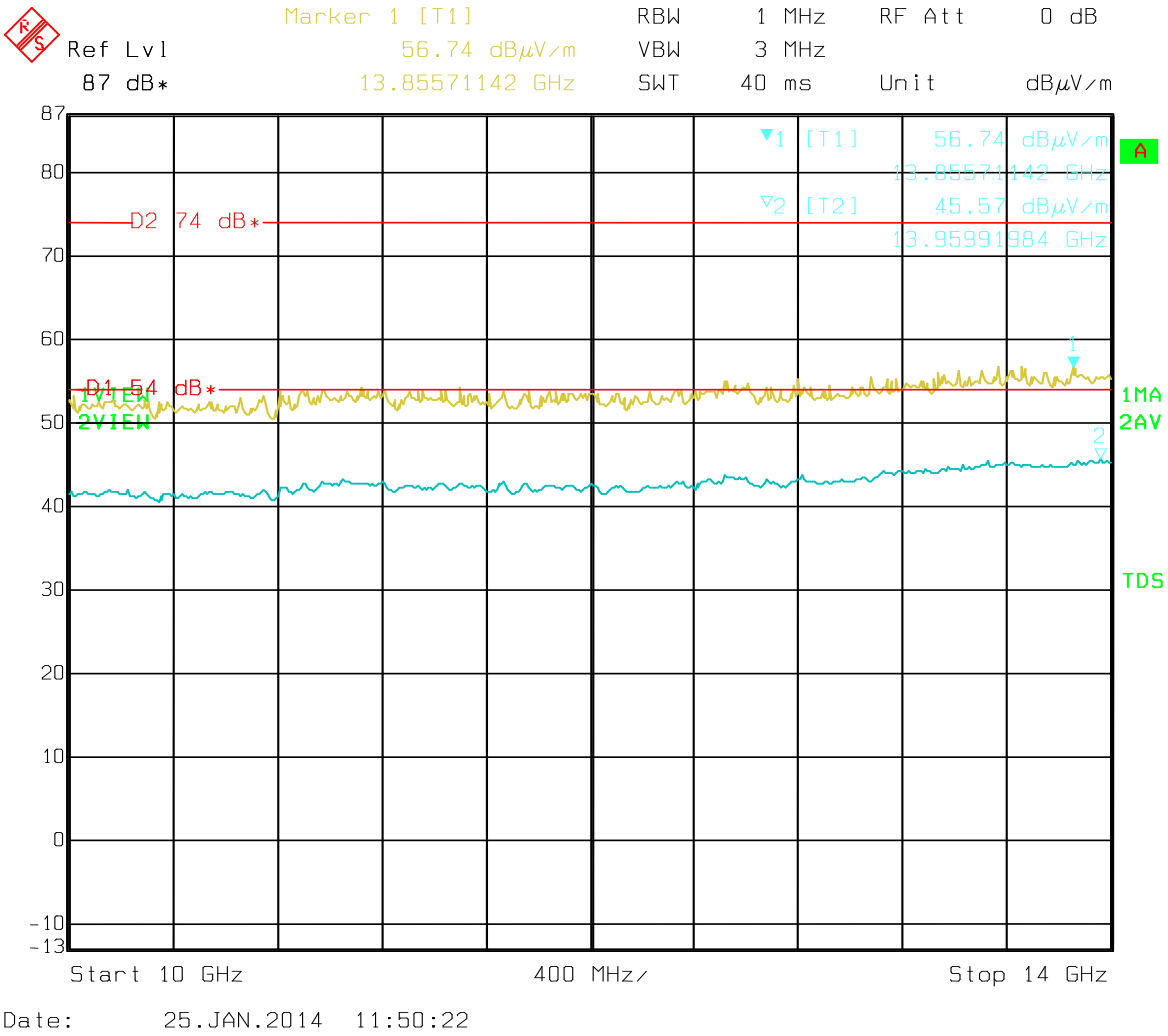
Graph 54 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 3 to 6GHz.



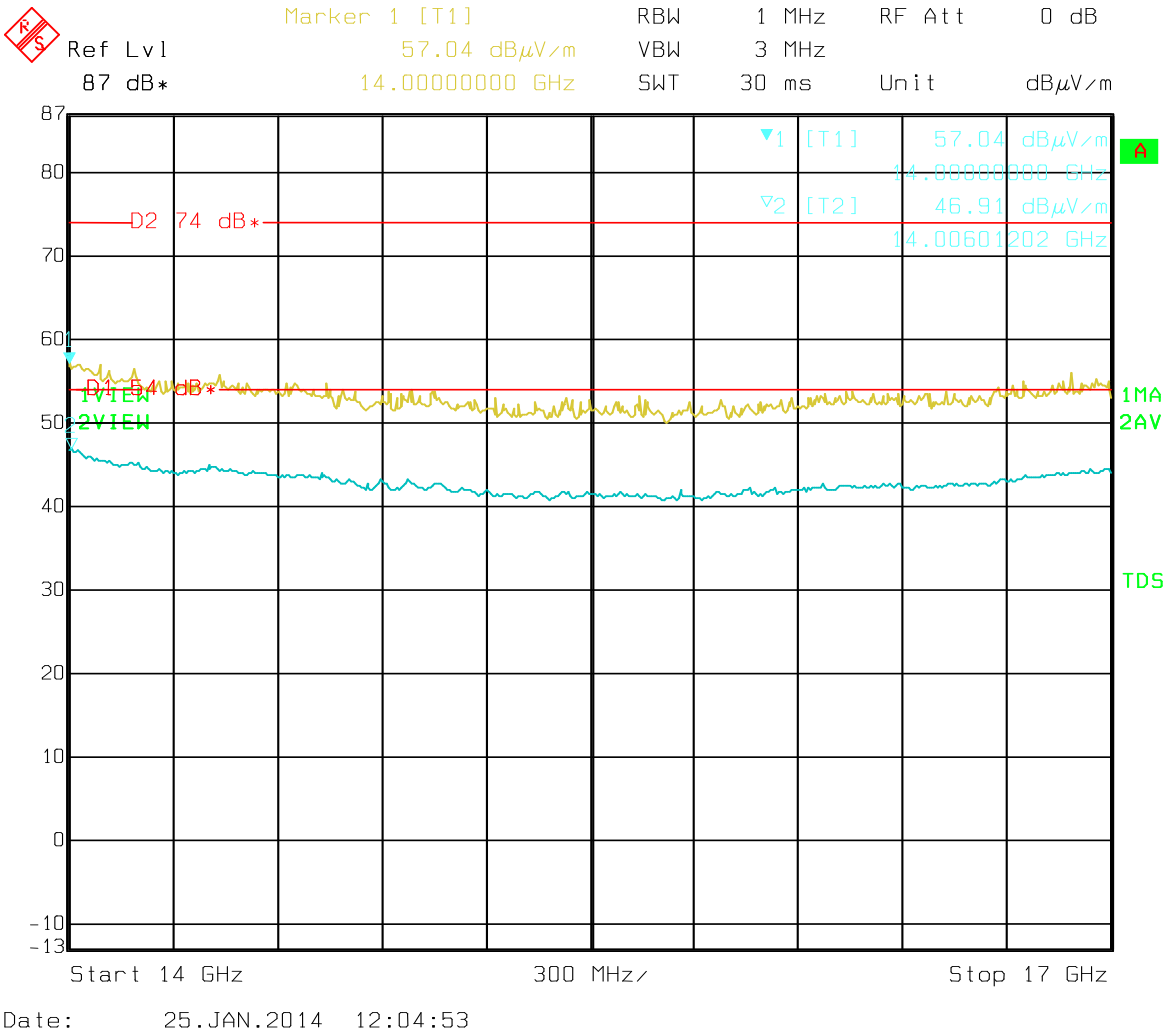
Graph 55 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 6 to 10GHz.



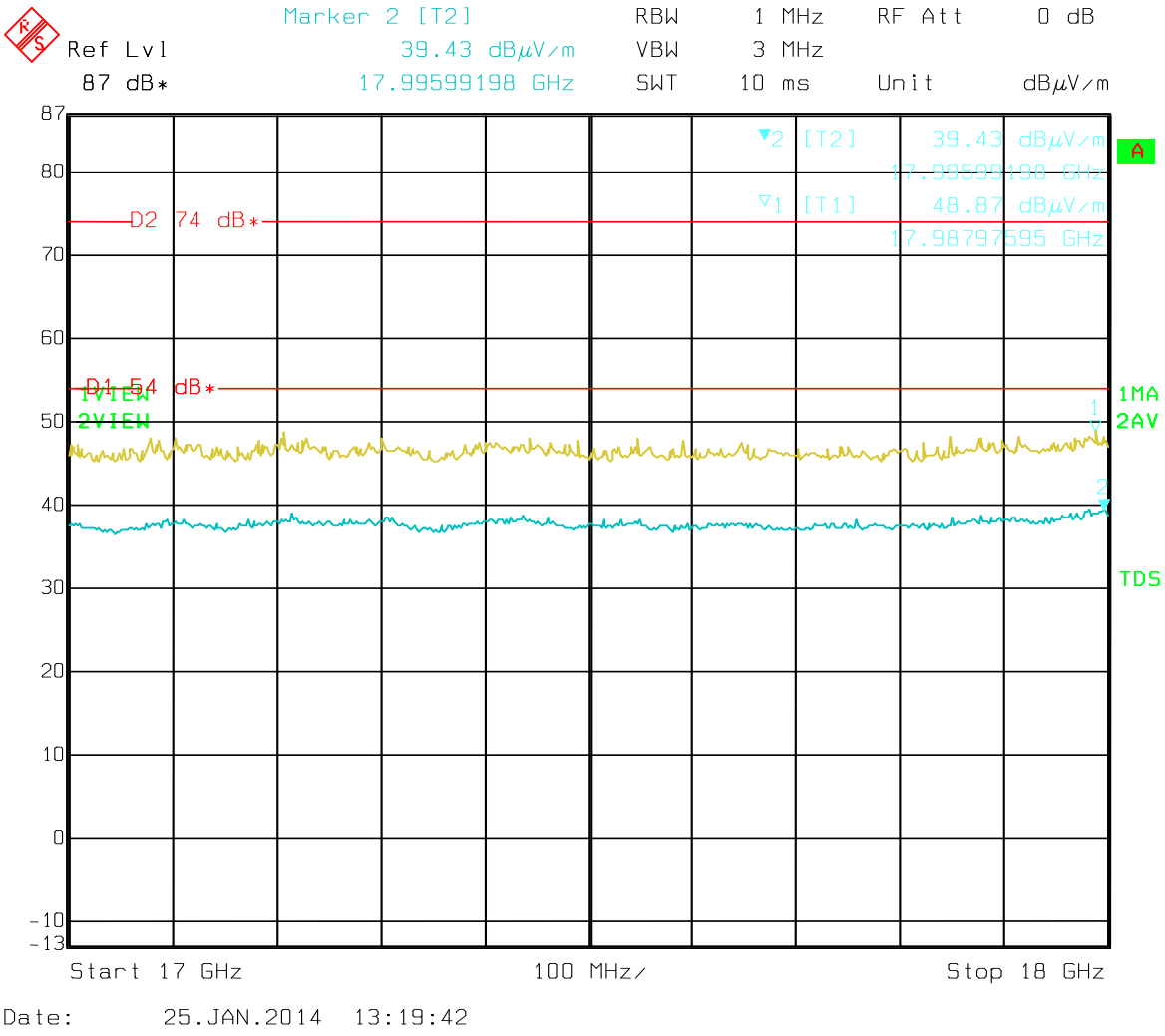
Graph 56 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 10 to 14GHz.



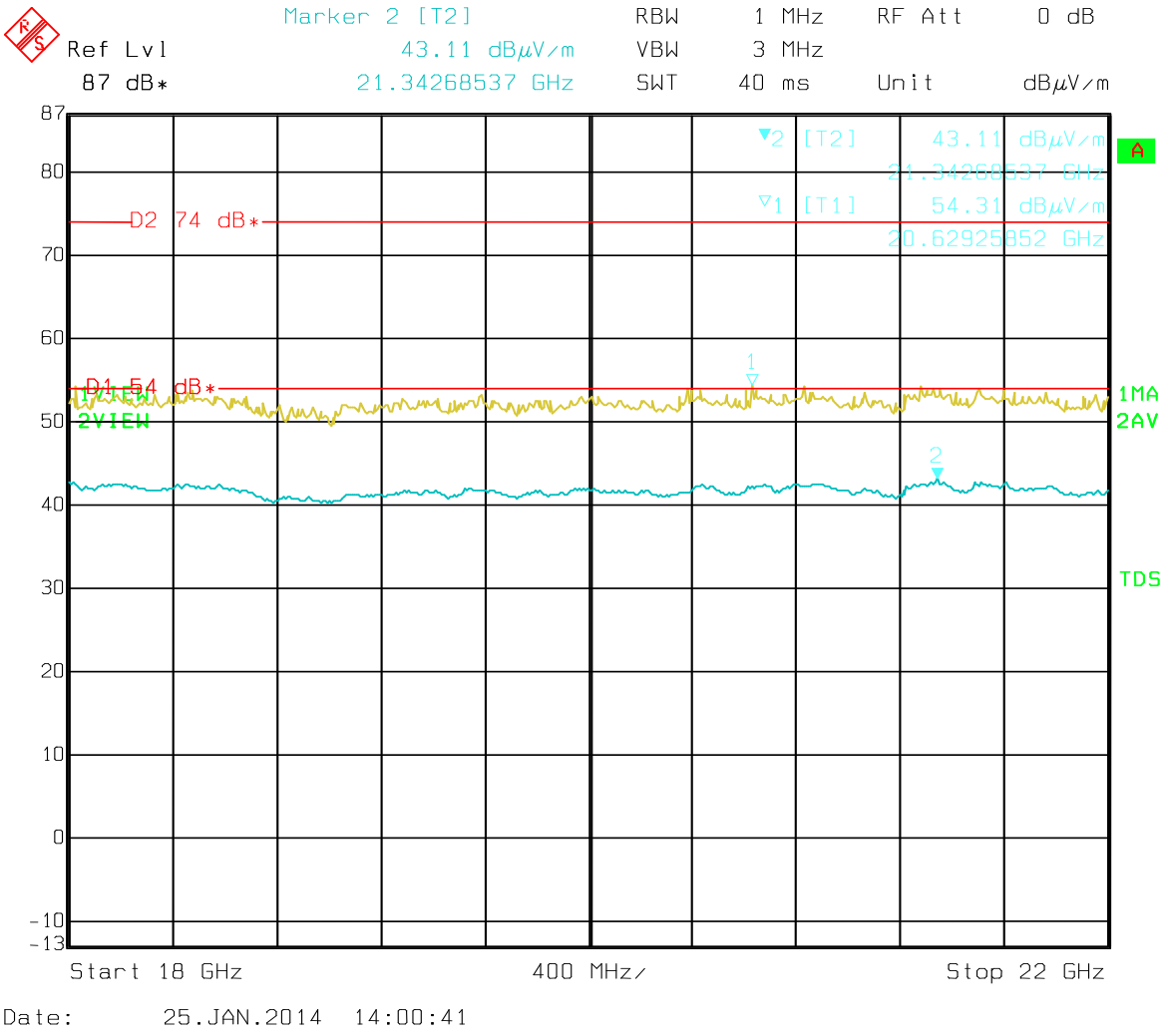
Graph 57 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 14 to 17GHz.



Graph 58 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 17 to 18GHz.



Graph 59 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 18 to 22GHz.



Graph 60 Radiated Emissions Test Results – Mode 3 – Receive Ch26 – Vertical – 18 to 25GHz.

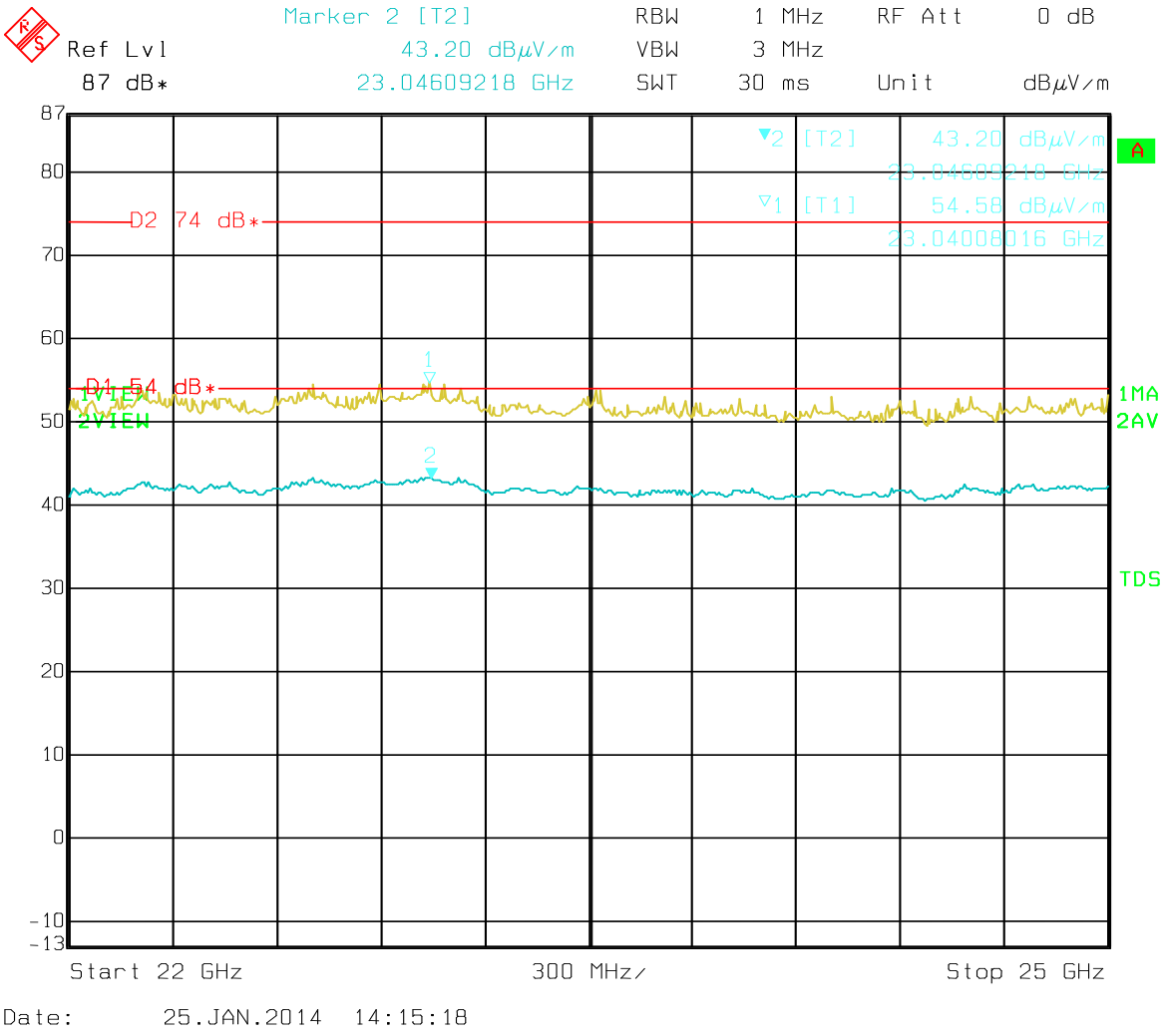


Table 13 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Horizontal.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.56 MHz	26.37	-13.62
1 Quasi Peak	240 MHz	45.74	-0.27
1 Quasi Peak	264 MHz	41.26	-4.75
1 Quasi Peak	288 MHz	43.38	-2.63
1 Quasi Peak	375 MHz	35.83	-10.18
1 Quasi Peak	938.6 MHz	32.97	-13.04

Graph 61 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Horizontal.

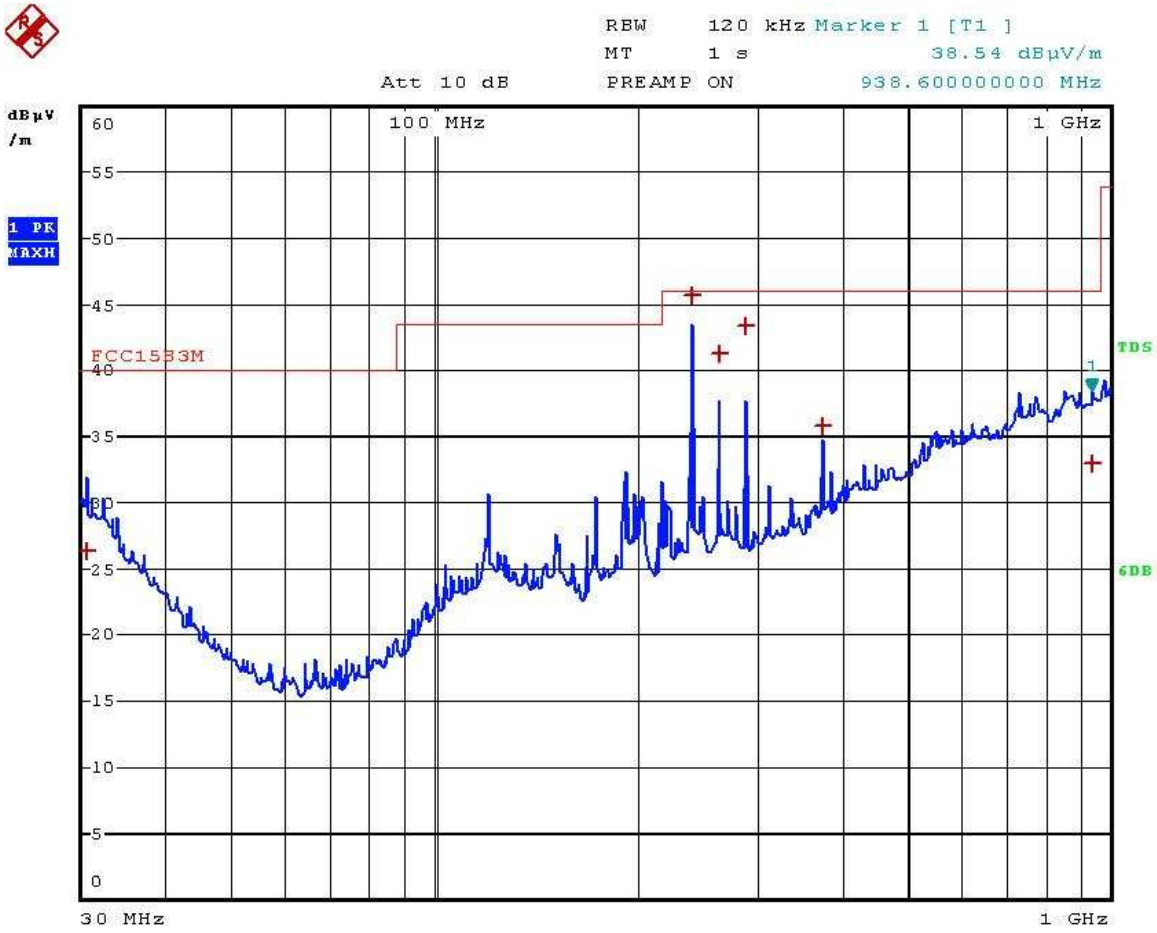


Table 14 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Vertical.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.76 MHz	26.31	-13.69
1 Quasi Peak	36.64 MHz	21.80	-18.19
1 Quasi Peak	192 MHz	38.57	-4.94
1 Quasi Peak	216 MHz	41.64	-4.38
1 Quasi Peak	240 MHz	41.93	-4.08
1 Quasi Peak	777.96 MHz	31.75	-14.26

Graph 62 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Vertical.

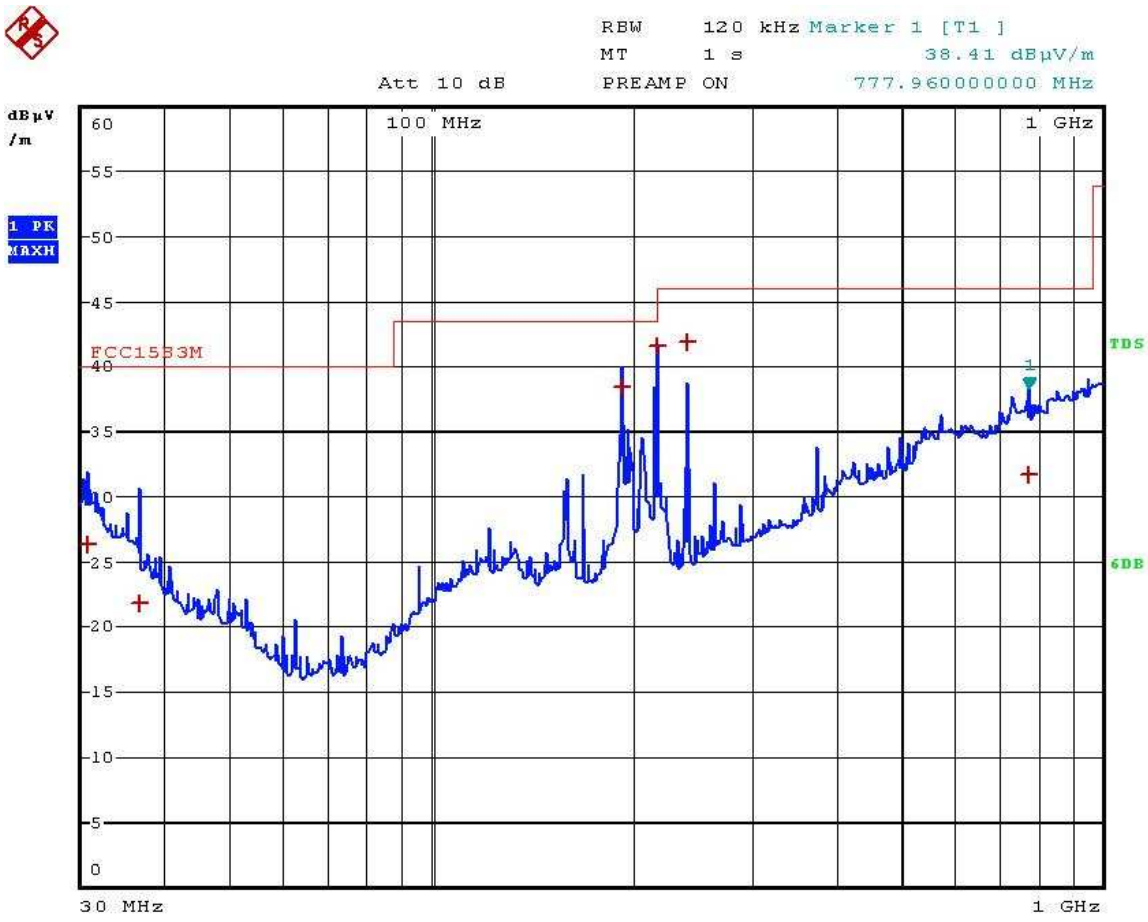


Table 15 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Horizontal - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.405	98.50	75.42	94.00	18.58	Pass
4.810	62.29	39.21	54.00	14.79	Pass
7.213	56.33	33.25	54.00	20.75	Pass
9.622	54.91	31.83	54.00	22.17	Pass
12.022	64.15	41.07	54.00	12.93	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

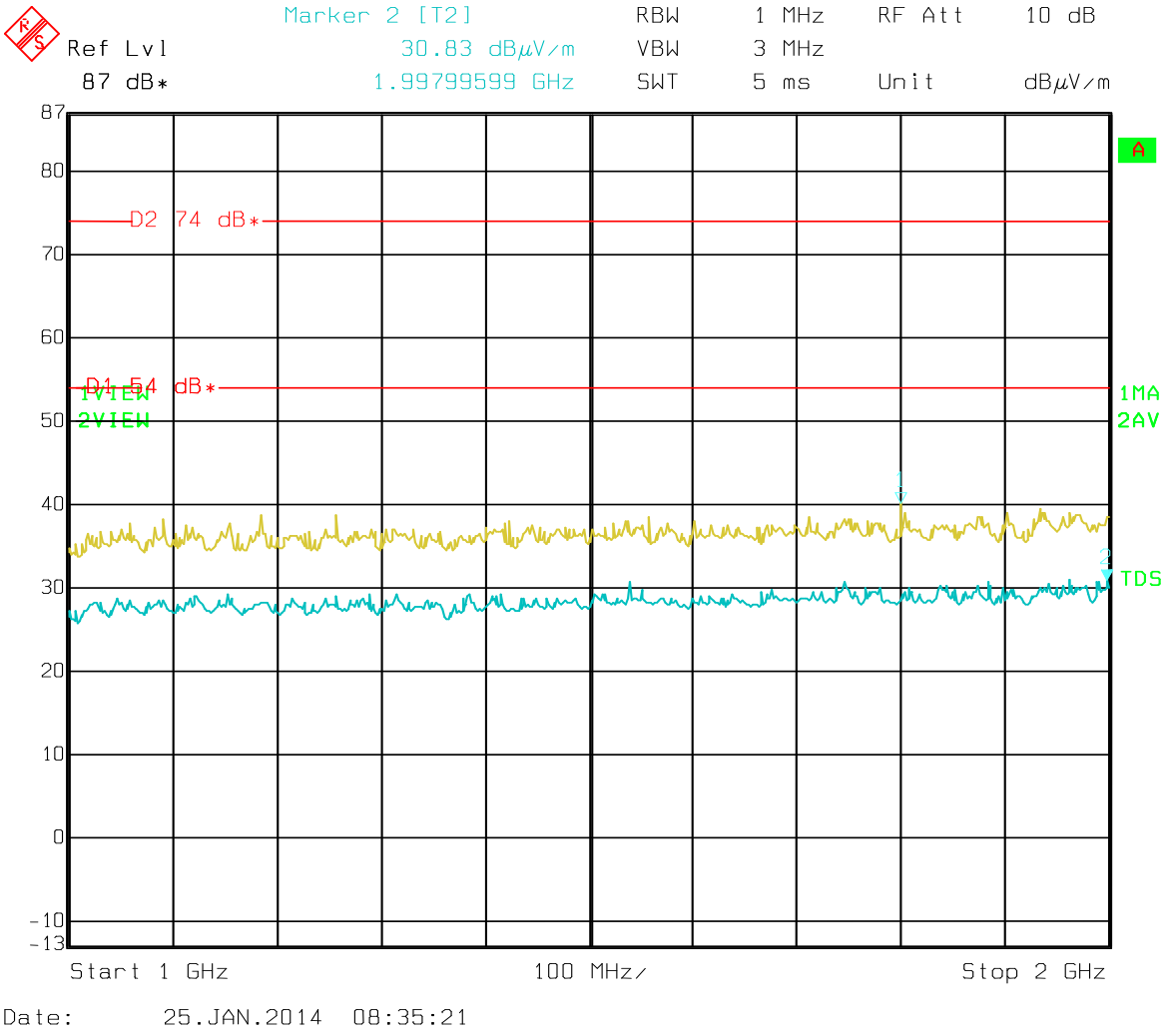
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse durations / Period of a transmission)

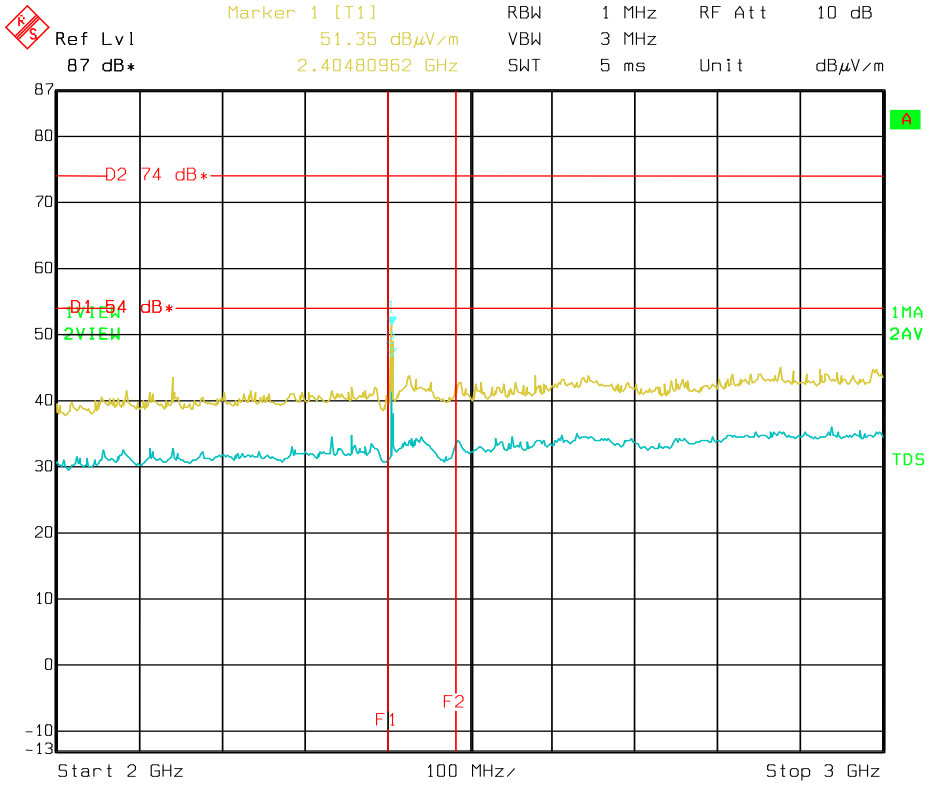
= 20 log (3.5047 + 3.5047 / 100)

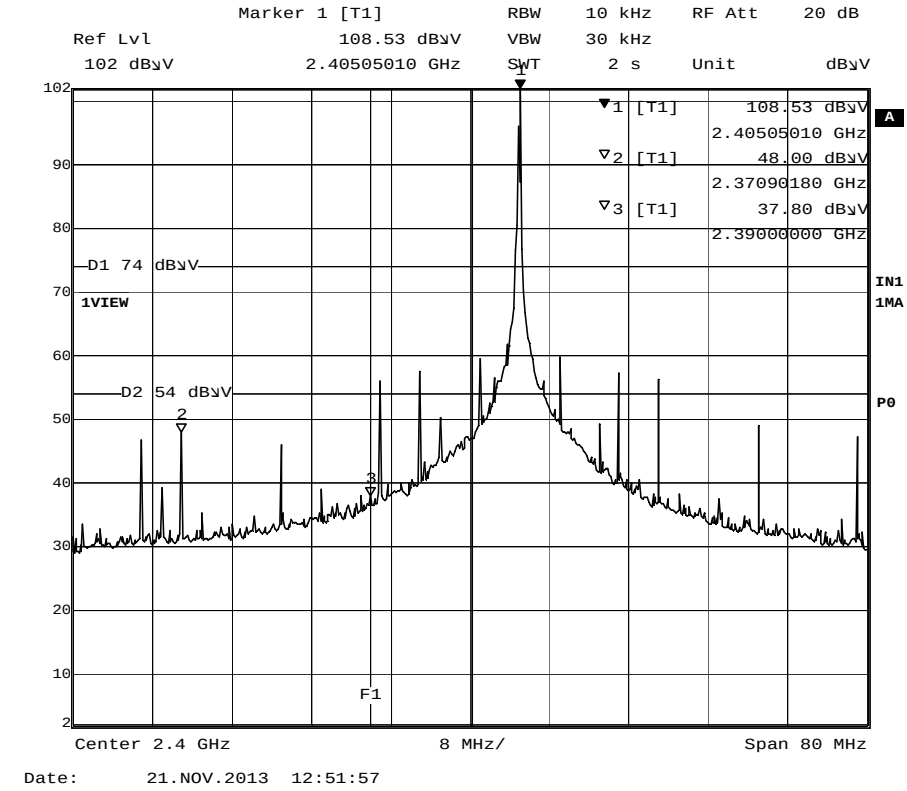
= -23.08 (dB)

Graph 63 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 1 to 2GHz.



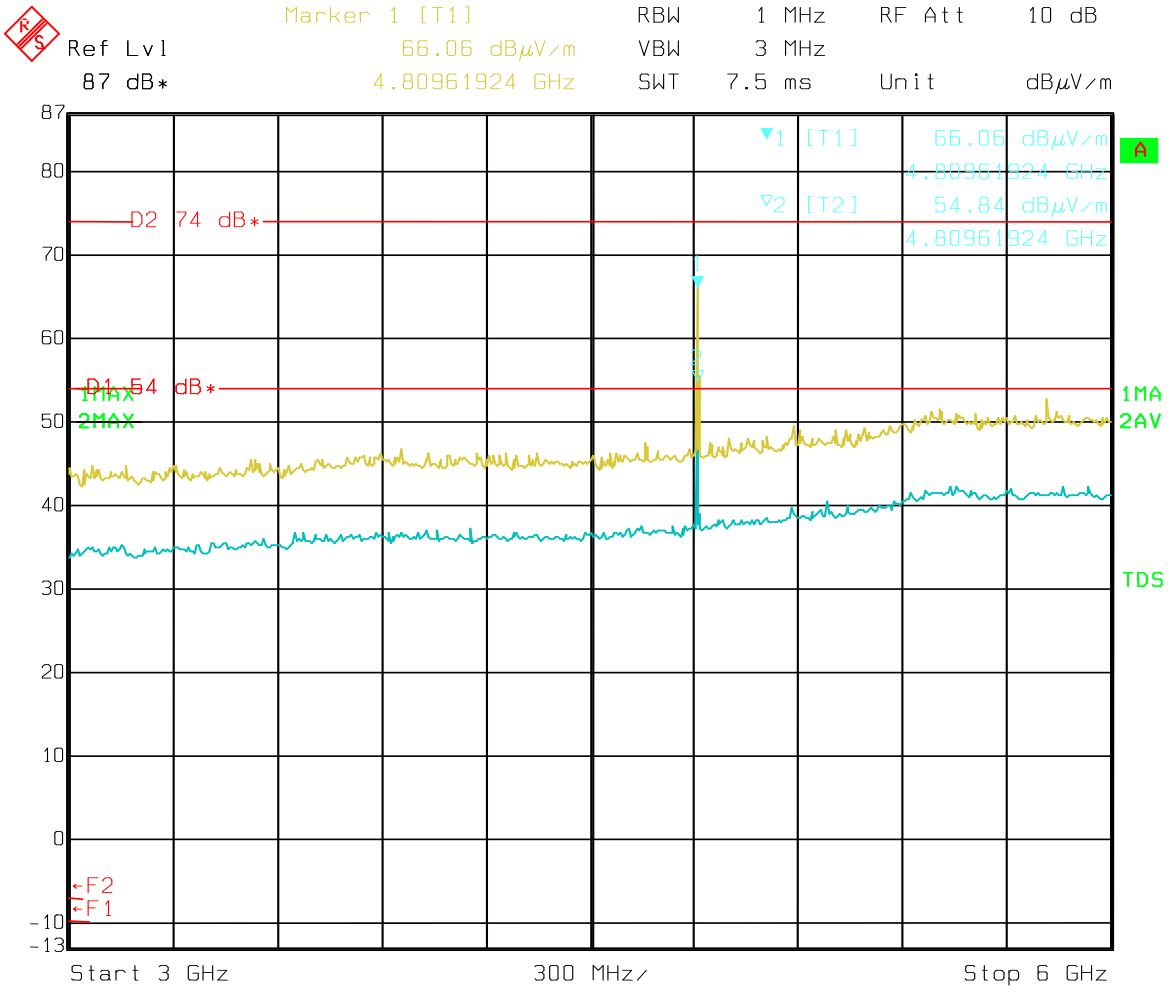
Graph 64 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 2 to 3GHz.



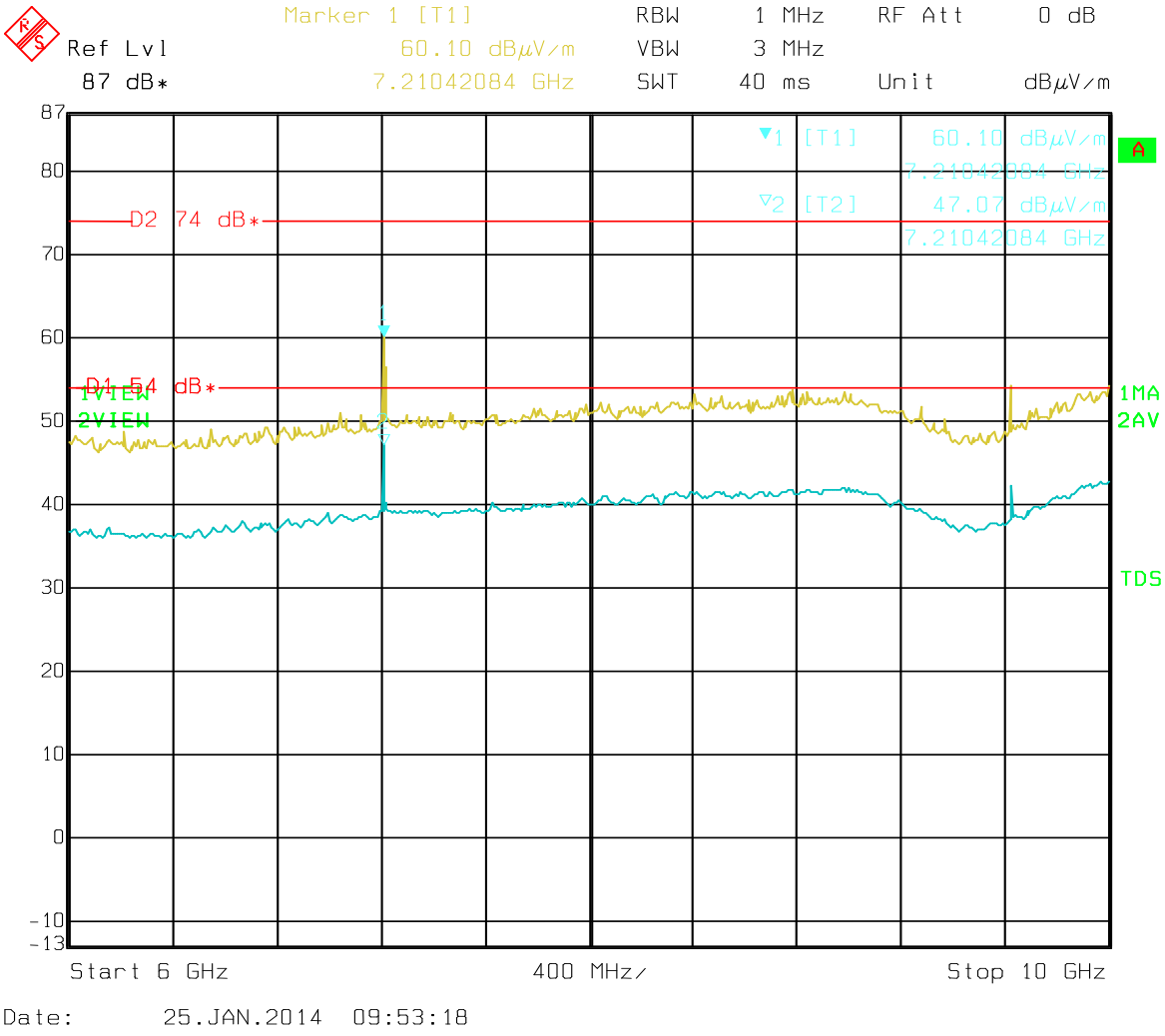


Expanded Band Edge

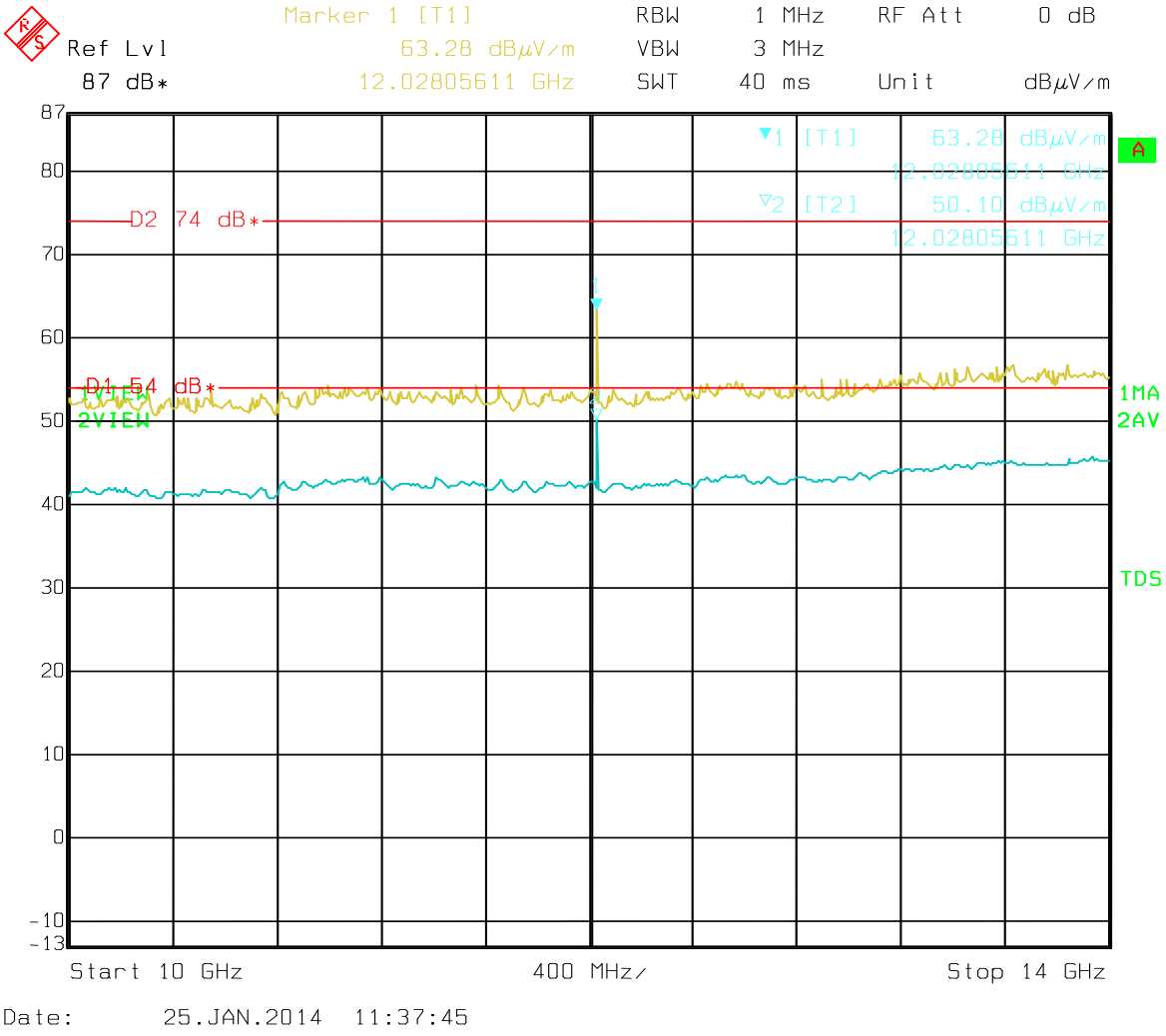
Graph 65 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 3 to 6GHz.



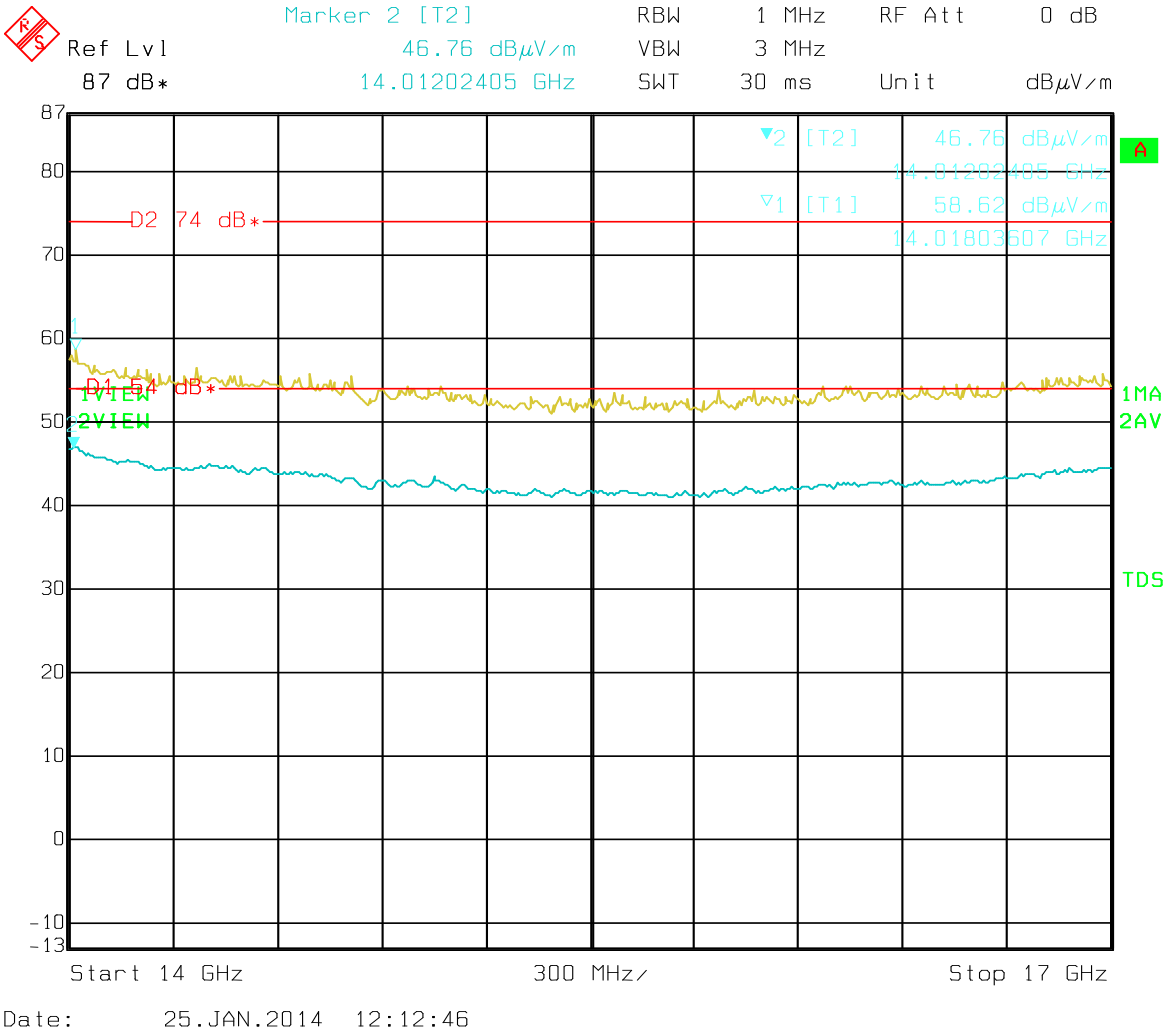
Graph 66 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 6 to 10GHz.



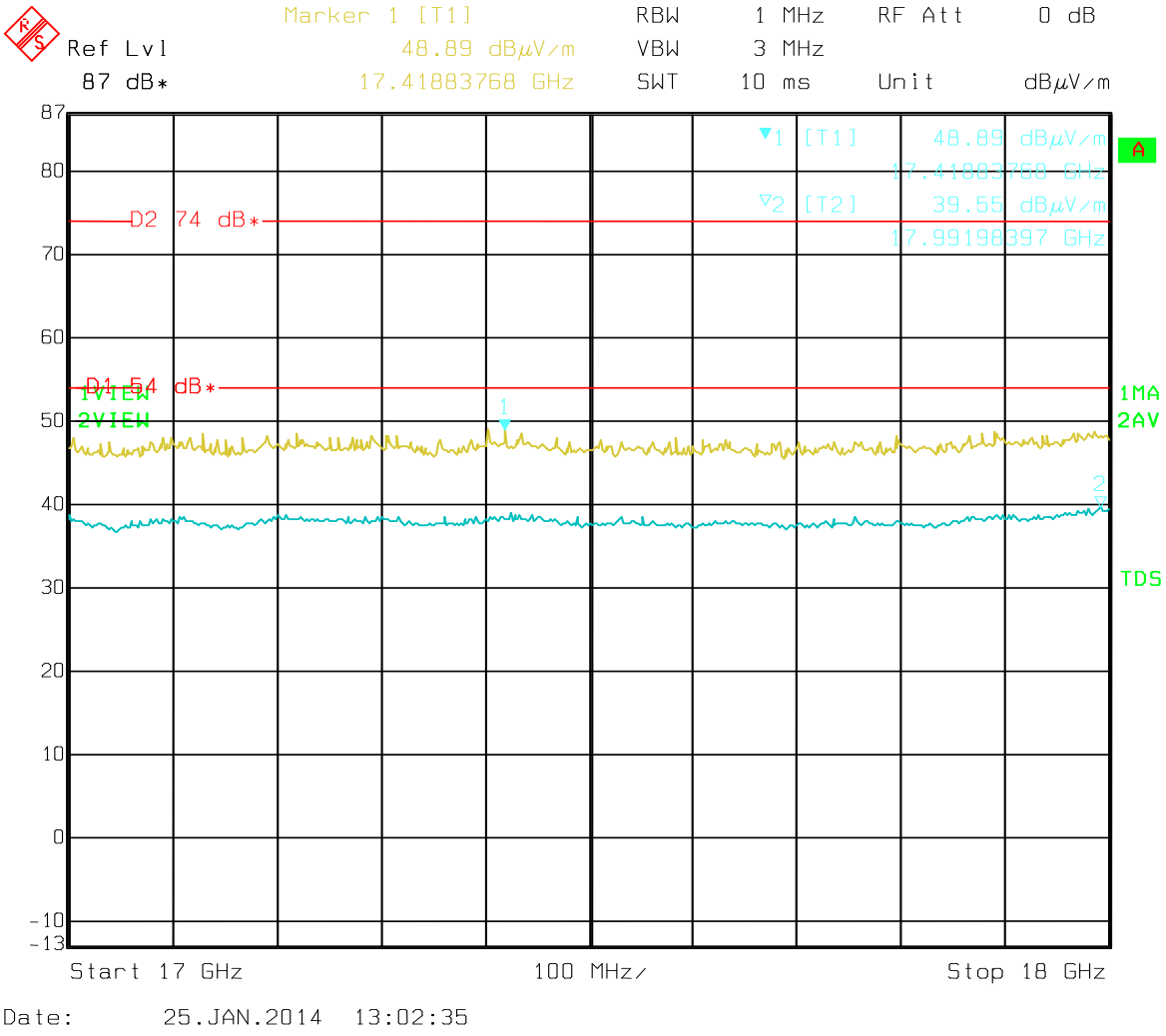
Graph 67 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 10 to 14GHz.



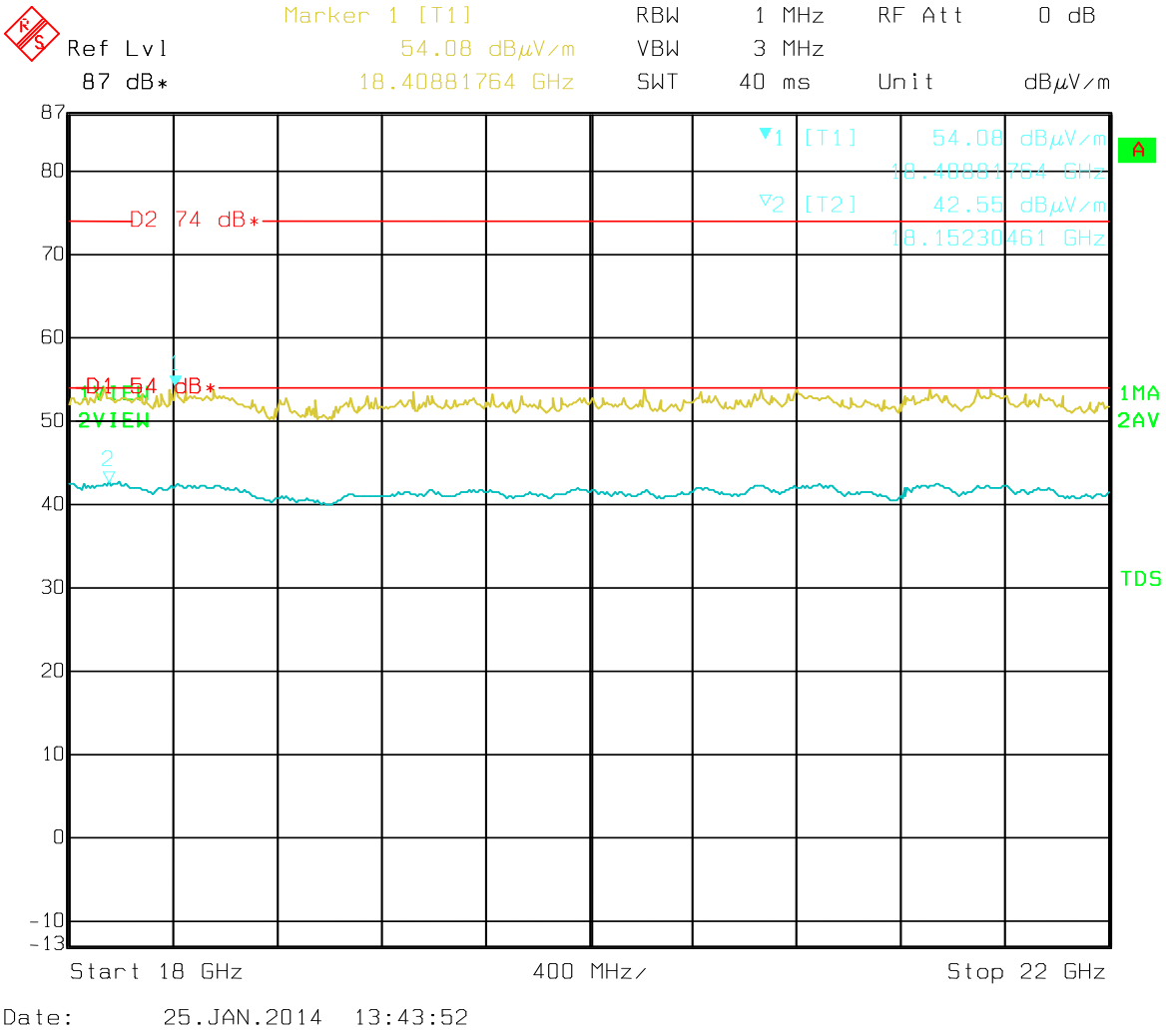
Graph 68 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 14 to 17GHz.



Graph 69 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 17 to 18GHz.



Graph 70 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 18 to 22GHz.



Graph 71 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Horizontal – 22 to 25GHz.

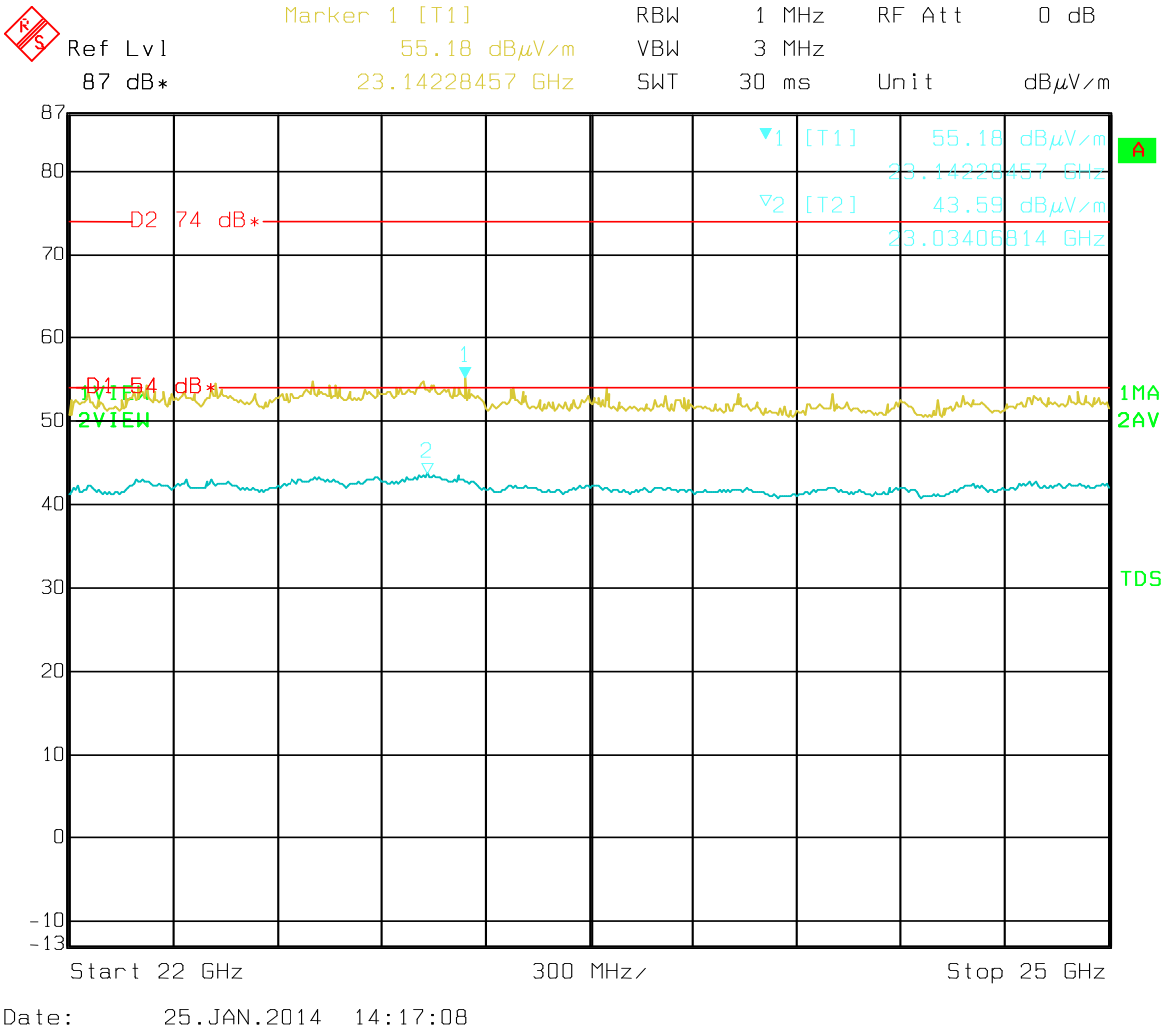


Table 16 Radiated Emissions Test Results – Mode 4: Transmit Mode (Data Stream) – Ch11 – Vertical - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.405	114.51	91.43	94.00	2.57	Pass
4.881	66.82	43.74	54.00	10.26	Pass
7.213	66.73	43.65	54.00	10.35	Pass
9.621	59.44	36.36	54.00	17.64	Pass
12.027	68.55	45.47	54.00	8.53	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

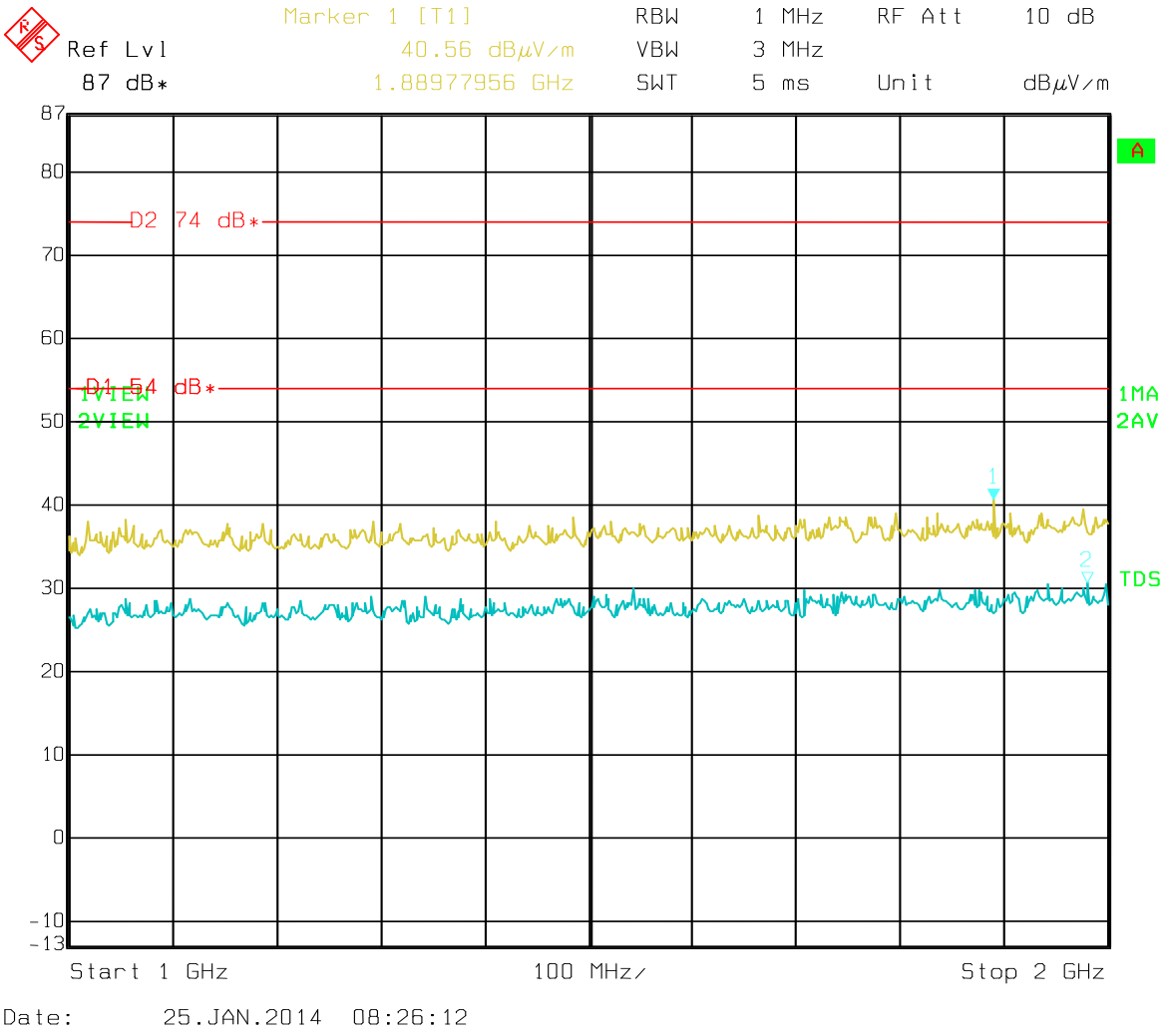
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse duratsions / Period of a transmission)

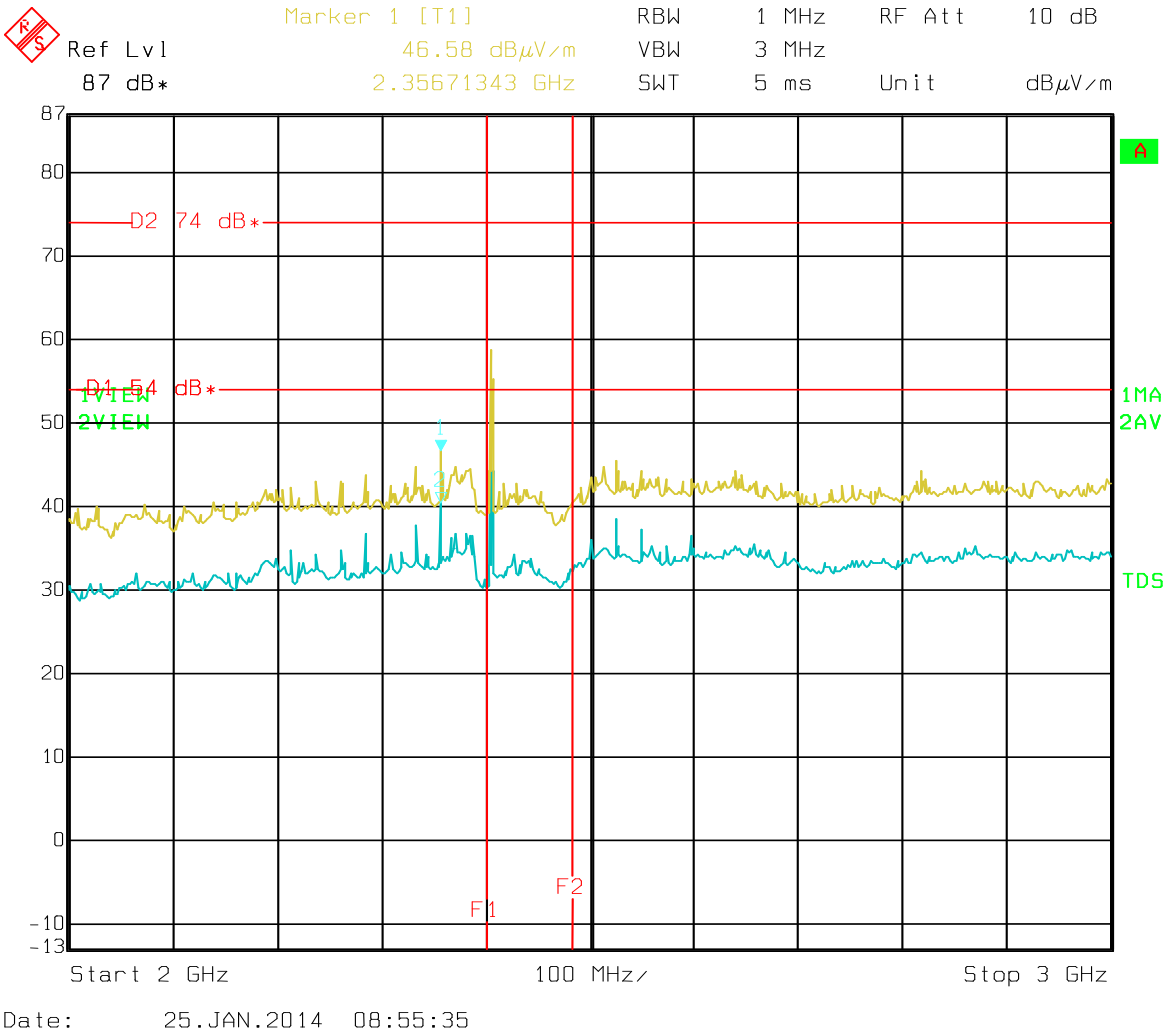
= 20 log (3.5047 + 3.5047 / 100)

= -23.08 (dB)

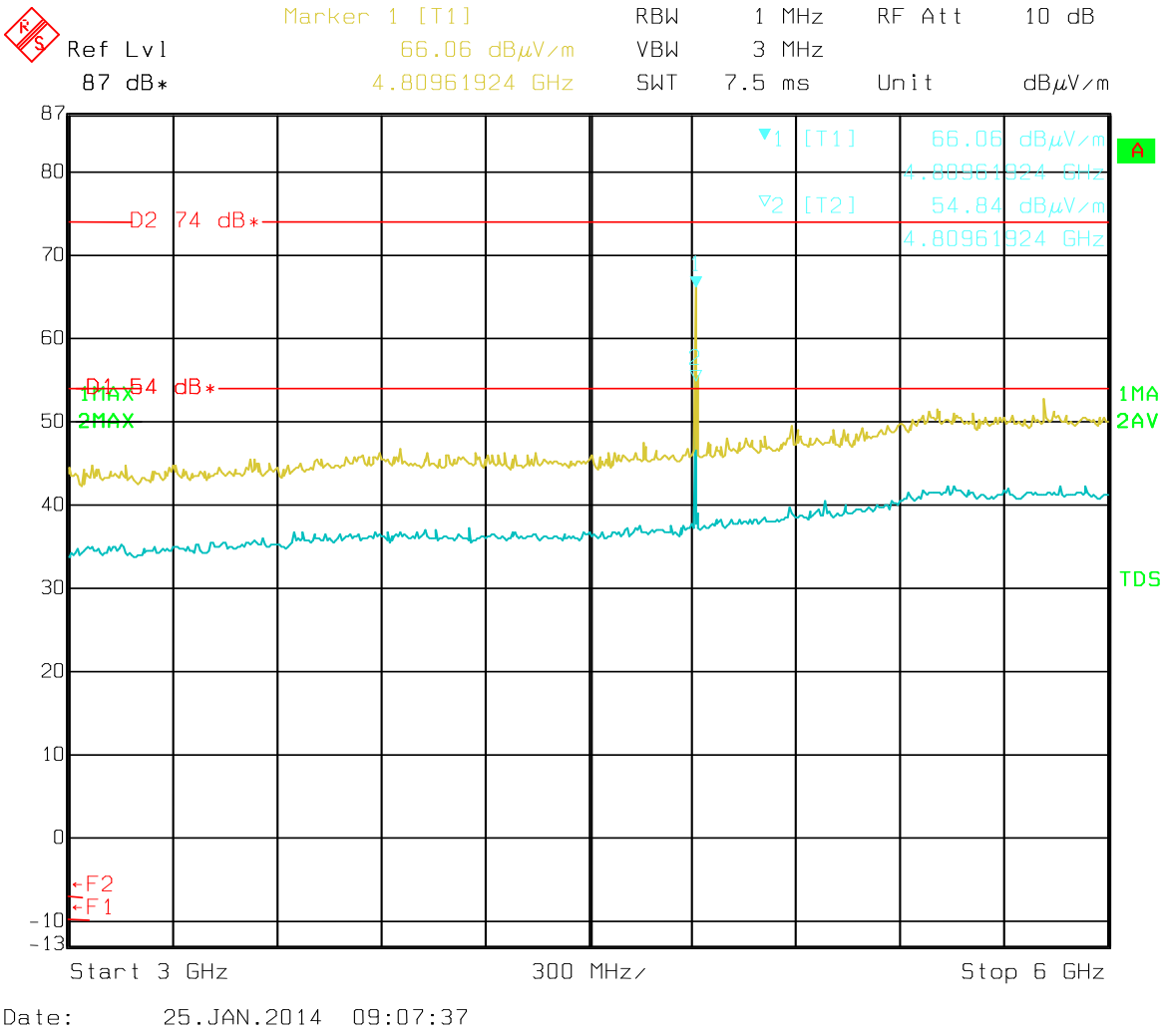
Graph 72 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 1 to 2GHz.



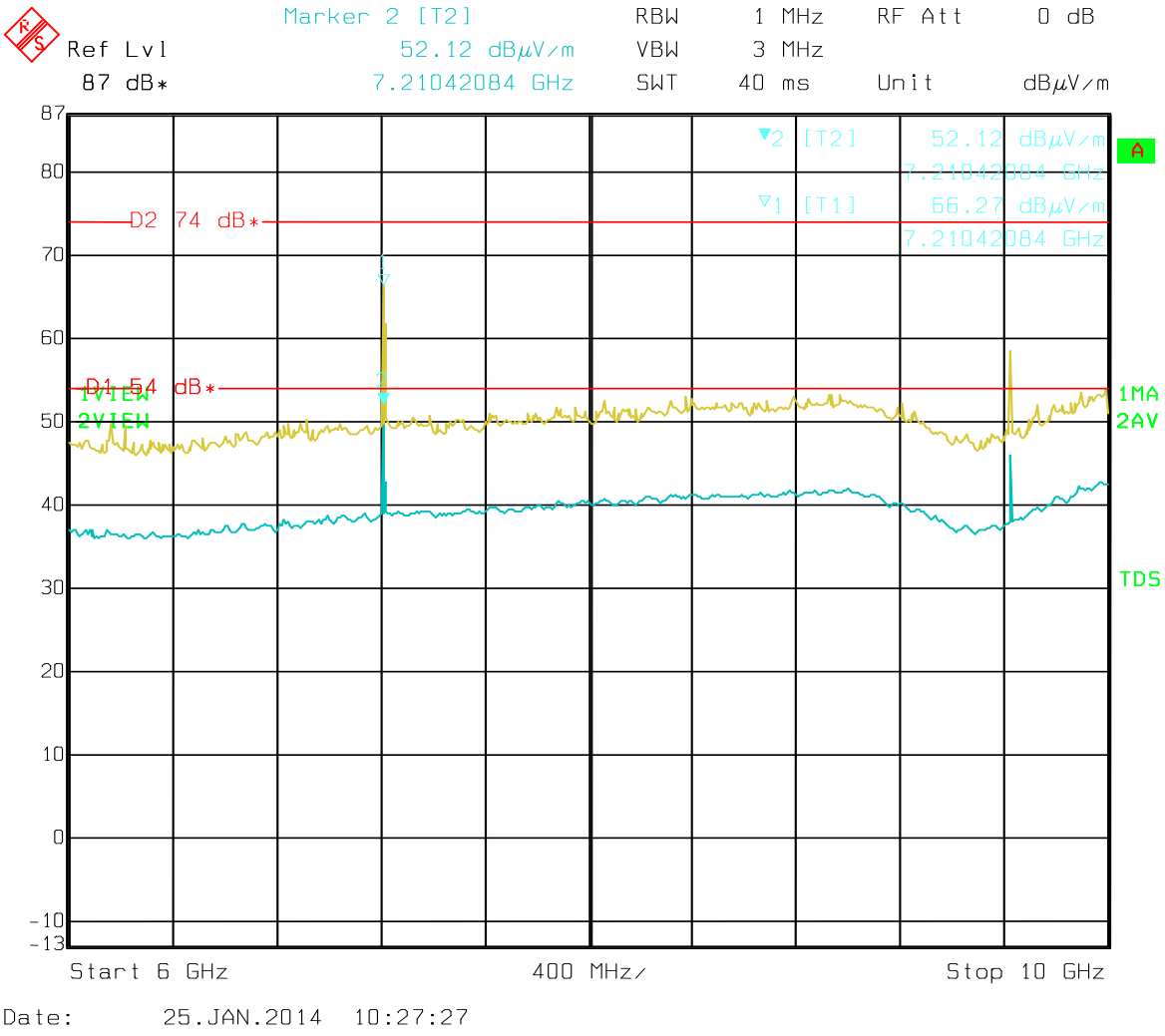
Graph 73 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 2 to 3GHz.



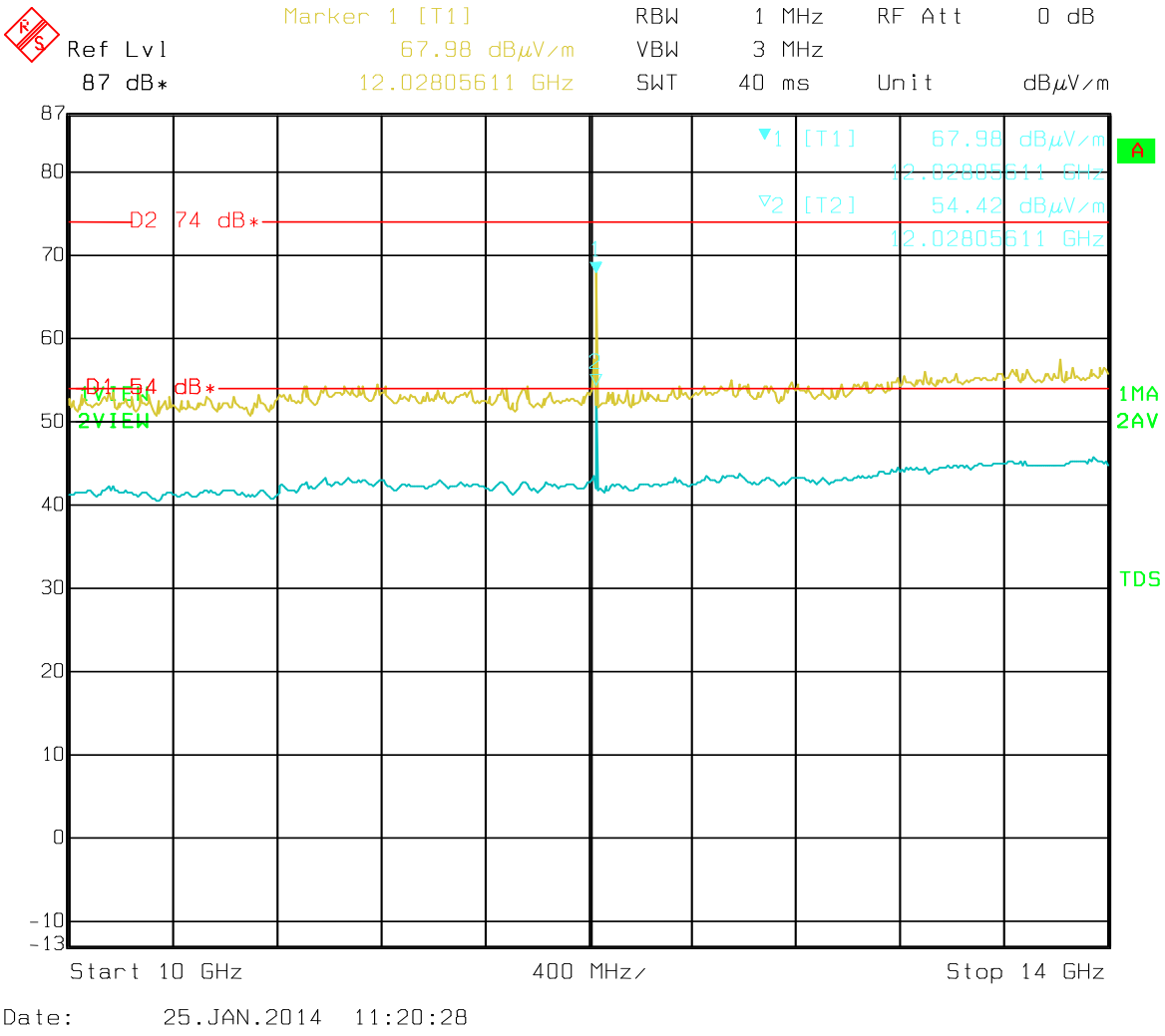
Graph 74 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 3 to 6GHz.



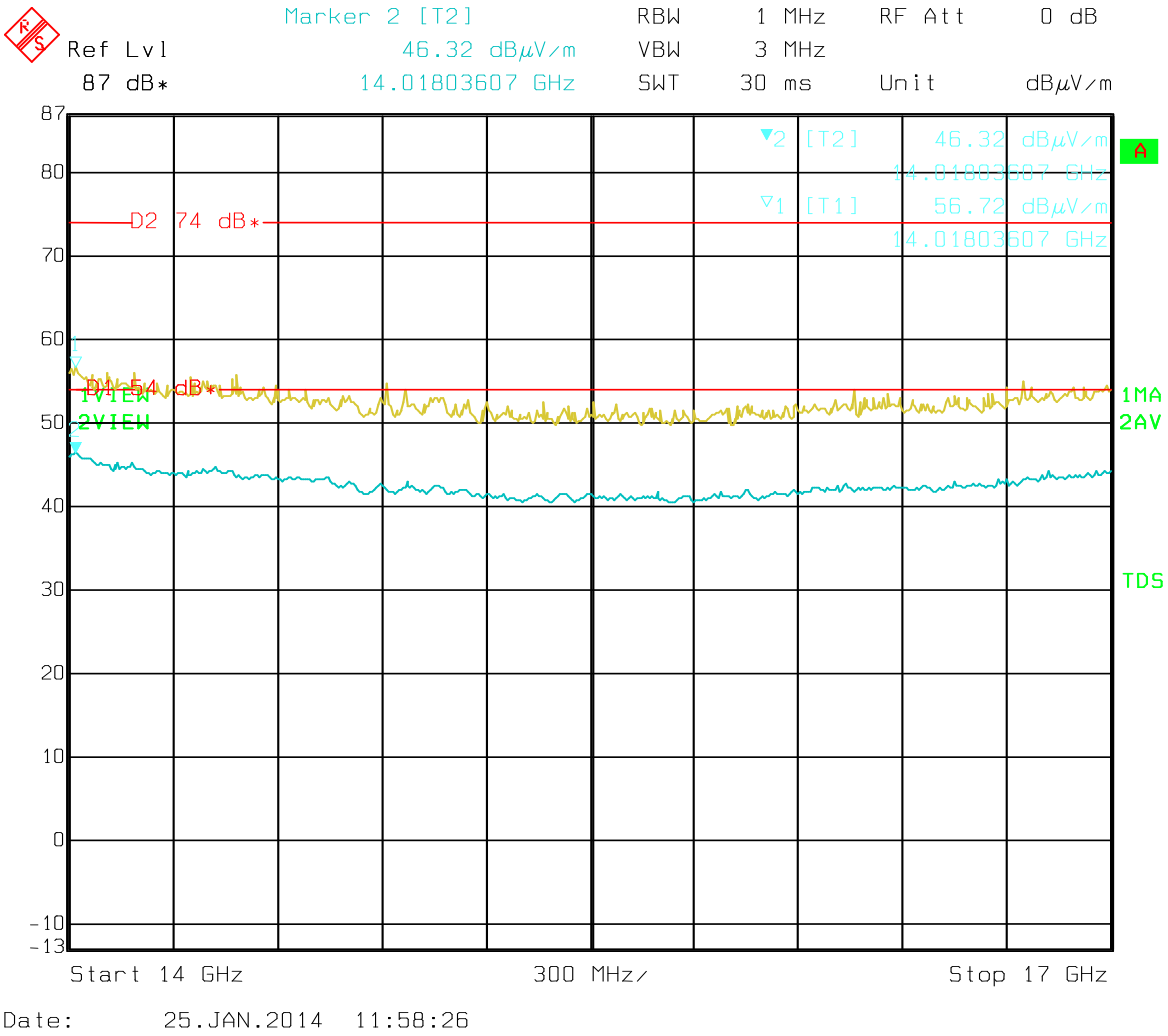
Graph 75 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 6 to 10GHz.



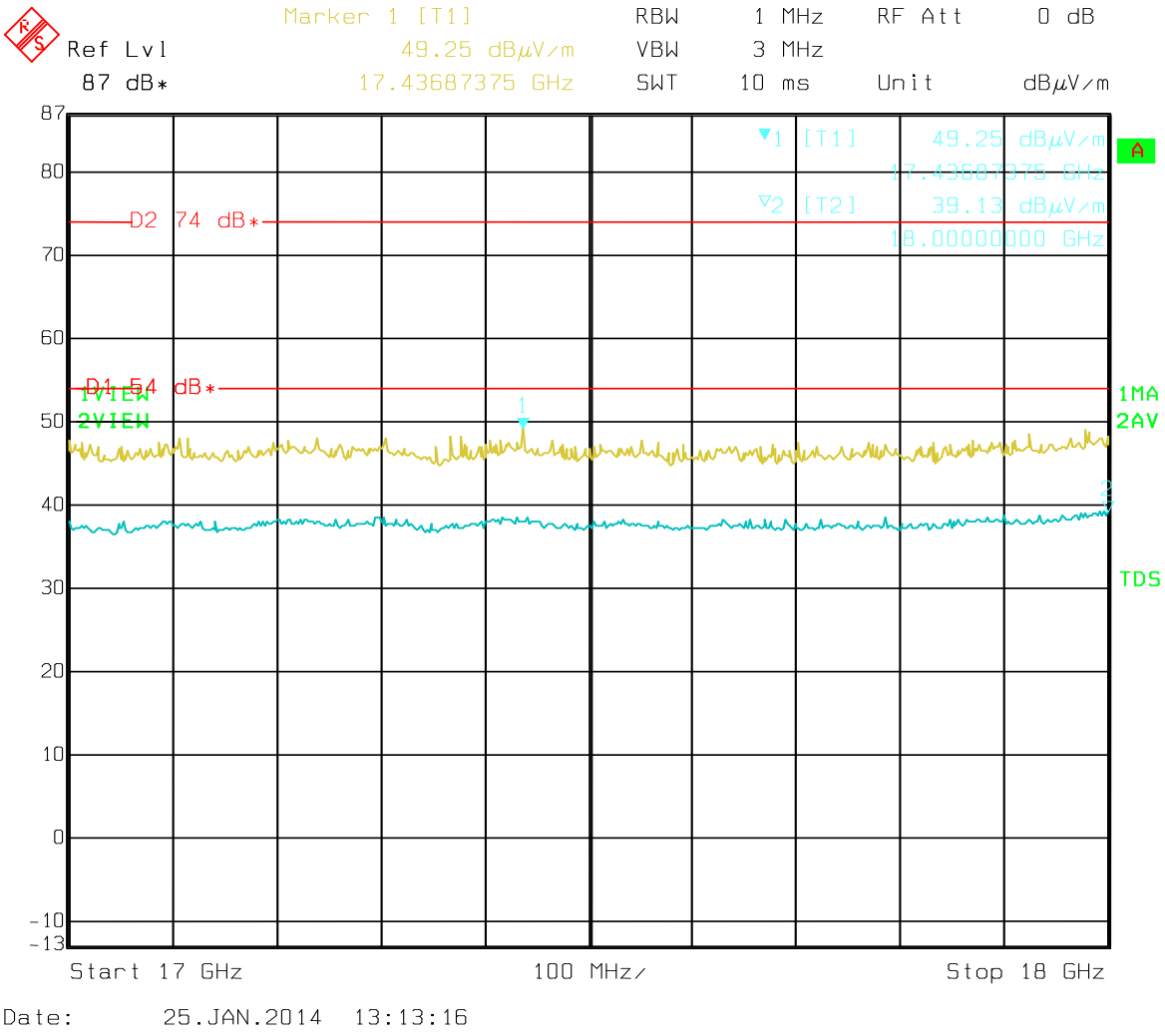
Graph 76 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 10 to 14GHz.



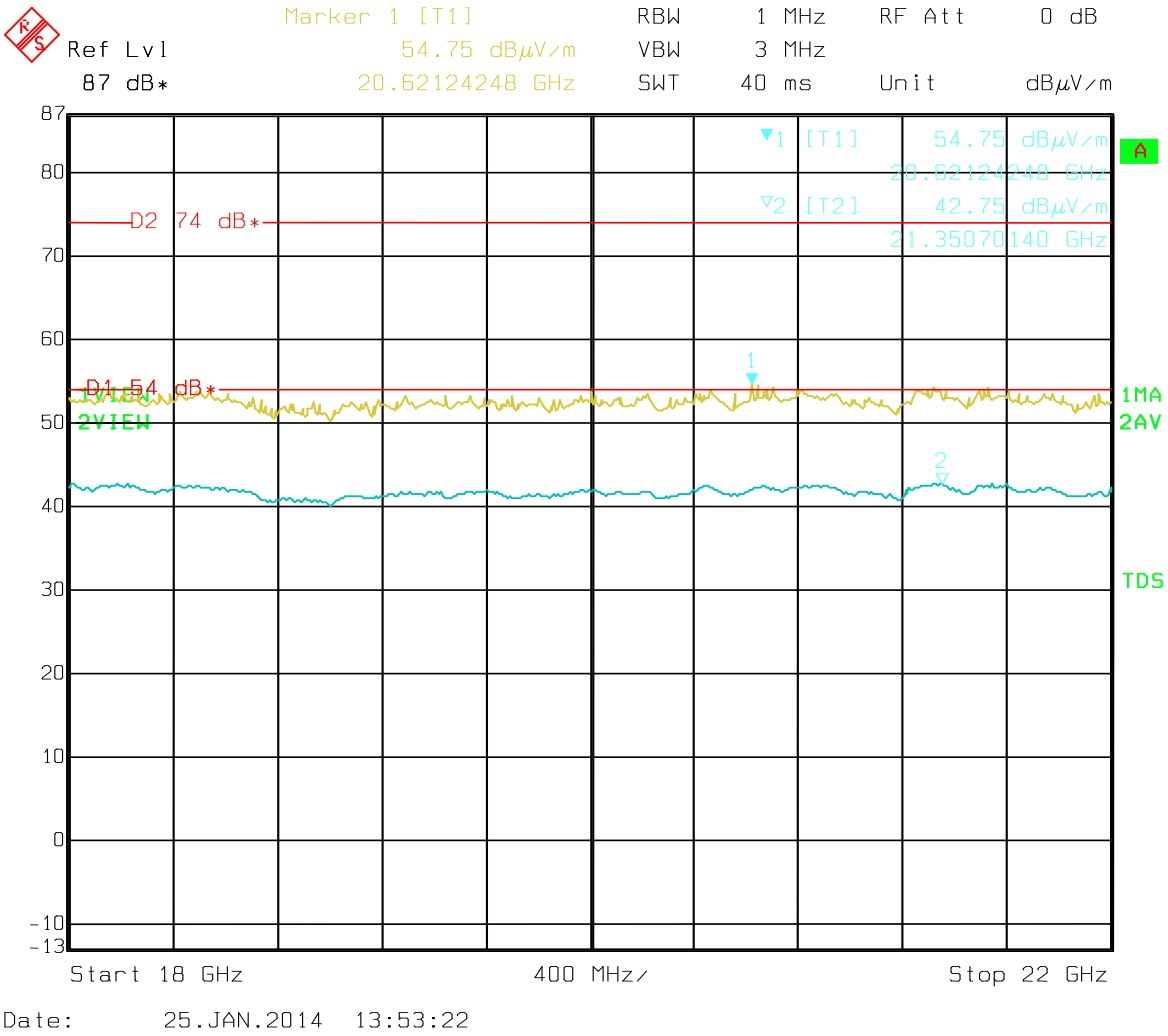
Graph 77 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 14 to 17GHz.



Graph 78 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 17 to 18GHz.



Graph 79 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 18 to 22GHz.



Graph 80 Radiated Emissions Test Results – Mode 4 – Transmit Ch11 – Vertical – 22 to 25GHz.

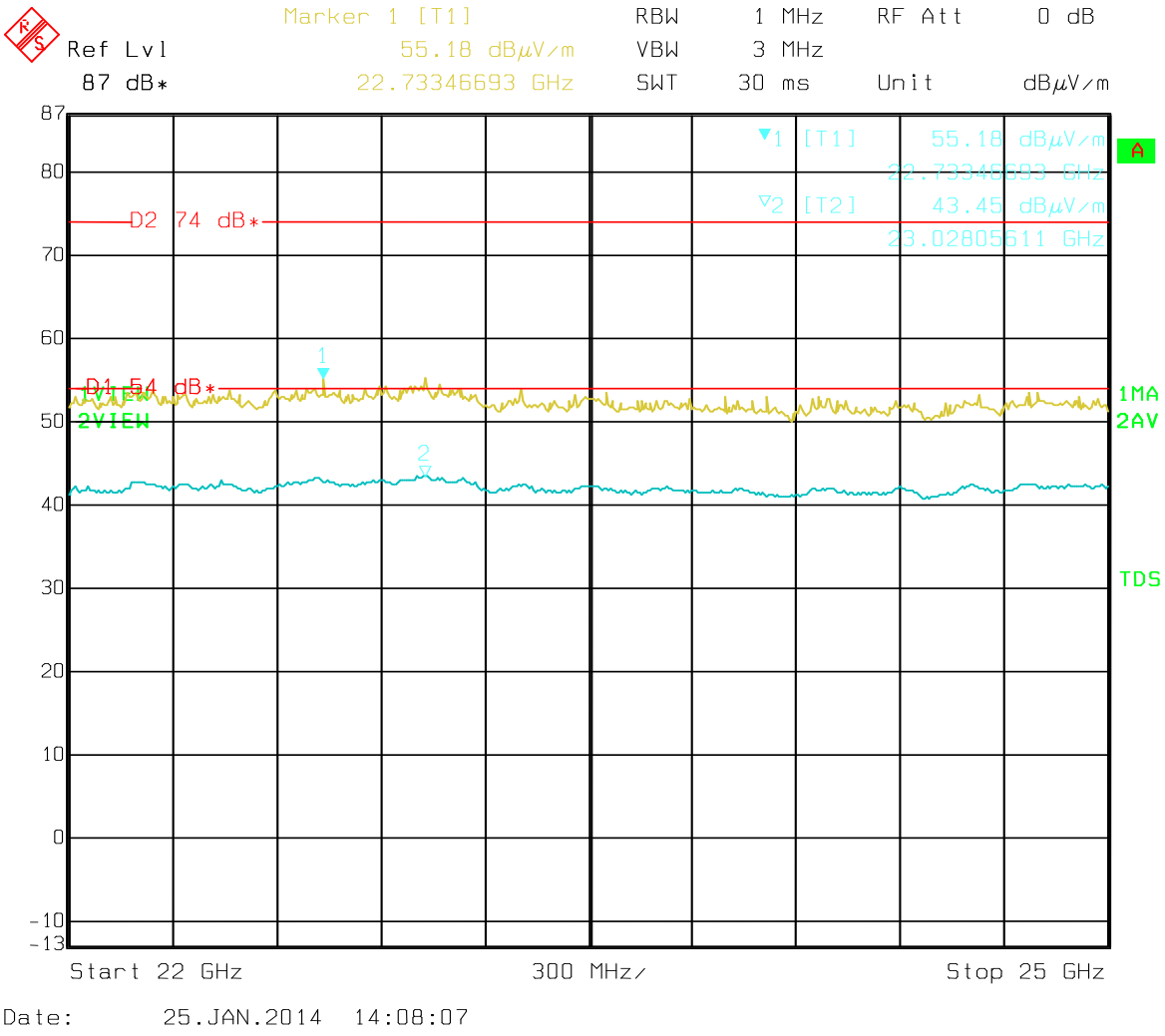


Table 17 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Horizontal.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	216 MHz	41.09	-4.92
1 Quasi Peak	240 MHz	45.86	-0.15
1 Quasi Peak	264 MHz	42.22	-3.80
1 Quasi Peak	288 MHz	42.58	-3.43
1 Quasi Peak	375 MHz	37.87	-8.14
1 Quasi Peak	731.24 MHz	31.76	-14.25

Graph 81 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Horizontal.

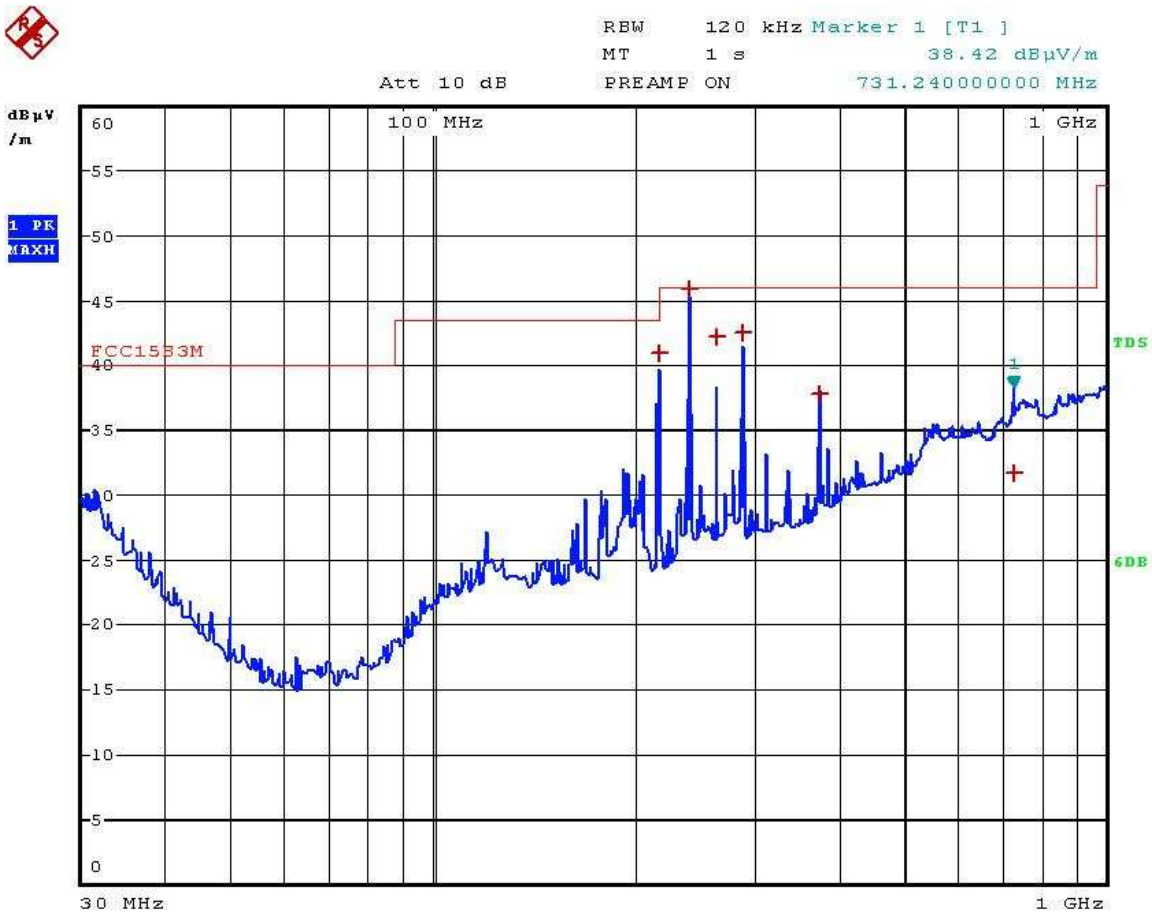


Table 18 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Vertical.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.12 MHz	26.55	-13.44
1 Quasi Peak	188.68 MHz	24.82	-18.69
1 Quasi Peak	192 MHz	37.34	-6.17
1 Quasi Peak	216 MHz	40.80	-5.21
1 Quasi Peak	240 MHz	41.88	-4.13
1 Quasi Peak	922.52 MHz	32.80	-13.21

Graph 82 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Vertical.

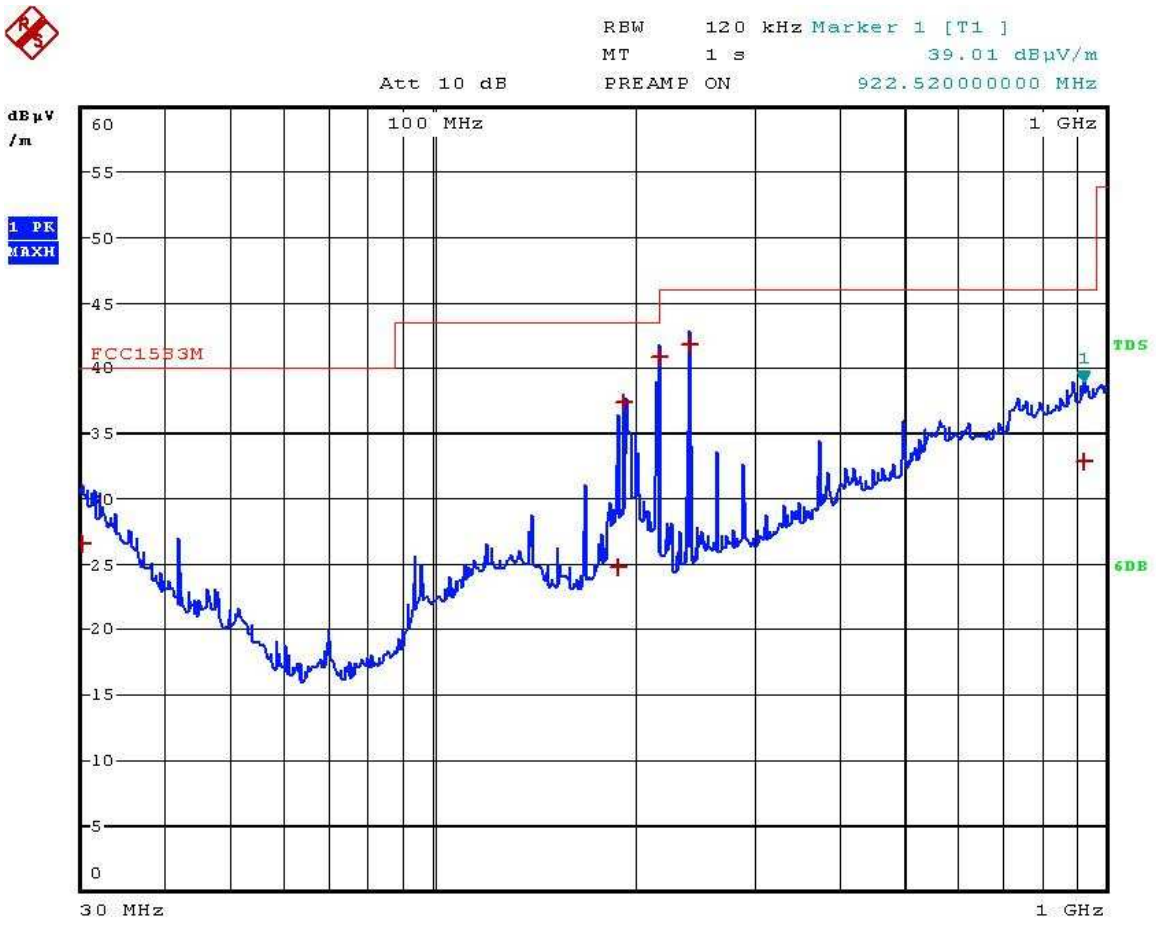


Table 19 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Horizontal - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.441	95.75	72.67	94.00	21.33	Pass
4.878	65.21	42.13	54.00	11.87	Pass
7.321	59.17	36.09	54.00	17.91	Pass
9.762	55.31	32.23	54.00	21.77	Pass
12.202	64.52	41.44	54.00	12.56	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

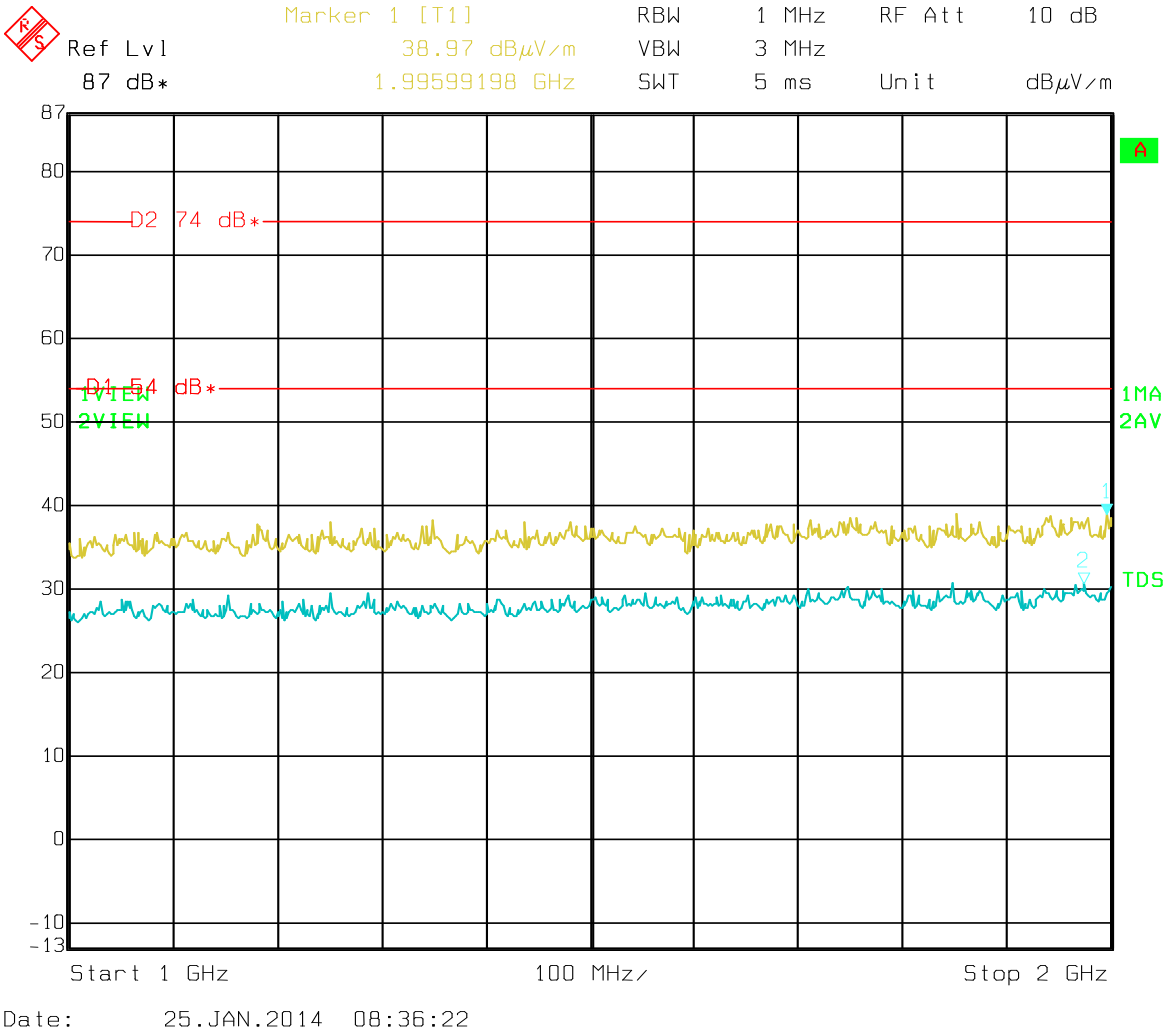
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse duratsions / Period of a transmission)

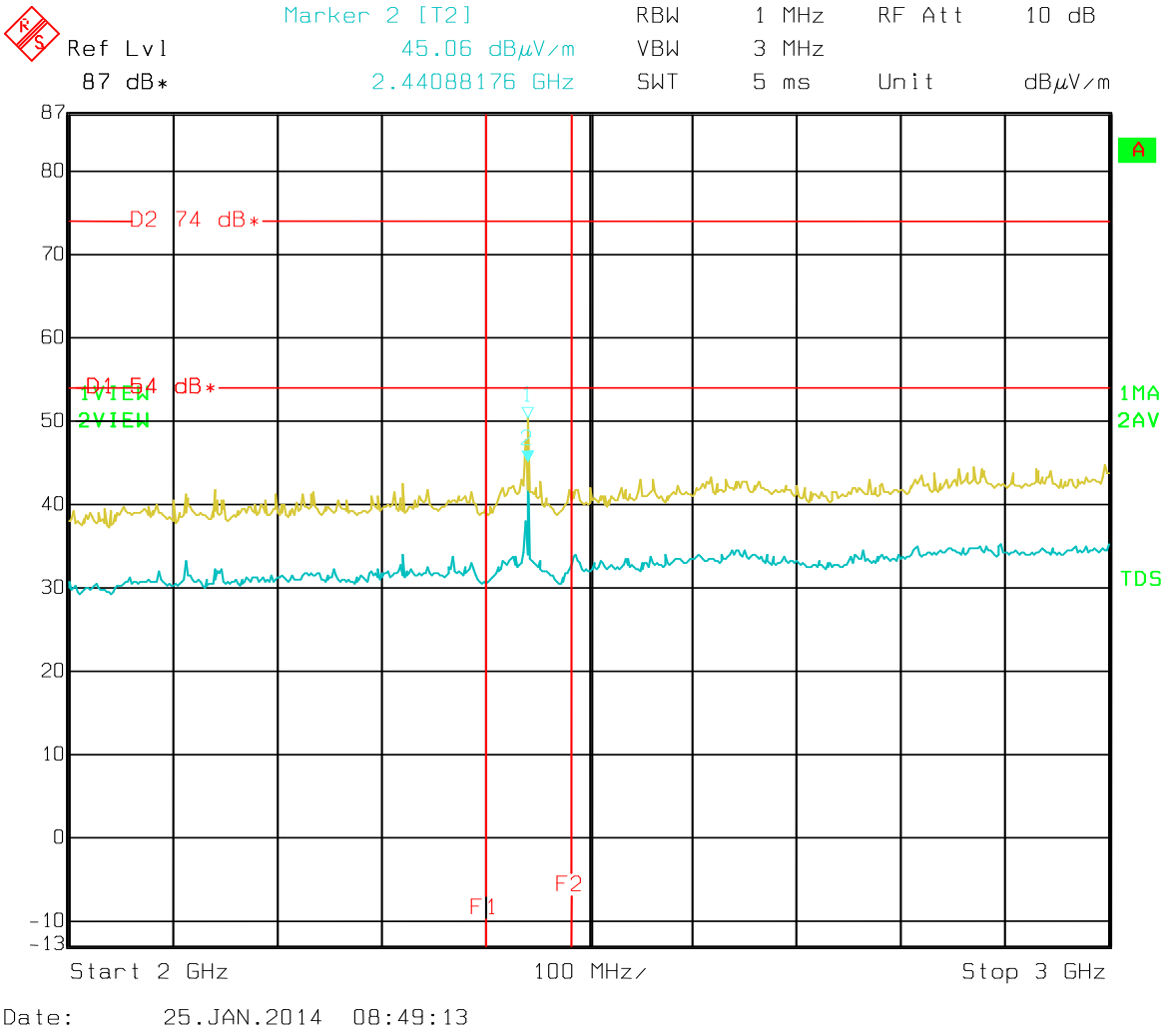
= 20 log (3.5047 + 3.5047 / 100)

= -23.08 (dB)

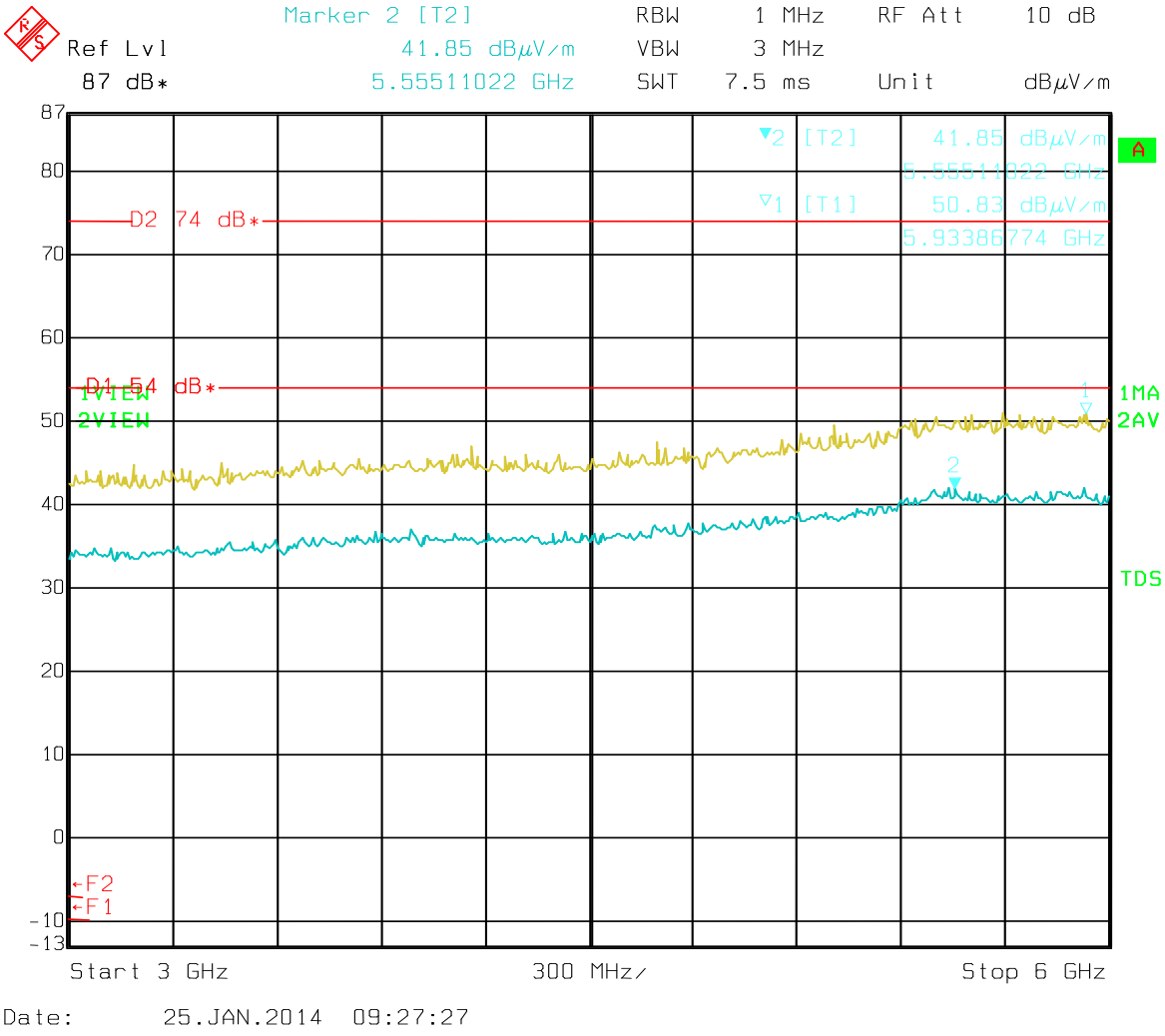
Graph 83 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 1 to 2GHz.



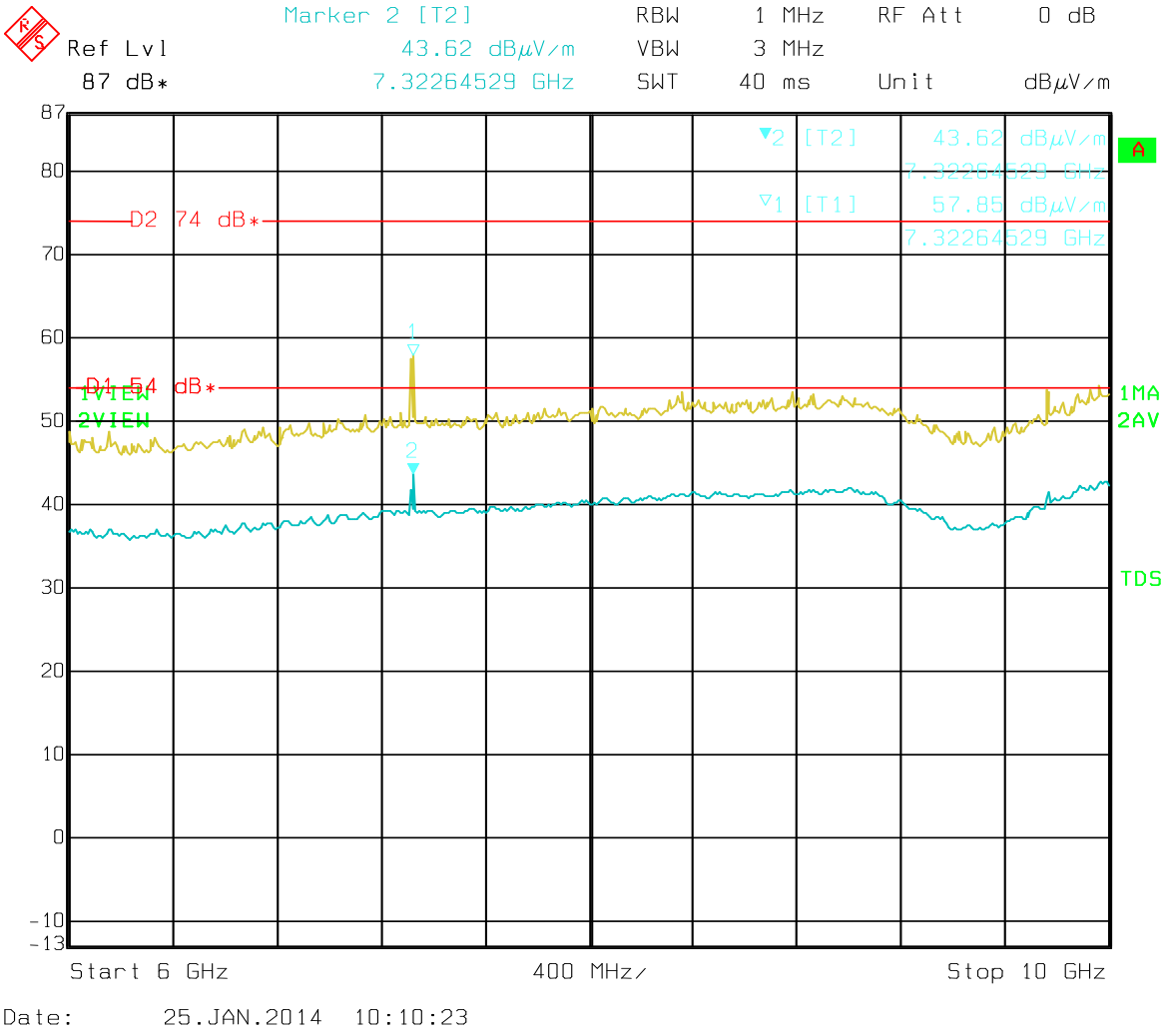
Graph 84 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 2 to 3GHz.



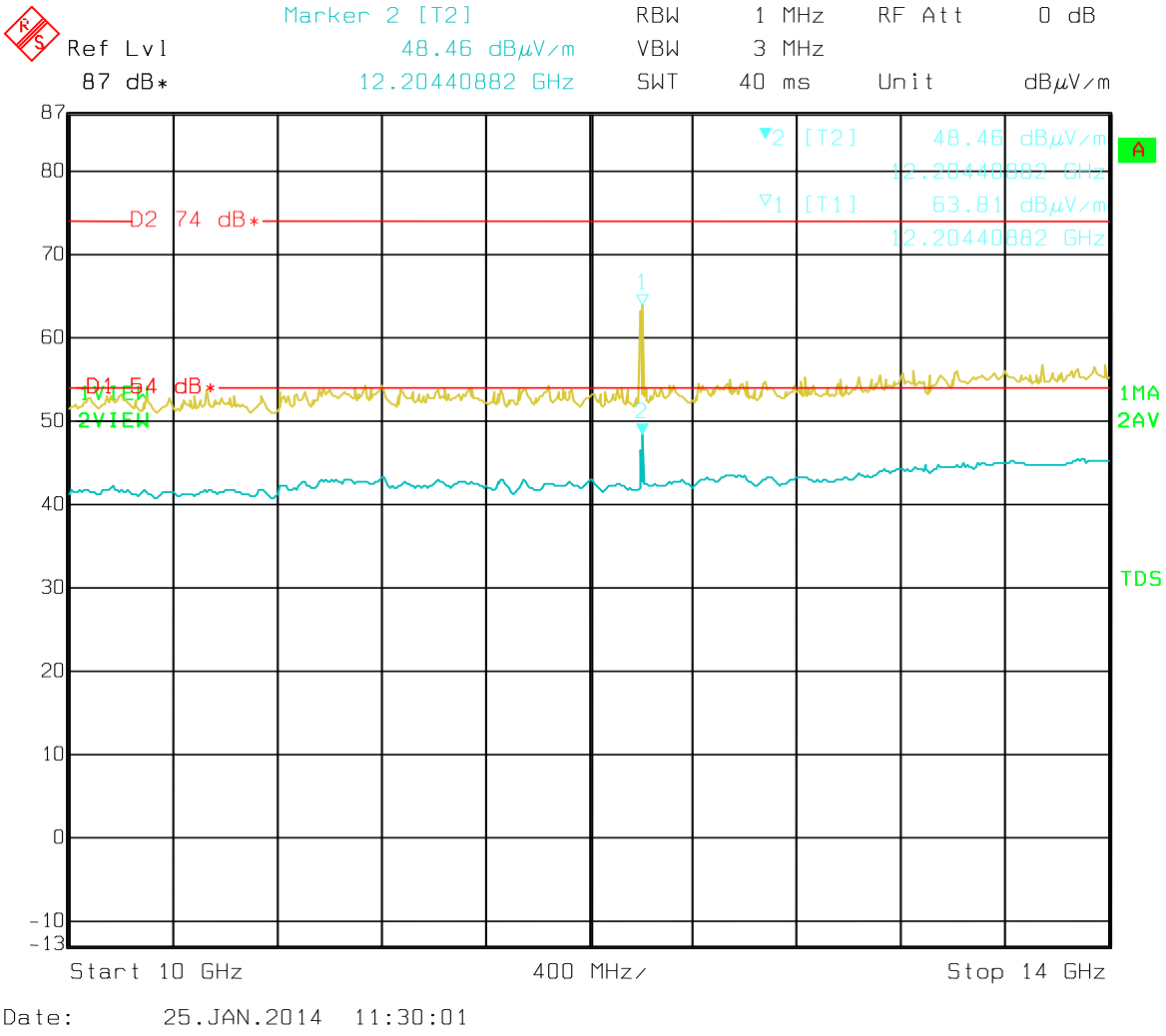
Graph 85 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 3 to 6GHz.



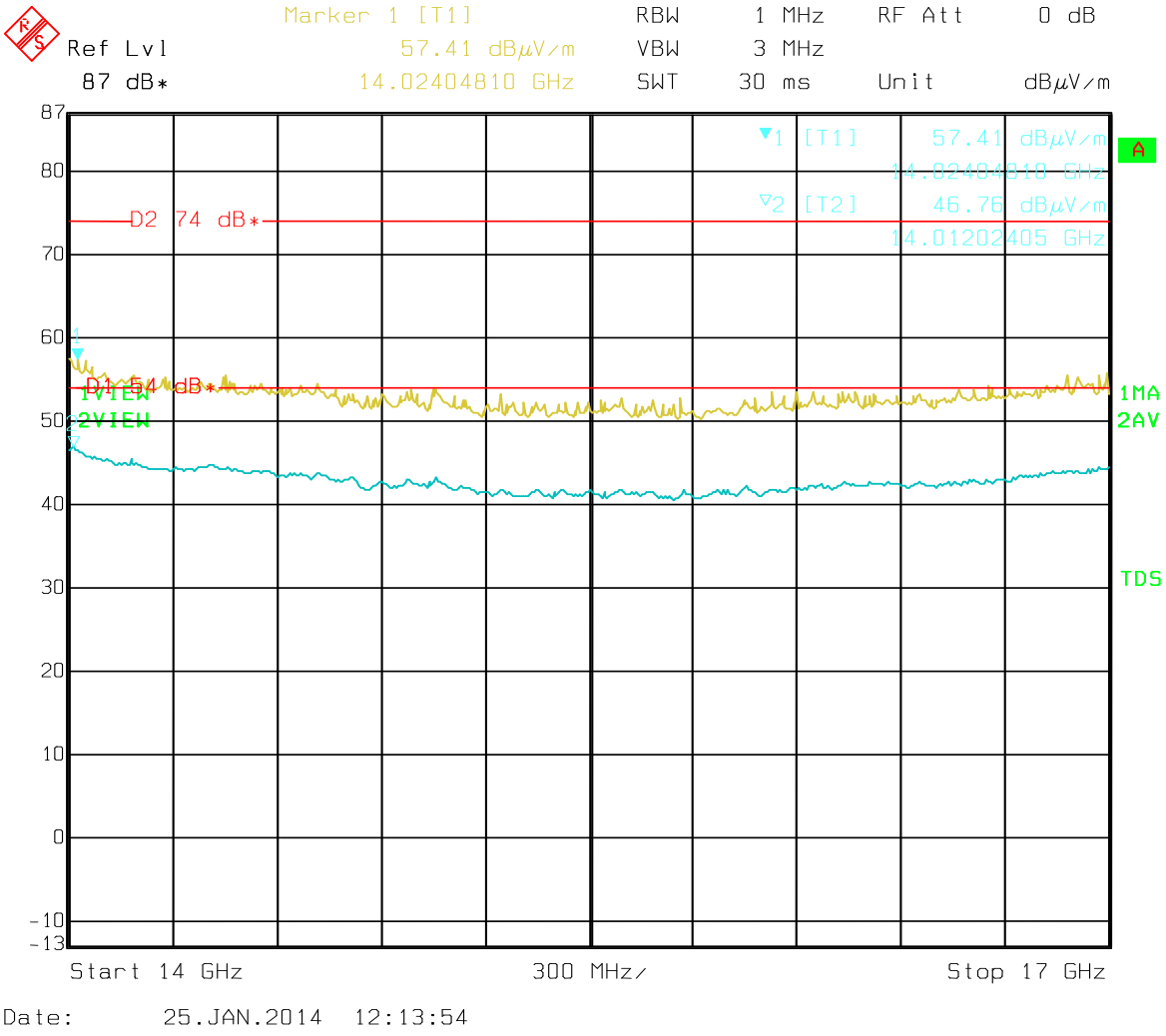
Graph 86 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 6 to 10GHz.



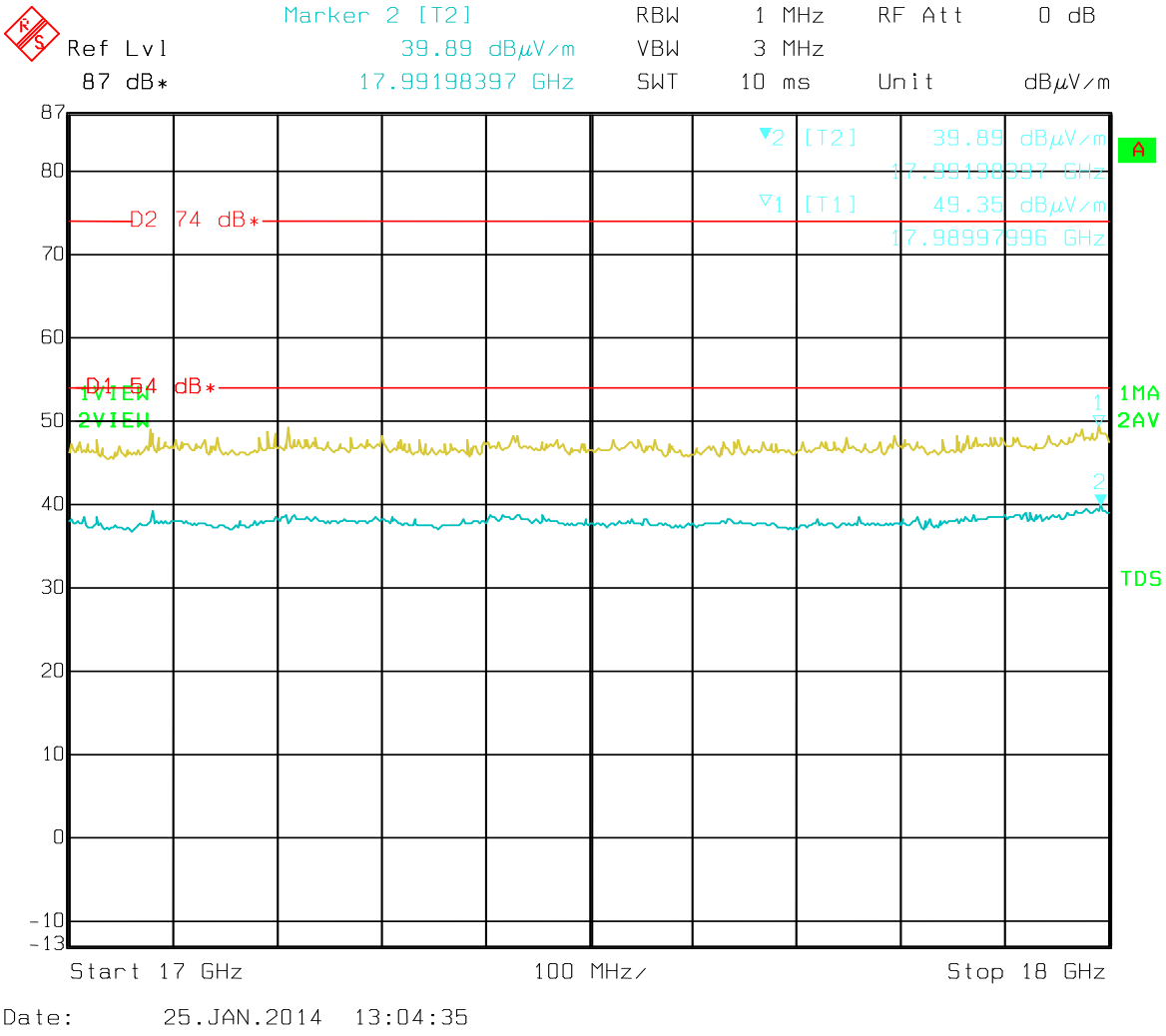
Graph 87 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 10 to 14GHz.



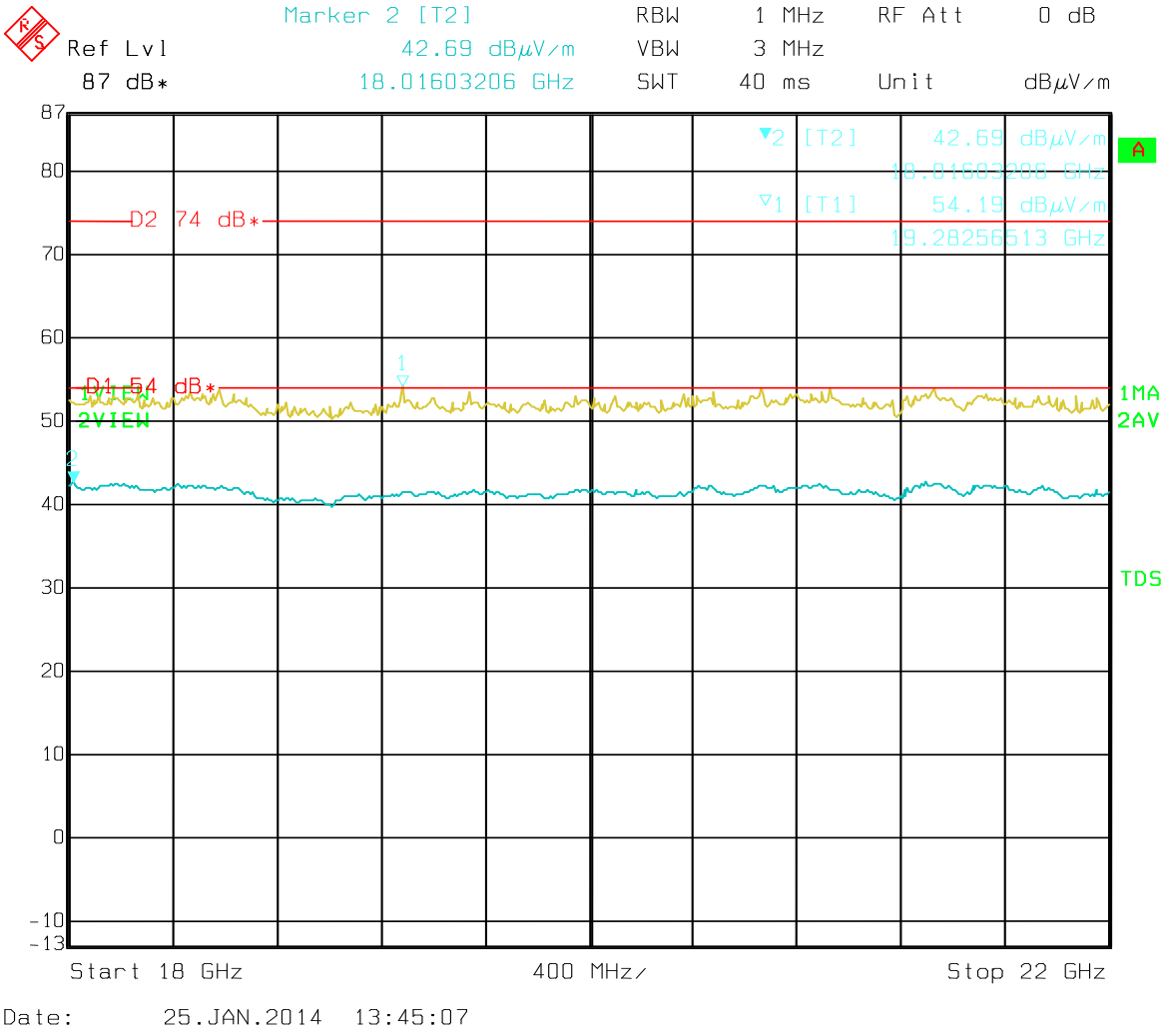
Graph 88 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 14 to 17GHz.



Graph 89 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 17 to 18GHz.



Graph 90 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 18 to 22GHz.



Graph 91 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Horizontal – 22 to 25GHz.

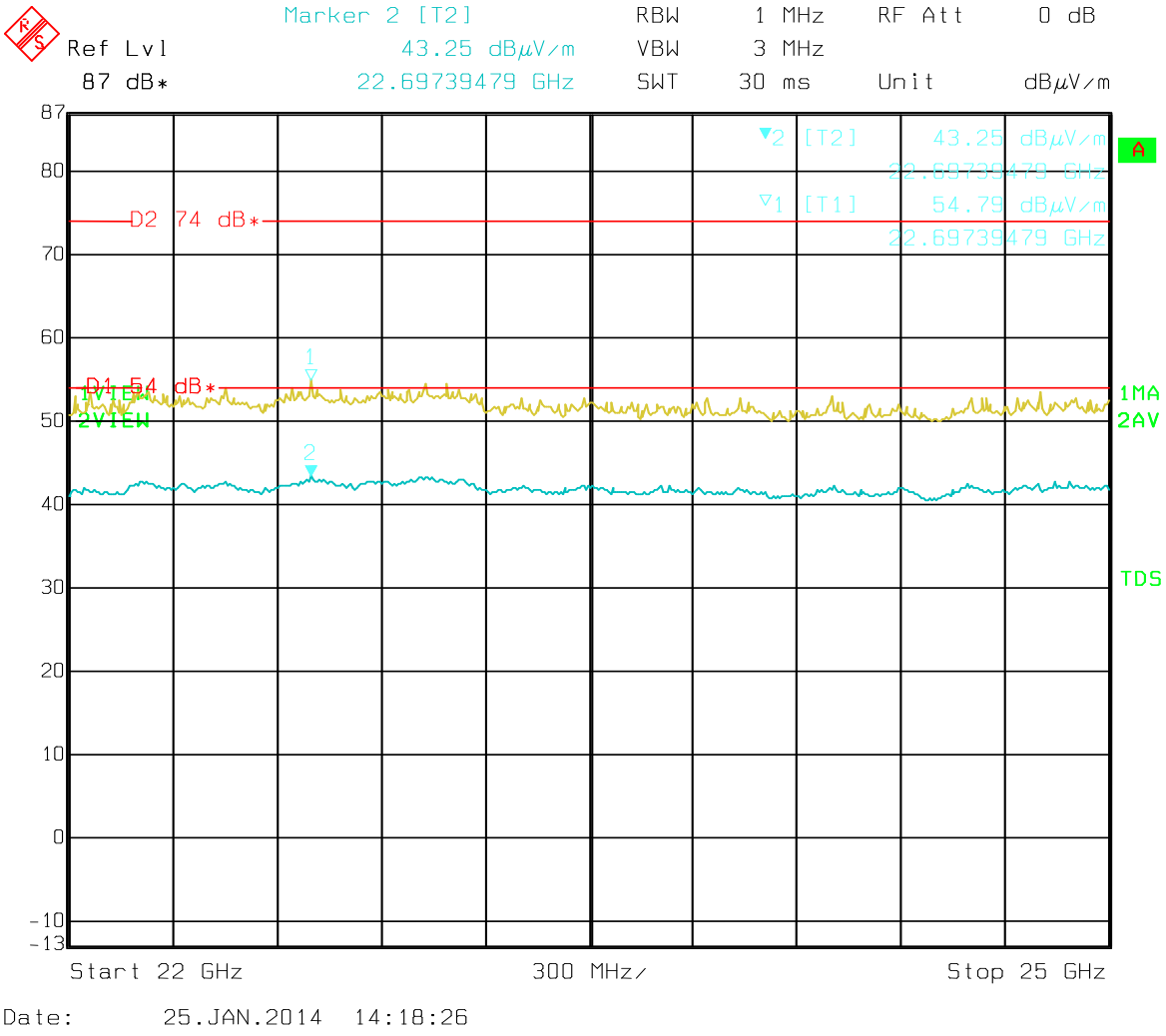


Table 20 Radiated Emissions Test Results – Mode 5: Transmit Mode (Data Stream) – Ch18 – Vertical - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.441	115.67	92.59	94.00	1.41	Pass
4.881	70.77	47.69	54.00	6.31	Pass
7.322	64.10	41.02	54.00	12.98	Pass
9.758	61.24	38.16	54.00	15.84	Pass
12.197	68.75	45.67	54.00	8.33	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

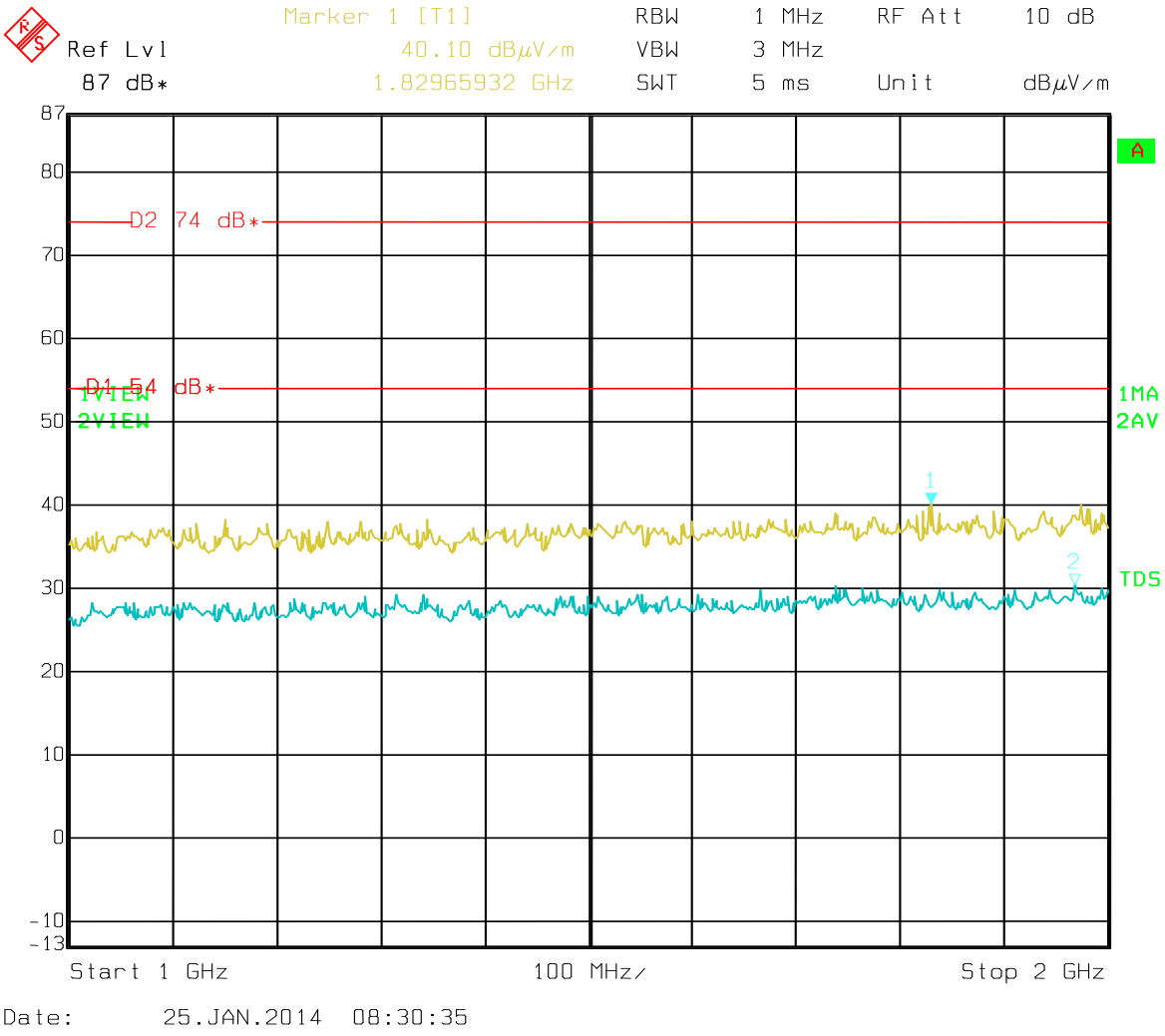
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse duratsions / Period of a transmission)

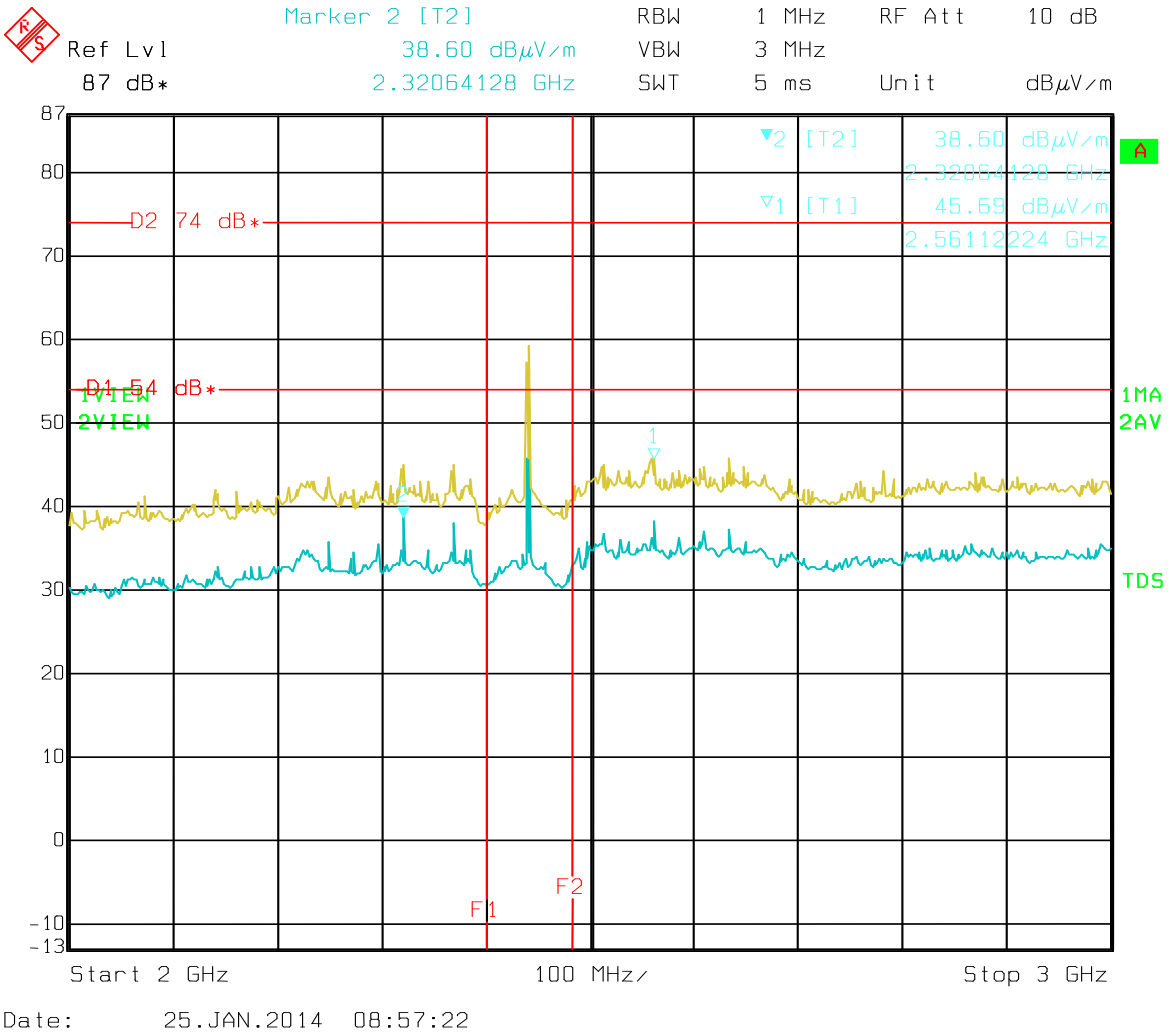
= 20 log (3.5047 + 3.5047 / 100)

= -23.08 (dB)

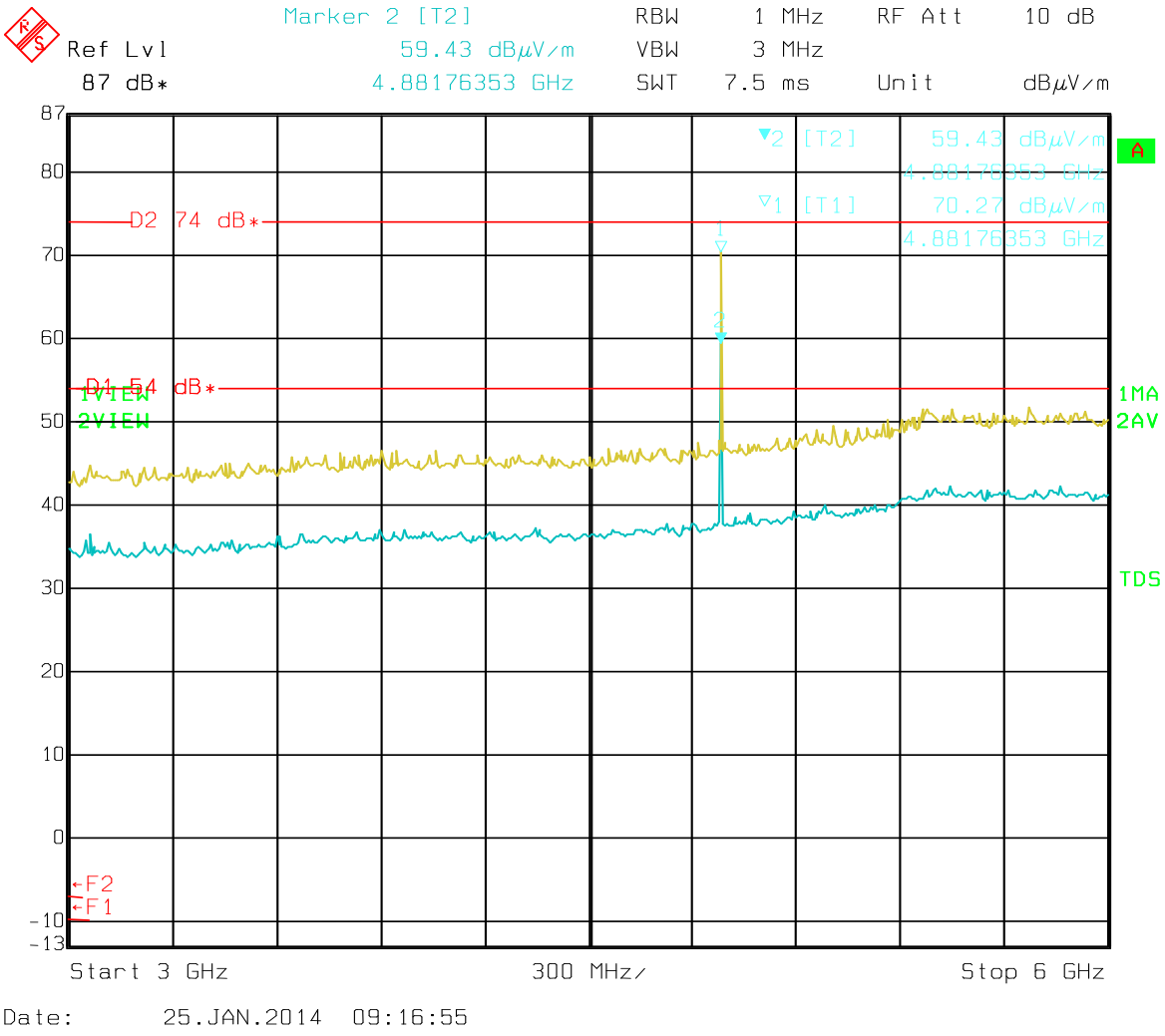
Graph 92 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 1 to 2GHz.



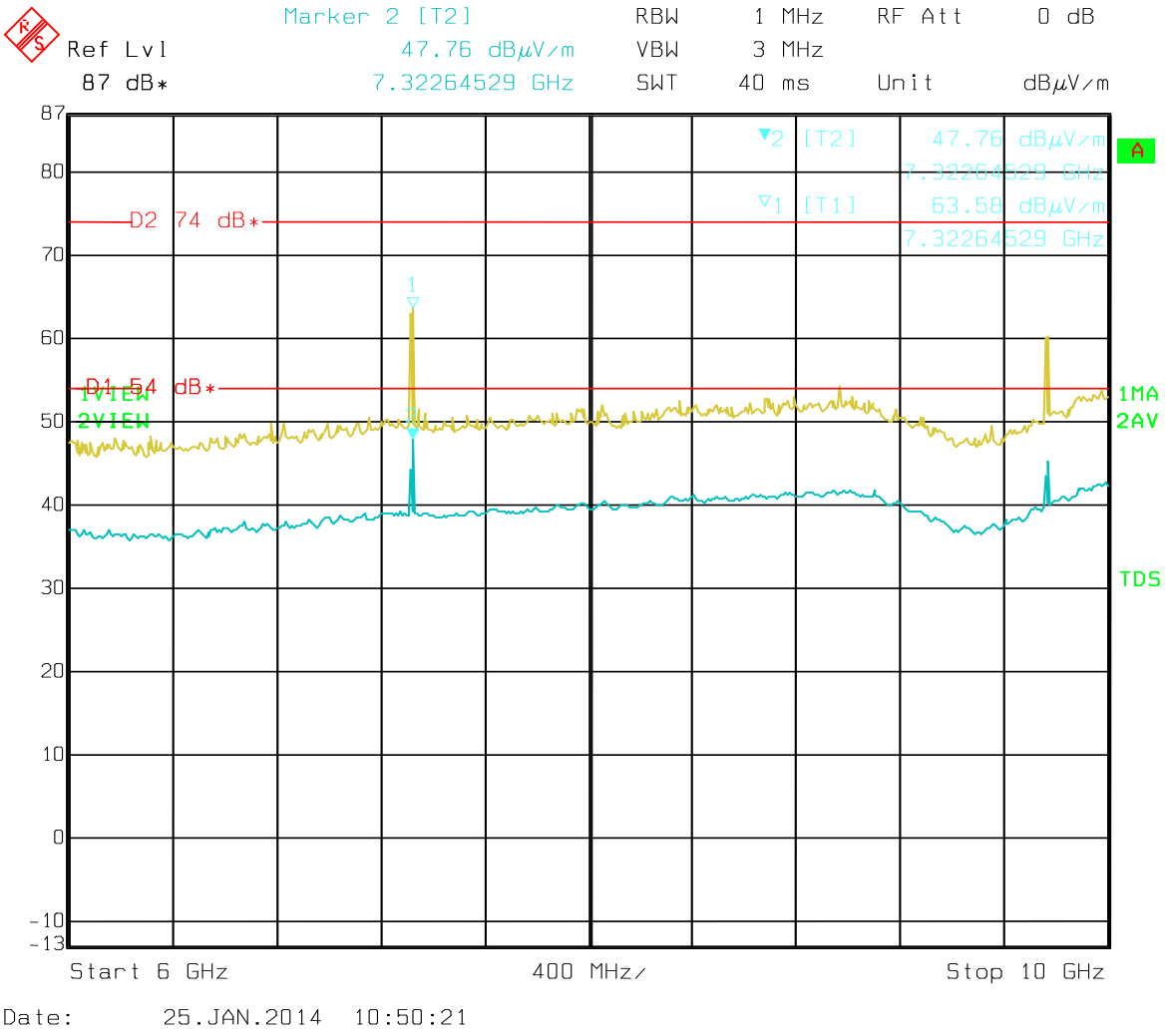
Graph 93 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 2 to 3GHz.



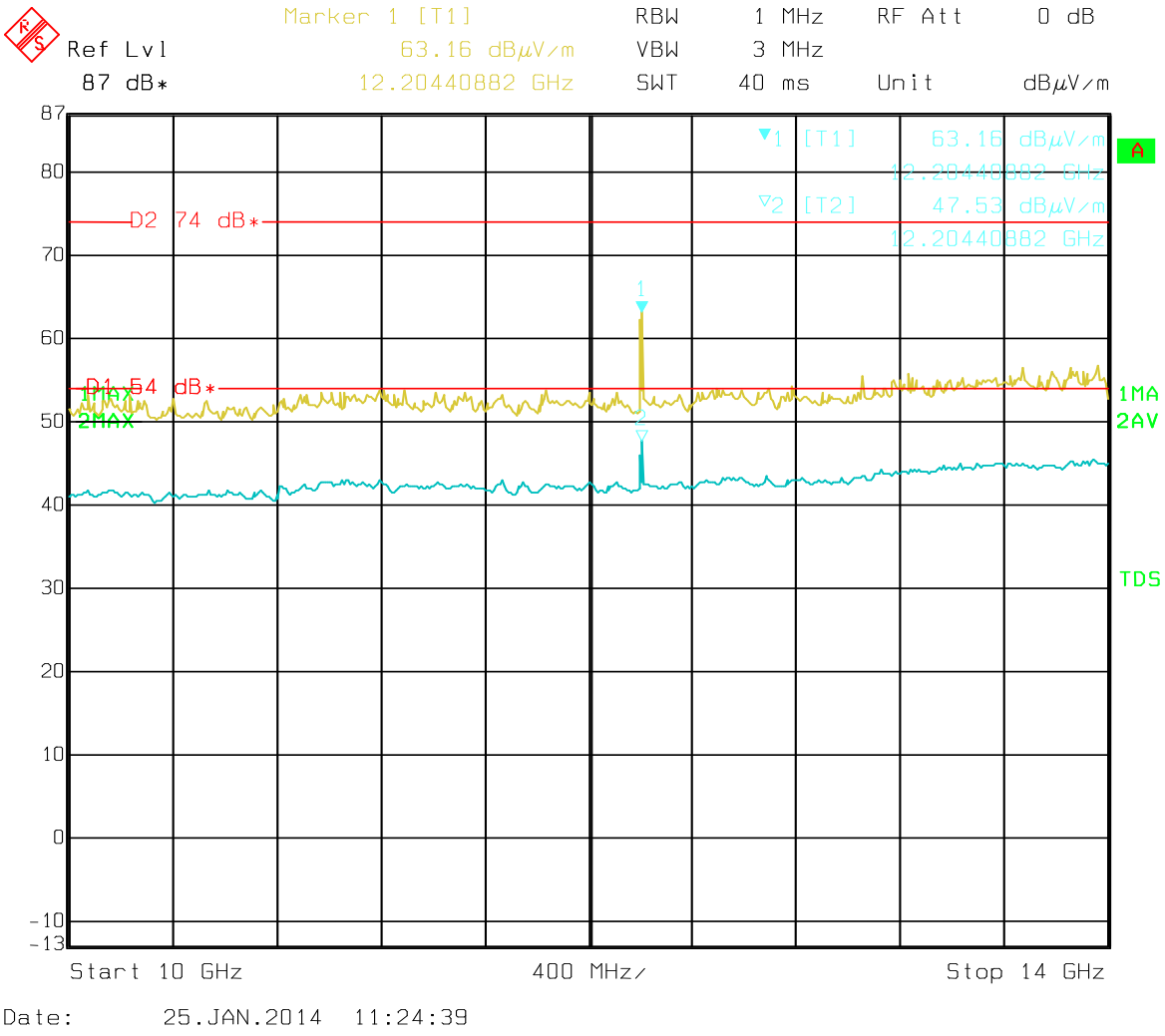
Graph 94 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 3 to 6GHz.



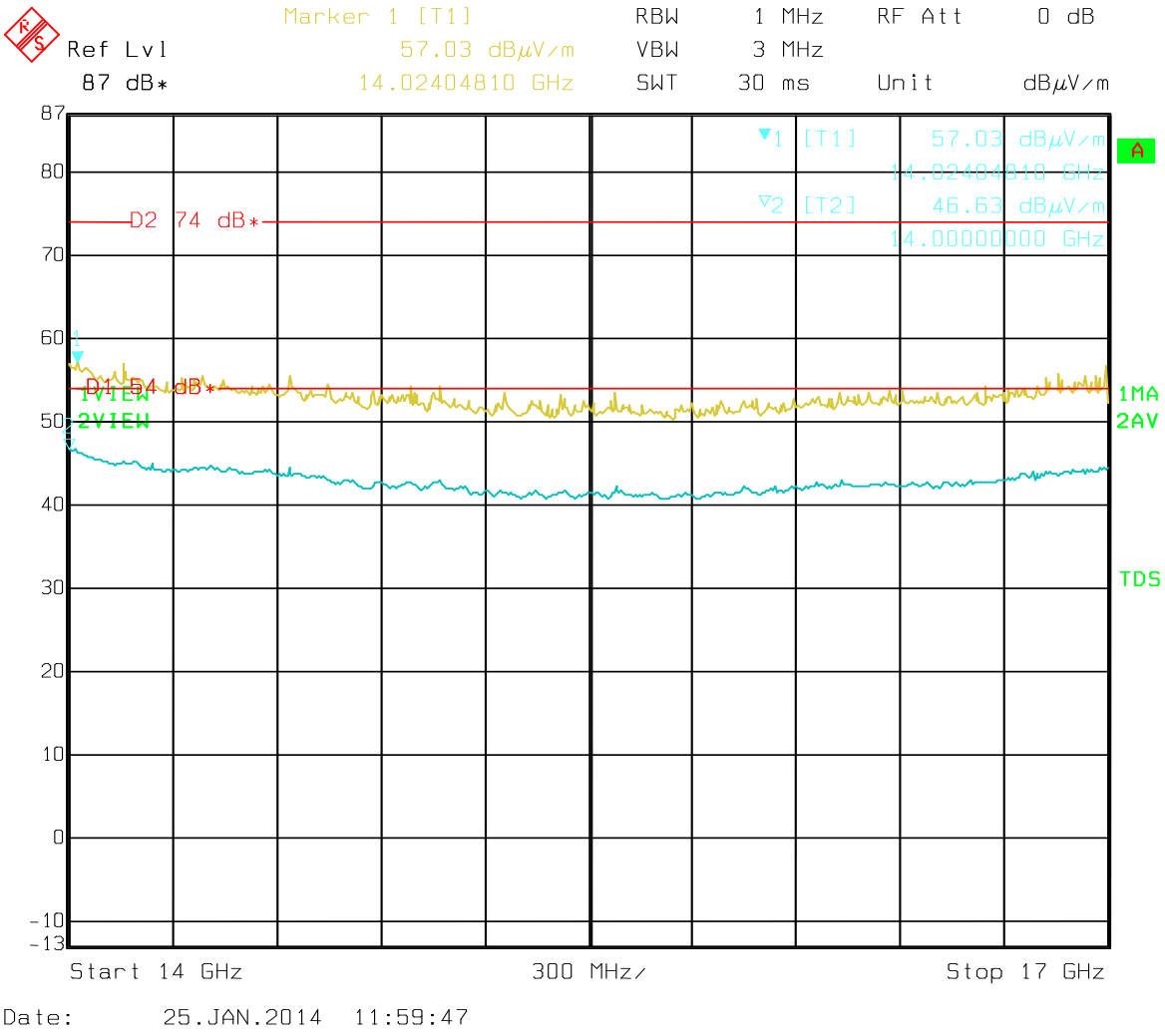
Graph 95 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 6 to 10GHz.



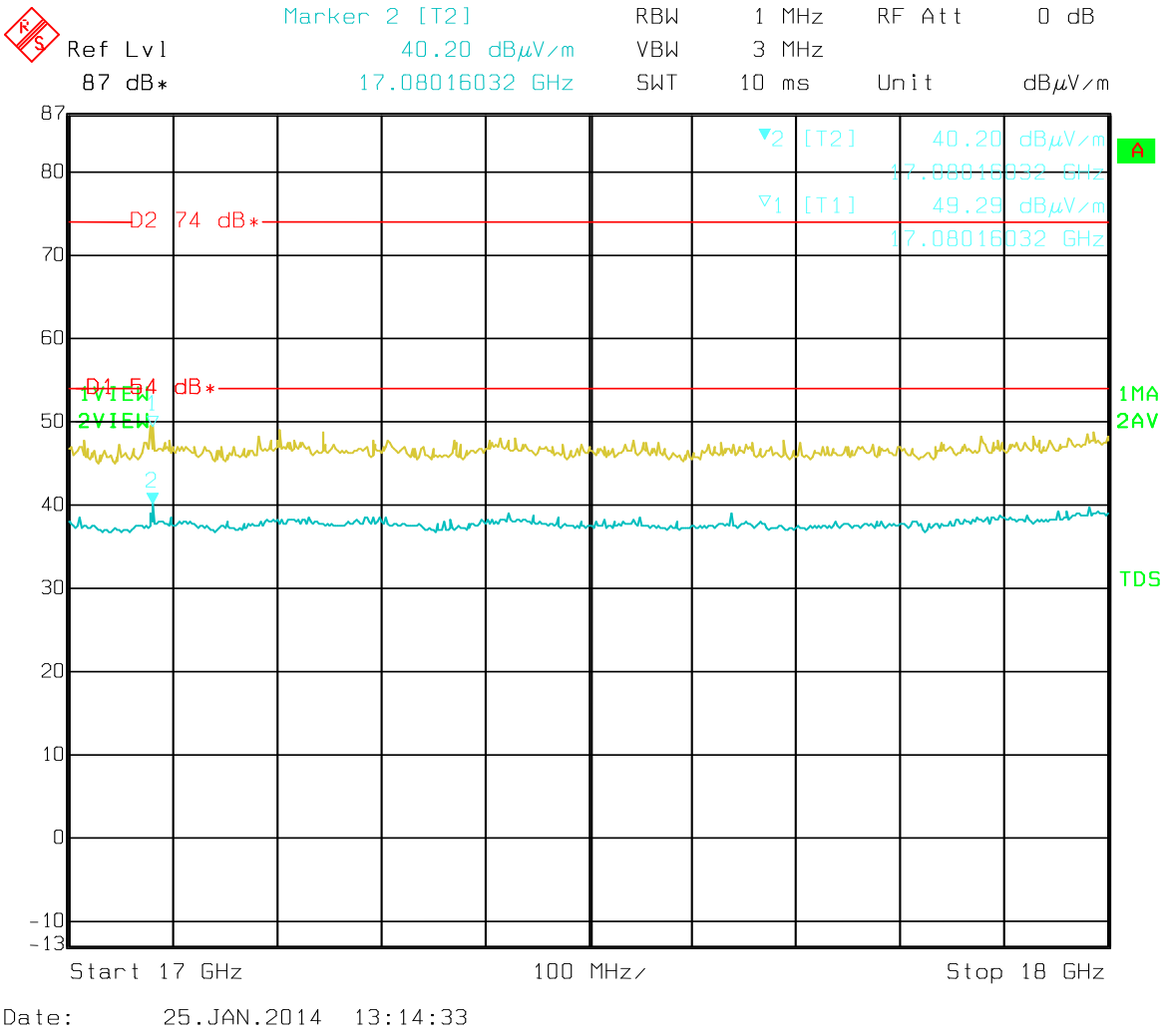
Graph 96 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 10 to 14GHz.



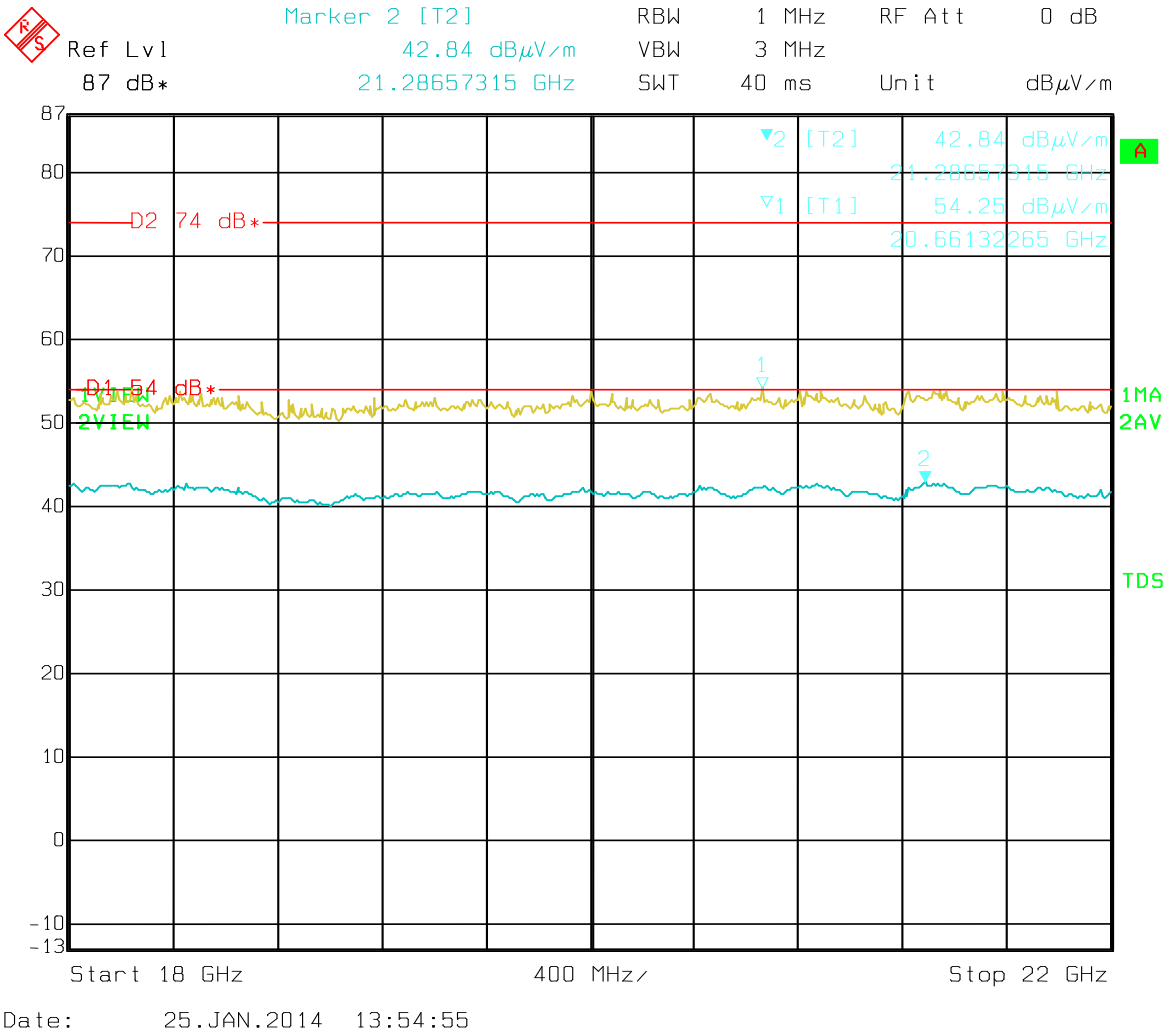
Graph 97 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 14 to 17GHz.



Graph 98 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 17 to 18GHz.



Graph 99 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 18 to 22GHz.



Graph 100 Radiated Emissions Test Results – Mode 5 – Transmit Ch18 – Vertical – 22 to 25GHz.

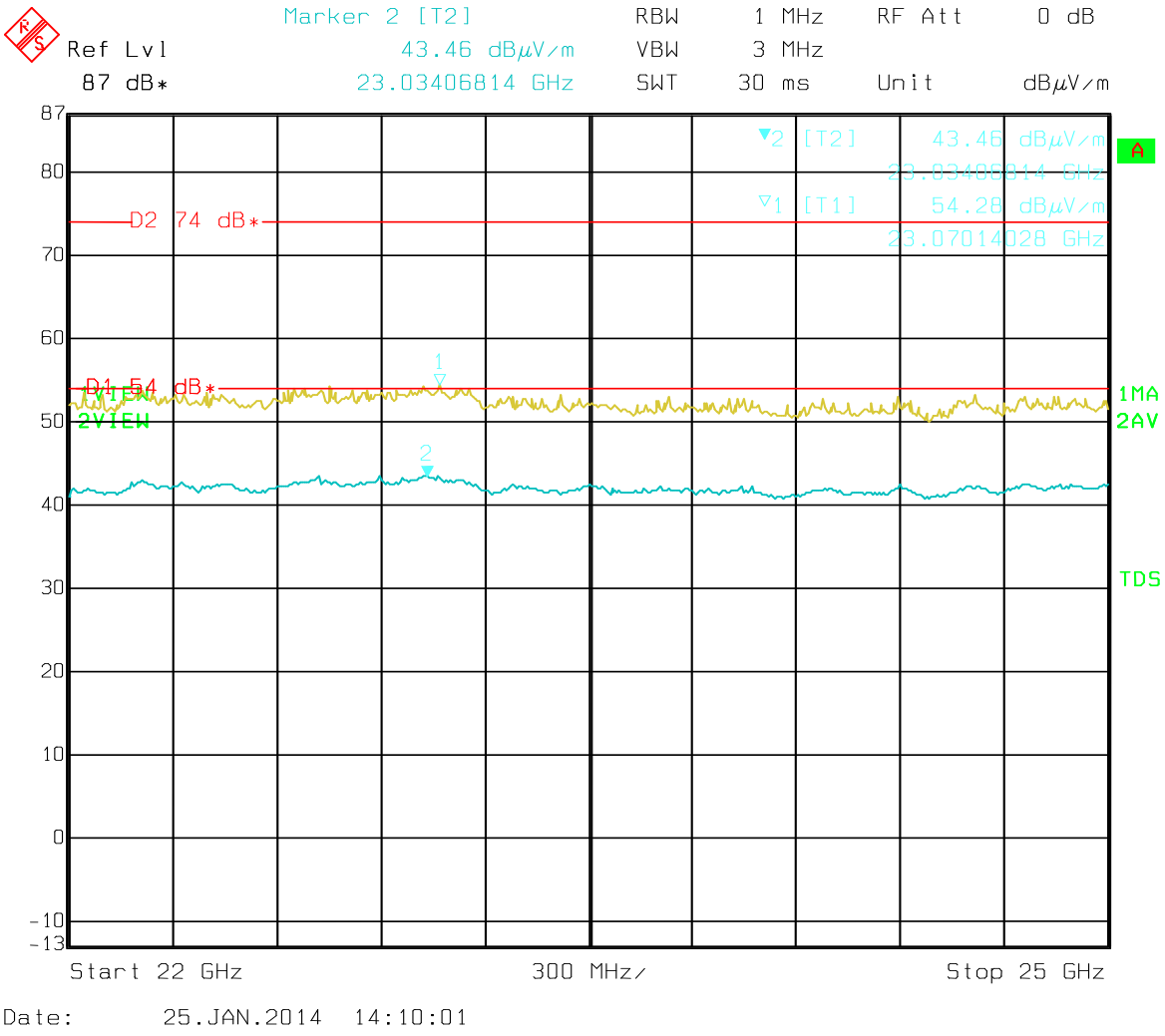


Table 21 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Horizontal.

Standard: FCC Part 15.109

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	216 MHz	37.40	-8.61
1 Quasi Peak	240 MHz	42.04	-3.98
1 Quasi Peak	288 MHz	42.89	-3.12
1 Quasi Peak	312 MHz	35.58	-10.43
1 Quasi Peak	375 MHz	36.64	-9.37
1 Quasi Peak	625.04 MHz	30.97	-15.04
1 Quasi Peak	750 MHz	32.47	-13.54

Graph 101 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Horizontal.

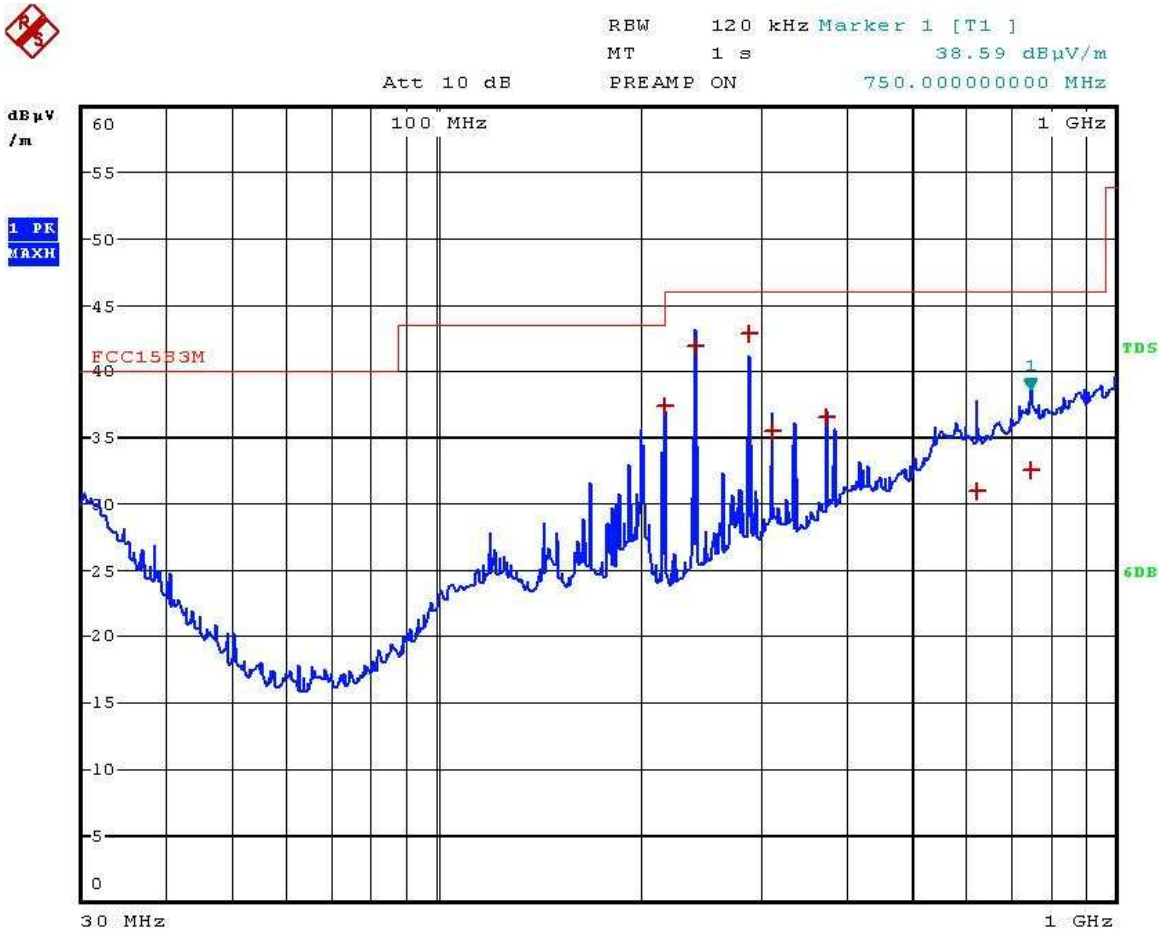


Table 22 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Vertical.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: MHz Amplitude: dBµV/m

Bandwidth: 120kHz

EDIT PEAK LIST (Final Measurement Results)

Trace1: FCC15B3M
Trace2: ---
Trace3: ---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.04 MHz	26.51	-13.48
1 Quasi Peak	195.48 MHz	28.70	-14.81
1 Quasi Peak	216 MHz	37.40	-8.61
1 Quasi Peak	240 MHz	38.15	-7.86
1 Quasi Peak	552.64 MHz	29.94	-16.07
1 Quasi Peak	934.68 MHz	32.73	-13.28

Graph 102 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Vertical.

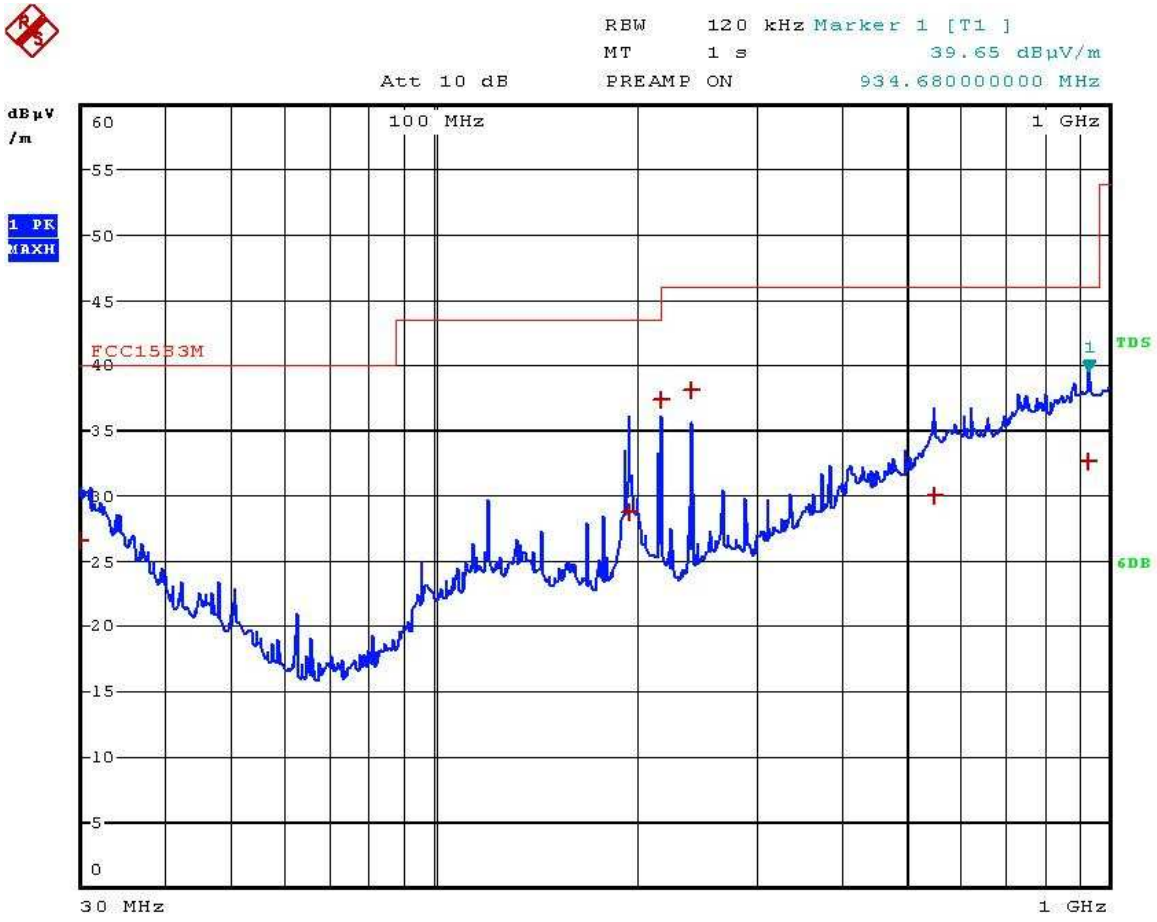


Table 23 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Horizontal - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.480	93.02	69.94	94.00	24.06	Pass
4.961	63.18	40.10	54.00	13.90	Pass
7.441	59.22	36.14	54.00	17.86	Pass
9.922	56.58	33.50	54.00	20.50	Pass
12.402	62.98	39.90	54.00	14.10	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

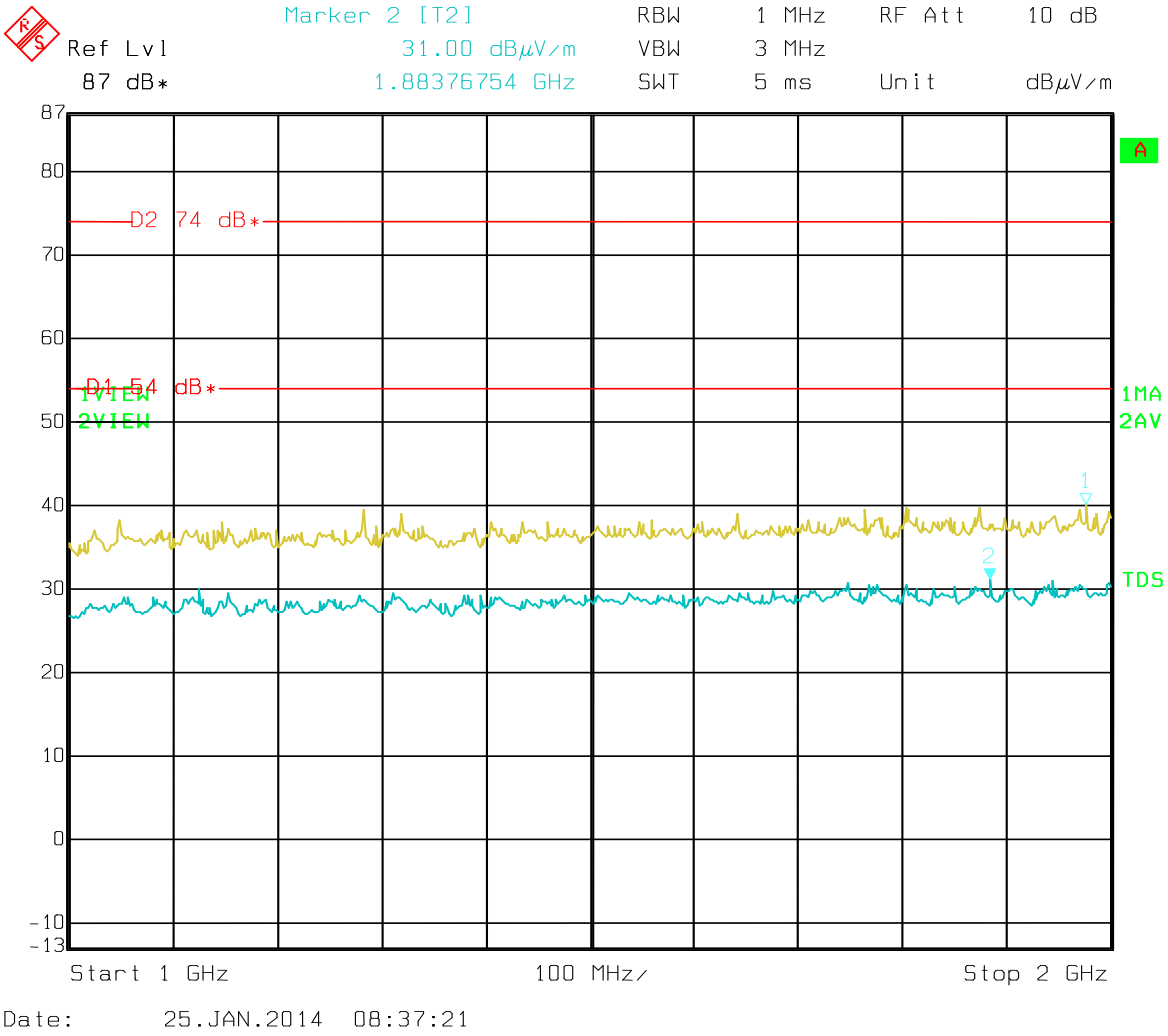
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse duratsions / Period of a transmission)

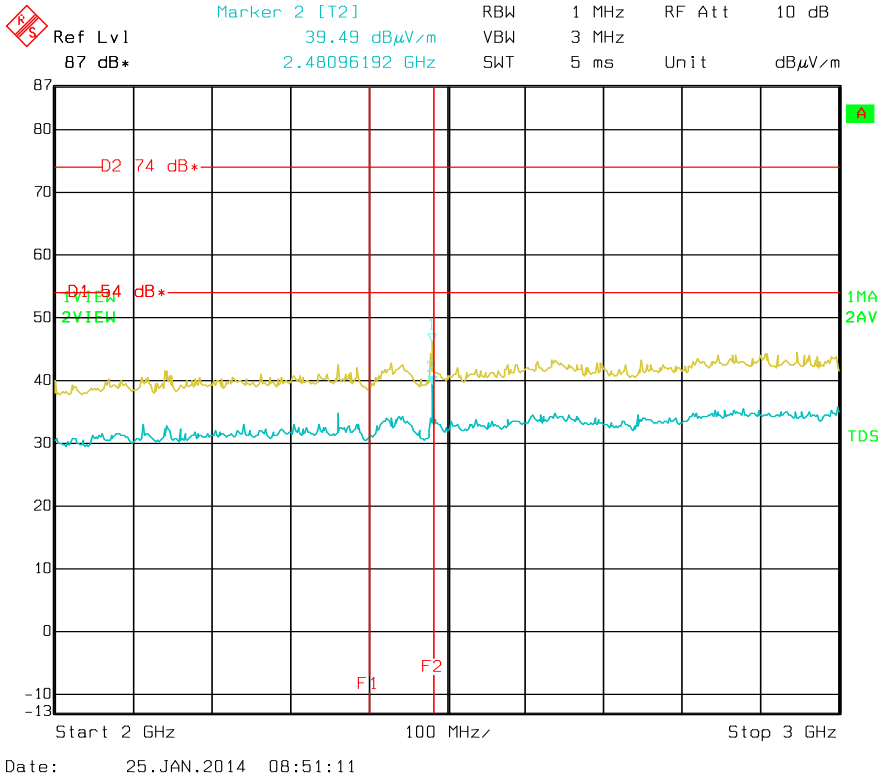
= 20 log (3.5047 + 3.5047 / 100)

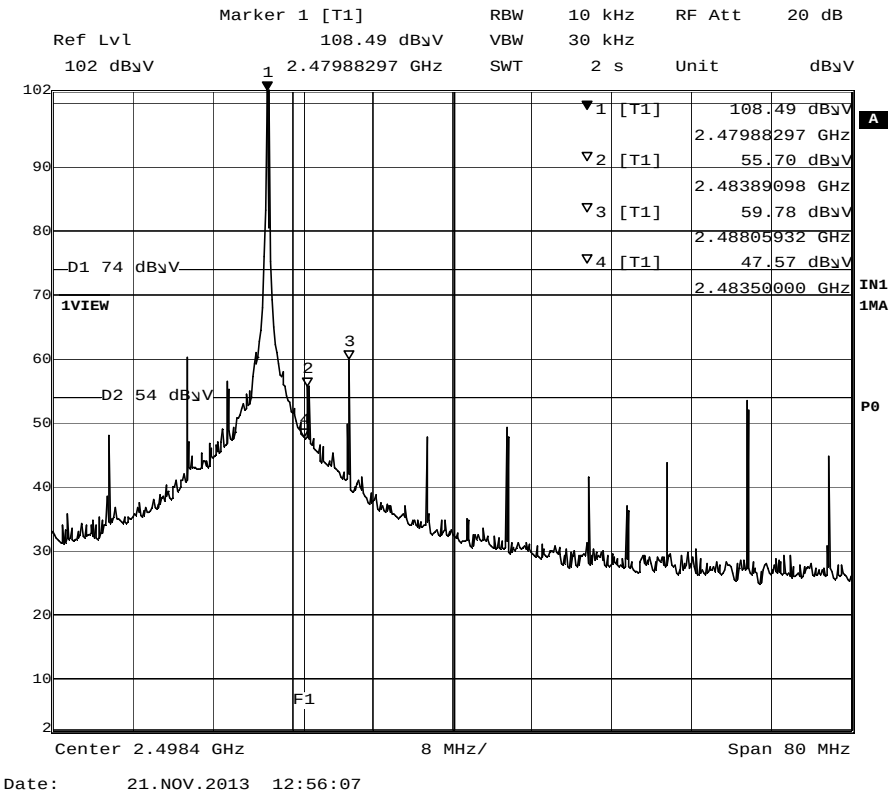
= -23.08 (dB)

Graph 103 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 1 to 2GHz.



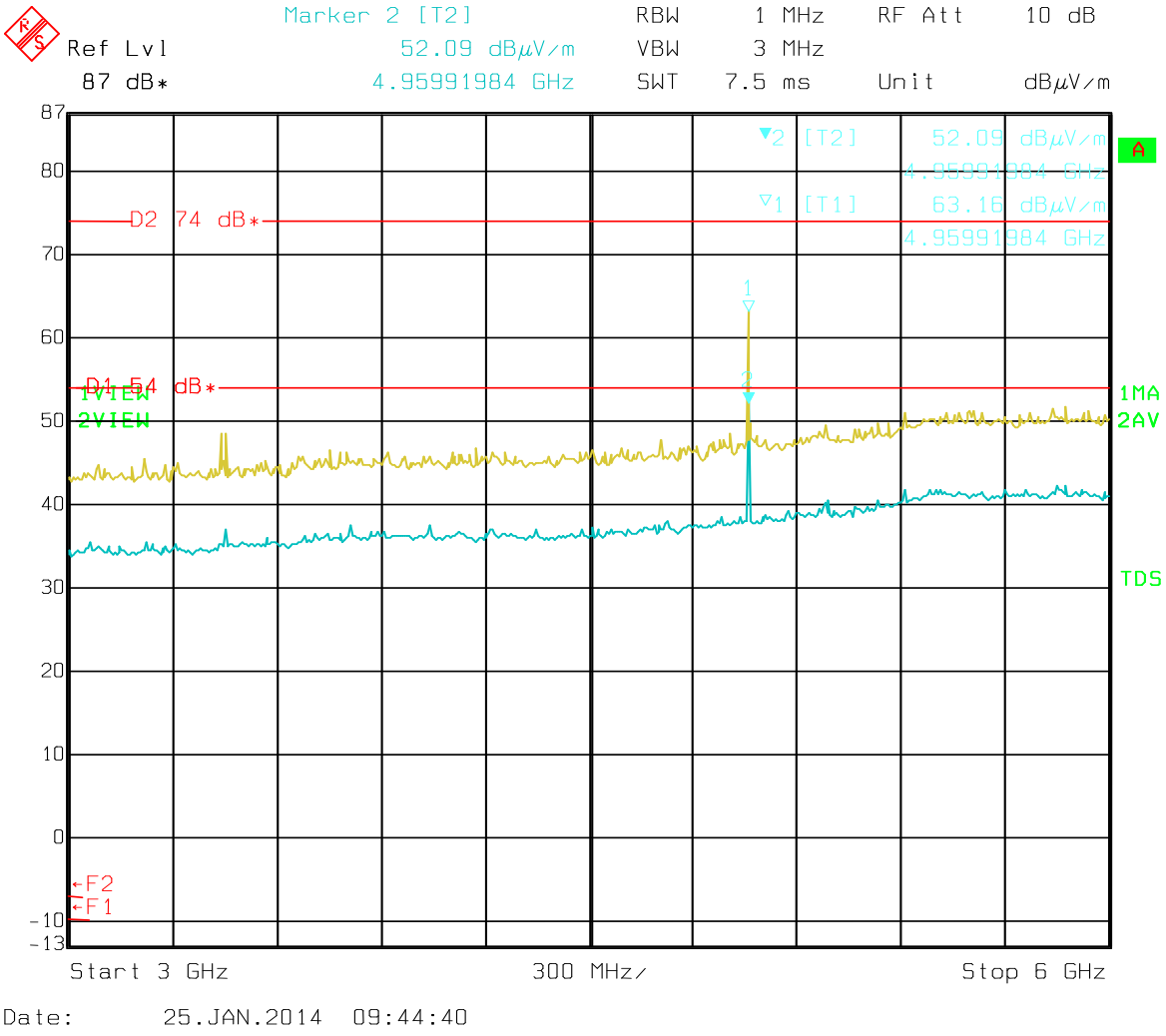
Graph 104 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 2 to 3GHz.



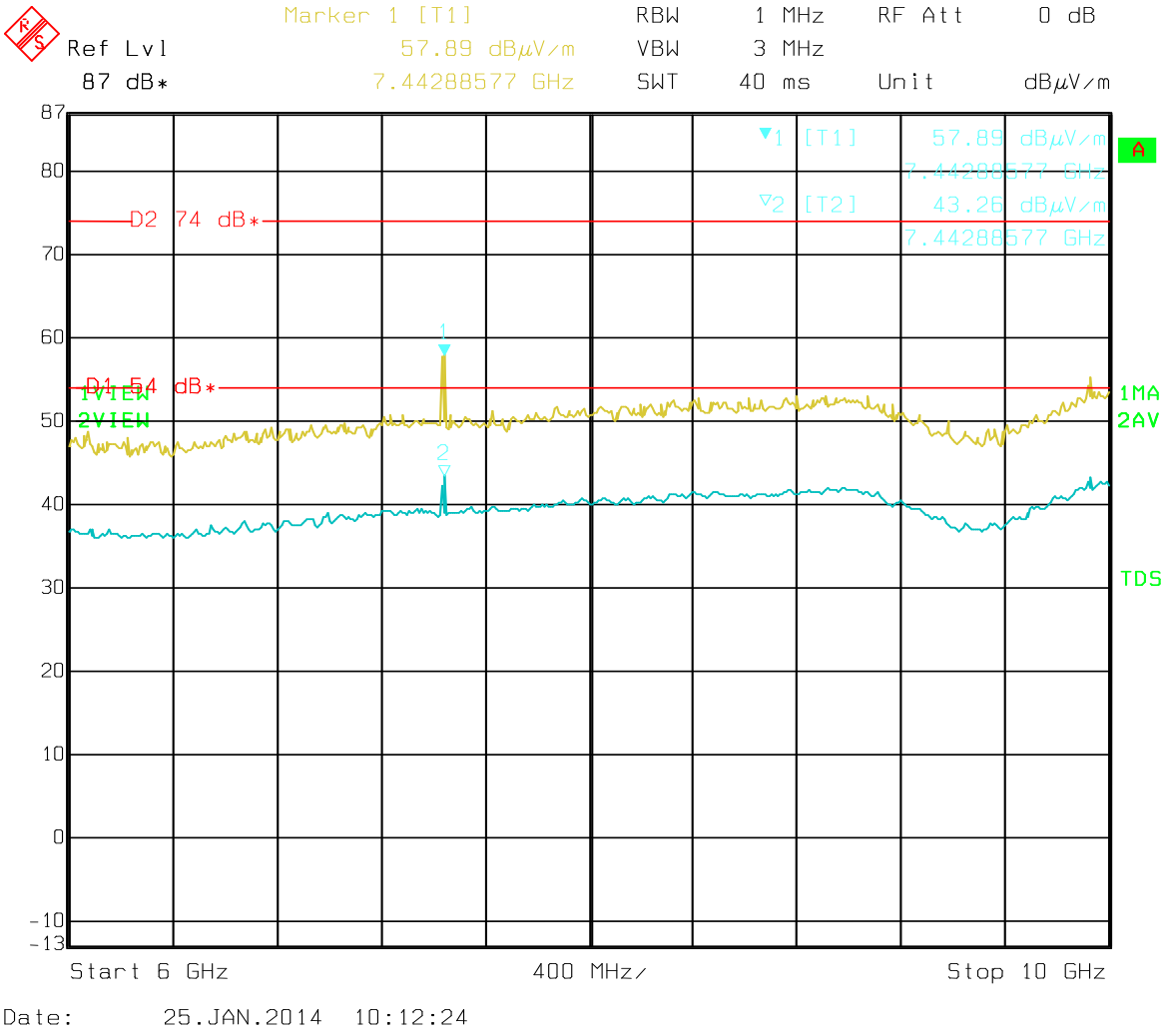


Expanded Band Edge

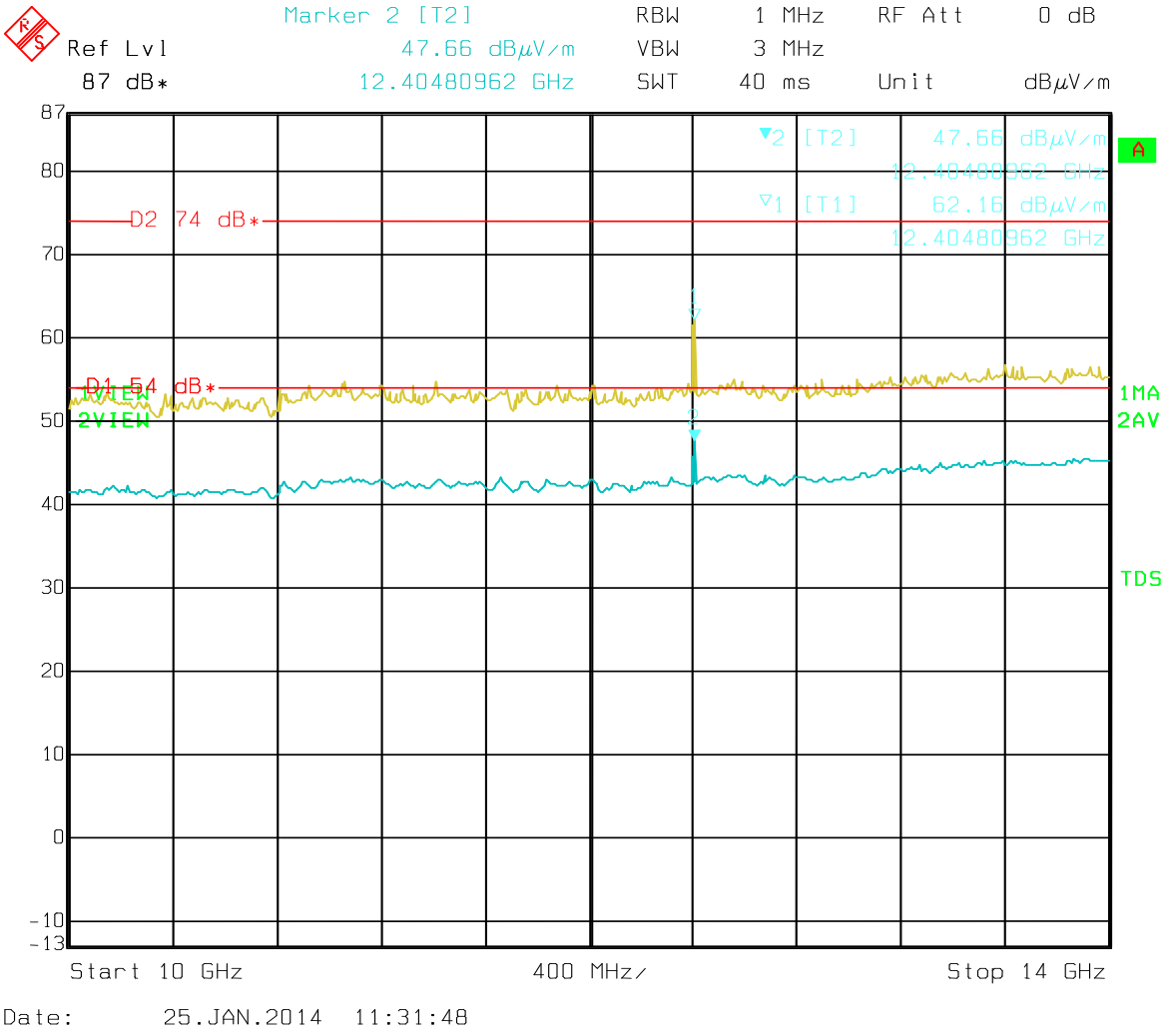
Graph 105 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 3 to 6GHz.



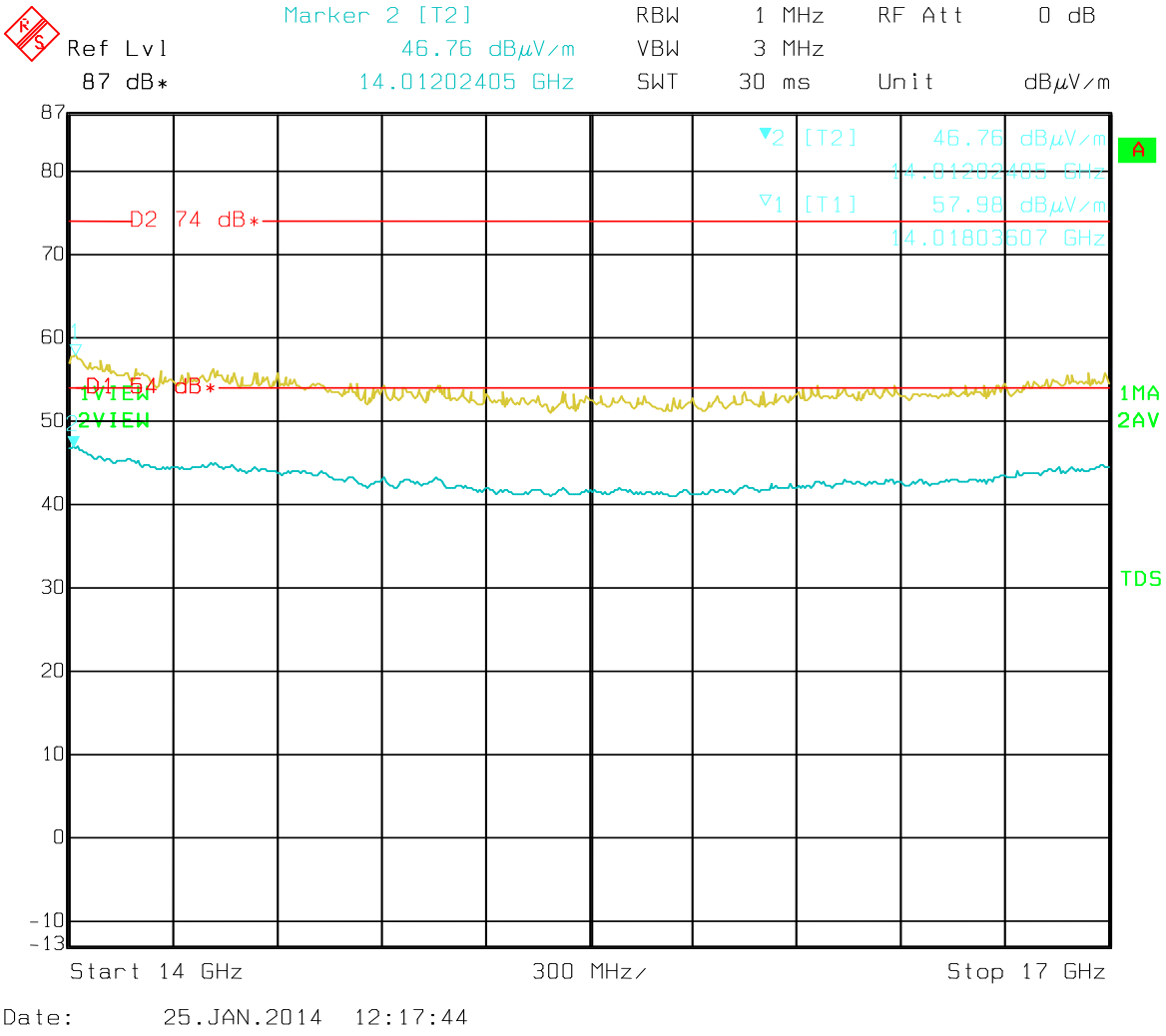
Graph 106 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 6 to 10GHz.



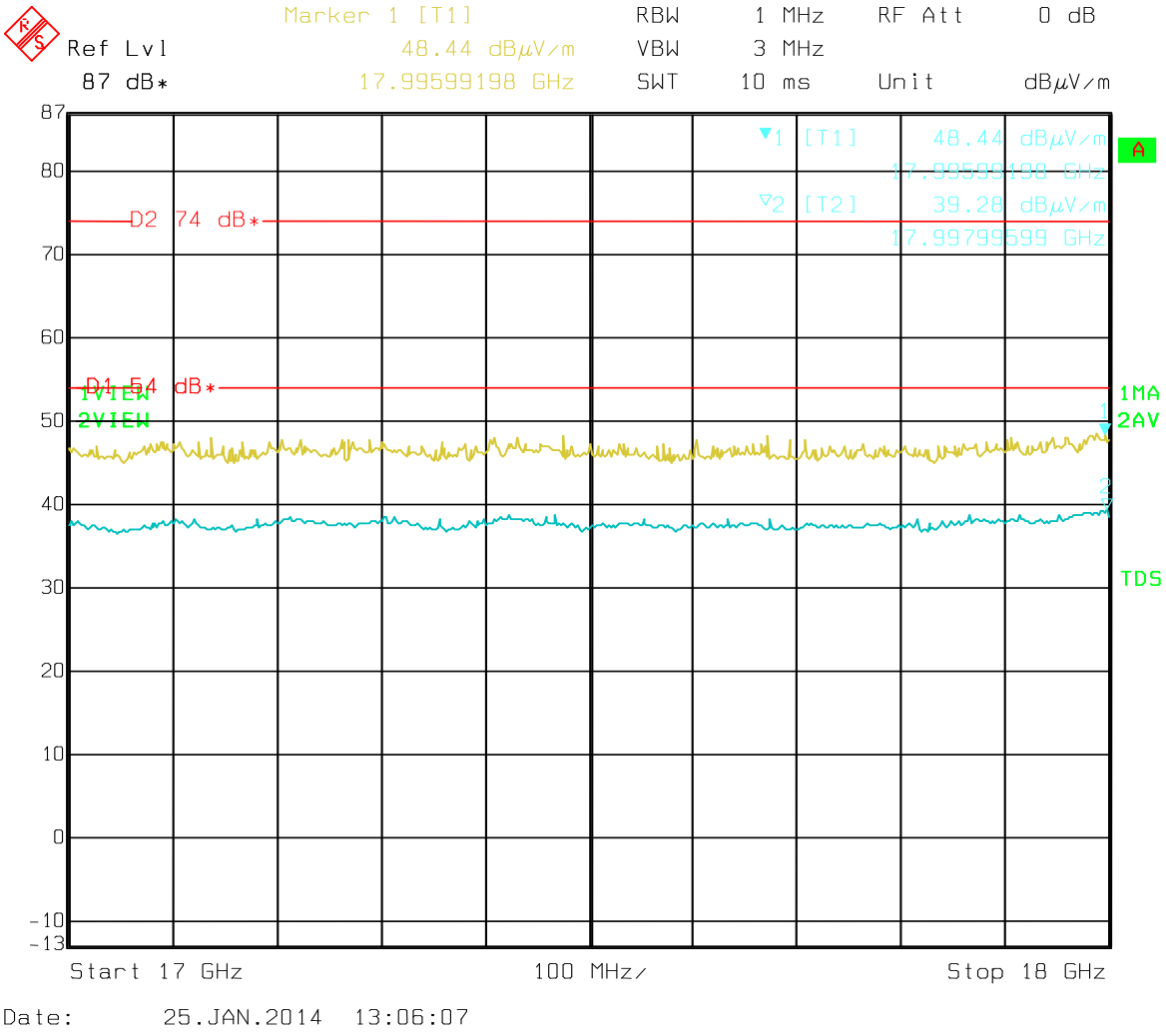
Graph 107 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 10 to 14GHz.



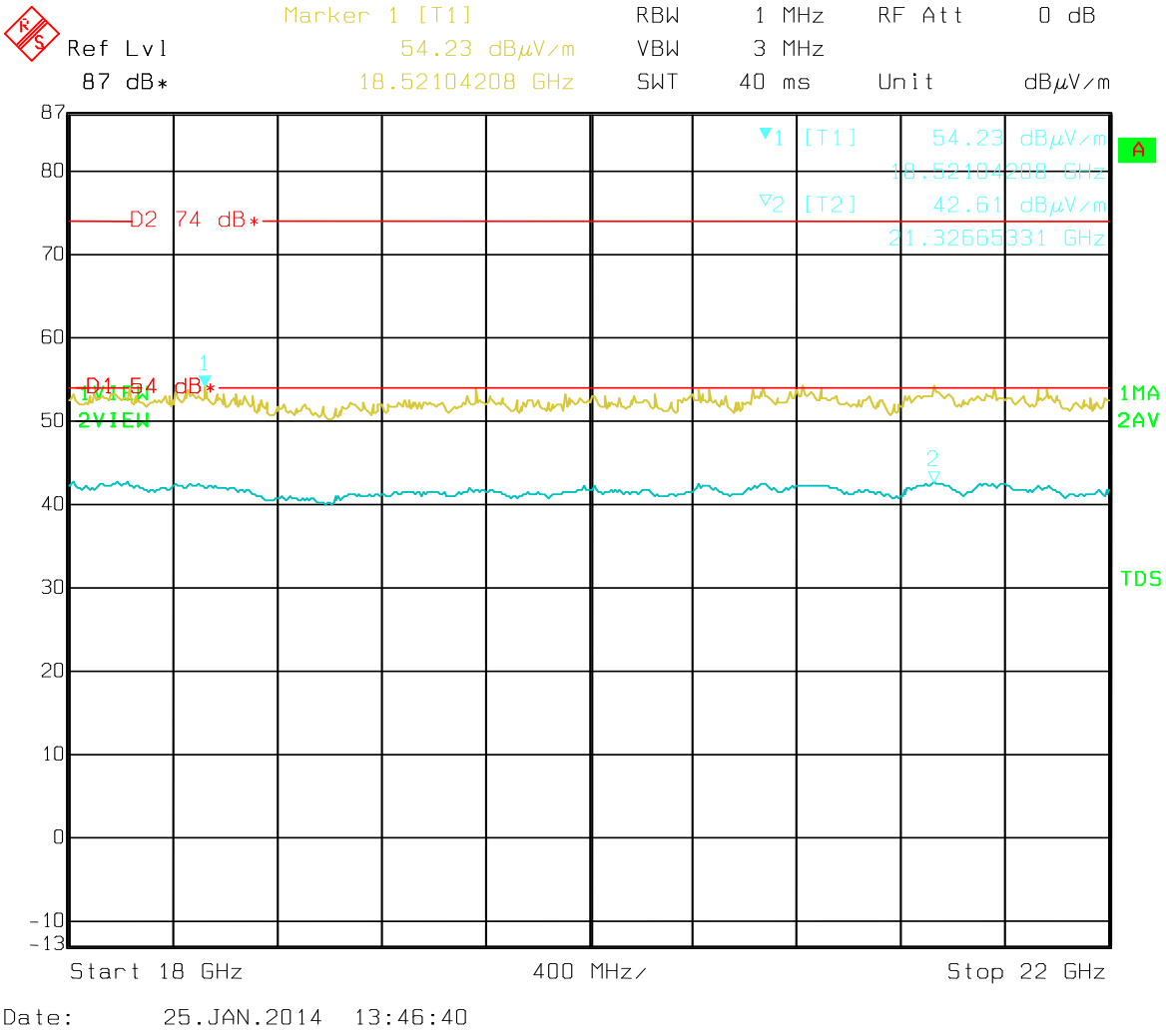
Graph 108 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 14 to 17GHz.



Graph 109 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 17 to 18GHz.



Graph 110 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 18 to 22GHz.



Graph 111 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Horizontal – 22 to 25GHz.

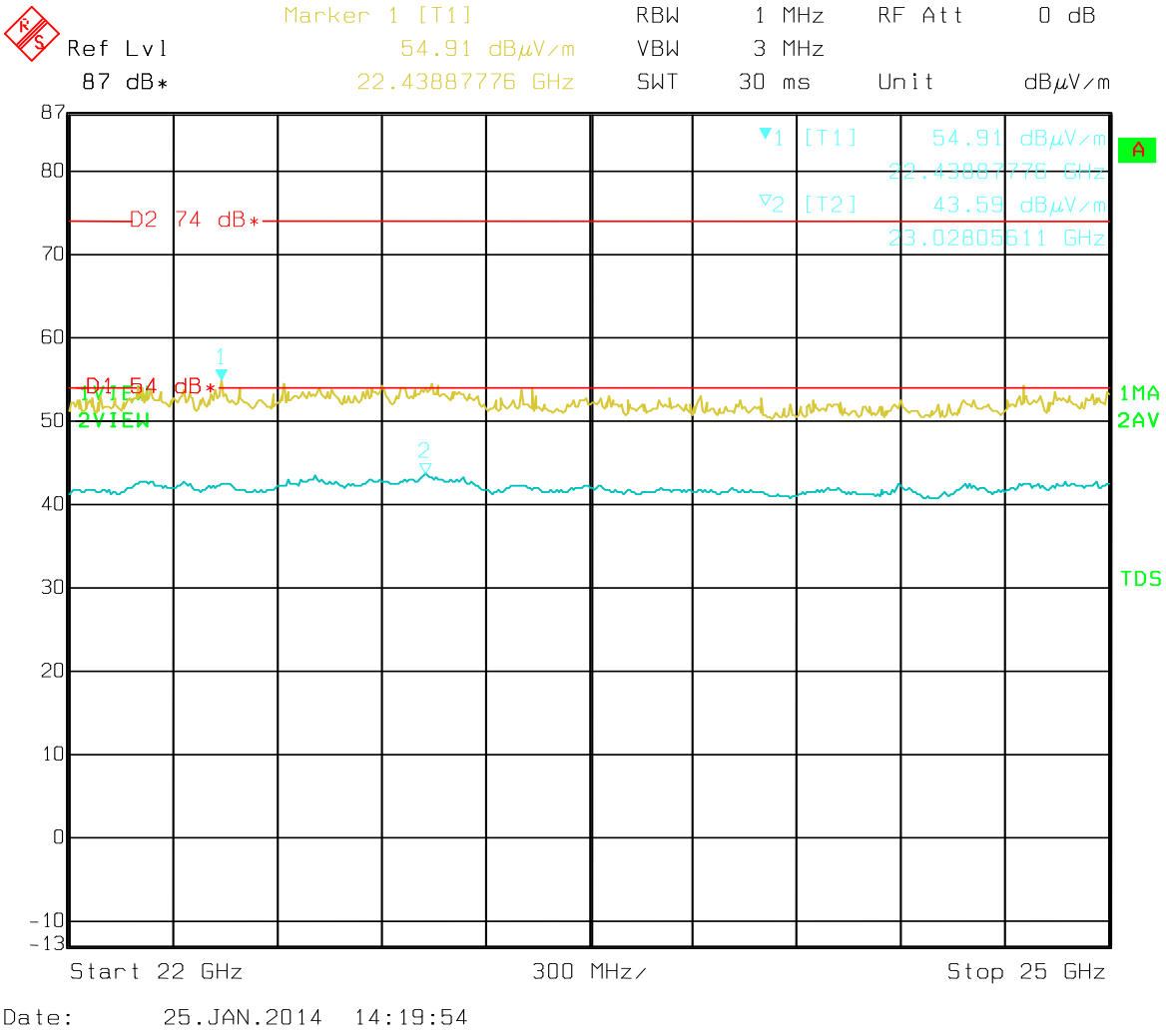


Table 24 Radiated Emissions Test Results – Mode 6: Transmit Mode (Data Stream) – Ch26 – Vertical - 1 to 25GHz.

Standard: FCC Part 15

Test: Radiated Emissions

Port: Enclosure

Units of measurement:
Frequency: GHz Amplitude: dBμV/m

Bandwidth: 1MHz

Frequency (GHz)	Peak Level (dBuV/m)	PDCF Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Result
2.480	115.18	92.10	94.00	1.90	Pass
4.959	71.70	48.62	54.00	5.38	Pass
7.441	62.73	39.65	54.00	14.35	Pass
9.922	62.45	39.37	54.00	14.63	Pass
12.402	66.15	43.07	54.00	10.93	Pass

Note 1: As the EUT uses a pulse train when communicating the following calculation has been applied to the peak levels.

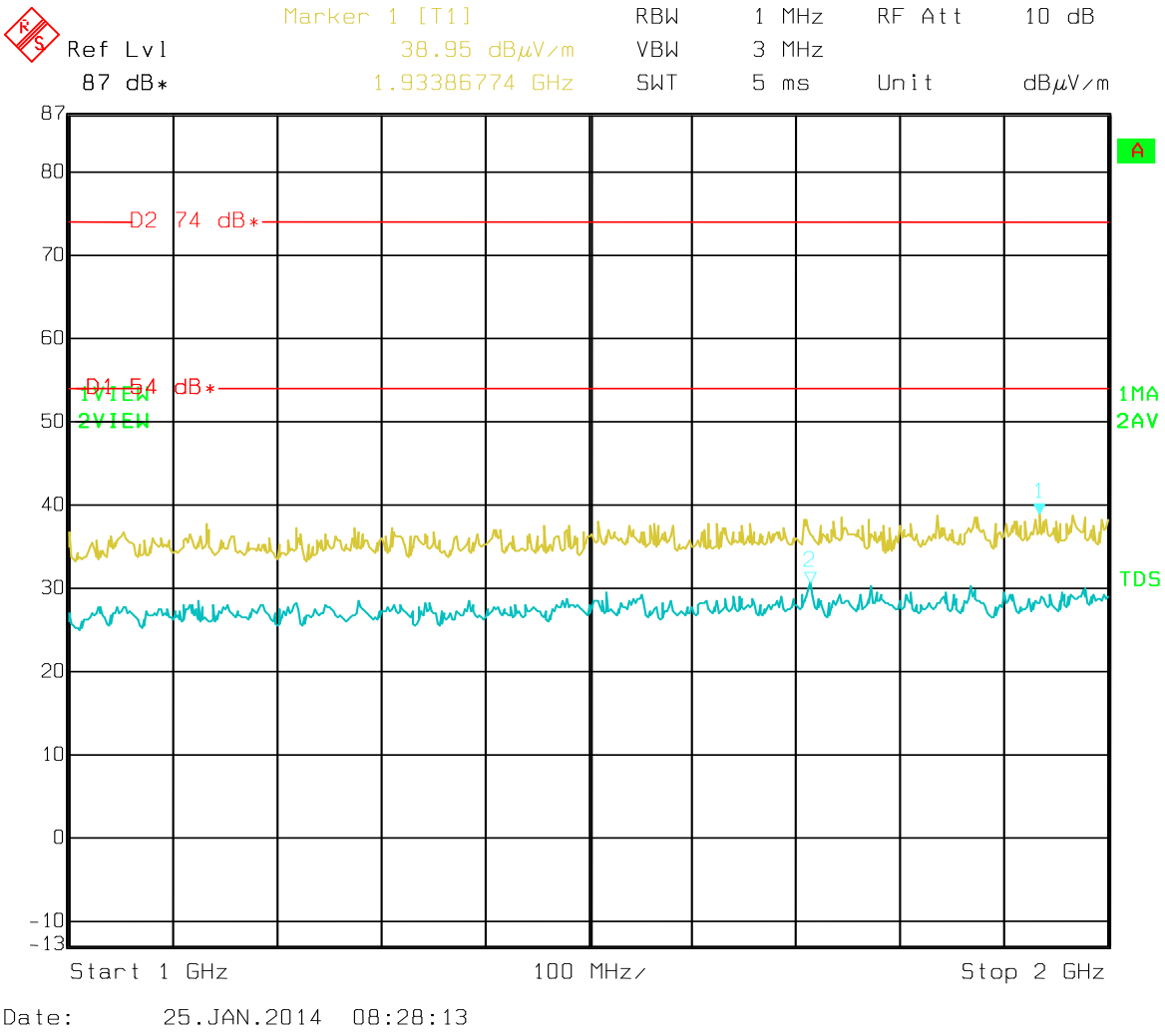
Pulse Desensitization Correction Factor = PDCF

PDCF(dB) = 20 log (Total Pulse duratsions / Period of a transmission)

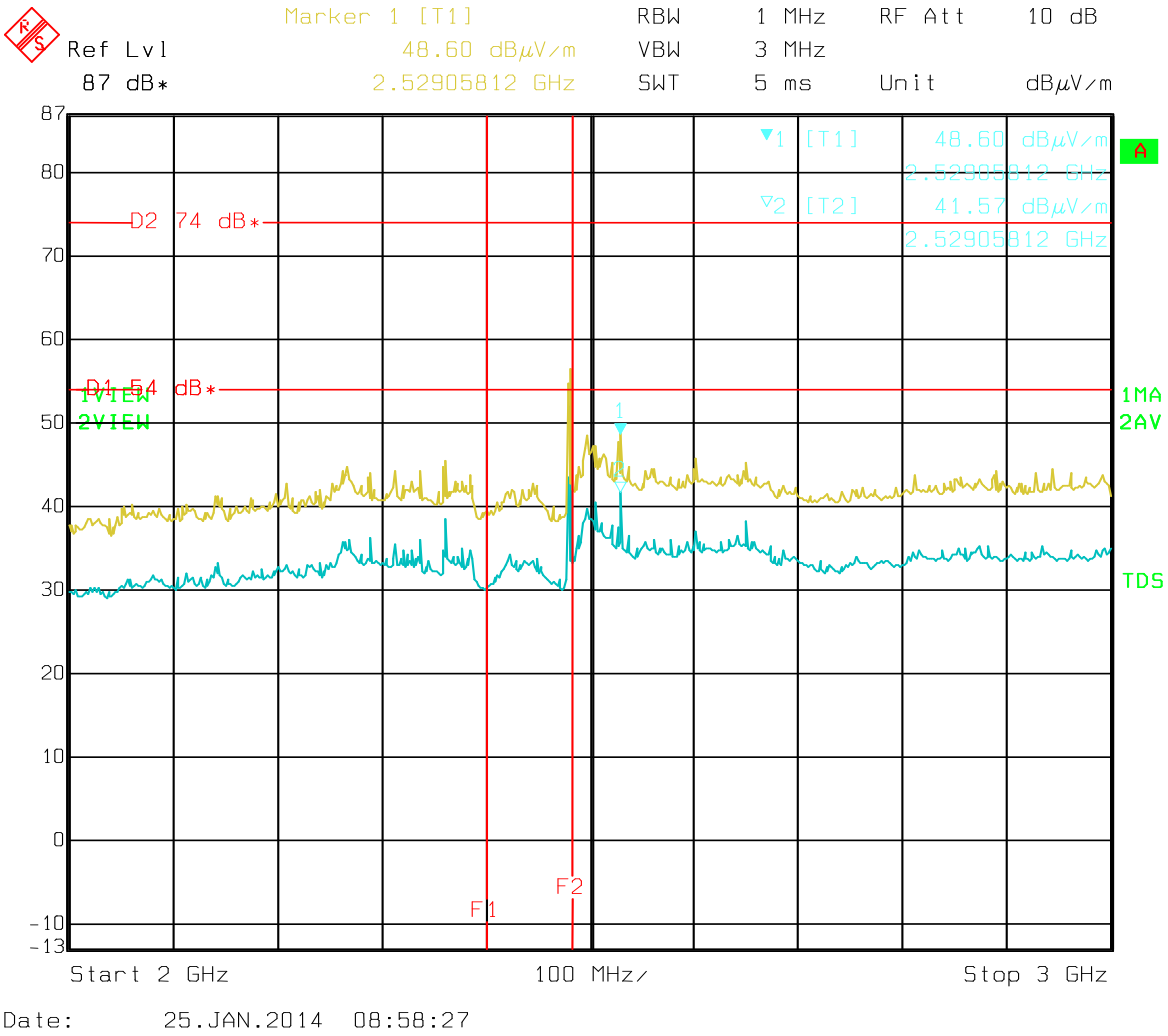
= 20 log (3.5047 + 3.5047 / 100)

= -23.08 (dB)

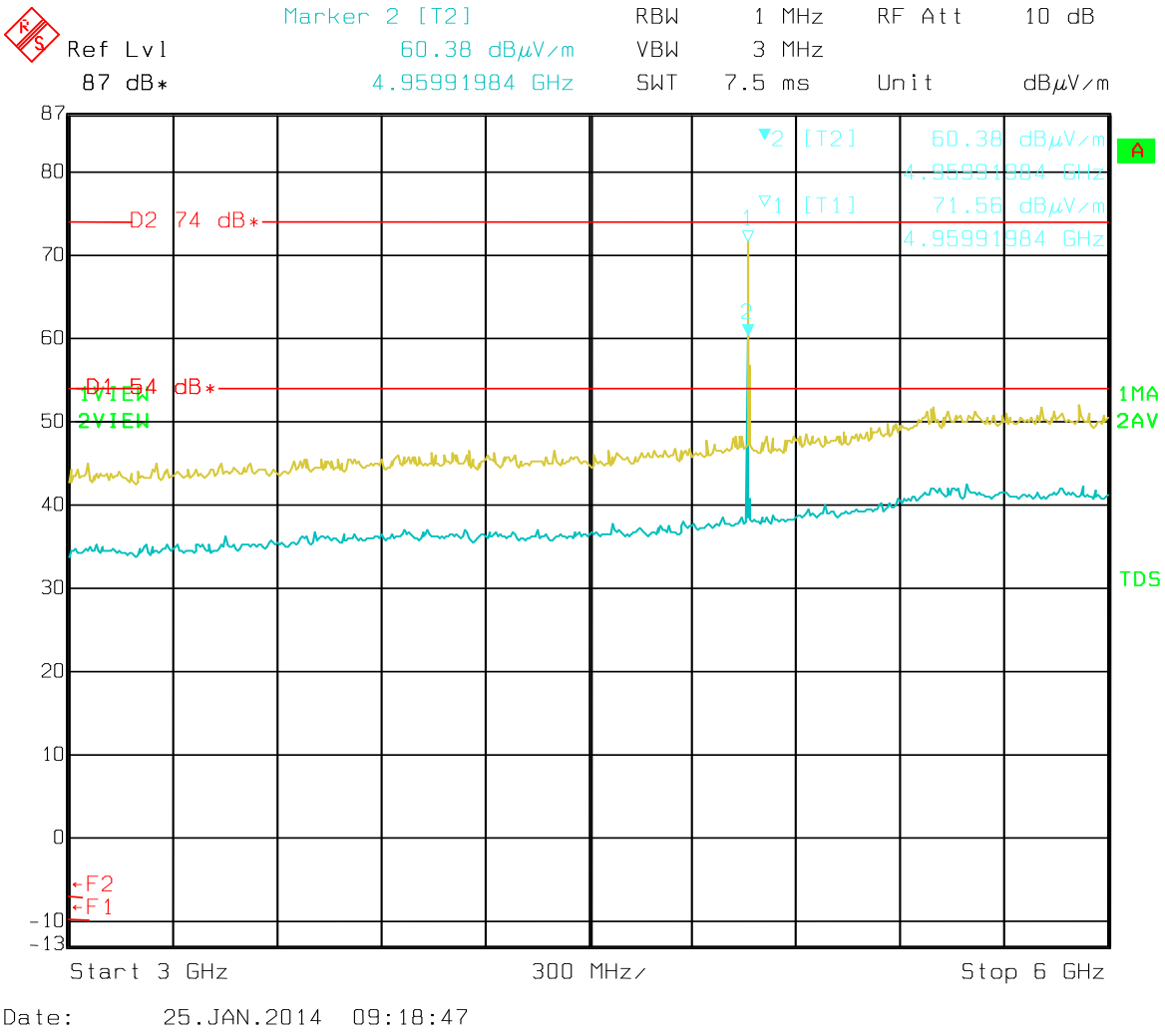
Graph 112 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 1 to 2GHz.



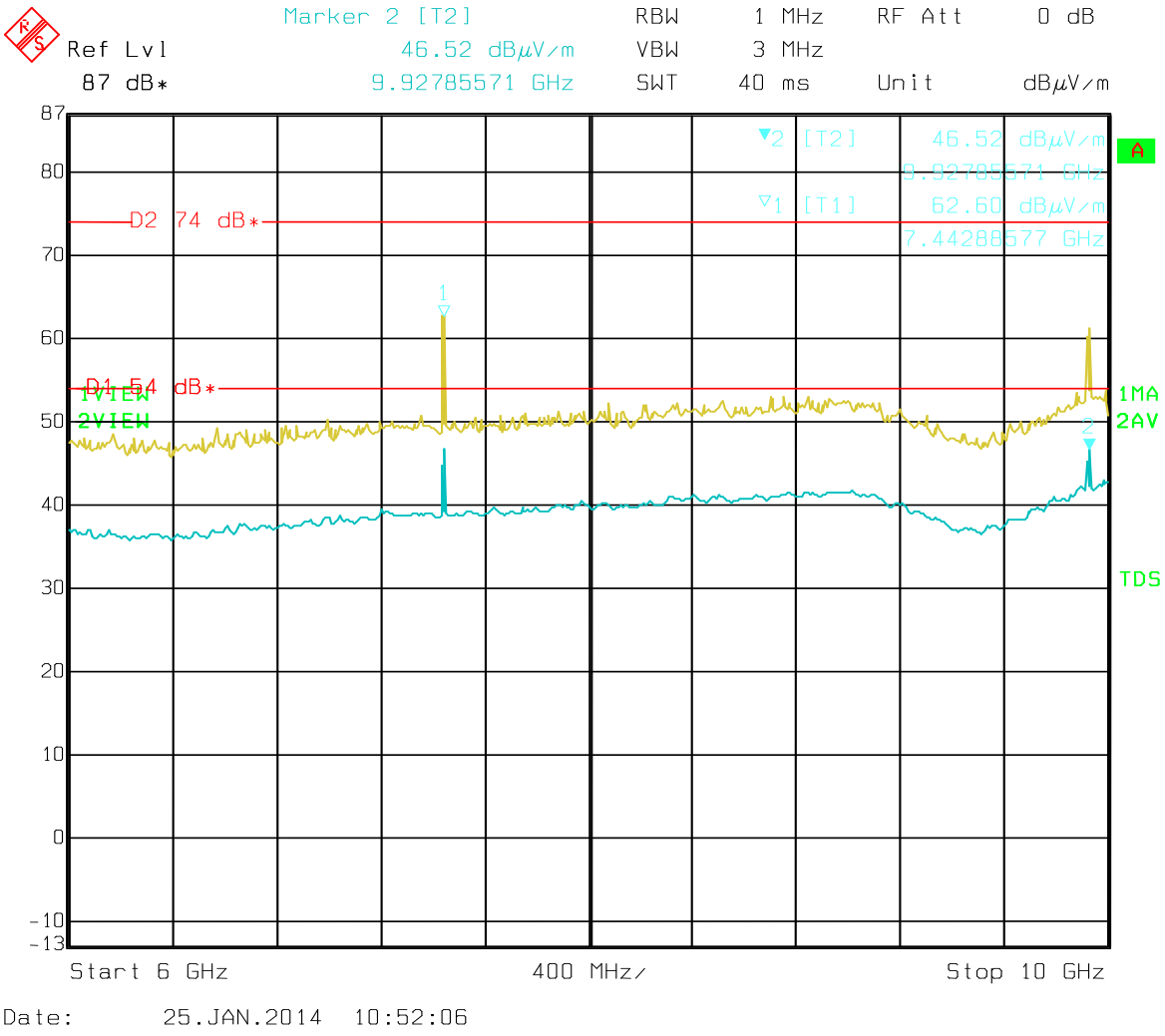
Graph 113 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 2 to 3GHz.



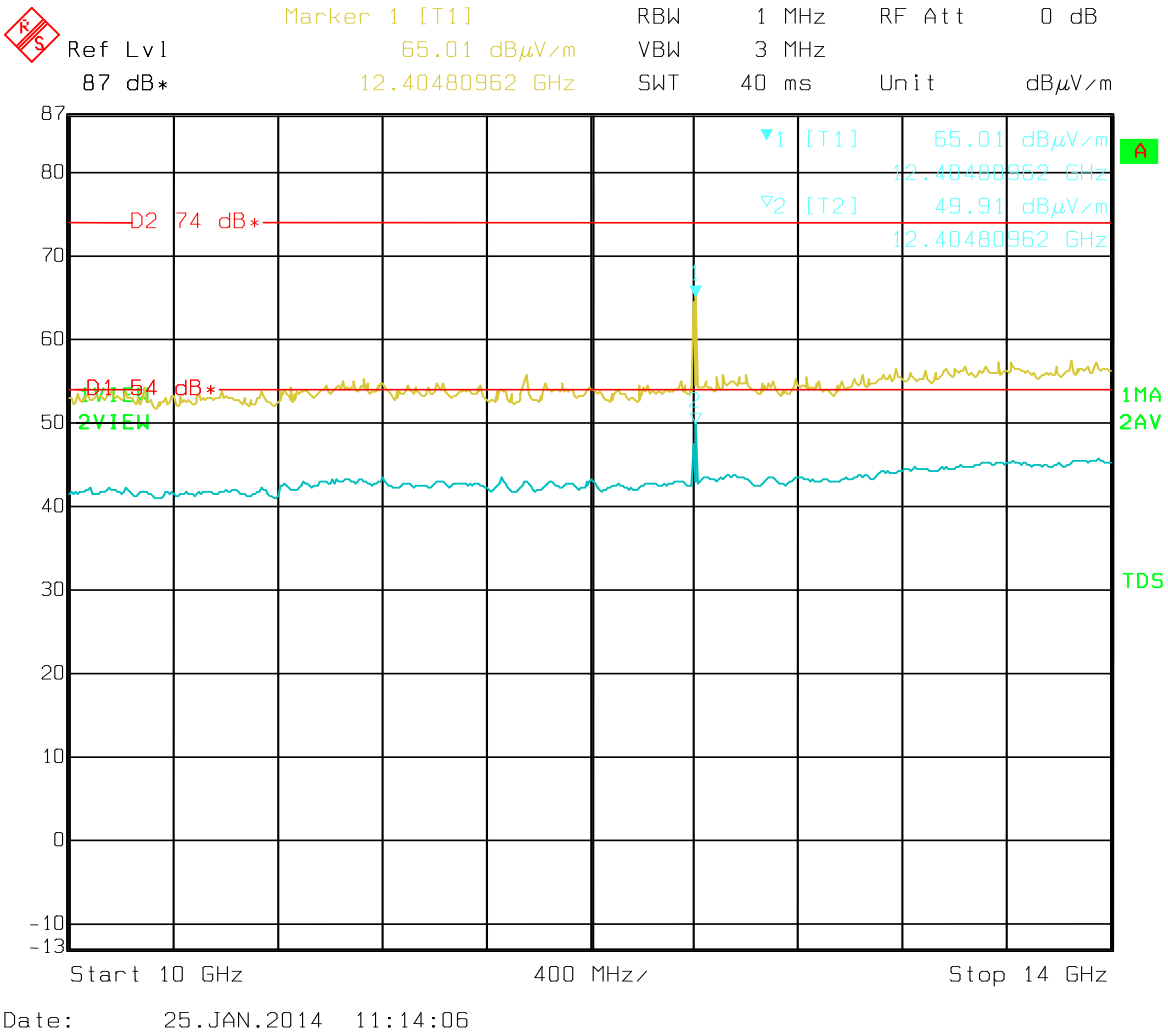
Graph 114 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 3 to 6GHz.



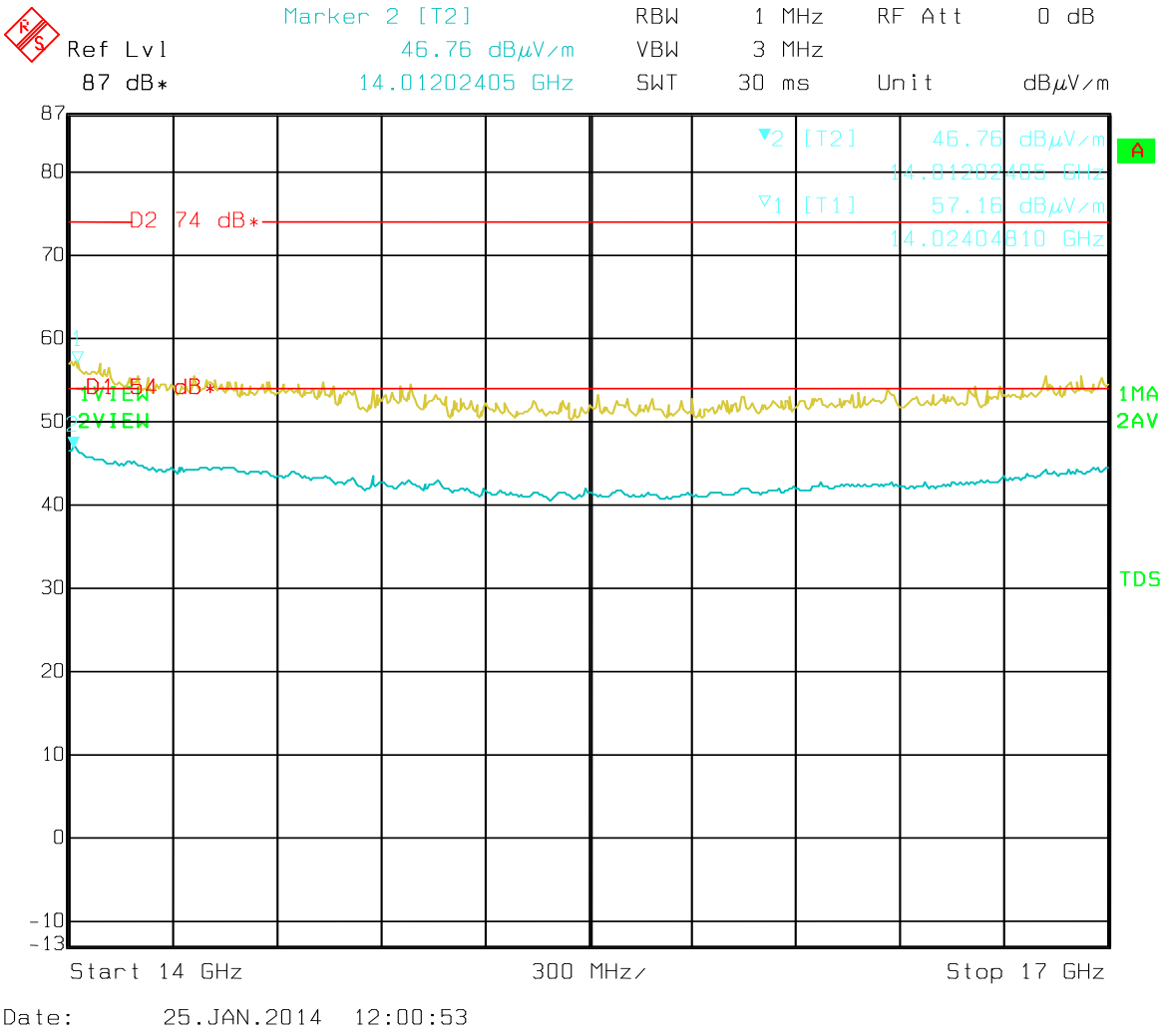
Graph 115 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 6 to 10GHz.



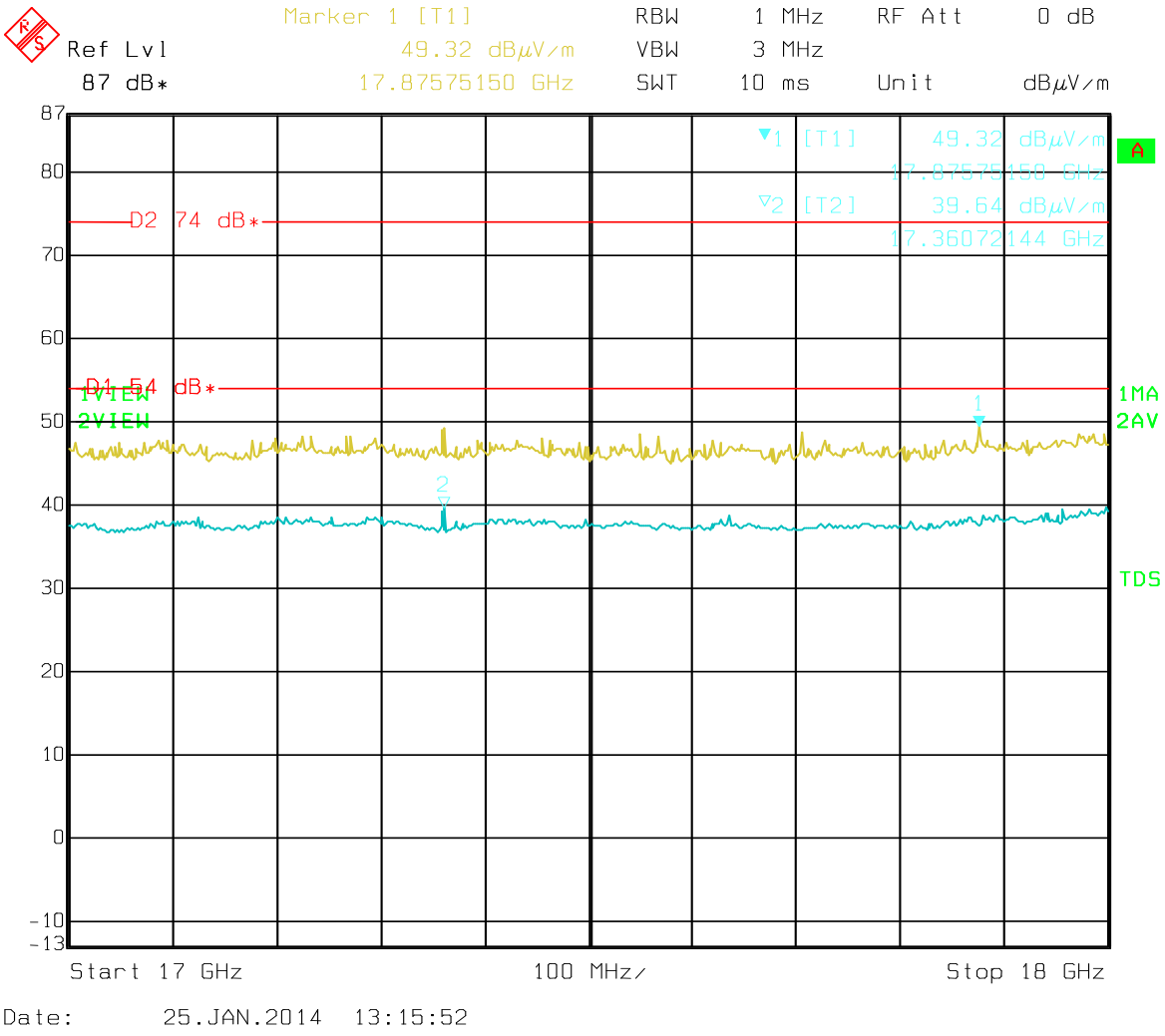
Graph 116 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 10 to 14GHz.



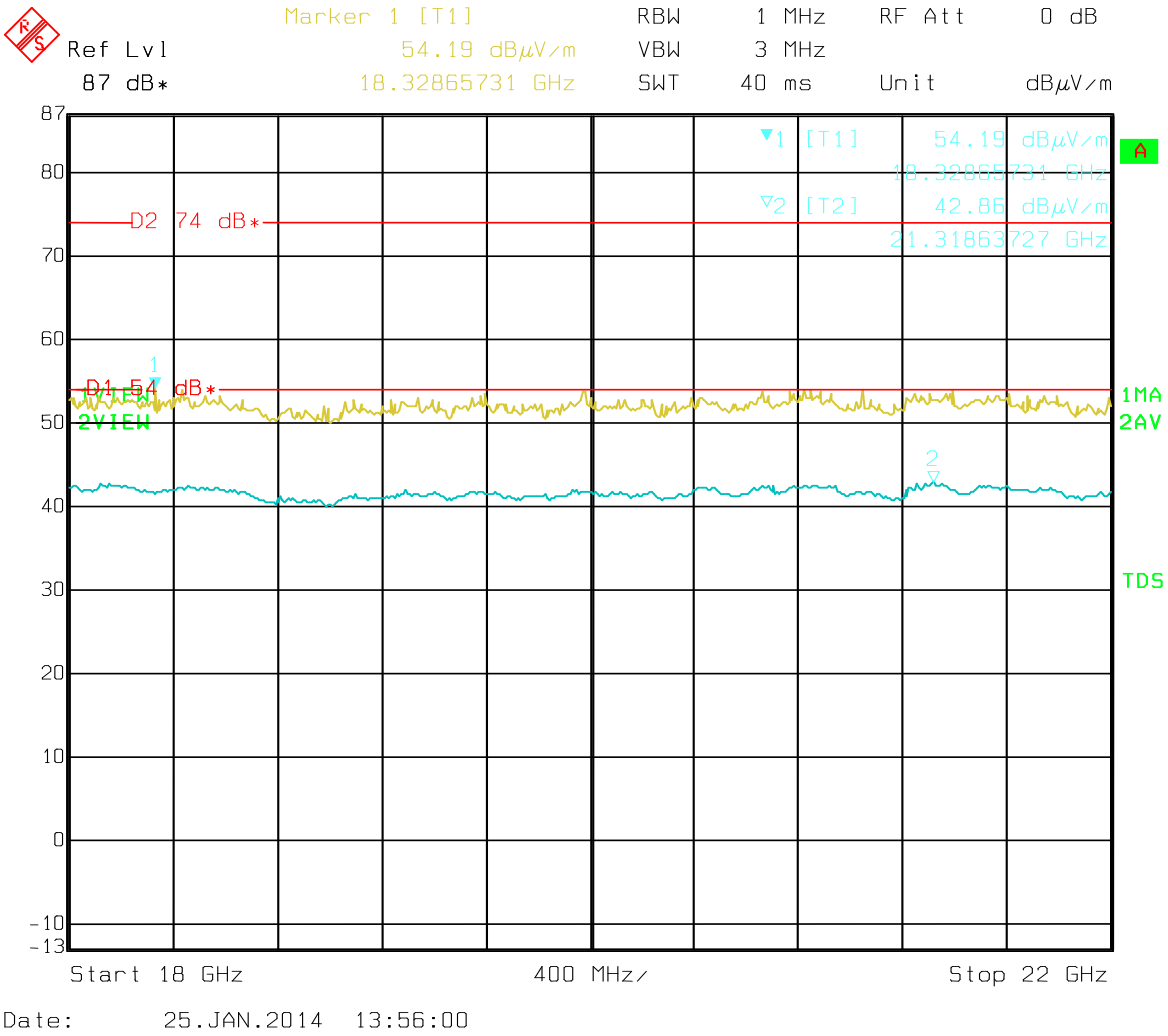
Graph 117 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 14 to 17GHz.



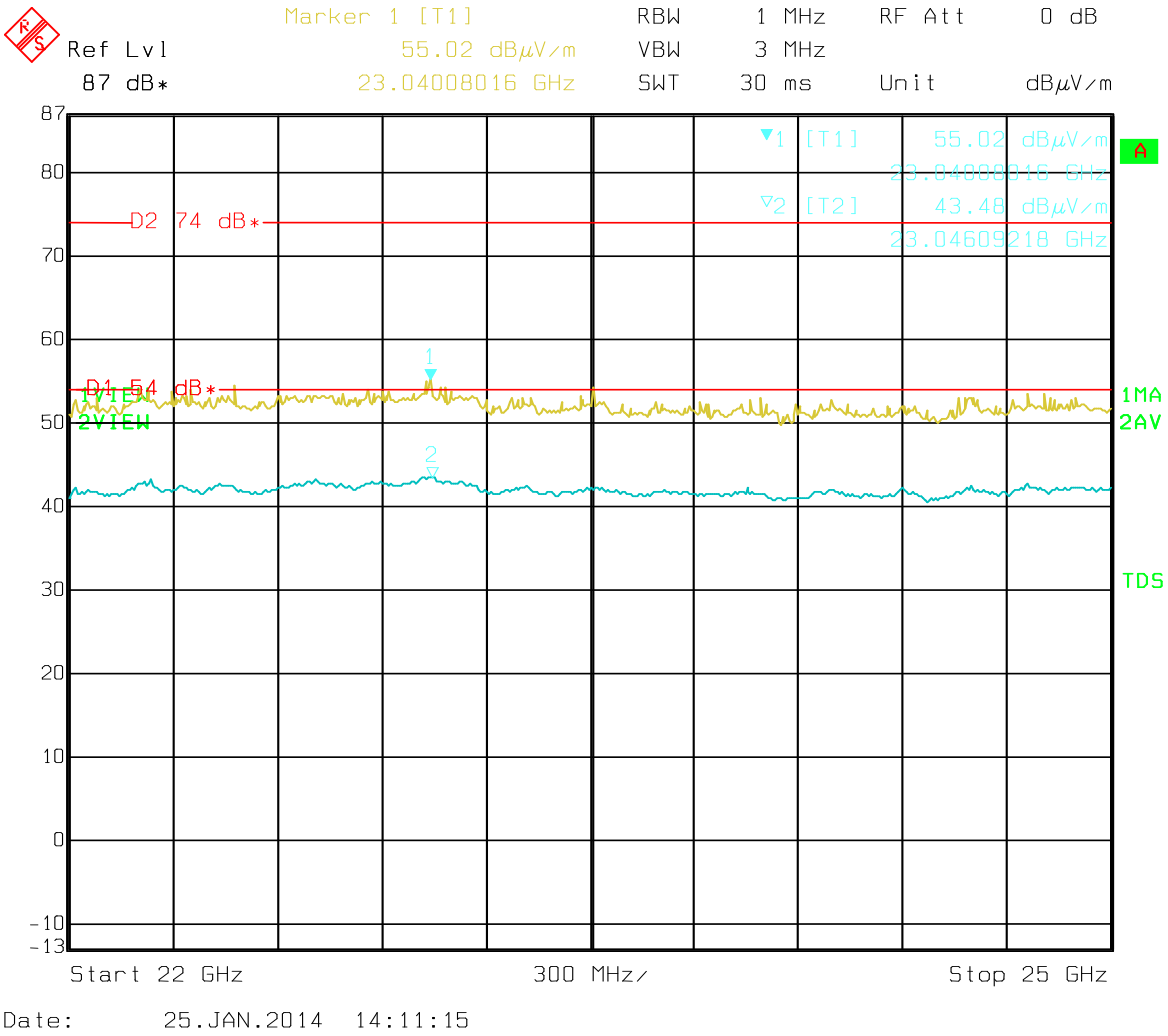
Graph 118 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 17 to 18GHz.



Graph 119 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 18 to 22GHz.



Graph 120 Radiated Emissions Test Results – Mode 6 – Transmit Ch26 – Vertical – 22 to 25GHz.

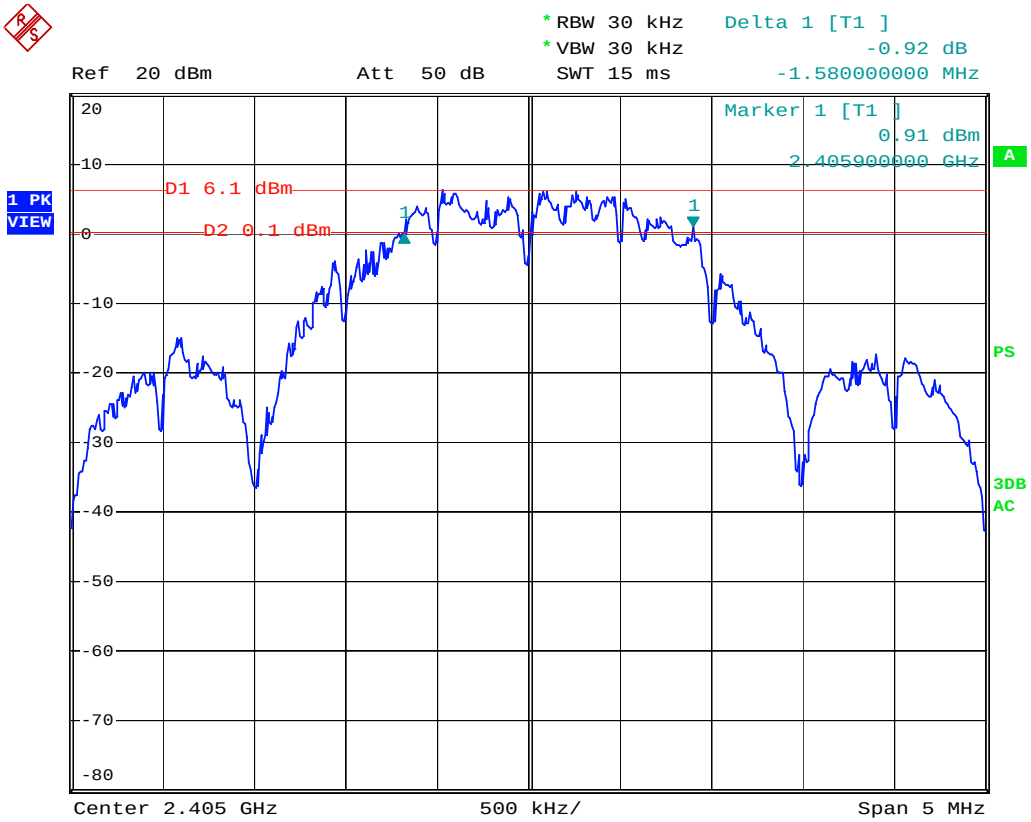


5. – 6DB BANDWIDTH

Specifications: CFR47: Part 15:247 (a)(2)
RSS-210: A8.2 (a)

Temperature: 20 °C **Relative Humidity:** 40 %

Mode of operation: Transmit Mode Stream Data (Channel18)



50C

Date: 6.MAR.2013 09:53:24

Channel 18 (worst case)

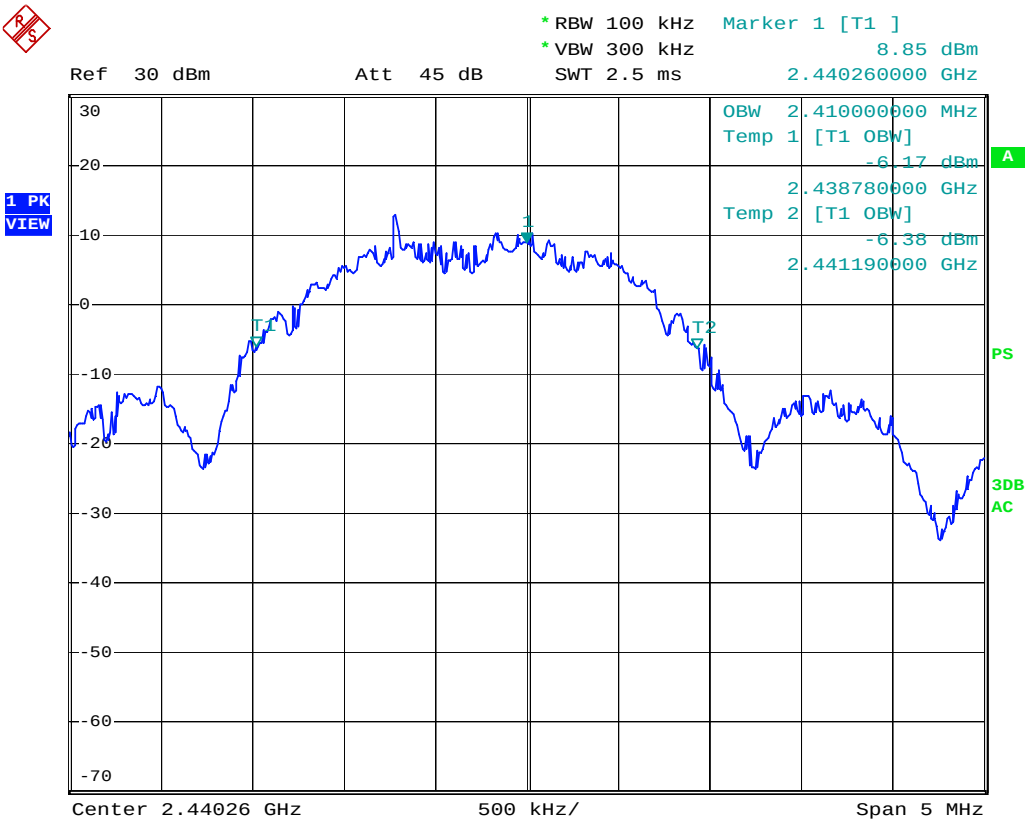
Channel	- 6dB Bandwidth (MHz)	Limit (kHz)	Comment
18	1.58	≥ 500	Pass

Specification: RSS-Gen: 4.6.1

Temperature: 20 °C **Relative Humidity:** 40 %

Mode of operation: Transmit Mode (Channels 18*)

- Largest bandwidth out of Ch11, Ch18 & Ch26



50C

Date: 6.MAR.2013 10:47:58

Channel 18(worst case)

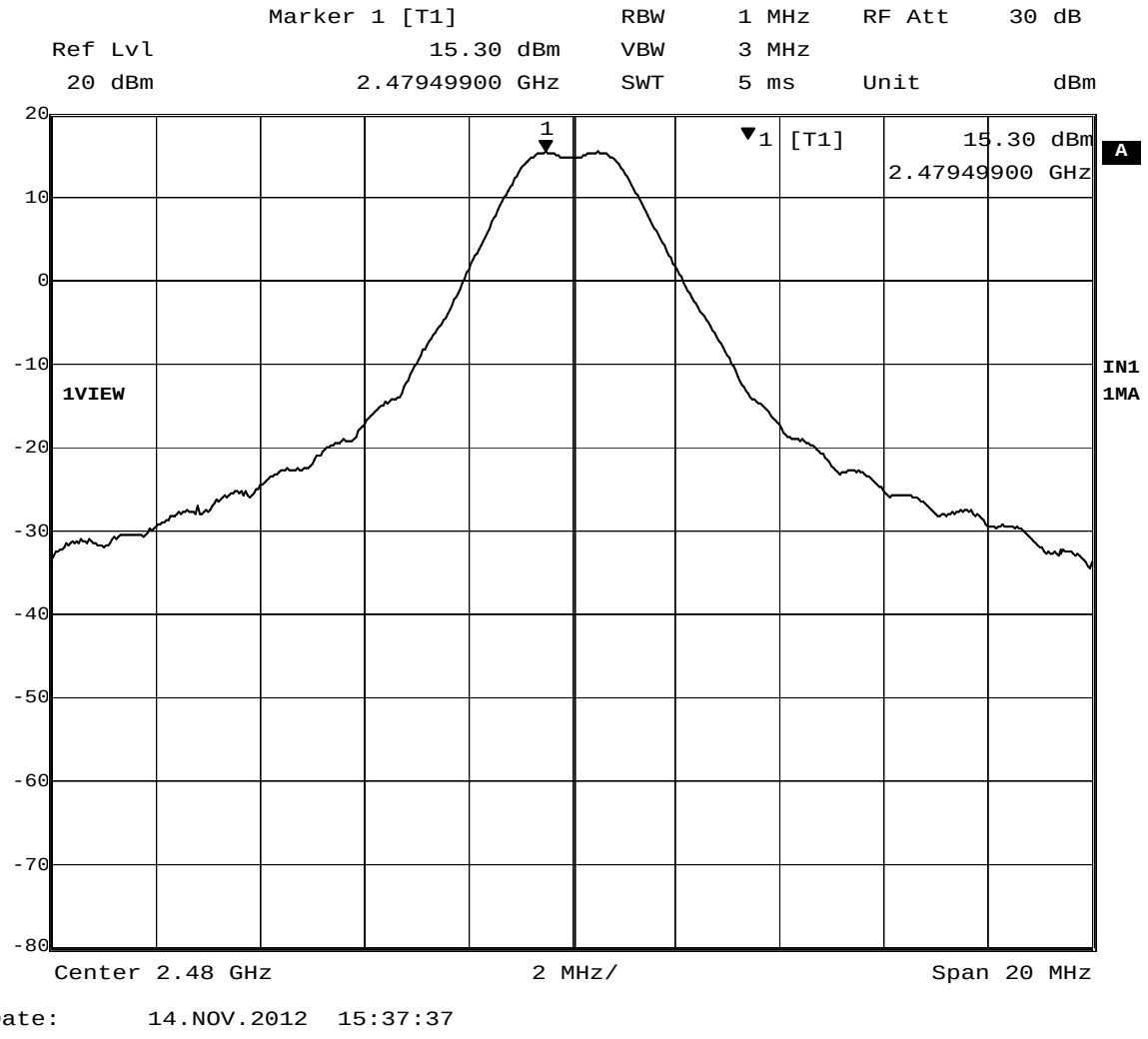
Channel	Occupied Bandwidth (MHz)
18	2.41

6. TRANSMITTER PEAK OUTPUT POWER (CONDUCTED)

Specifications: RSS-210: A8.4 (4)

Temperature: 20 °C **Relative Humidity:** 40 %

Mode of operation: Transmit Mode Stream Data (Channel 26)



Channel	Power (dBm)	Limit (dBm)	Comment
26*	15.30	30.00	Pass

Worst case out of Ch11, Ch18 & Ch26

Antenna gain 3dB. B/W correction factor 10log(6dB B/W)/1
= 10Llog(1.58)/1= 1.98 + 15.30 = 17.28dBm = 0.053W

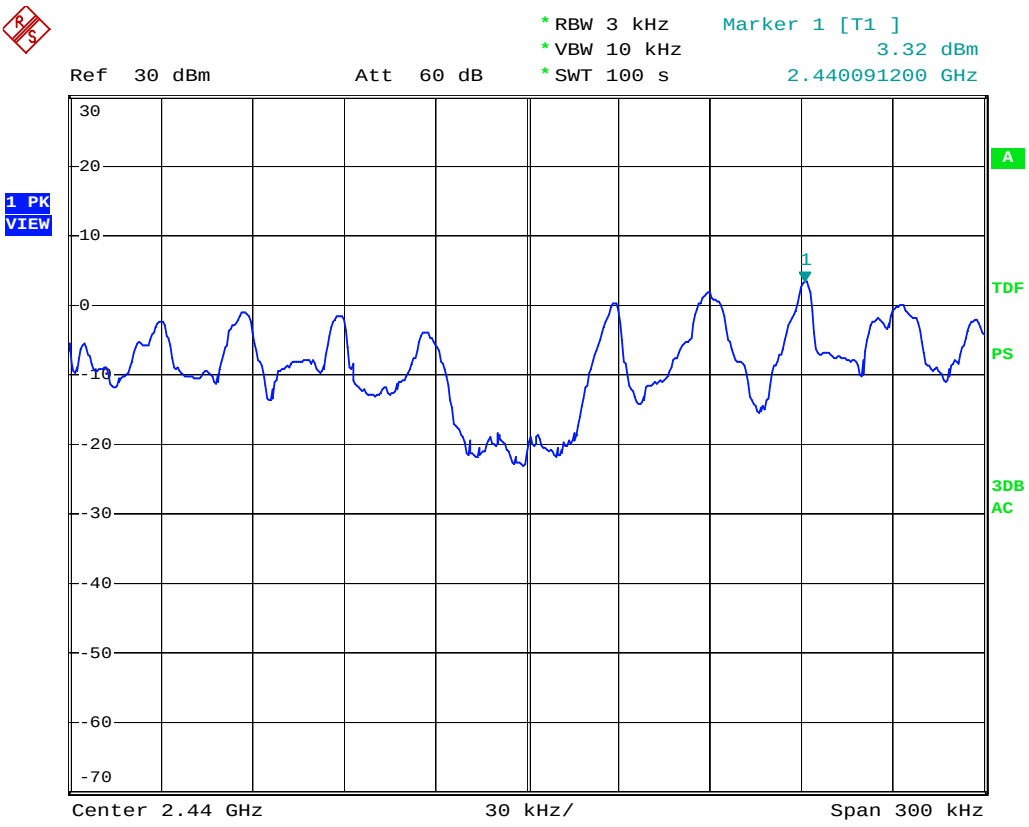
7. POWER SPECTRAL DENSITY (CONDUCTED)

Specifications: CFR47: Part 15:247 (e)
RSS-210: A8.2 (b)

Temperature: 20 °C **Relative Humidity:** 40 %

Mode of operation: Transmit Mode (Channels 18*)

* Worst case out of Ch11, Ch18 & Ch26



50C

Date: 1.AUG.2013 14:15:16

Channel	Power (dBm/3kHz)	Limit (dBm/3kHz)	Comment
18	3.32	8.0	Pass

8. UNCERTAINTY BUDGET CALCULATIONS

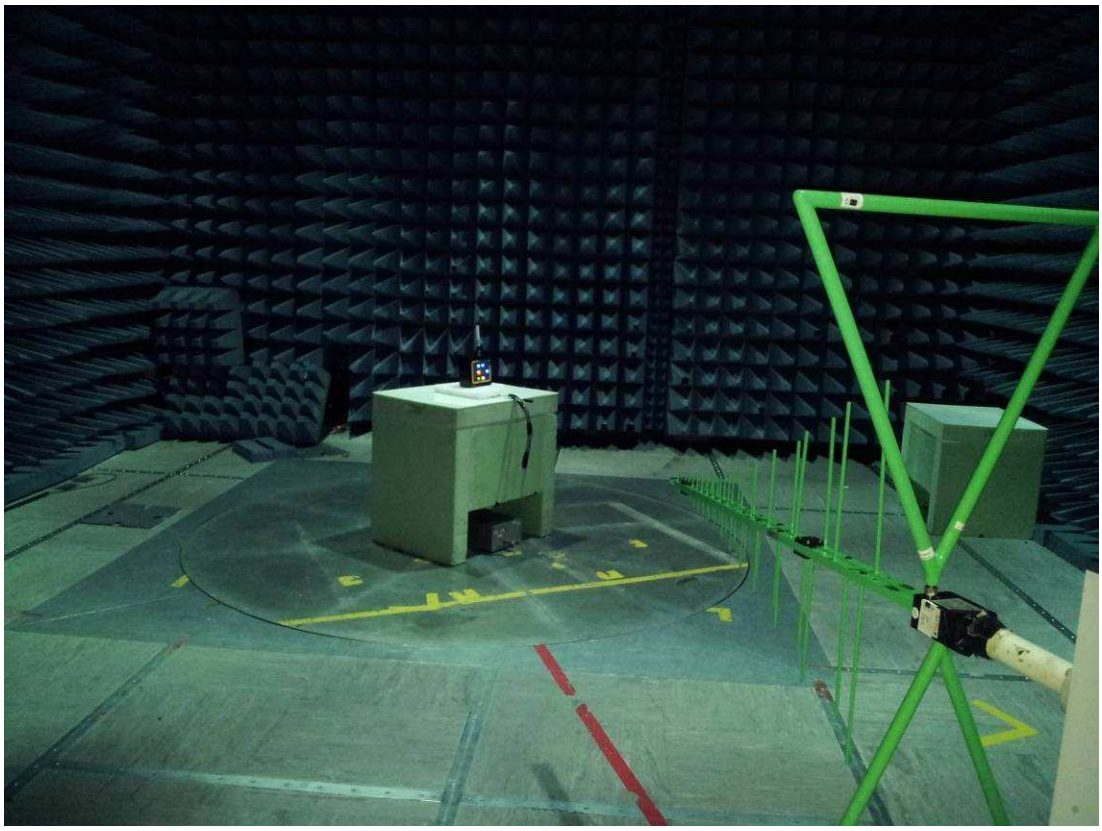
Symbol	Source of Uncertainty	Value	Probability distribution	Divisor	c_i	$u_i(y)$	$(u_i(y))^2$	v_i or v_{eff}	ui^4(y)
RI	Receiver Indication	0.05	normal 2	2.000	1	0.03	0.001	∞	0
dVsw	Receiver Sine Wave	1.60	normal 2	2.000	1	0.80	0.640	∞	0
dVpa	Receiver Pulse Amplitude	1.60	normal 2	2.000	1	0.80	0.640	∞	0
dVpr	Receiver Pulse repetition	1.60	normal 2	2.000	1	0.80	0.640	∞	0
dVnf	Noise Floor Proximity	1.60	normal 2	2.000	1	0.80	0.640	∞	0
AF	Antenna Factor Calibration	1.20	normal 2	2.000	1	0.60	0.360	∞	0
CL	Cable Loss	0.50	normal 2	2.000	1	0.25	0.063	∞	0
AD	Antenna Directivity	3.00	rectangular	1.732	1	1.73	3.000	∞	0
AH	Antenna Factor Height Dependence	1.00	rectangular	1.732	1	0.58	0.333	∞	0
AP	Antenna Phase Centre Variation	0.50	rectangular	1.732	1	0.29	0.083	∞	0
AI	Antenna Factor Frequency Interpolation	0.68	rectangular	1.732	1	0.39	0.154	∞	0
SI	Site Imperfections	4.00	triangular	2.449	1	1.63	2.667	∞	0
DV	Measurement Distance Variation	0.60	rectangular	1.732	1	0.35	0.120	∞	0
Fstep	Frequency step error	0.00	rectangular	1.732	1	0.00	0.000	∞	0
M	Mismatch	-1.99	U-shaped	1.414	1	-1.41	1.990	∞	0
	Receiver VRC 0.216		-						0
	Antenna +Cable VRC 0.95		-						0
R_S	Measurement System Repeatability	0.96	normal 1	1.000	1	0.96	0.922	13	0.065334351
R_{EUT}	Repeatability of EUT	0.00	normal 1	1.000	1	0.00	0.000		0
$u_c(F_S)$	Combined Standard Uncertainty		normal			3.50	12.252	2298	0.065334351
$U(F_S)$	**Expanded Uncertainty**		**normal k=**	**1.64**		**5.7**		2298	

9. TEST EQUIPMENT

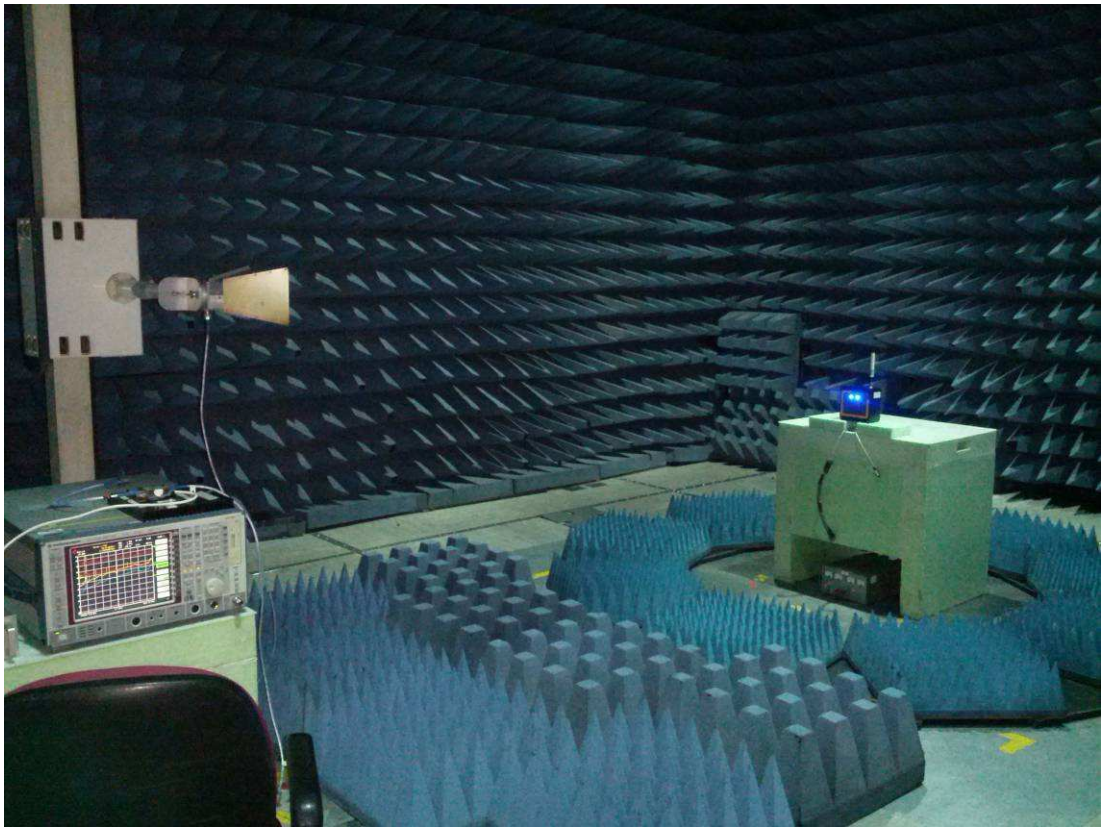
Equipment	Type	ID	Cal Due
Radiated Emissions 30MHz to 1GHz (Bay 1)			
Rohde & Schwarz ESCI	Receiver	8283	05/11/2013
Schaffner CBL6112B	Bilog Antenna	8164	13/12/2013
N to N Type	Coaxial Cable	7602	25/04/2014
N to N Type	Coaxial Cable	8183	25/04/2014
N to N Type	Coaxial Cable	7569	25/04/2014
N to N Type	Coaxial Cable	7287	25/04/2014
Radiated Emission >1GHz			
Rohde & Schwarz FSEK	Spectrum analyser	8267	19/06/2014
ERA WBA3-406G20N	RF Preamplifier	8426	04/04/2014
N to N Type	Coaxial Cable	7532	04/04/2014
N to N Type	Coaxial Cable	7170	02/07/2014
EMCO 3115	Horn Antenna	7512	05/07/2014
Wainwright Instruments WRCGV	Filter	8429	08/07/2014
Narda DBP-1840N824	RF Preamplifier**	447	03/07/2014

** Hired from ‘EMC Hire’ + k cables

10. PHOTOGRAPHS



Radiated Emissions <1GHz



Radiated Emissions >1GHz

11. ANNEX A: RF EXPOSURE EVALUATION

FCC ID: T7VEM250B

The maximum conducted power specified in manual is 3dBm; therefore, to comply with RF Exposure Requirement, the SAR evaluation is considered.

The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm is determined by:

[(max. power of channel(average), including tune-up tolerance, mW)/(min. test separation distance,mm)]*[√ (f(GHz))]
= [39.63/200]*[√ (2.40)]
= 0.306
Since the above calculation is less than 3.0, the product fulfils the RF exposure requirement without SAR testing.

Remark:
1. When the minimum test separation distance is < 5mm, a distance of 5mm is applied to determine SAR test exclusion.

12. ANNEX B: REGISTRATION

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

April 19, 2012

Registration Number: 737726

Intertek
Unit D,
Imperial Park,
Leatherhead, KT22 7TS
United Kingdom

Attention: David Hussey, Consultant Engineer

Re: Measurement facility located at: Leatherhead, United Kingdom
Anechoic chamber (3 meters)
Date of Renewal: April 19, 2012

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Parrish
Industry Analyst

Industry Canada Industrie Canada

February 7, 2011

OUR FILE: 46405-2042
Submission No: 145396

Intertek Commercial & Electrical
Unit D Imperial Park Randalls Way
Leatherhead, SRY, KT22 7SB
United Kingdom

Attention: Dave Feasey

Dear Sir/Madame:

The Bureau has received your application for the renewal of a 3m alternative test site. Be advised that the information received was satisfactory to Industry Canada. The following number(s) is now associated to the site(s) for which registration / renewal was sought (**Site# 2042F-1**). Please reference the appropriate site number in the body of test reports containing measurements performed on the site. In addition, please keep for your records the following information;

- The company address code associated to the site(s) located at the above address is: **2042F**

Furthermore, to obtain or renew a unique site number, the applicant shall demonstrate that the site has been accredited to ANSI C63.4-2003 or later. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2003 or later shall be accepted. Please indicate in a letter the previous assigned site number if applicable and the type of site (example: 3 metre OATS or 3 metre chamber). If the test facility is not accredited to ANSI C63.4-2003 or later, the test facility shall submit test data demonstrating full compliance with the ANSI standard. The Bureau will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to **exceed three years**. There is no fee or form associated with an OATS filing. OATS submissions are encouraged to be submitted electronically to the Bureau using the following URL;
http://strategis.ic.gc.ca/epic/internet/inceb-bhst.nsf/en/h_tt00052e.html.

If you have any questions, you may contact the Bureau by e-mail at certification.bureau@ic.gc.ca Please reference our file and submission number above for all correspondence.

Yours sincerely,

Dalwinder Gill
For: Wireless Laboratory Manager
Certification and Engineering Bureau
3701 Carling Ave., Building 94
P.O. Box 11490, Station "H"
Ottawa, Ontario K2H 8S2
Email: dalwinder.gill@ic.gc.ca
Tel. No. (613) 998-8363
Fax. No. (613) 990-4752