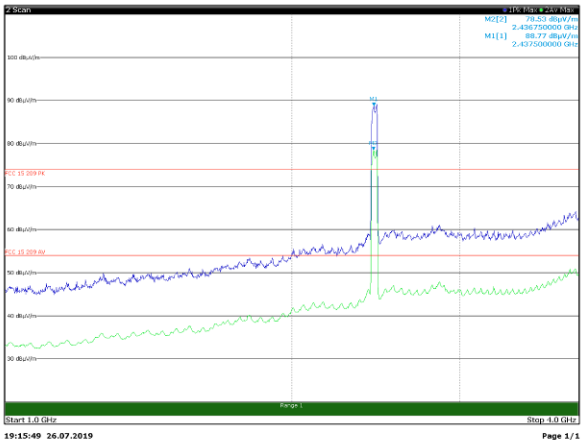
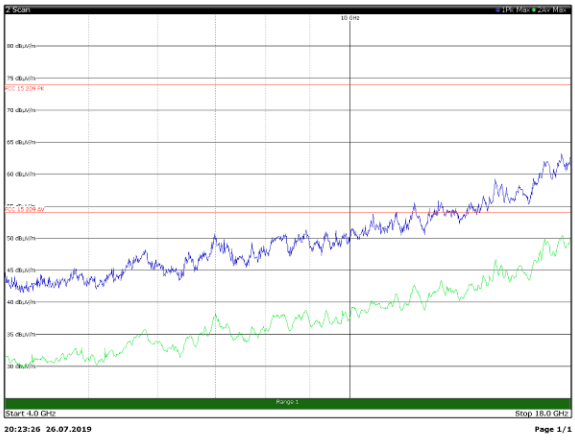
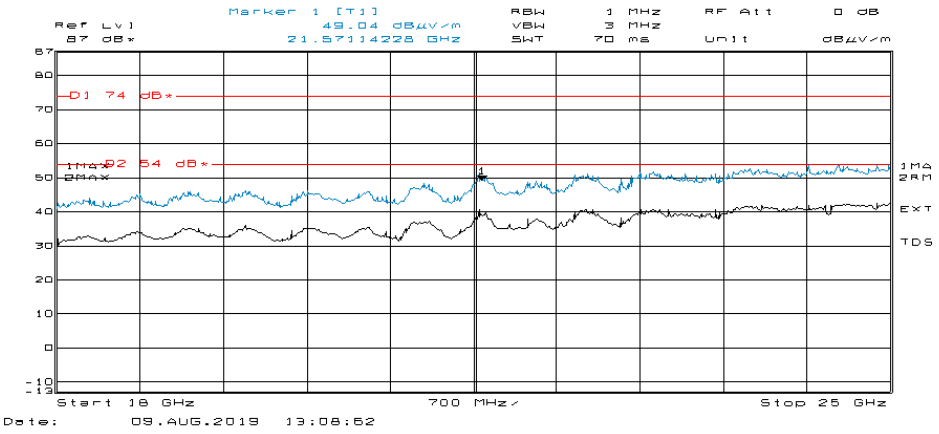
Section 8 Radiated measurement 802.11n HT40 horizontal polarization

Mid channel

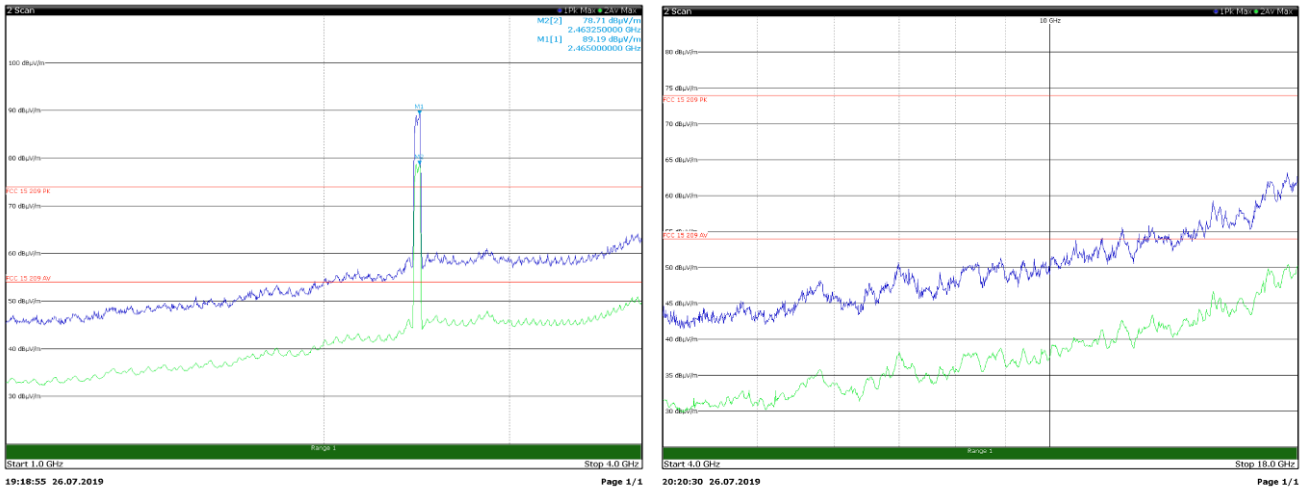


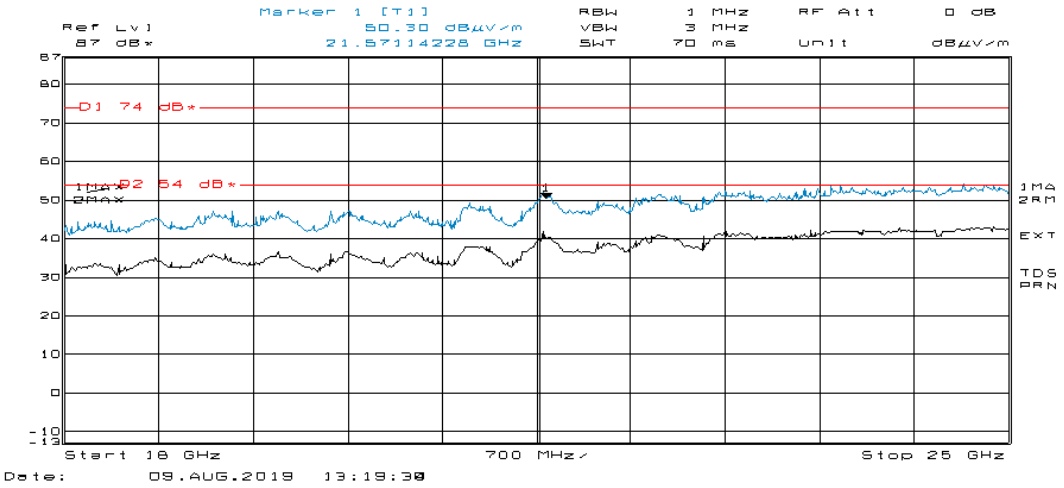




Section 8 Radiated measurement 802.11n HT40 horizontal polarization

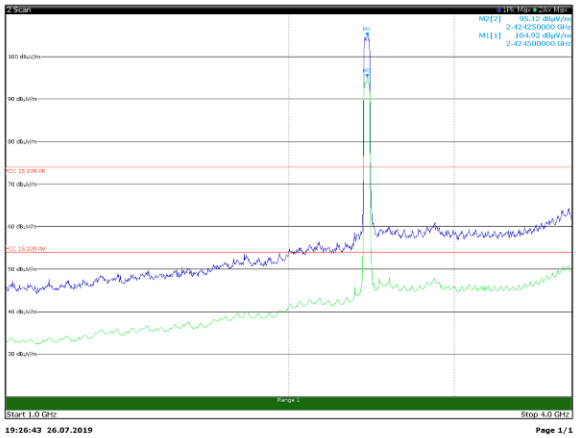
High channel

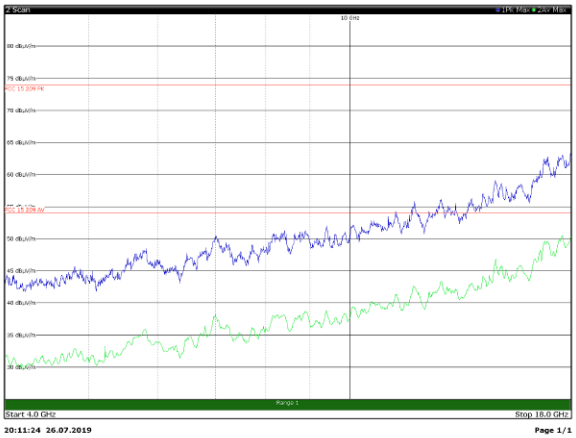


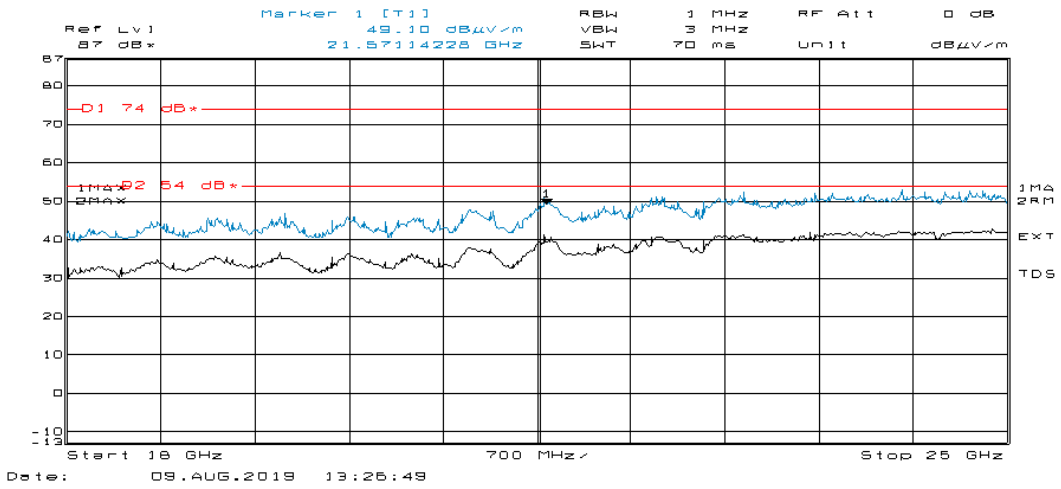


Section 8 Radiated measurement 802.11n HT40 vertical polarization

Low channel

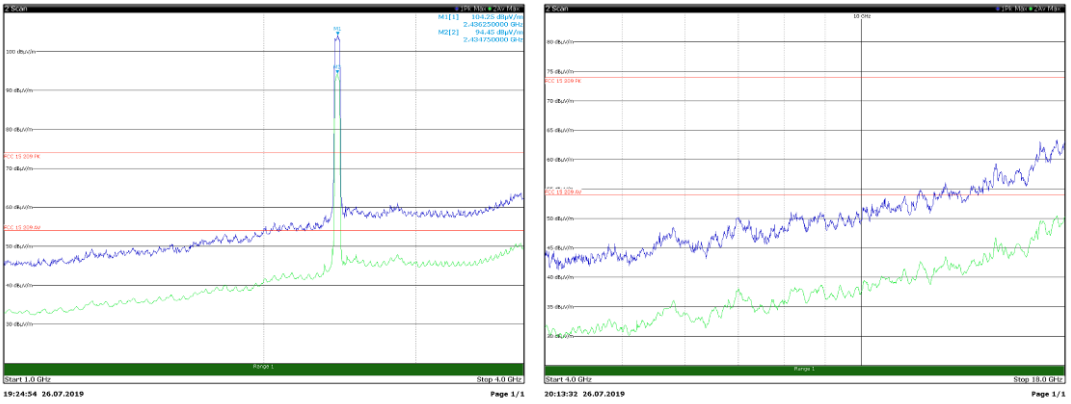


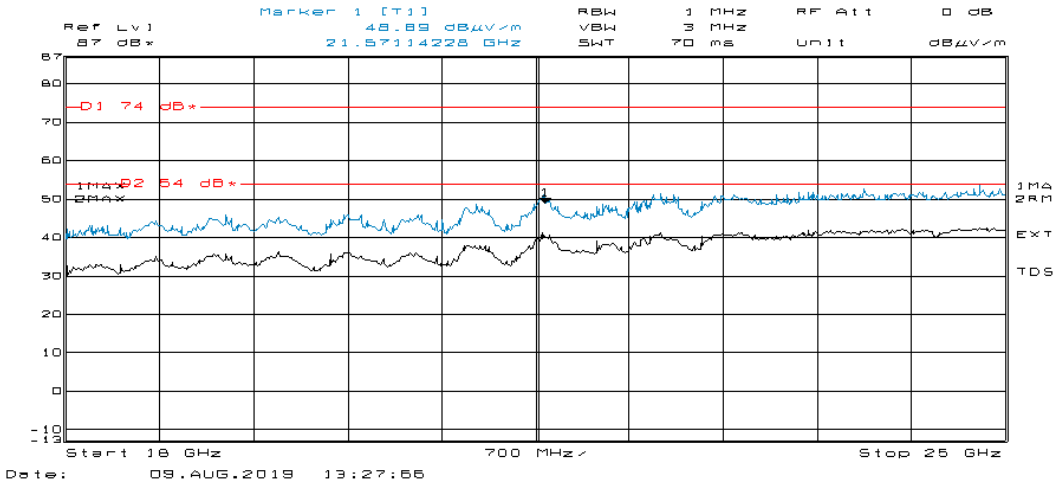




Section 8 Radiated measurement 802.11n HT40 vertical polarization

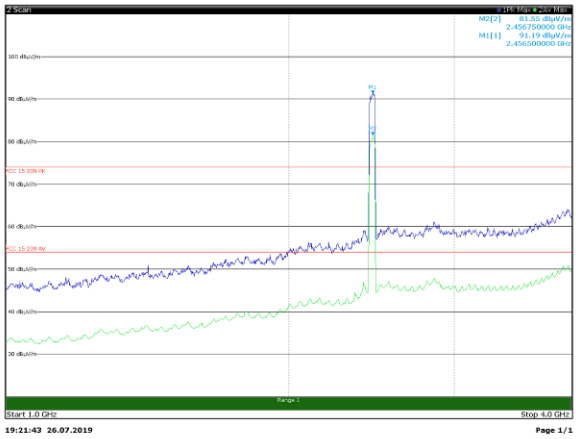
Mid channel

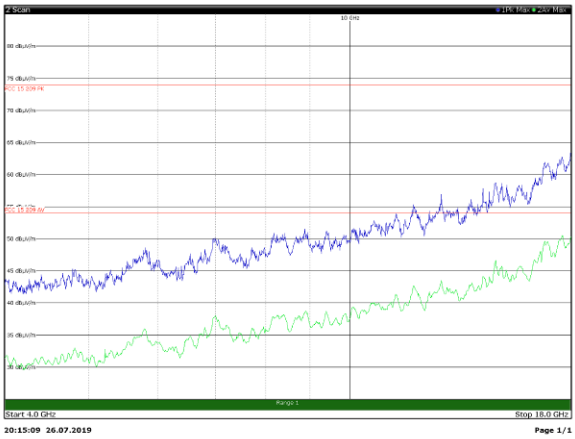


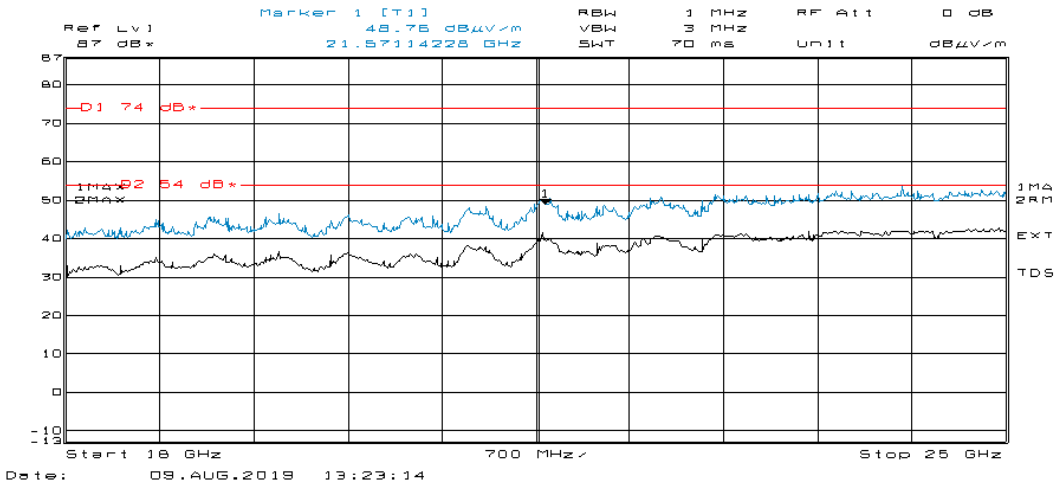


Section 8 Radiated measurement 802.11n HT40 vertical polarization

High channel

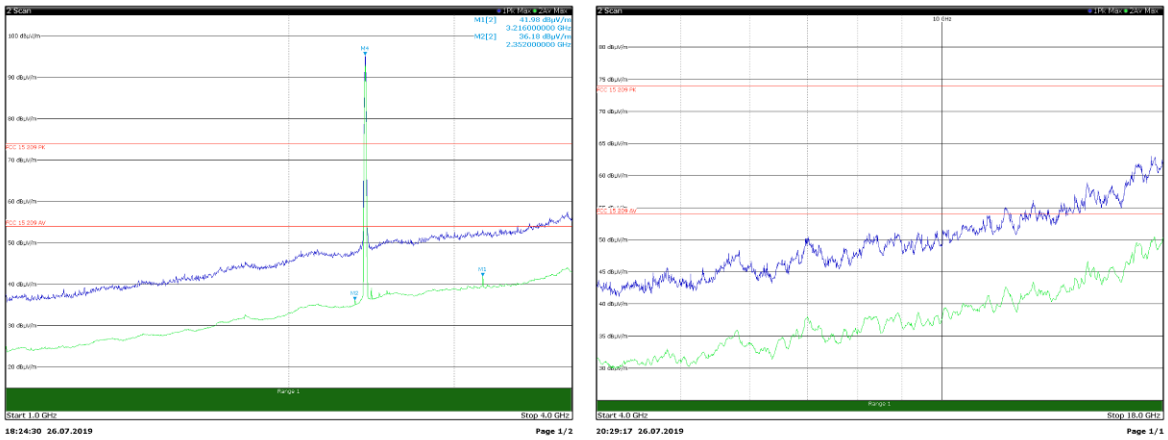


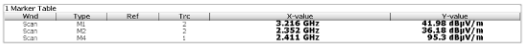


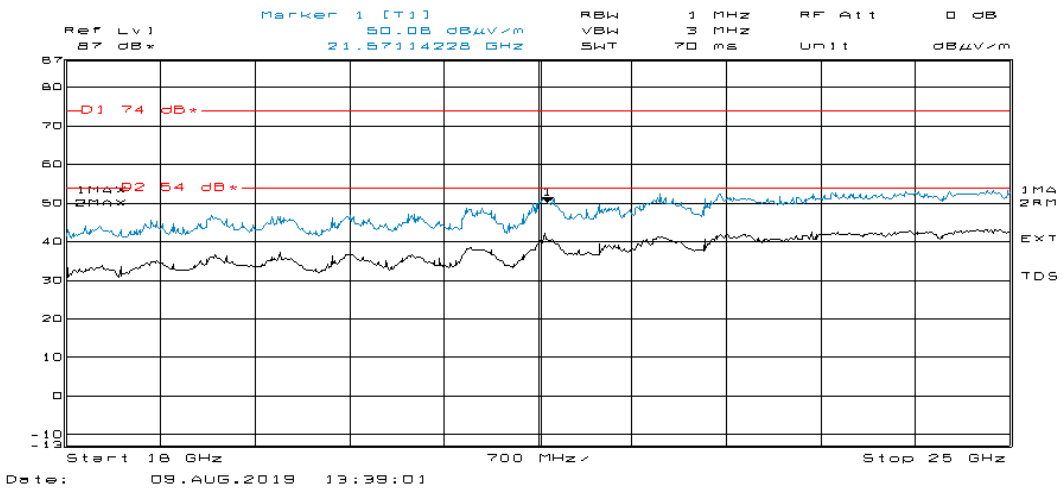


Section 8 Radiated measurement 802.11b horizontal polarization

Low channel

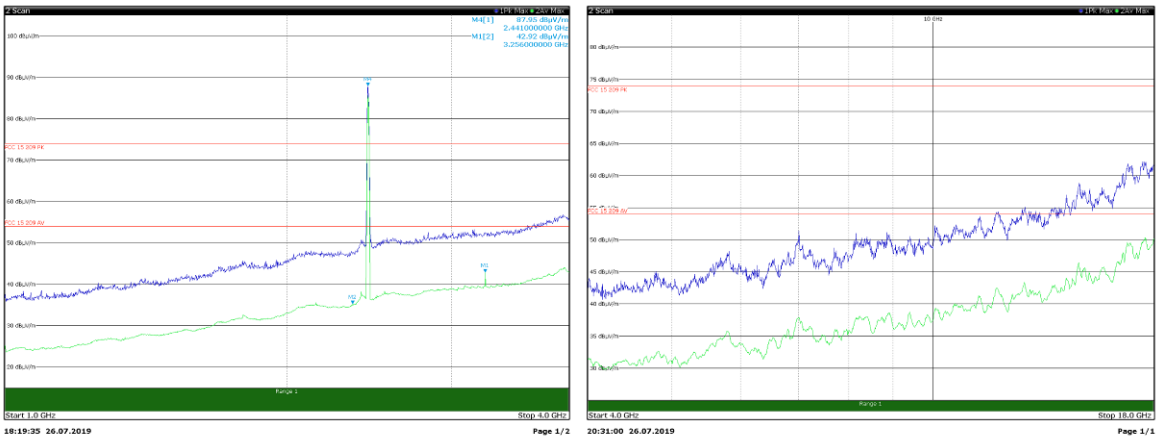


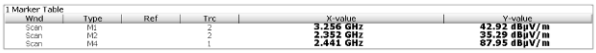


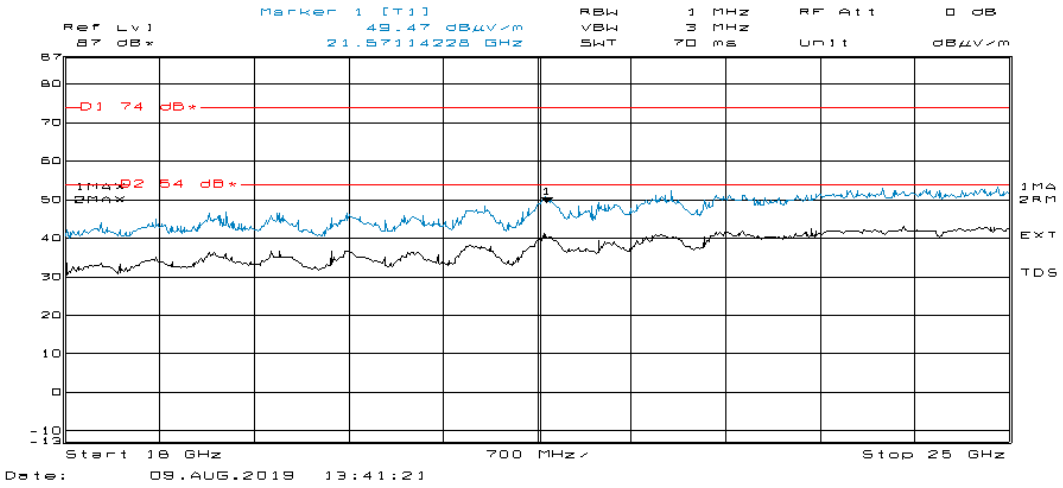


Section 8 Radiated measurement 802.11b horizontal polarization

Mid channel

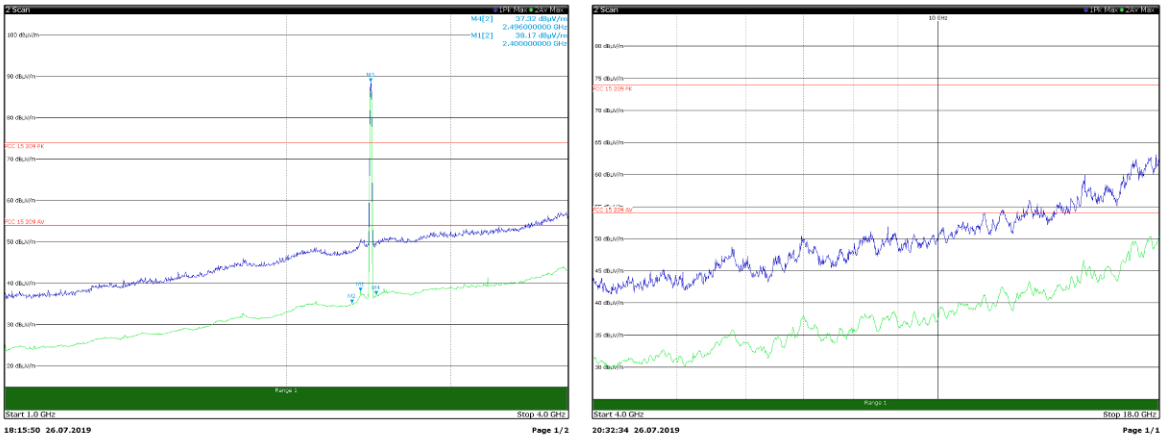






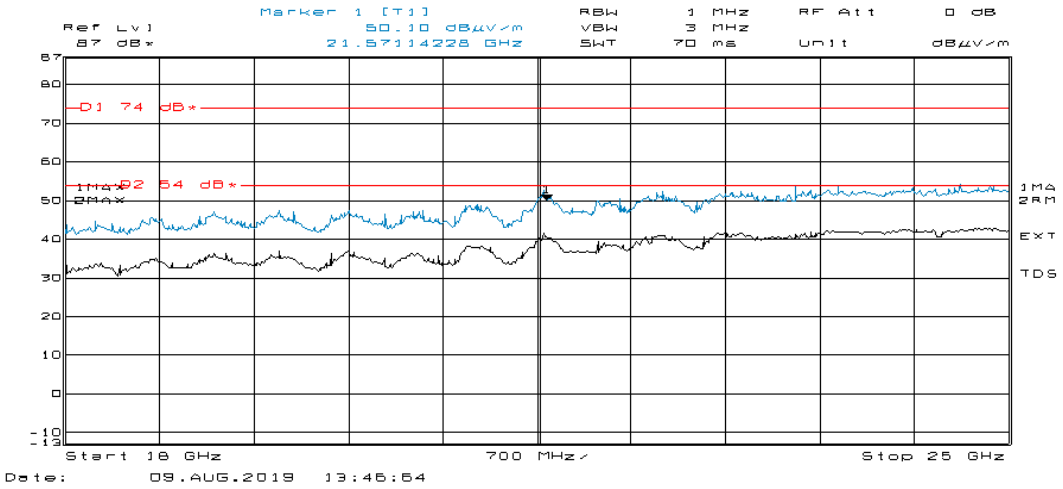
Section 8 Radiated measurement 802.11b horizontal polarization

High channel



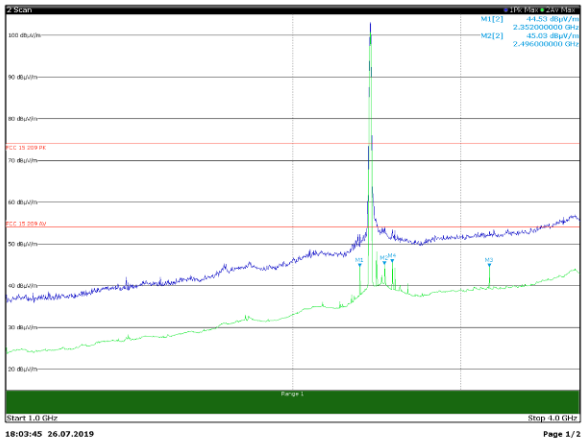
1 Marker Table

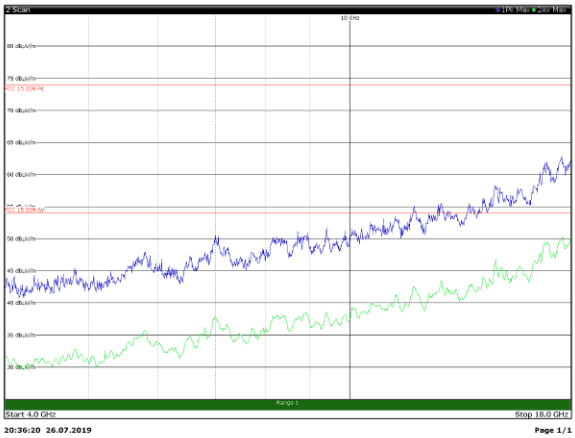
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		2	2.4 GHz	38.17 dBµV/m
Scan	M2		2	2.352 GHz	35.32 dBµV/m
Scan	M3		1	2.4625 GHz	88.7 dBµV/m
Scan	M4		2	2.496 GHz	37.32 dBµV/m



Section 8 Radiated measurement 802.11b vertical polarization

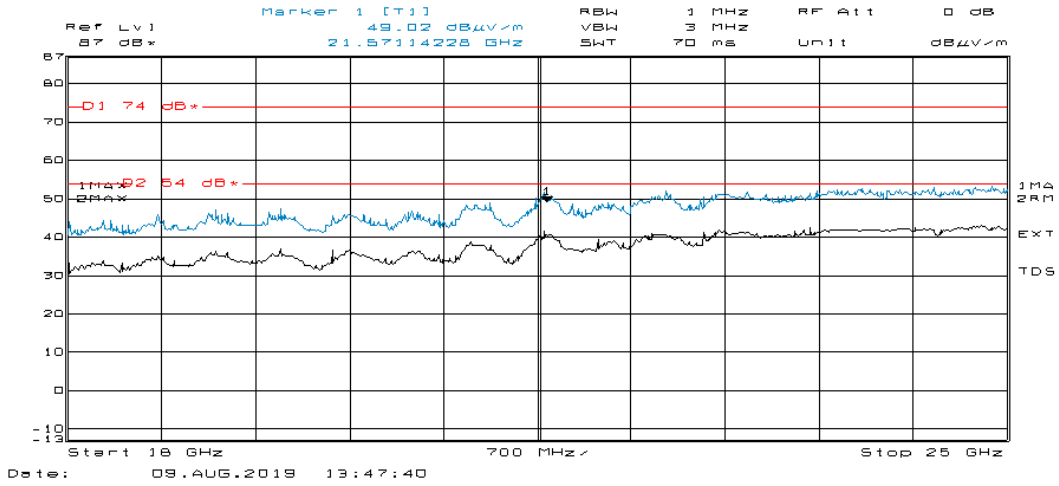
Low channel





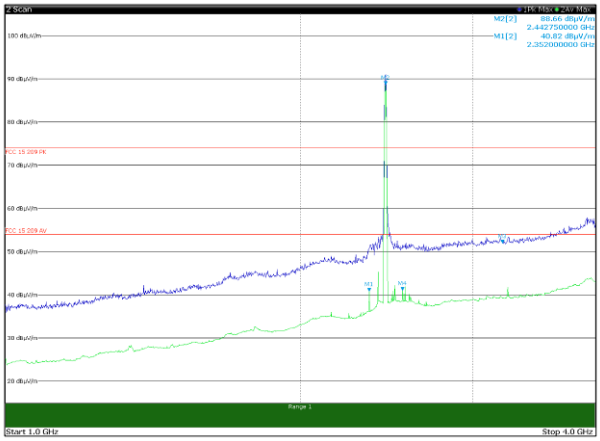
1 Marker Table

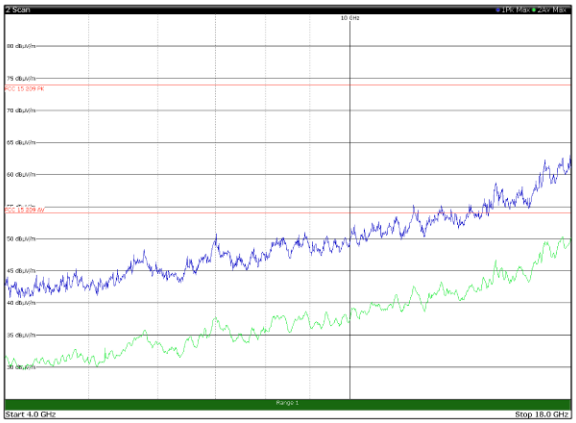
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		2	2.352 GHz	44.53 dBµV/m
Scan	M2		2	2.496 GHz	45.03 dBµV/m
Scan	M3		2	3.216 GHz	44.58 dBµV/m
Scan	M4		2	2.344 GHz	45.54 dBµV/m



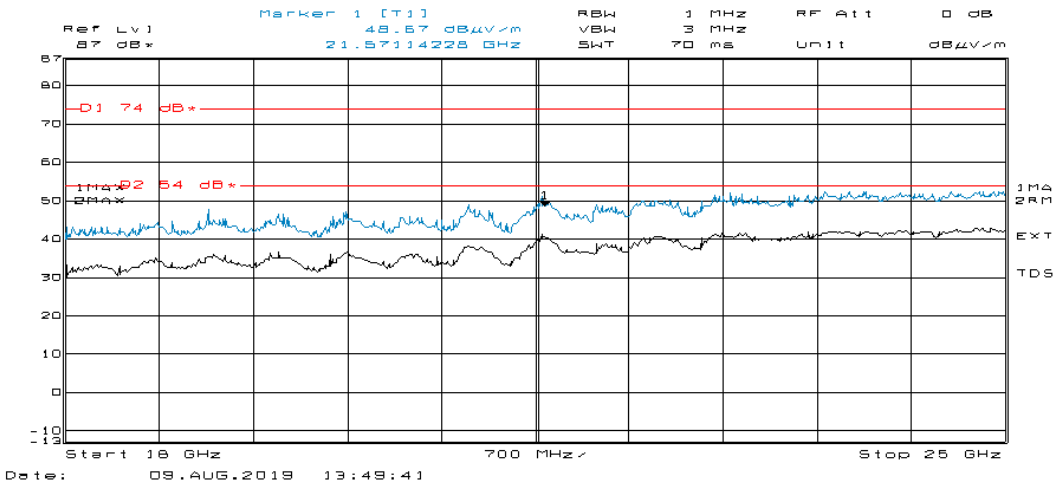
Section 8 Radiated measurement 802.11b vertical polarization

Mid channel



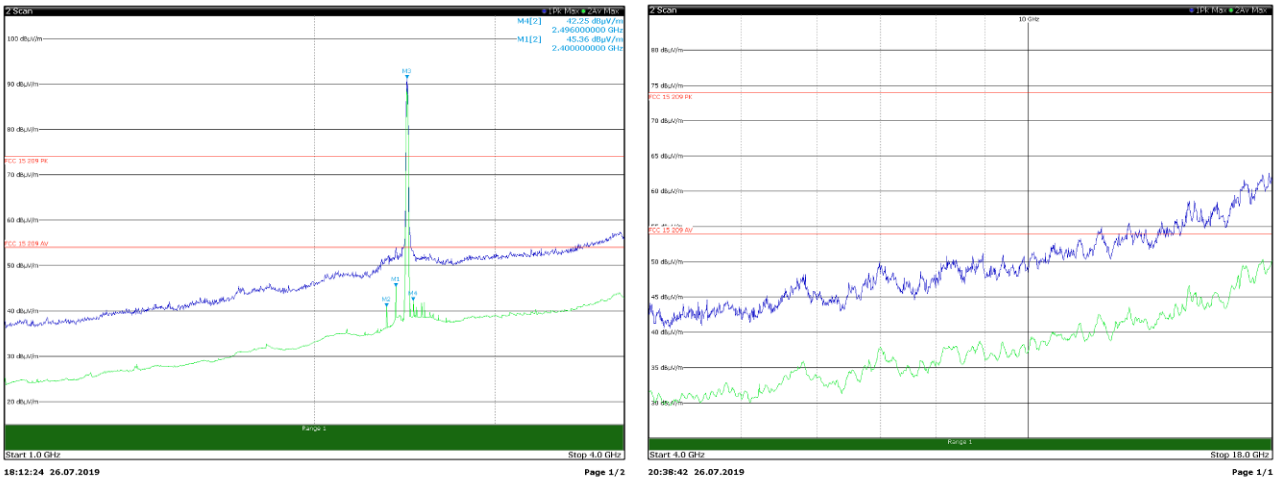


1 Marker Table					
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		1	2.352 GHz	44.53 dBµV/m
Scan	M2		1	2.496 GHz	45.03 dBµV/m
Scan	M3		1	3.216 GHz	44.58 dBµV/m
Scan	M4		1	2.544 GHz	45.54 dBµV/m



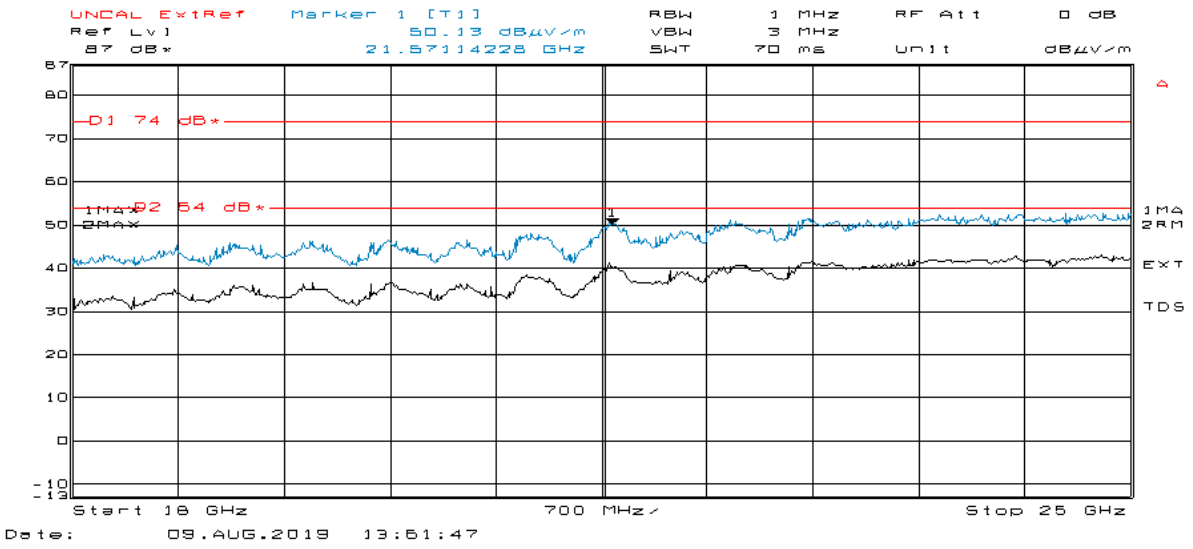
Section 8 Radiated measurement 802.11b vertical polarization

High channel



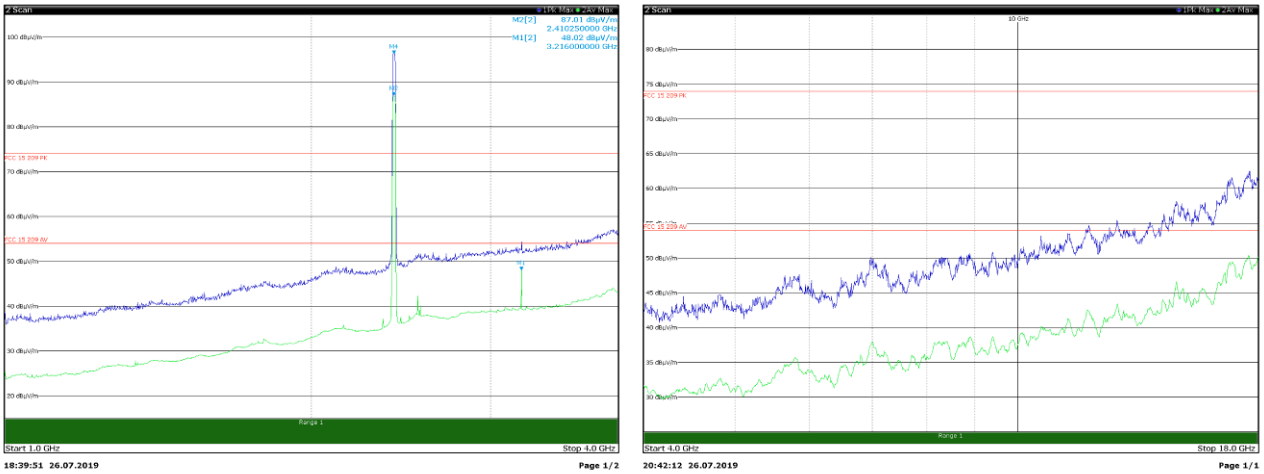
1 Marker Table

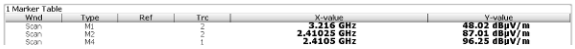
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		2	2.4 GHz	45.36 dBµV/m
Scan	M2		2	2.352 GHz	40.92 dBµV/m
Scan	M3		1	2.461 GHz	91.22 dBµV/m
Scan	M4		2	2.496 GHz	42.25 dBµV/m

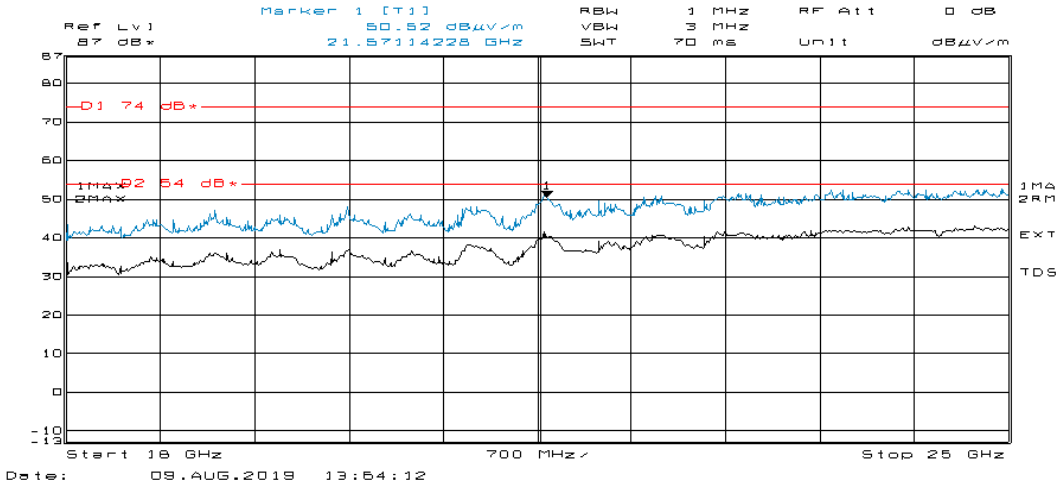


Section 8 Radiated measurement 802.11g horizontal polarization

Low channel

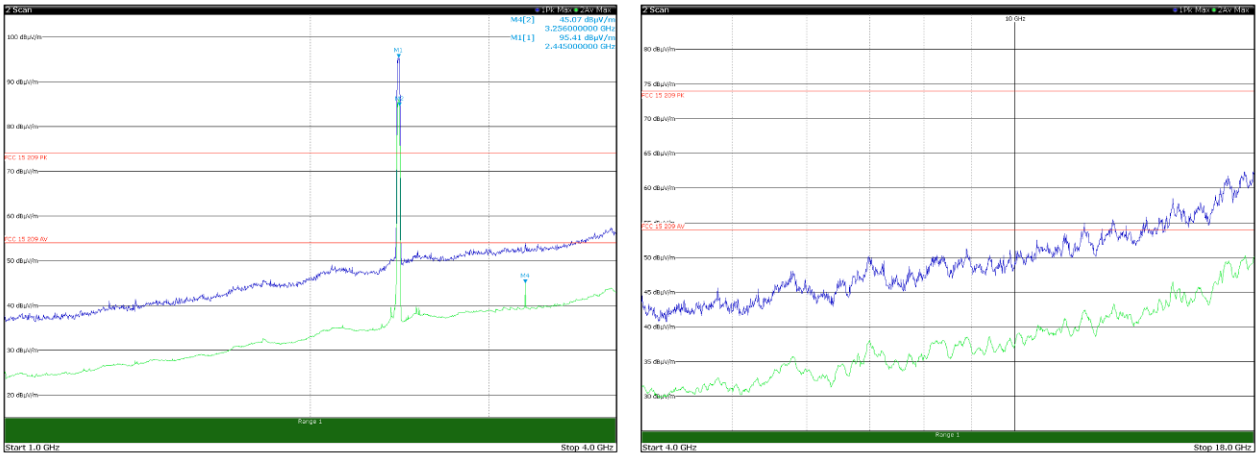






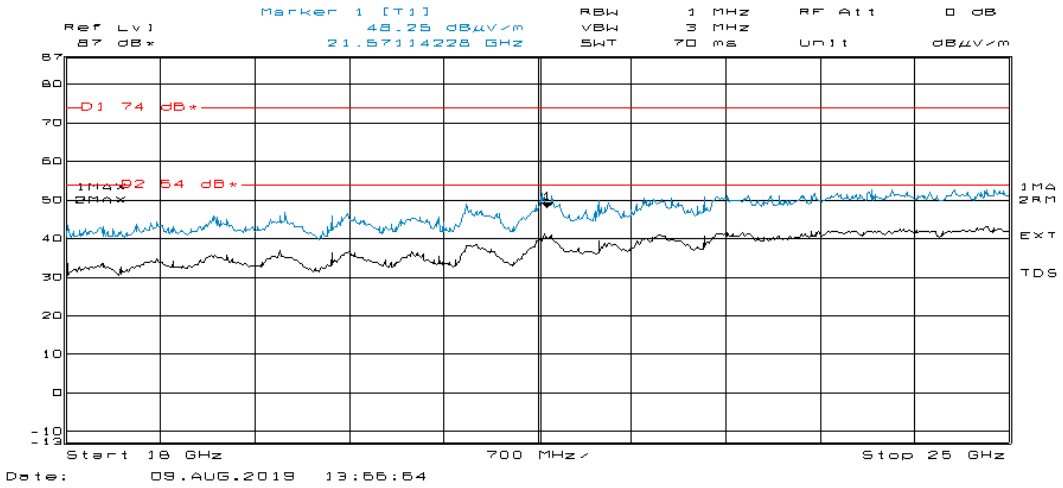
Section 8 Radiated measurement 802.11g horizontal polarization

Mid channel



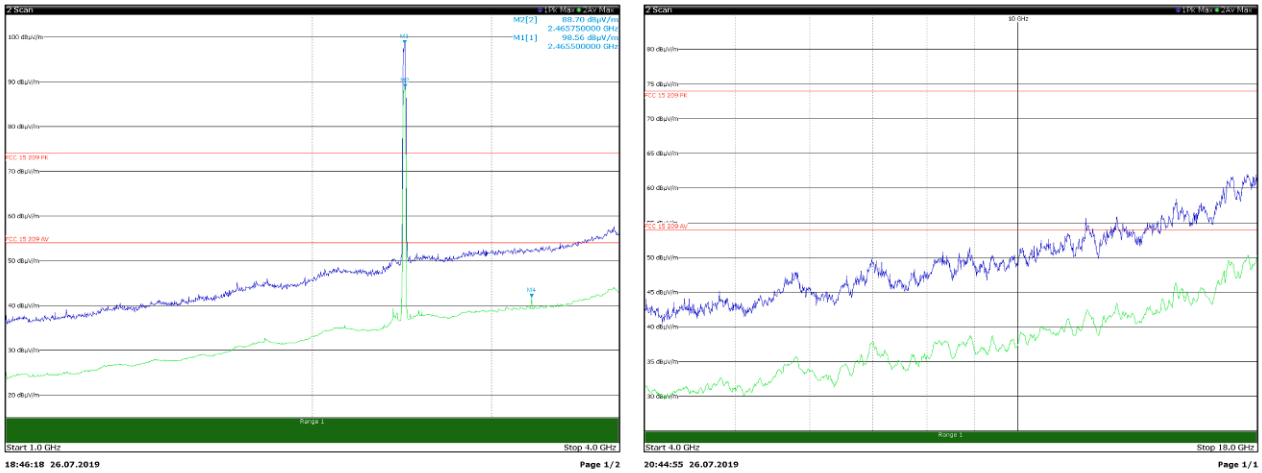
1 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		1	2.445 GHz	95.41 dBµV/m
Scan	M2		2	2.44975 GHz	84.65 dBµV/m
Scan	M4		2	3.256 GHz	45.07 dBµV/m



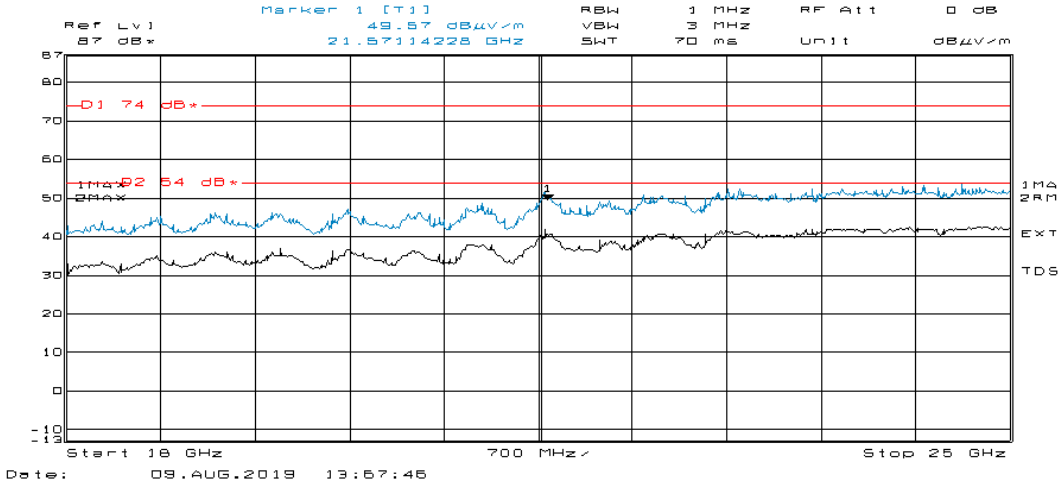
Section 8 Radiated measurement 802.11g horizontal polarization

High channel



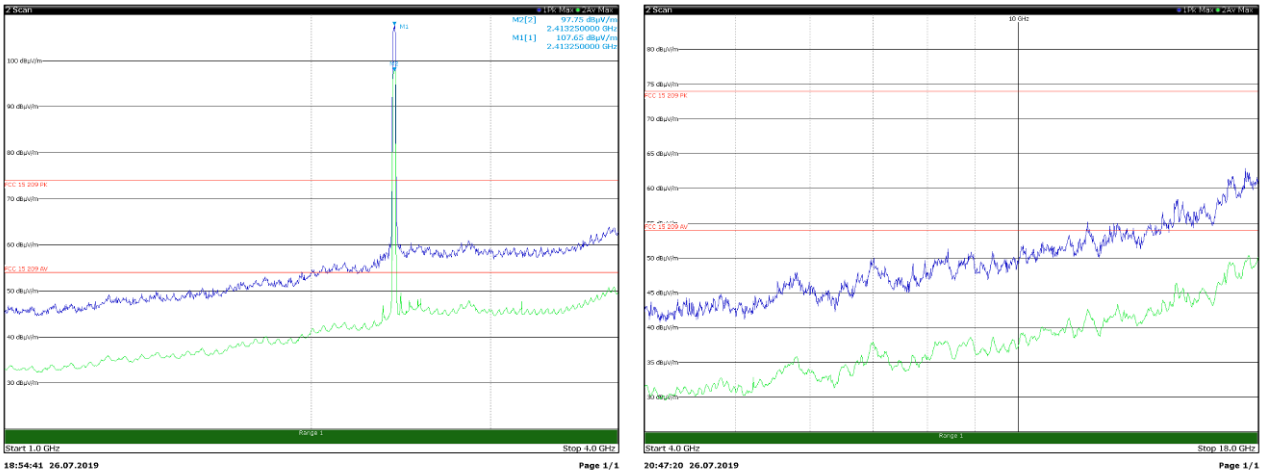
1 Marker Table

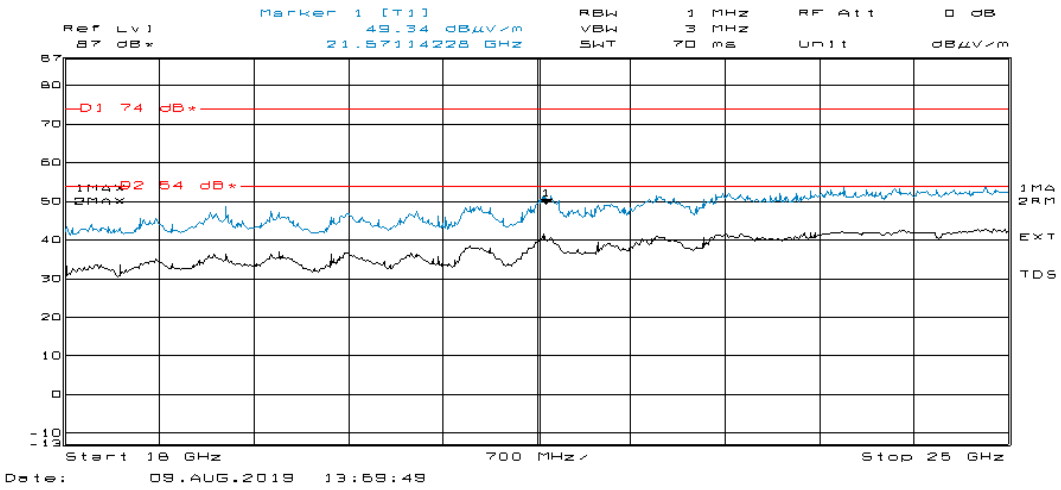
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		2	2.4 GHz	38.17 dBµV/m
Scan	M2		2	2.352 GHz	35.32 dBµV/m
Scan	M3		1	2.4625 GHz	88.7 dBµV/m
Scan	M4		2	2.496 GHz	37.32 dBµV/m



Section 8 Radiated measurement 802.11g vertical polarization

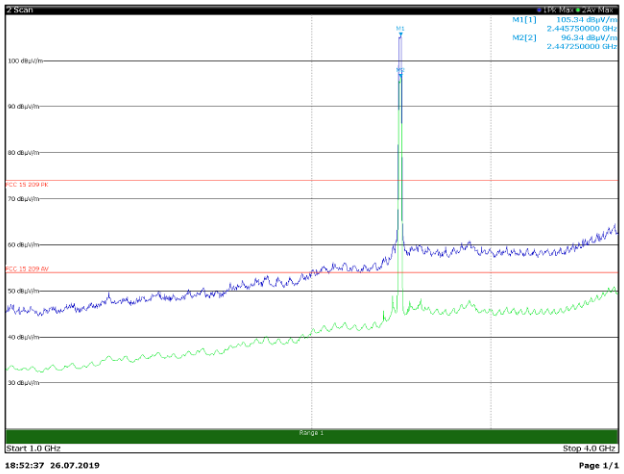
Low channel

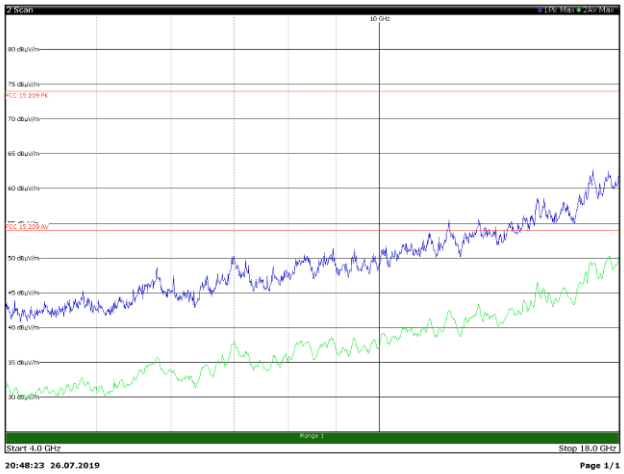


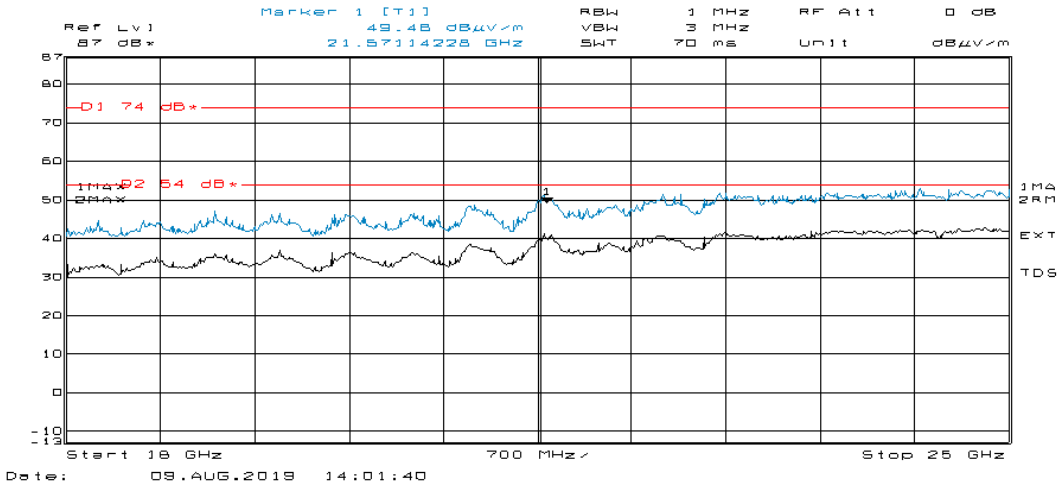


Section 8 Radiated measurement 802.11g vertical polarization

Mid channel

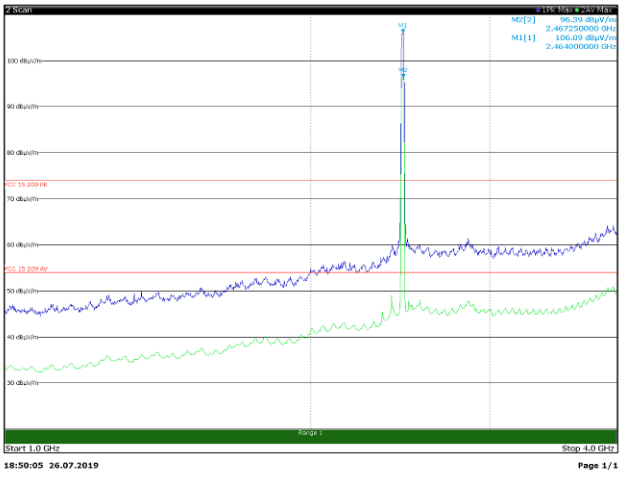


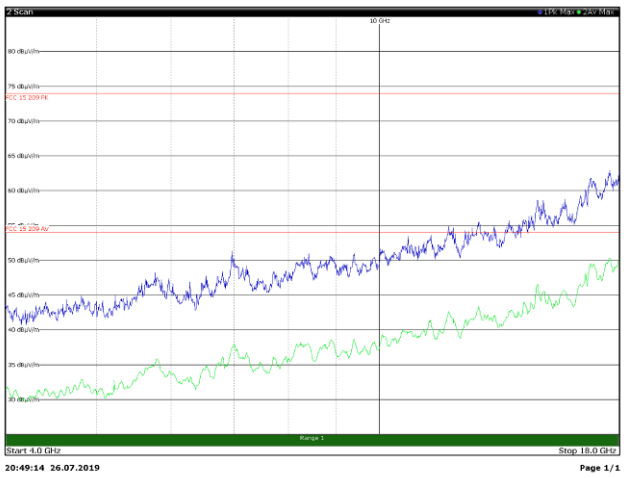


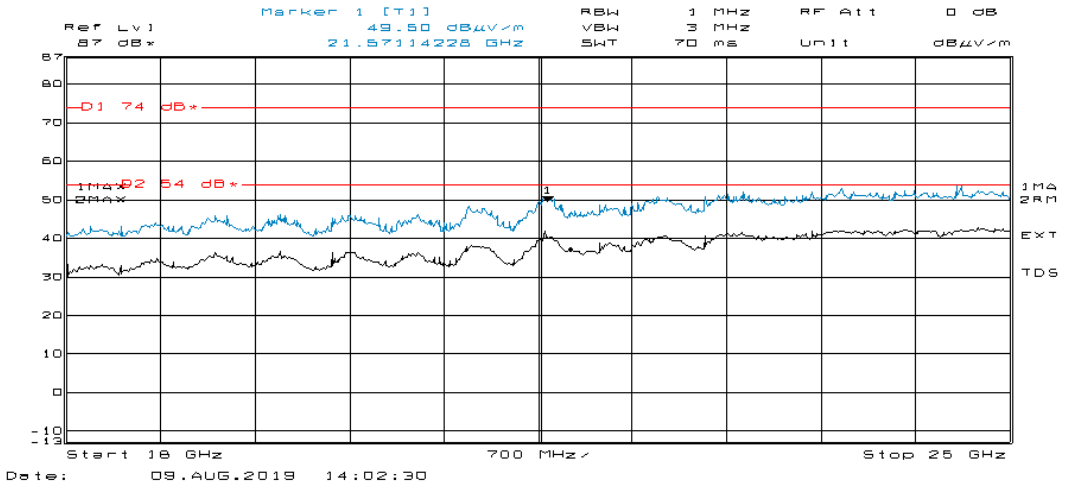


Section 8 Radiated measurement 802.11g vertical polarization

High channel

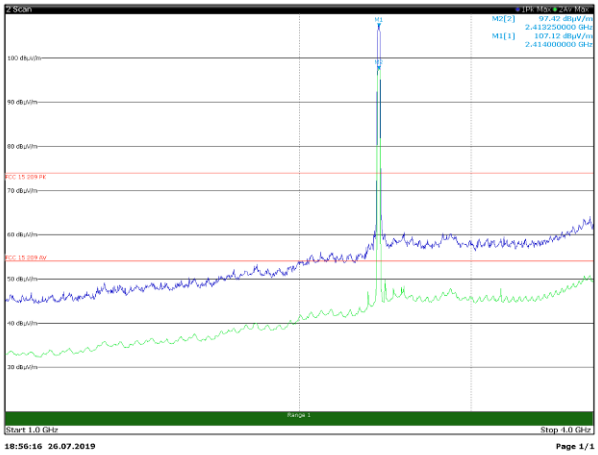


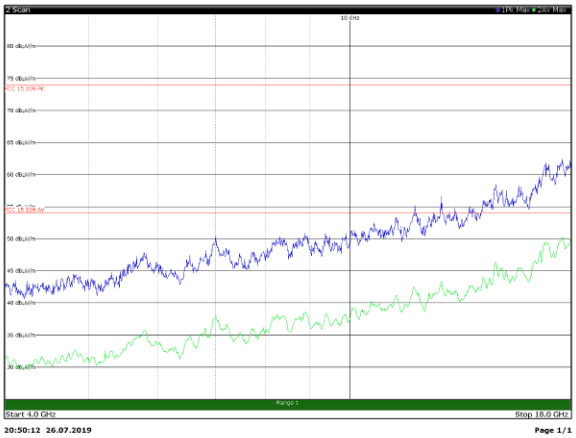


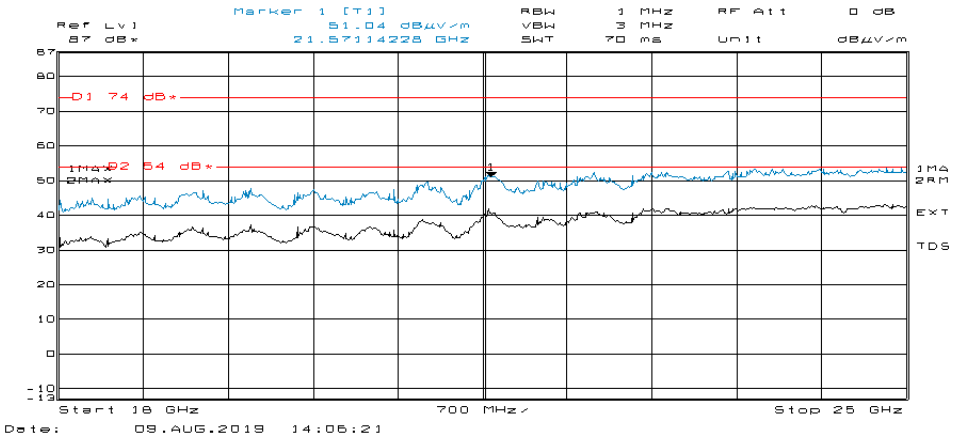


Section 8 Radiated measurement 802.11n HT20 vertical polarization

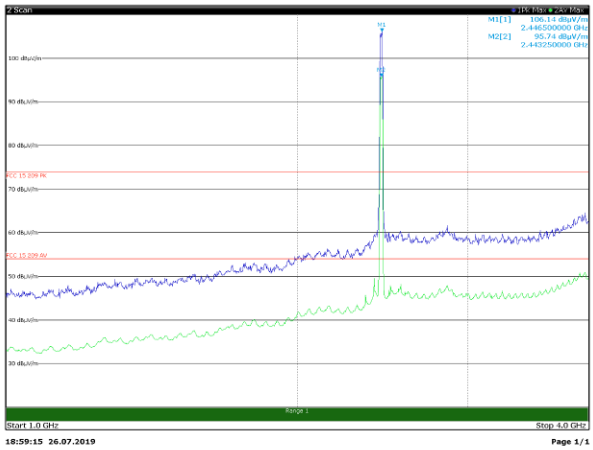
Low channel

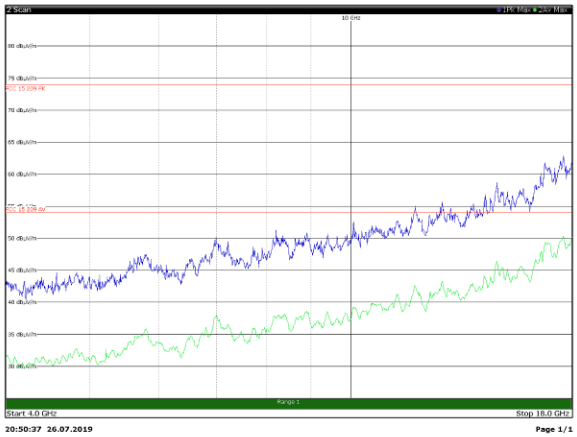


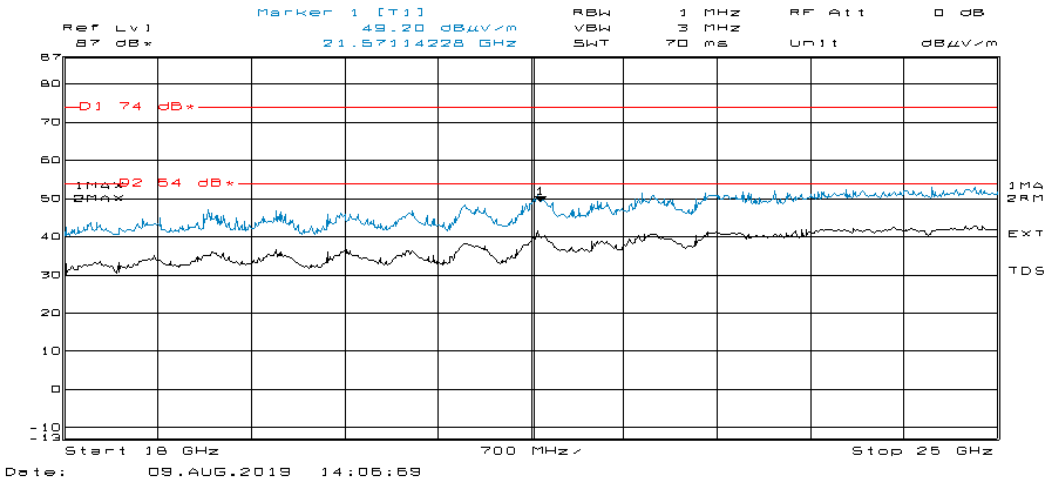




Mid channel

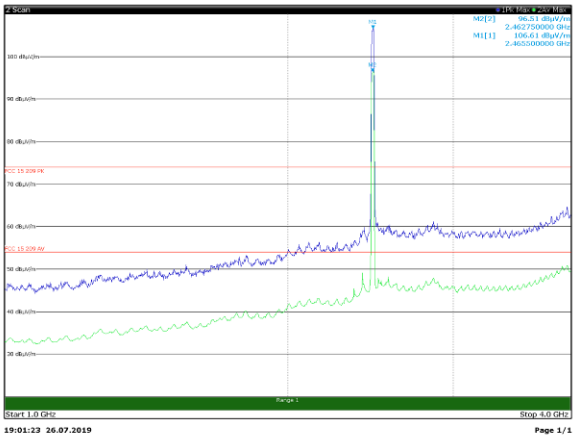

Start 1.0 GHz
Stop 4.0 GHz
18:59:15 26.07.2019
Page 1/1

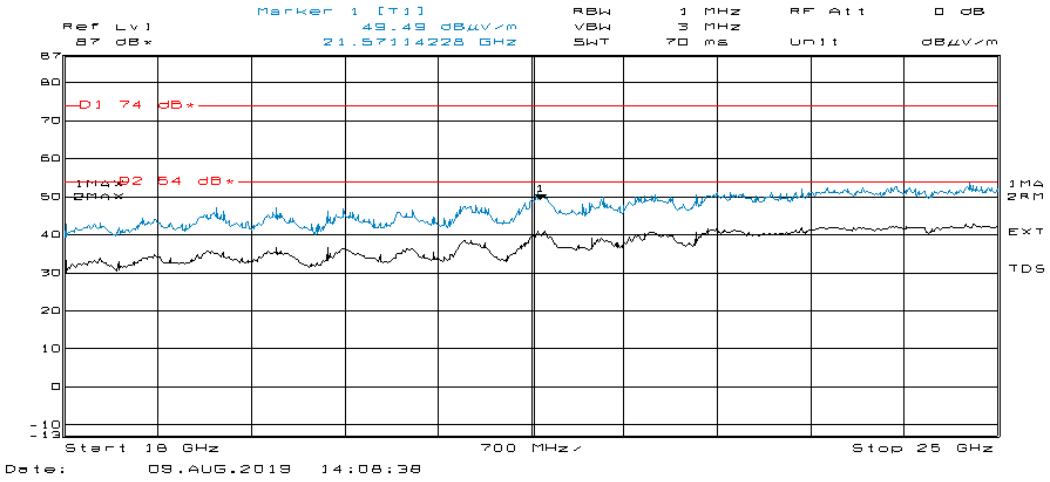

Start 4.0 GHz
Stop 18.0 GHz
20:50:37 26.07.2019
Page 1/1


Marker 1 [T1]
49.20 dBµV/m
21.5711228 GHz
RBW 1 MHz
VBW 3 MHz
SWT 70 ms
RF Att 0 dB
Unit dBµV/m
Ref Lvl
87 dB*
D1 74 dB*
D2 54 dB*
1MaxPeak
PMAX
1MA
1RM
EXT
TDS
Start 18 GHz
700 MHz/
Stop 25 GHz
Date: 09.AUG.2019 14:06:59

Section 8 Radiated measurement 802.11n HT20 vertical polarization

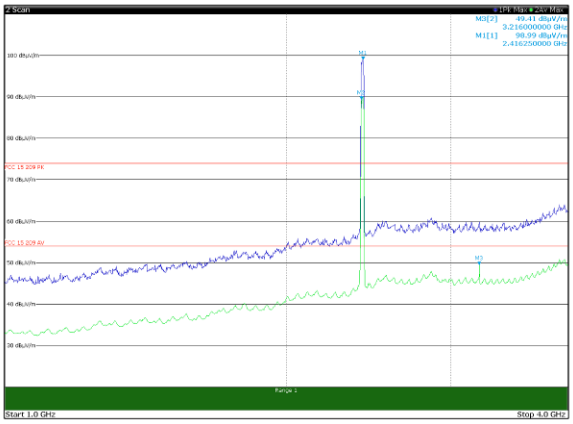
High channel

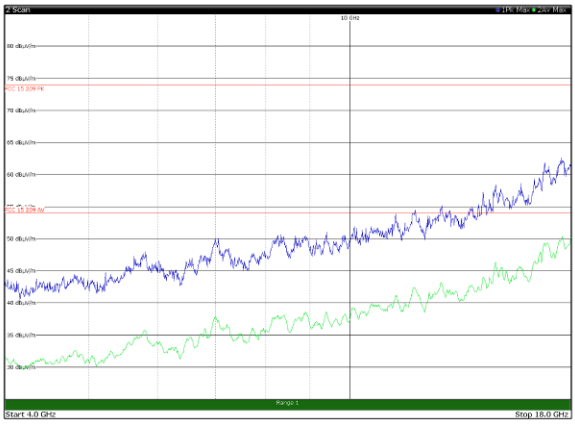




Section 8 Radiated measurement 802.11n HT20 horizontal polarization

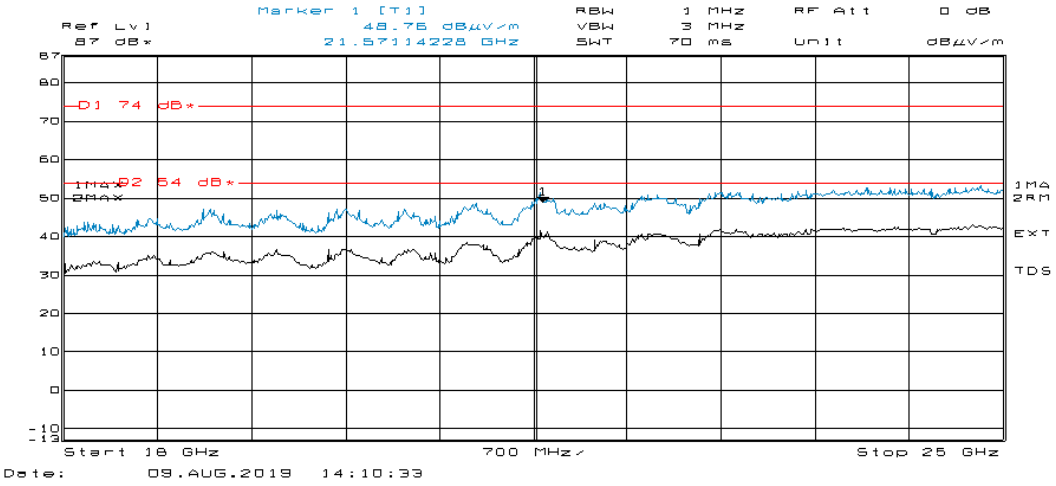
Low channel





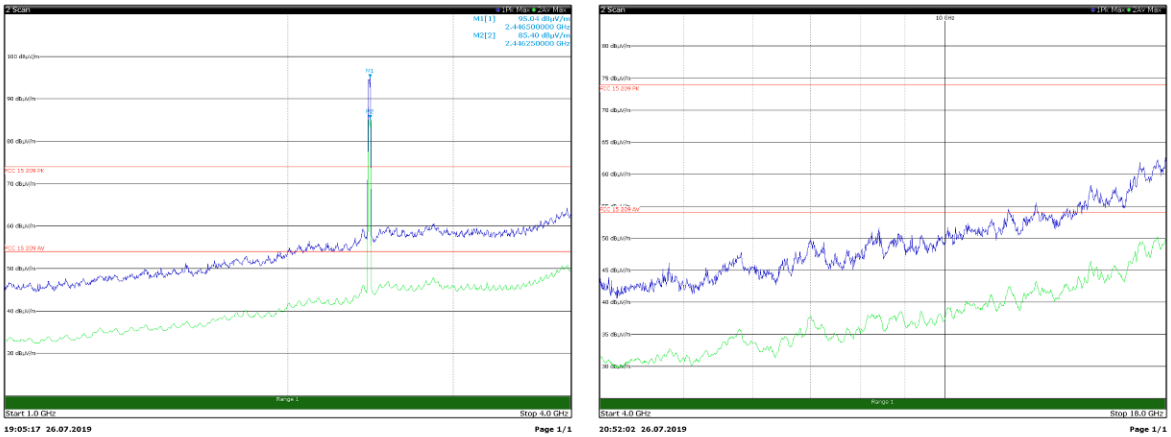
1 Marker Table

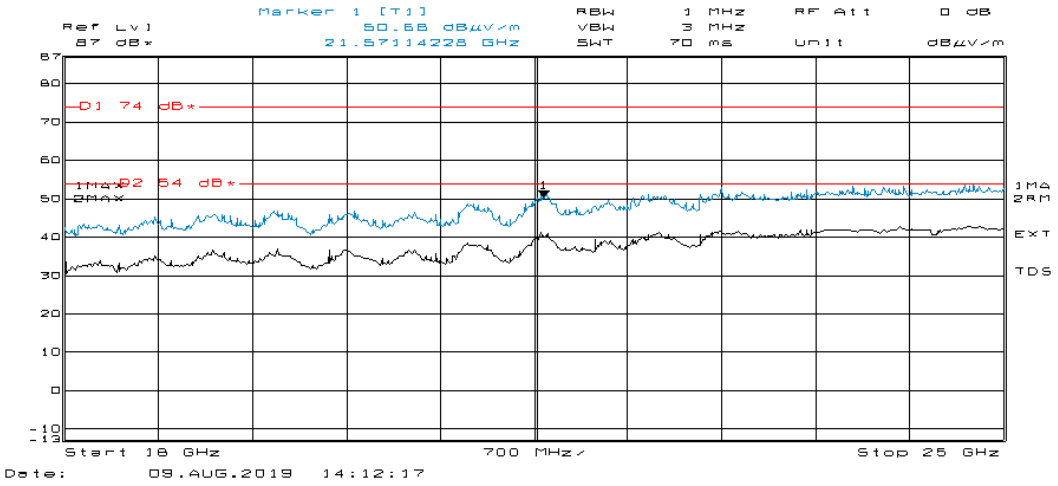
Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		1	2.41625 GHz	98.99 dBµV/m
Scan	M2		2	2.40675 GHz	89.38 dBµV/m
Scan	M3		2	3.216 GHz	49.41 dBµV/m



Section 8 Radiated measurement 802.11n HT20 horizontal polarization

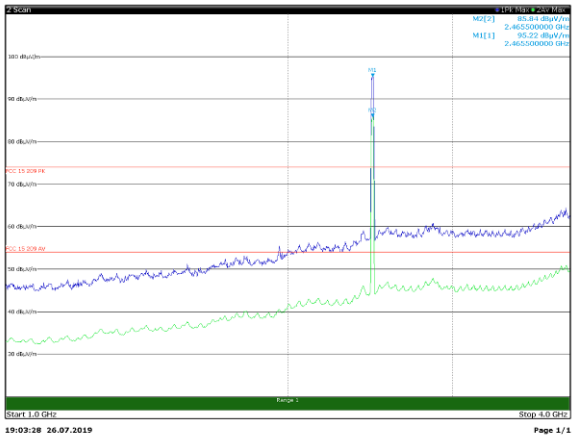
Mid channel

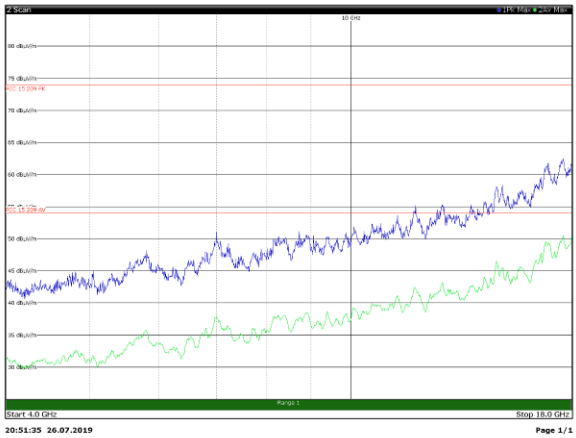


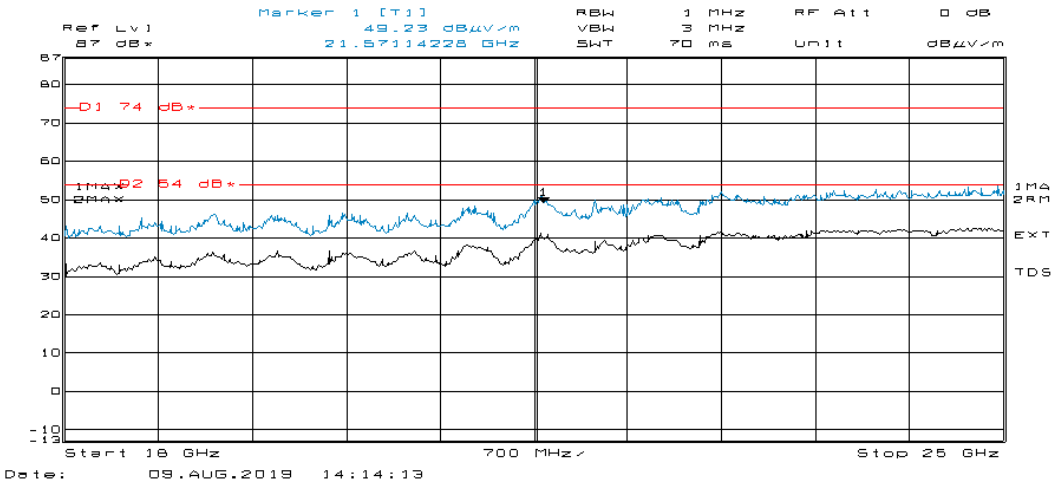


Section 8 Radiated measurement 802.11n HT20 horizontal polarization

High channel







FCC 15.247(e) and RSS-247 5.2(b) Power spectral density for digitally modulated devices

8.7.2 Definitions and limits

FCC:
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

ISED:
The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

8.7.1 Test date

Start date	Juy 29, 2019

8.7.2 Observations, settings and special notes

The test was performed using method PKPSD (peak PSD).
Spectrum analyser settings:

Resolution bandwidth:	3 kHz ≤ RBW ≤ 100 kHz
Video bandwidth:	≥3 × RBW
Frequency span:	1.5 times the OBW
Detector mode:	Peak
Trace mode:	Max hold

According clause 14.5 of ANSI C63.10 where radiated measurements are used for determining compliance with conducted limits, the following steps are required to ensure that the total emission power or PSD is determined for equipment driving cross-polarized antennas:

a) Measure radiated emissions with vertical and horizontal polarizations of the measurement antenna.
b) Convert each radiated measurement to transmit power or PSD based on the antenna gain.
c) Sum the powers or PSDs across the two polarizations.

8.7.3 Test data

Radiated PSD in vertical polarization

Modulation	Frequency,	dBm		Margin, dB	Antenna gain, dBi	EIRP,	EIRP limit,	EIRP margin, dB	E Field dBuV/m
	MHz	Measured	Limit			dBm	dBm		
802.11b	2412	-33.6	-7.5	-26.1	21.5	-12.1	--	--	83.1
	2442	-41.9	-7.5	-34.4	21.5	-20.4	--	--	74.8
	2462	-46.5	-7.5	-39.0	21.5	-25.0	--	--	70.2
802.11g	2412	-37.1	-7.5	-29.6	21.5	-15.6	--	--	79.5
	2442	-28.1	-7.5	-20.6	21.5	-6.6	--	--	88.6
	2462	-44.5	-7.5	-37.0	21.5	-23.0	--	--	72.2
802.11n HT20	2412	-37.3	-7.5	-29.8	21.5	-15.8	--	--	79.4
	2442	-37.4	-7.5	-29.9	21.5	-15.9	--	--	79.2
	2462	-38.6	-7.5	-31.1	21.5	-17.1	--	--	78.1
802.11n HT40	2422	-40.2	-7.5	-32.7	21.5	-18.7	--	--	76.4
	2442	-46.2	-7.5	-38.7	21.5	-24.7	--	--	70.5
	2452	-48.1	-7.5	-40.6	21.5	-26.6	--	--	68.6

Radiated PSD in horizontal polarization

Modulation	Frequency,	dBm		Margin, dB	Antenna gain, dBi	EIRP,	EIRP limit,	EIRP margin, dB	E Field dBuV/m
	MHz	Measured	Limit			dBm	dBm		
802.11b	2412	-39.1	-7.5	-31.6	21.5	-17.6	--	--	77.6
	2442	-44.0	-7.5	-36.5	21.5	-22.5	--	--	72.7
	2462	-46.2	-7.5	-38.7	21.5	-24.7	--	--	70.5
802.11g	2412	-47.7	-7.5	-40.2	21.5	-26.2	--	--	68.9
	2442	-51.6	-7.5	-44.1	21.5	-30.1	--	--	65.1
	2462	-51.5	-7.5	-44.0	21.5	-30.0	--	--	65.2
802.11n HT20	2412	-45.3	-7.5	-37.8	21.5	-23.8	--	--	71.3
	2442	-50.6	-7.5	-43.1	21.5	-29.1	--	--	66.1
	2462	-52.5	-7.5	-45.0	21.5	-31.0	--	--	64.1
802.11n HT40	2422	-51.9	-7.5	-44.4	21.5	-30.4	--	--	64.8
	2442	-46.7	-7.5	-39.2	21.5	-25.2	--	--	69.9
	2452	-48.3	-7.5	-40.8	21.5	-26.8	--	--	68.4

Total PSD output 1+ output 2= 4:Sum of E Field in vertical and horizontal polarization to dBm EIRP (Total E Field – antenna gain -20*log10(3)-104.7 dB)

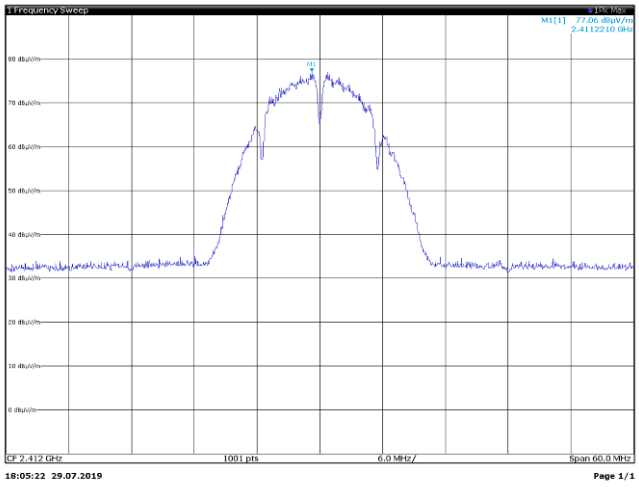
Table 8.6-1: Output power measurements results

Modulation	Frequency,	Conducted output power, dBm		Margin, dB	Antenna gain, dBi	EIRP,	EIRP limit,	EIRP margin, dB
	MHz	Measured	Limit			dBm	dBm	
802.11b	2412	-32.5	-7.5	-25.0	21.5	-11.0	--	--
	2442	-39.8	-7.5	-32.3	21.5	**-18.3**	--	--
	2462	-43.3	-7.5	-35.8	21.5	**-21.8**	--	--
802.11g	2412	-36.8	-7.5	-29.3	21.5	-15.3	--	--
	2442	-28.0	-7.5	-20.5	21.5	-6.5	--	--
	2462	-43.7	-7.5	-36.2	21.5	-22.2	--	--
802.11n HT20	2412	-36.7	-7.5	-29.2	21.5	-15.2	--	--
	2442	-37.2	-7.5	-29.7	21.5	-15.7	--	--
	2462	-38.4	-7.5	-30.9	21.5	-16.9	--	--
802.11n HT40	2422	-39.9	-7.5	-32.4	21.5	-18.4	--	--
	2442	-43.4	-7.5	-35.9	21.5	-21.9	--	--
	2452	-45.2	-7.5	-37.7	21.5	-23.7	--	--

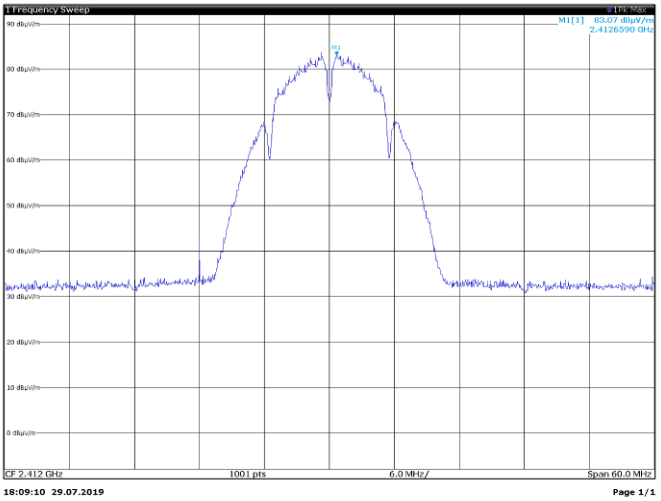
Detector: peak

Section (8) Results, continued protocol 802.11b

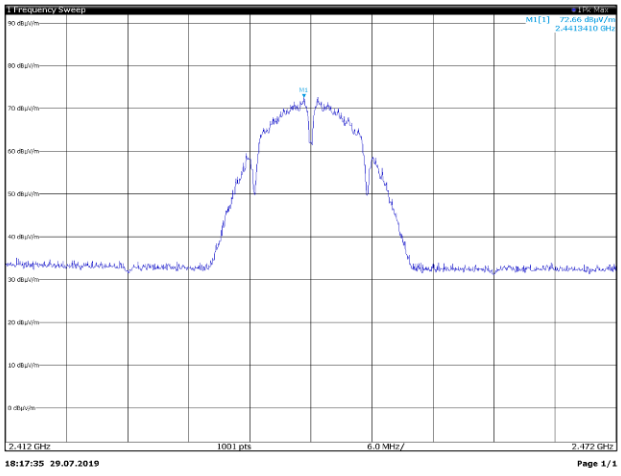
Low channel, horizontal polarization



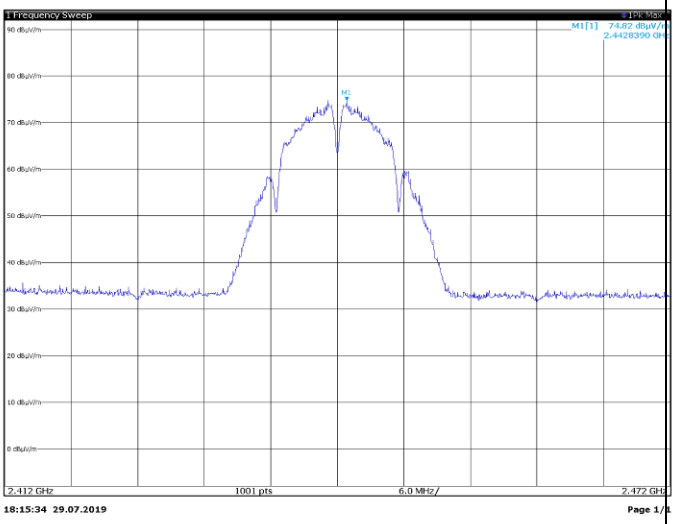
Low channel, vertical polarization



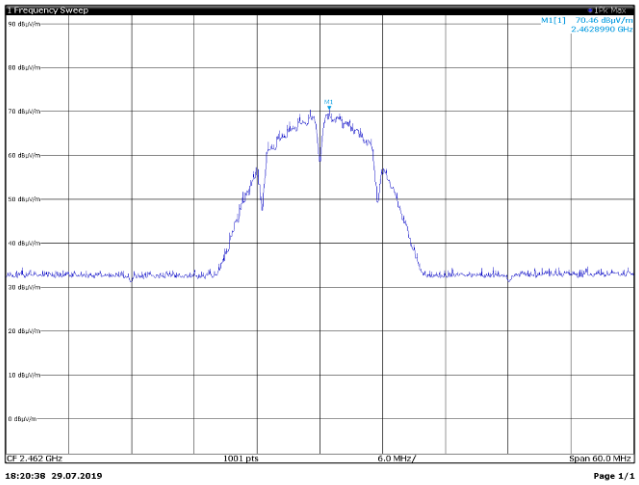
Middle channel, horizontal polarization



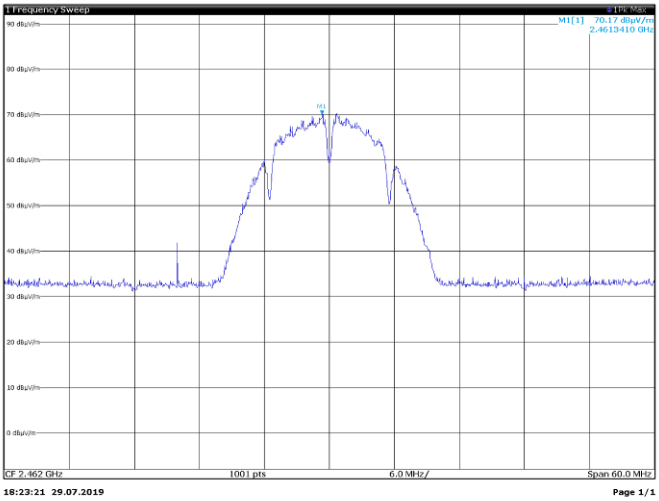
Middle channel, vertical polarization



High channel, horizontal polarization

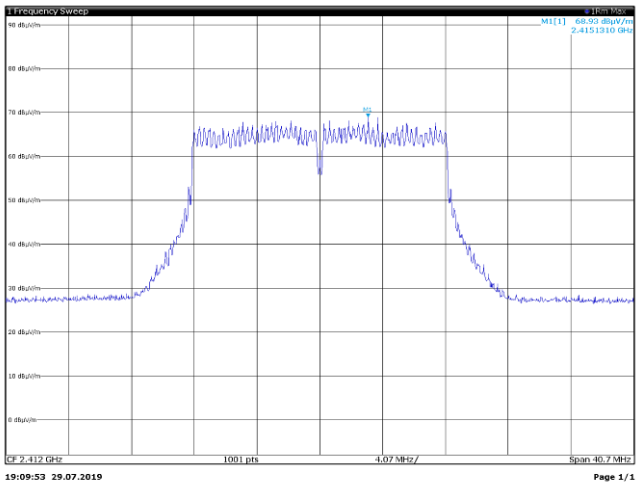


High channel, vertical polarization

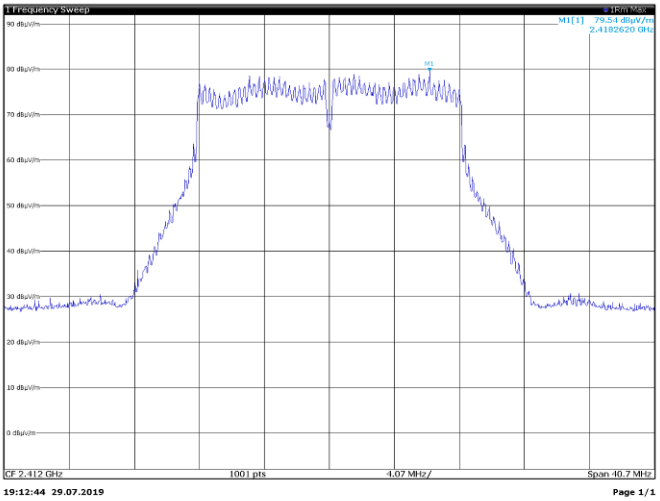


Section (8) Results, continued protocol 802.11g

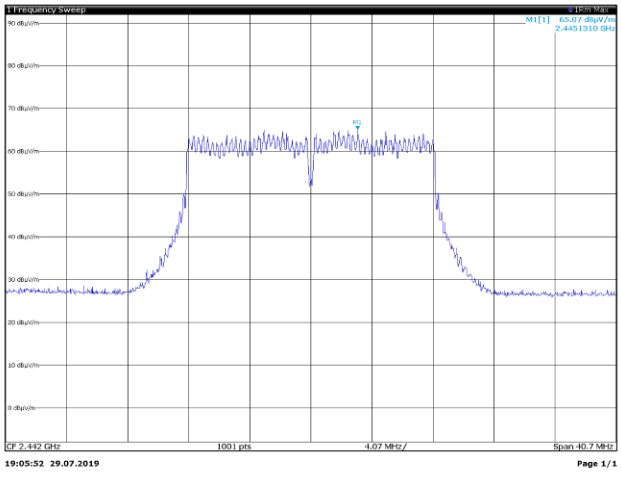
Low channel, horizontal polarization



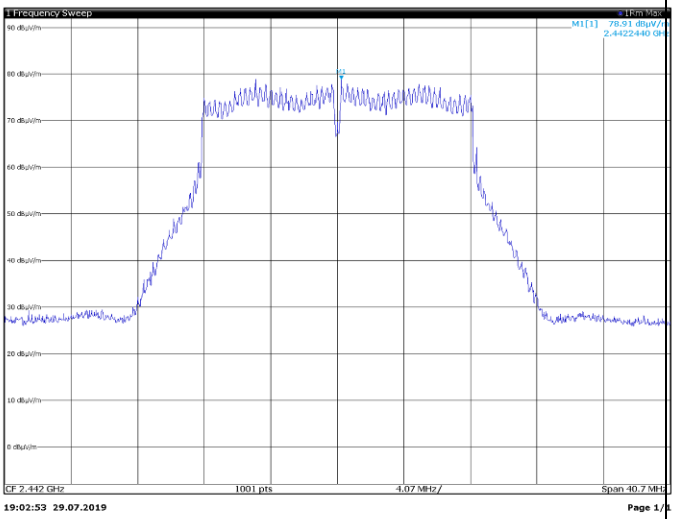
Low channel, vertical polarization



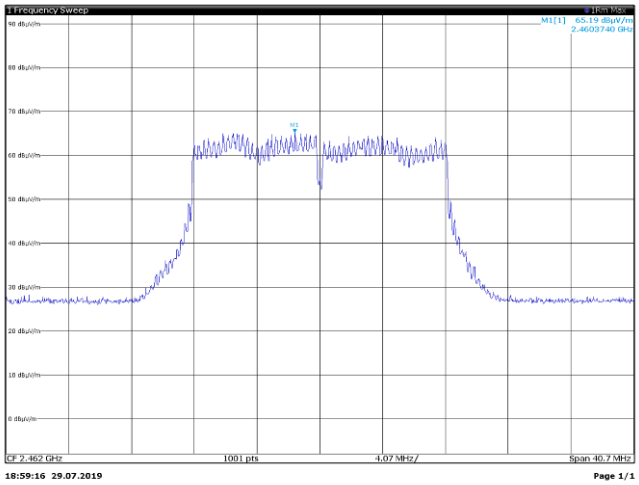
Middle channel, horizontal polarization



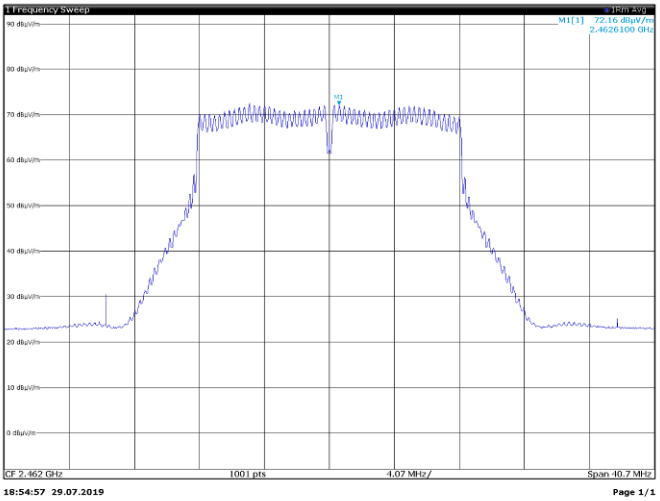
Middle channel, vertical polarization



High channel, horizontal polarization

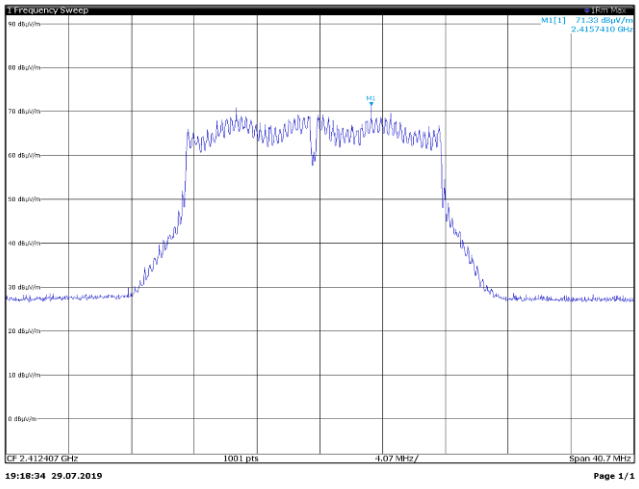


High channel, vertical polarization

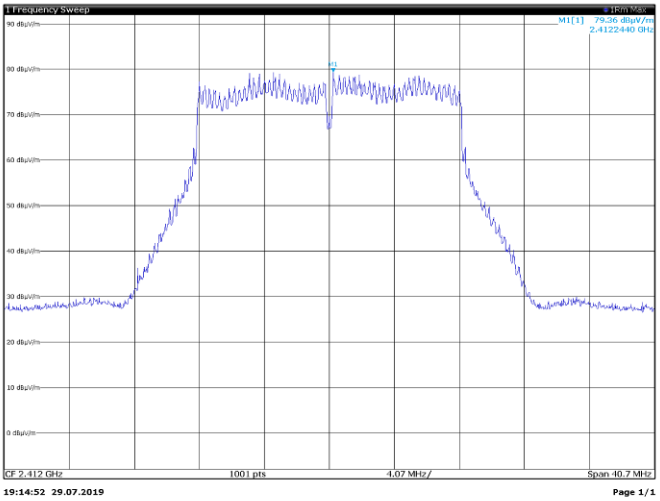


Section (8) Results, continued protocol 802.11Nht20

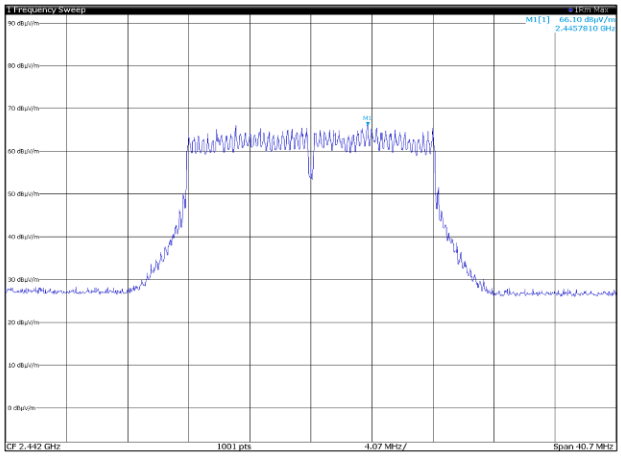
Low channel, horizontal polarization



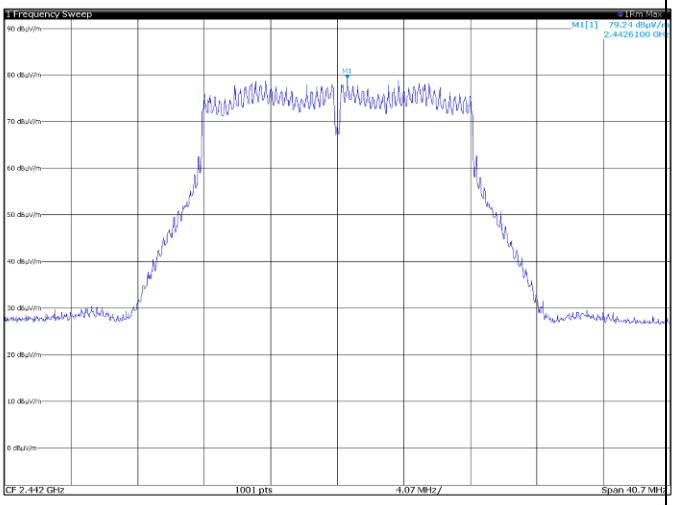
Low channel, vertical polarization



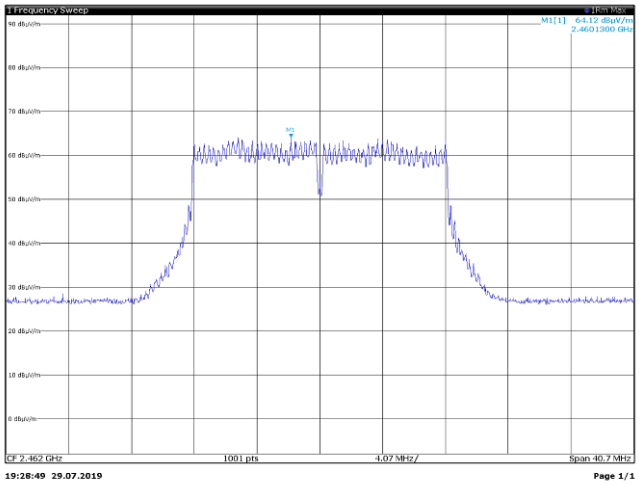
Middle channel, horizontal polarization



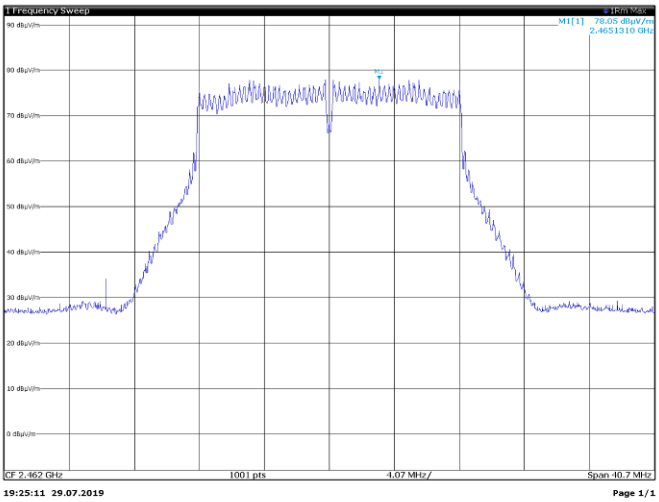
Middle channel, vertical polarization



High channel, horizontal polarization

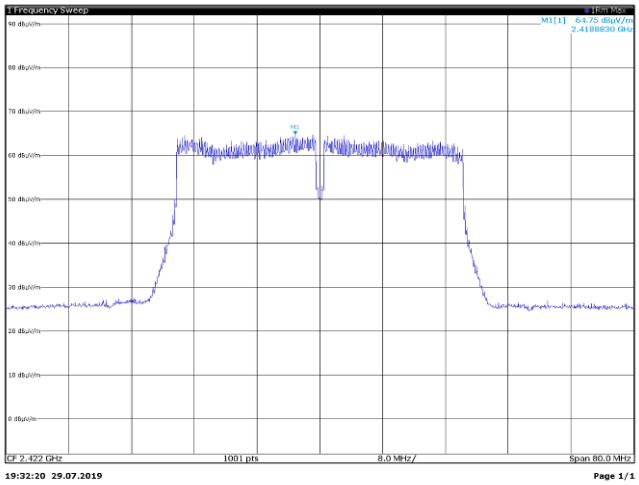


High channel, vertical polarization

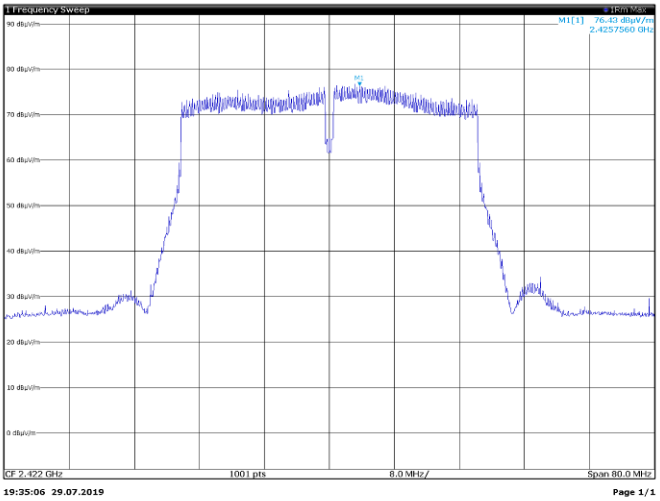


Section (8) Results, continued protocol 802.11n HT40

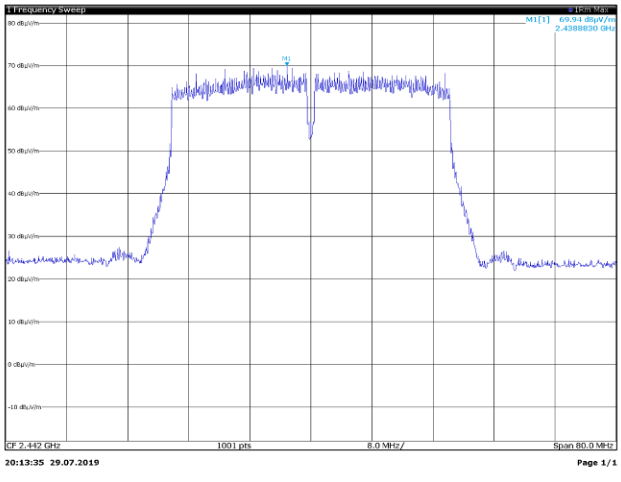
Low channel, horizontal polarization



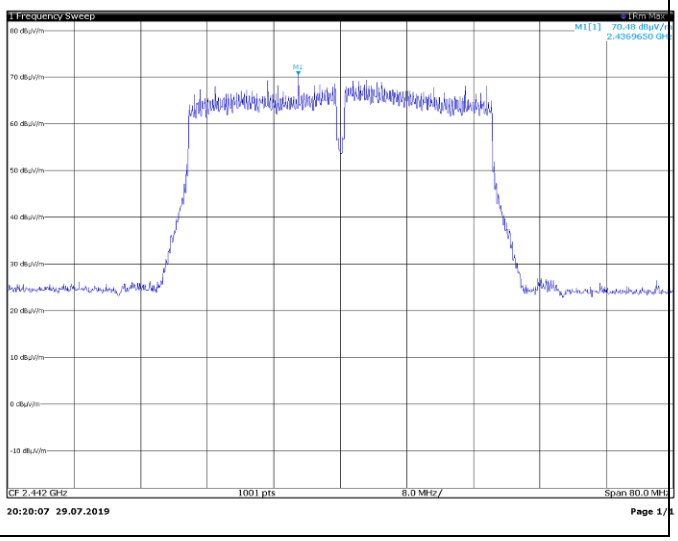
Low channel, vertical polarization



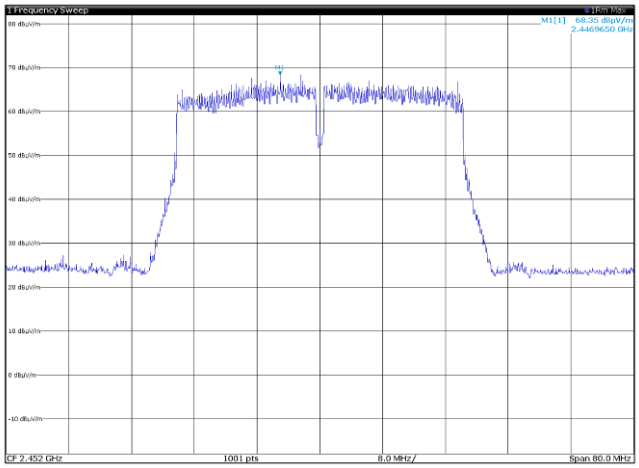
Middle channel, horizontal polarization



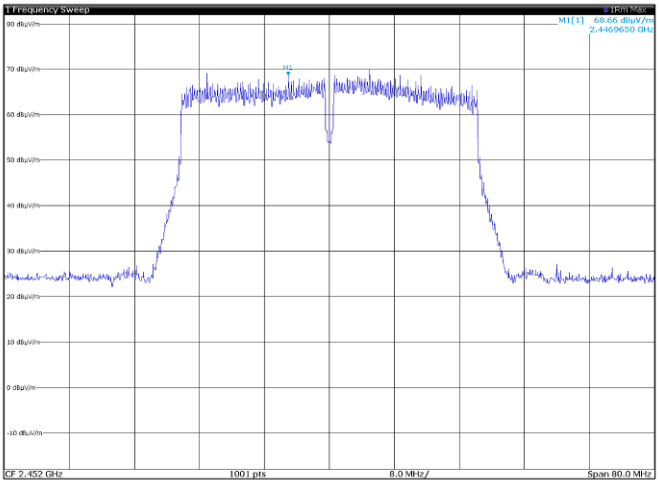
Middle channel, vertical polarization



High channel, horizontal polarization

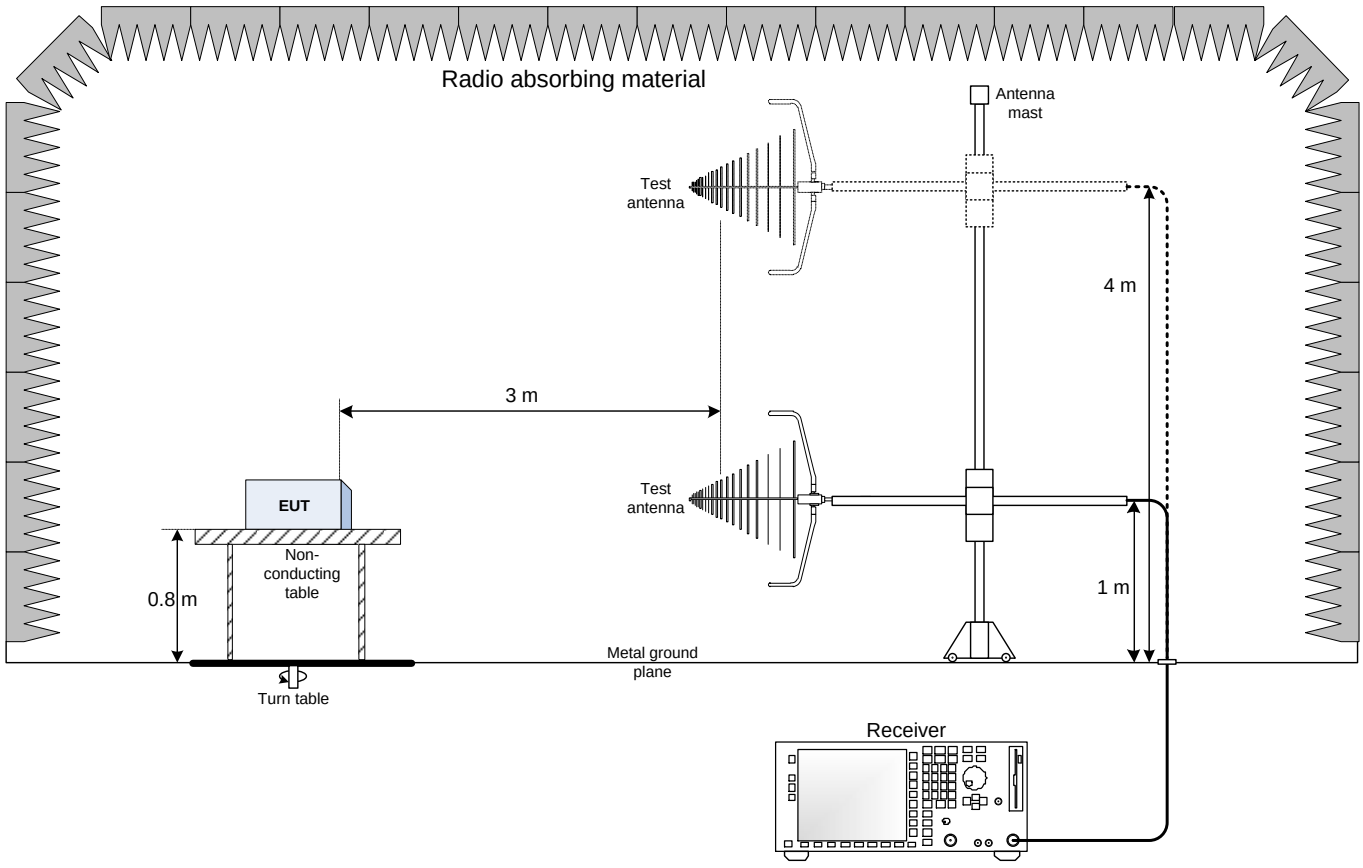


High channel, vertical polarization

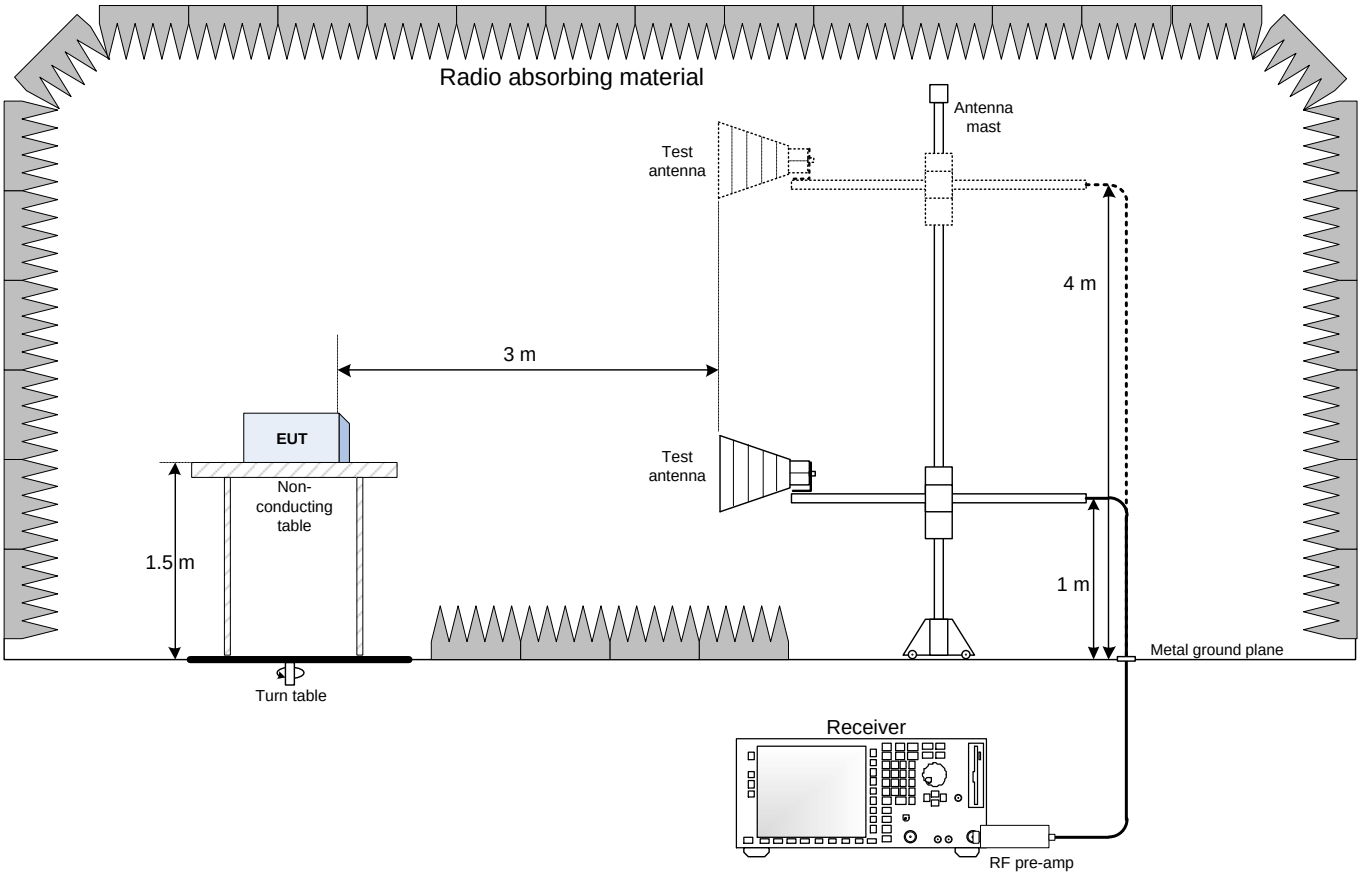


Section 9. Block diagrams of test set-ups

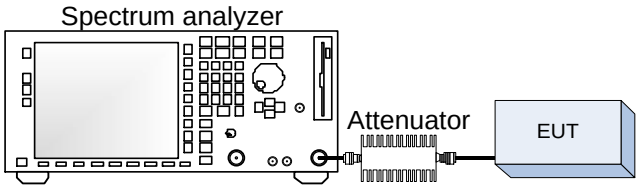
9.1 Radiated emissions set-up for frequencies below 1 GHz



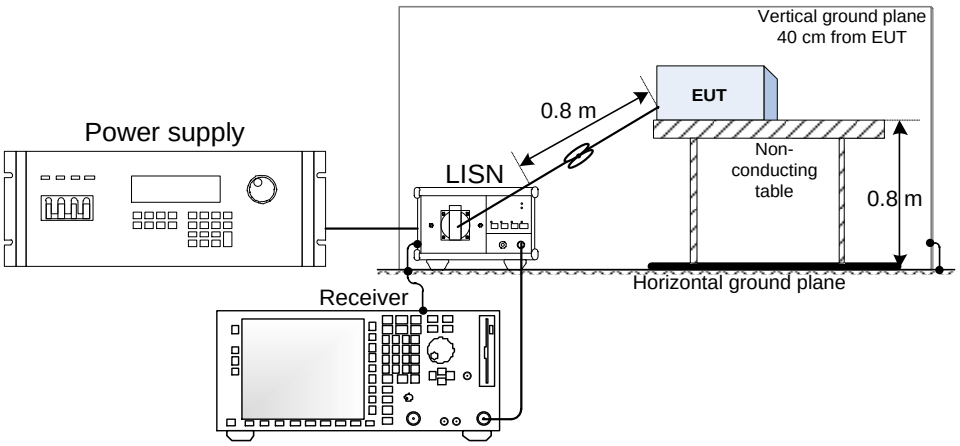
9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Antenna port conducted measurements set-up



9.4 Conducted emissions on AC line set-up



(End of report)

9.5