Prüfbericht-Nr.: *Test Report No.:*	60338884-002	**Auftrags-Nr.:** *Order No.:*	23870280
Kunden Referenz-Nr.: Client Reference No.:	1288973	**Auftragsdatum** *Order date:*	2019-11-13
Auftraggeber: *Client:*	Axis Communications AB Emdalavägen 14 SE-223 69 Lund Sweden	Dag Mårtensson Email: Dag.Martensson@axis.com	
Prüfgegenstand: *Test item:*	Security radar		
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	FCC ID: PNB-AXISD2110VE Model: D2110-VE		
Auftrags-Inhalt: *Order content:*	FCC Certification testing – 24 GHz Radar		
Prüfgrundlage: *Test specification:*	FCC Part 15.209 and 15.249 ANSI C63.10-2013		
Wareneingangsdatum: *Date of receipt:*	2019-11-12		
Prüfmuster-Nr.: *Test sample No.:*	A000248144-001		
Prüfzeitraum: *Testing period:*	2019-12-11 to 2020-02-04		
Ort der Prüfung: *Place of testing:*	Lund, Sweden		
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland Sweden		
Prüfergebnis: *Test results:*	Pass		

Geprüft von *Tested by:*	Fariborz Abasi Test Engineer		**Kontrolliert von** *Reviewed by:*	Per Isacsson Lab Manager	
2020-03-16			2020-03-16		
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sontiges /*Other:*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden.
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.

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Revisions ***Revisions***			
Revision Revision	**Datum** Date	**Anmerkung** Remark	**Verfasser** Author
001	2020-02-13	First release	Fariborz Abasi
002	2020-03-16	20 dB bandwidth added	Fariborz Abasi
Note: Latest revision report will replace all previous reports			

Summary of Test Results

FCC Rule Part	Test item	Result	Remarks
§15.249(a)	Field strength of emissions (wanted signal)	Pass	
§2.1049	Occupied bandwidth (99% bandwidth)	Pass	
15.215 (c)	20 dB Bandwidth	Pass	
§15.209(a) / 15.249(d)	Field strength of emissions (spurious & harmonics)	Pass	

Possible test case verdicts:

- test case does not apply to the test object ....: N/A
- test object does meet the requirement .....: PASS
- test object does not meet the requirement ....: FAIL
- test case not performed on the test object ....: n.p.

Table of contents

1 TEST SITES

Testing facility

TÜV Rheinland Sweden AB
Mobilvägen 10
223 62 Lund
Sweden

FCC Test Firm Registration Number: 517458

2 PRODUCT INFORMATION

2.1 General description

Model name:	AXIS D2110-VE
Manufacturer:	Axis Communications AB
Model number:	D2110-VE
FCC ID:	PNB-AXISD2110VE
Description:	Security radar
Supported Radio Technologies:	24050 – 24250 MHz – Radar
Type of modulation	Frequency Modulated Continuous Wave (FMCW)
Number of TX antennas	4 identical antennas
Antenna type	Array of patch elements integrated on a PCB substrate
Antenna gain	+8.5 dBi
Supply Voltage to Product:	Power Over Ethernet (PoE) IEEE802.3bt type 3 50-57 VDC or 8-28 VDC
Ancillary Equipment:	See section 2.3

2.2 Equipment Under Test (EUT) identification

TÜV Rheinland ID	S/N	HW	SW
A000248144-001	00408C187BD7	1.0	20191015

2.3 Ancillary equipment identification

TÜV Rheinland ID	Type	Model	Manufacturer	S/N
A000248144-002	Switching Power Adapter	FSP040-DAAN2	Axis Communications	H7261000086

3 TEST METHODS AND OPERATION MODES

3.1 Test Methods

The following standards/references has been considered for the testing

Reference Standards	
Standard	**Description**
FCC Part 15 (Subpart C)	§15.249 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.
FCC Part 15 (Subpart C)	§15.209 Radiated emission limits; general requirements
ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Operation modes

All testing were done on DUT operating in Chirp mode (meaning a frequency modulated continuous wave signal is swept from 24.05 – 24.25 GHz)

Operation Mode	Description
#1	Chirp mode

4 TEST METHODOLOGY

4.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2014.

- For frequency range 9KHz-30MHz loop antenna was used. Height of the loop antennas was adjusted to 1 m from floor, and 3 m from center of turntable. Testing was done with 3 different antenna positions; 1- Parallel to floor. 2- Parallel to axis. 3- Perpendicular to axis. The equipment under test (EUT) was placed at the middle of the turntable at 80cm height from floor.

- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to150 cm from floor, and 3 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.

- For frequency range 40GHz-60GHz horn Antenna was used. Antenna's height was adjusted to150 cm from floor, and 0.5 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor.

- For frequency range 60GHz-90GHz horn Antenna with was used. Antenna's height was adjusted to145; 150 and 155 cm from floor, and 0.25 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor.

- For frequency range 90GHz-100GHz horn Antenna was used. Antenna's height was adjusted to145; 150 and 155 cm from floor, and 0.1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor.

For all frequency ranges the turntable was rotated 360° for obtaining the maximum emission.

4.2 Test Setup Configuration diagrams

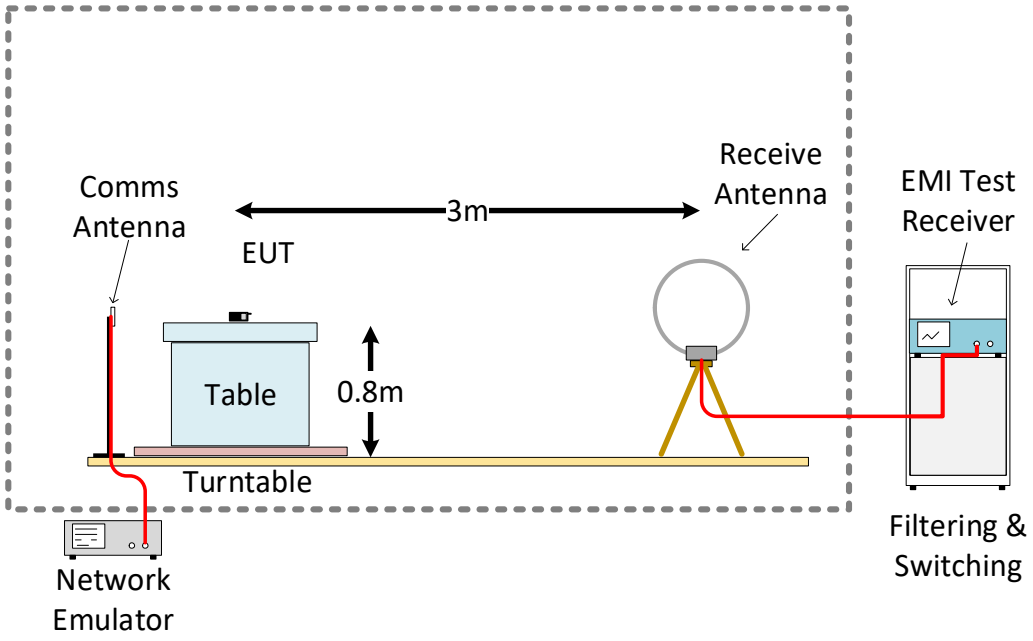


Figure 1: Frequency range 9 KHz – 30 MHz

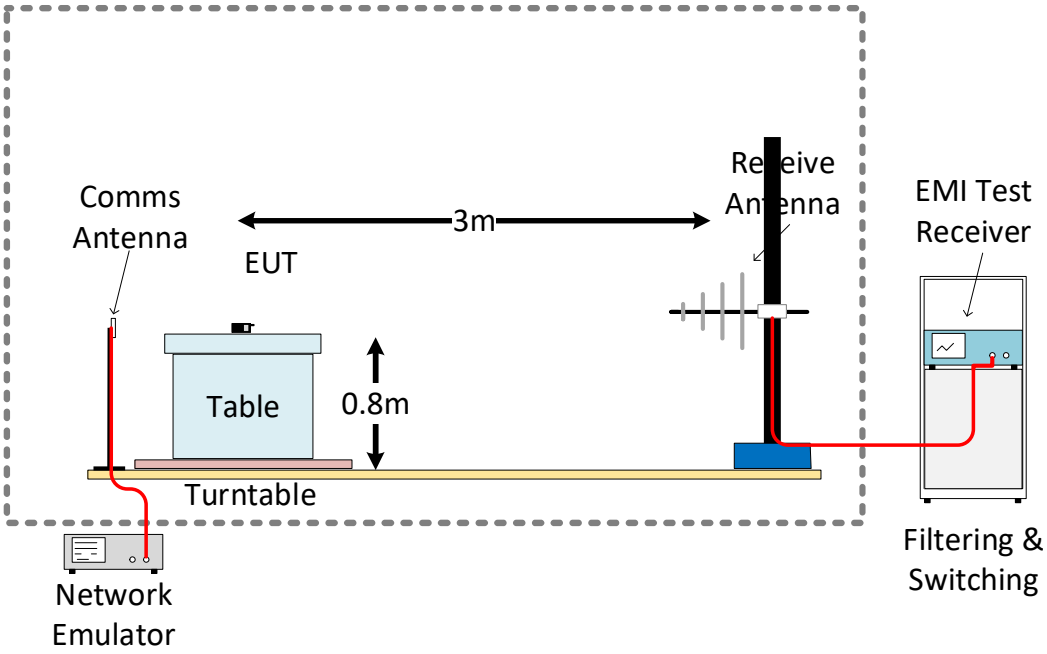


Figure 2: Frequency range 30 MHz – 1 GHz

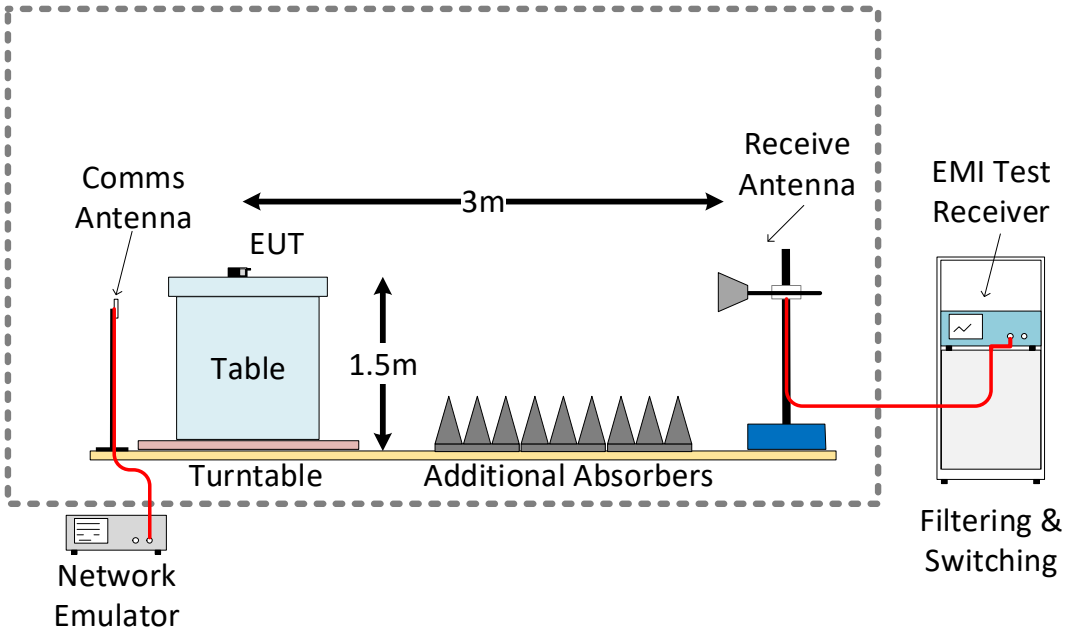


Figure 3: Frequency range 1 GHz – 18 GHz

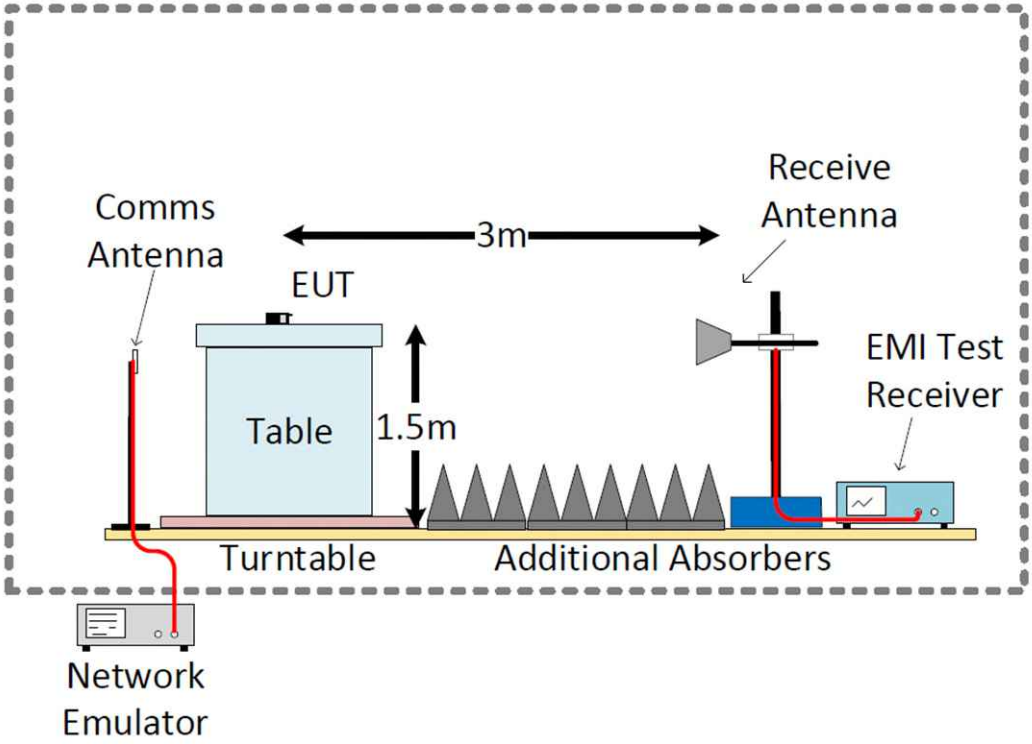


Figure 4: Frequency range 18 GHz – 40 GHz

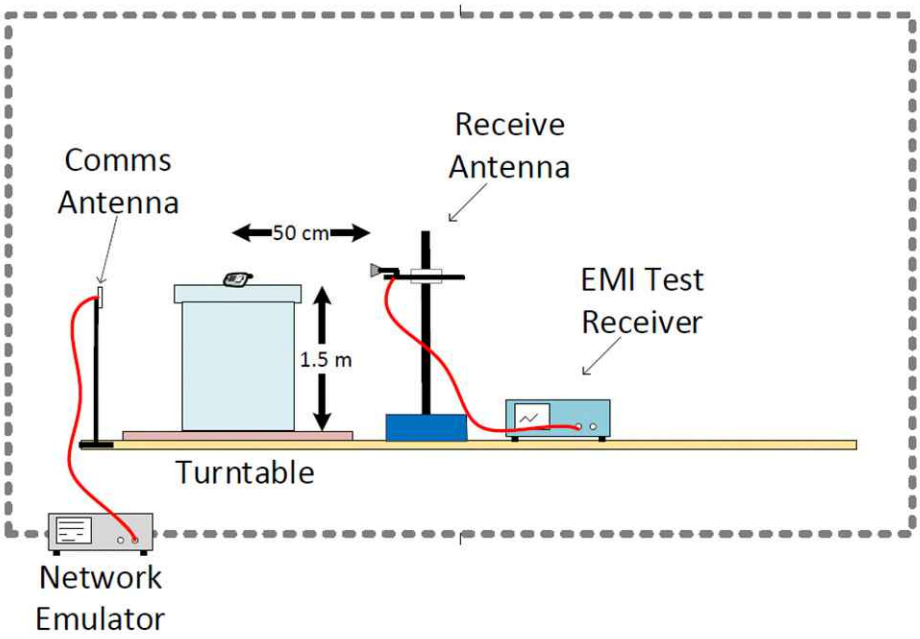


Figure 5: Frequency range 40 GHz – 60 GHz

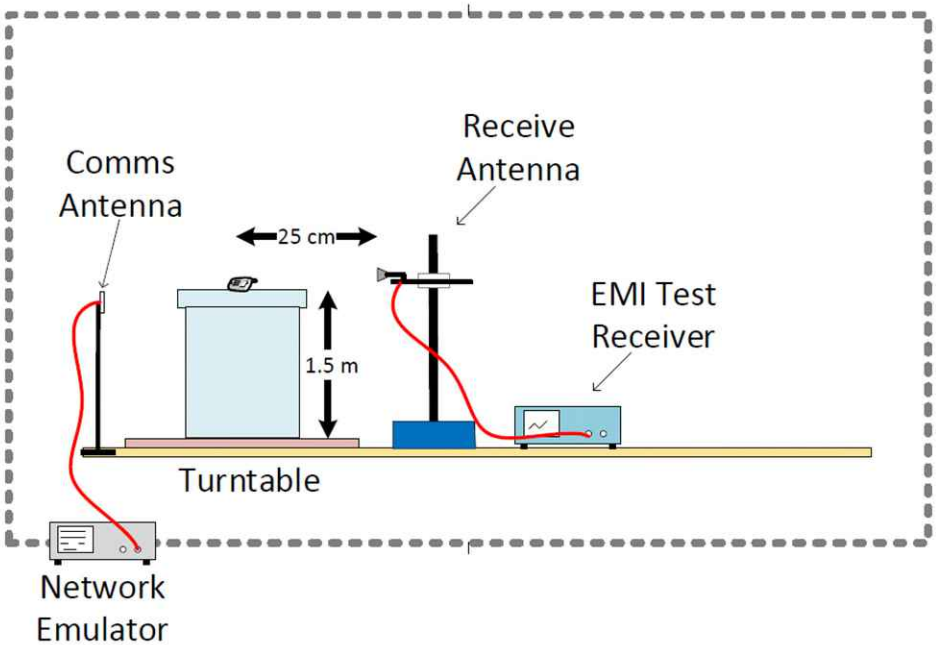


Figure 6: Frequency range 60 GHz – 90 GHz

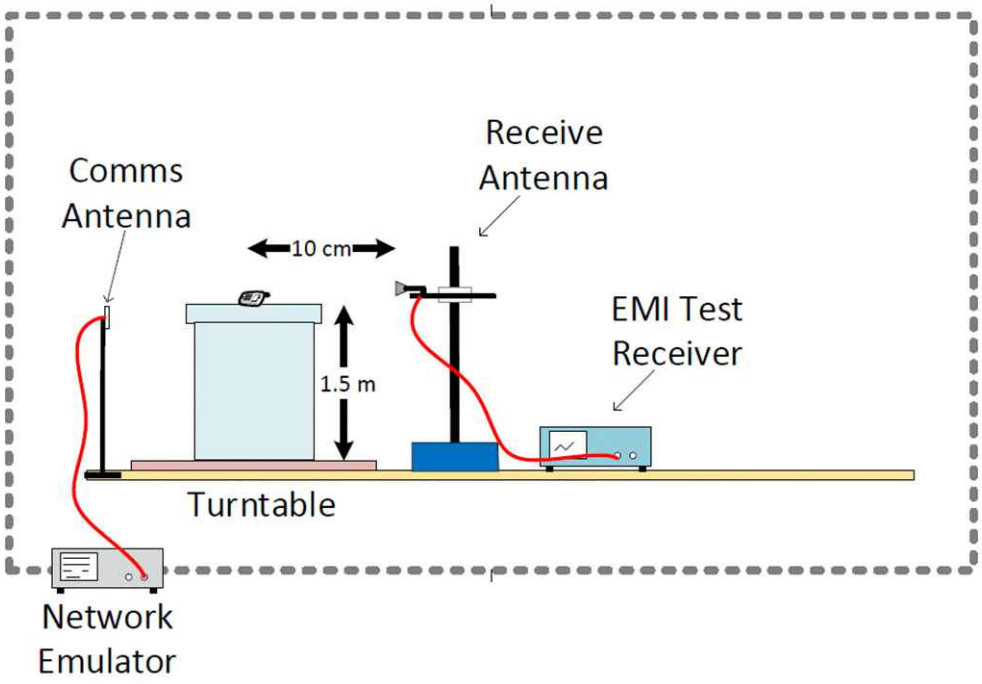


Figure 7: Frequency range 90 GHz – 100 GHz

4.3 Limits for Radiated Emission Test

The limits used in Radiated Emission tests are taken from 47 CFR 15.209 (a), with units converted from uV/m to dBuV/m. Where tests have been performed at distances other than those stated in the table, the limits have been adjusted appropriately according to the requirements in 47 CFR 15.31

4.4 Deviation from standard (47 CFR 15.209)

The measurements from 90GHz to 100GHz is measured both with 100KHz bandwidth and with 1MHz as declared by FCC.
Reason for this is that the measurement system thermal noise is higher than the limits in the above frequency span.
Part of the solution is to move the antenna closer to the EUT and that has been done. By moving the antenna to close to the EUT would lead into the situation there receiving antennas beam form does not cover the complete EUT at getting close to the near field.
The solution is to lower the resolution bandwidth to lower the measured noise. This has been done in order to make sure that no signals is hidden in the noise that is above the limit line when measure with 1MHz.
Since the measurement that is done with 100KHz resolution bandwidth show nothing more than thermal noise the results is in compliant.

5 TEST RESULTS – RADIATED EMISSIONS

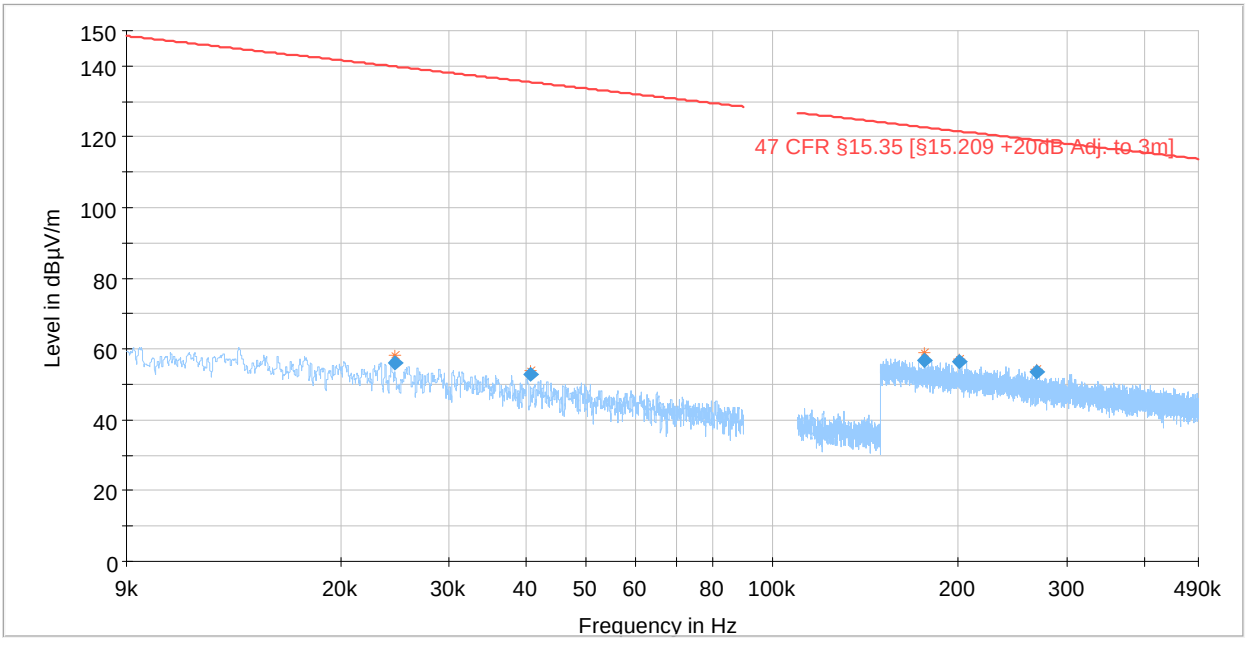
5.1 Radiated emissions - Test summary

Result	Pass
Equipment under Test	A000248144-001
Test period	2019-12-11 to 2020-01-09
Test Engineer	Fariborz Abasi
Test Specification	FCC part 15 Subpart C Section Part 15.205, 15.209, 15.249
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	- 3 m for frequency range 9 KHz – 18 GHz - 3 m for frequency range 18 GHz – 40 GHz - 0,5 m for frequency range 40 GHz – 60 GHz - 0,25 m for frequency range 60 GHz – 90 GHz - 0,1 m for frequency range 90 GHz – 100 GHz
Detector	- max peak / Quasi Peak & Average for frequency range 9 KHz – 30 MHz - Quasi Peak for frequency range 30 MHz – 1 GHz - Max peak and Average for frequency range 1 GHz – 100 GHz
Requirement	As per the limits in the below table
EUT Operation mode	#1
Ancillary equipment	See section 2.2
Environmental conditions	Temperature: + 18 - 20 °C Relative Humidity: 20 - 40 %

5.1 Detailed Test results - Radiated Emission

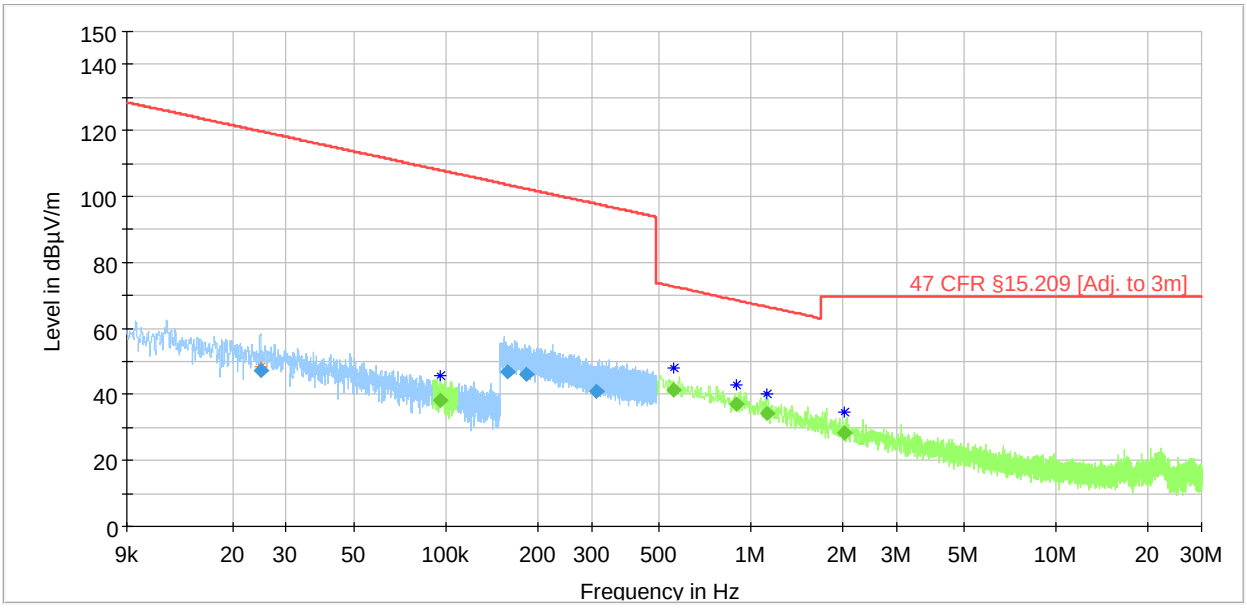
5.1.1 9 KHz – 30 MHz

Test mode condition	Chirp mode	
Antenna orientation	Parallel to axis_ Peak detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-20
Environmental conditions	Temperature: 20,4 ^{0}C	Humidity: 37,4 %
Chamber details	Chamber: SAC 5	



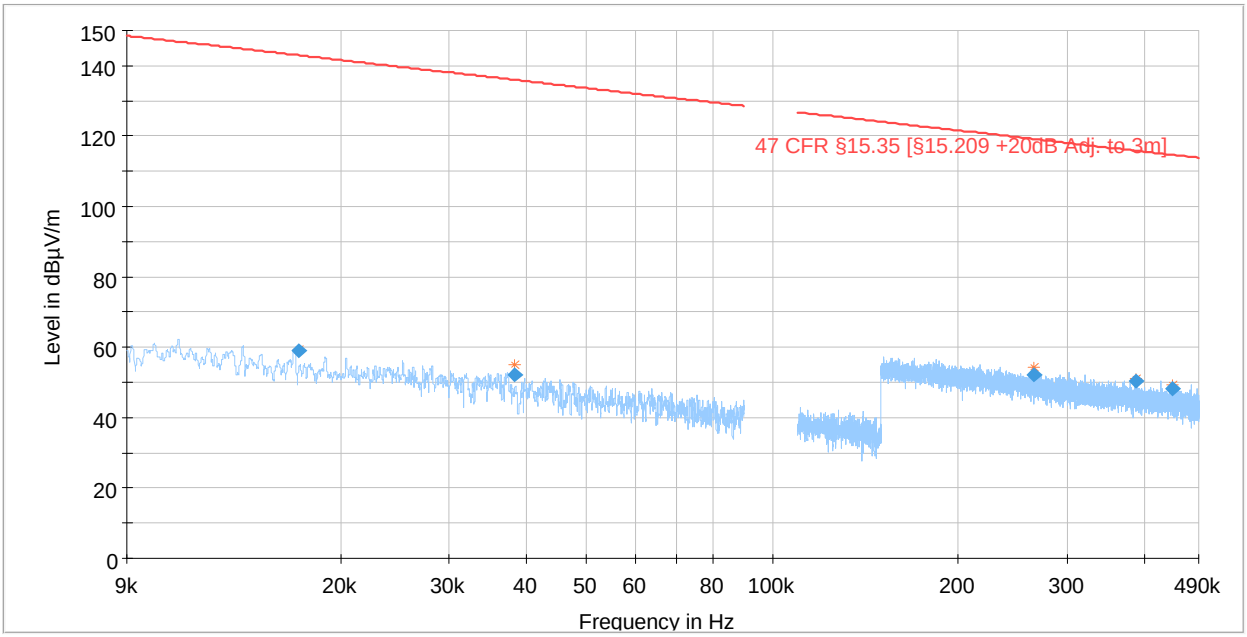
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.024524	56.27	139.81	83.54	1000.0	0.200	100.0	H	97.0
0.040630	52.90	135.43	82.52	1000.0	0.200	100.0	H	308.0
0.176146	56.74	122.69	65.94	1000.0	9.000	100.0	H	247.0
0.201127	56.59	121.54	64.94	1000.0	9.000	100.0	H	247.0
0.268236	53.52	119.03	65.52	1000.0	9.000	100.0	H	184.0

Test mode condition	Chirp mode	
Antenna orientation	Parallel to axis_ Quasi Peak & Average Detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-20
Environmental conditions	Temperature: 20,4 ^{0}C	Humidity: 37,4 %
Chamber details	Chamber: SAC 5	



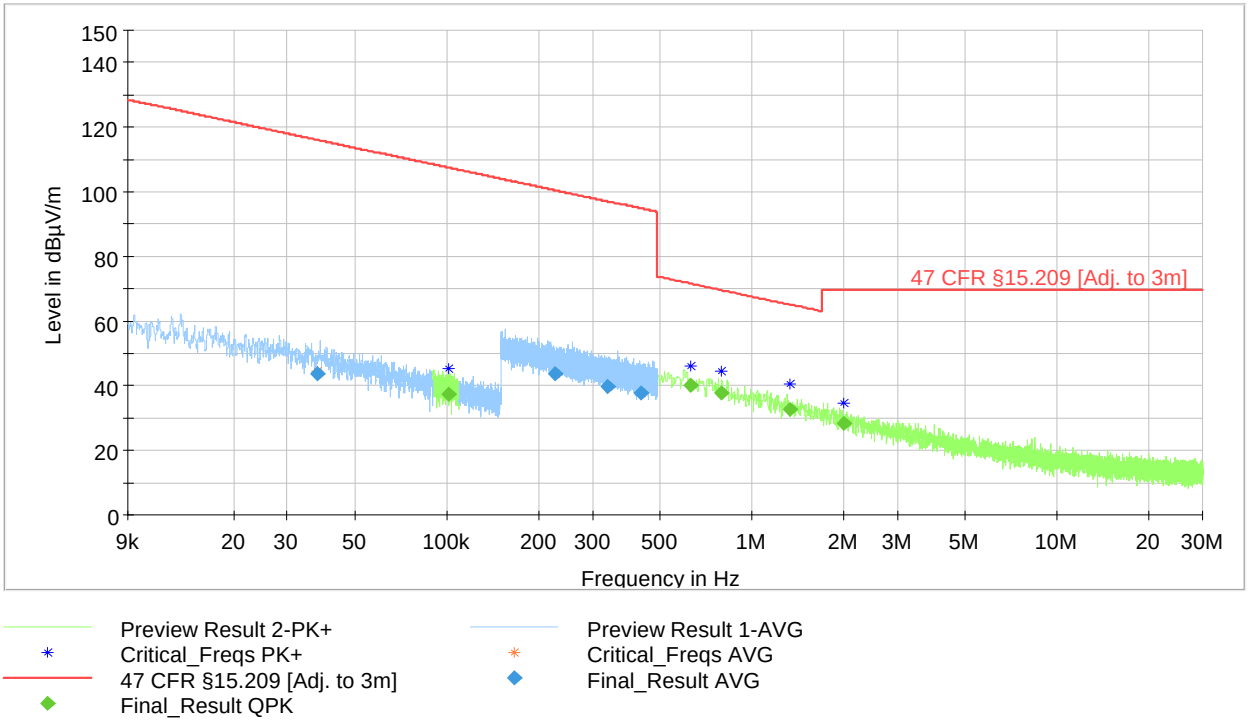
Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.096062	---	38.33	107.95	69.63	1000	0.2	100	H	70
0.158586	46.89	---	103.6	56.71	1000	9	100	H	112
0.183978	45.87	---	102.31	56.44	1000	9	100	H	85
0.310721	40.75	---	97.76	57.01	1000	9	100	H	112
0.559106	---	41.39	72.65	31.27	1000	9	100	H	129
0.896607	---	36.94	68.55	31.62	1000	9	100	H	68

Test mode condition	Chirp mode	
Antenna orientation	Parallel to Floor_ Peak detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Fariborz Abasi	Date: 2019-12-27
Environmental conditions	Temperature: 20,3 ^{0}C	Humidity: 35,2 %
Chamber details	Chamber: SAC 5	



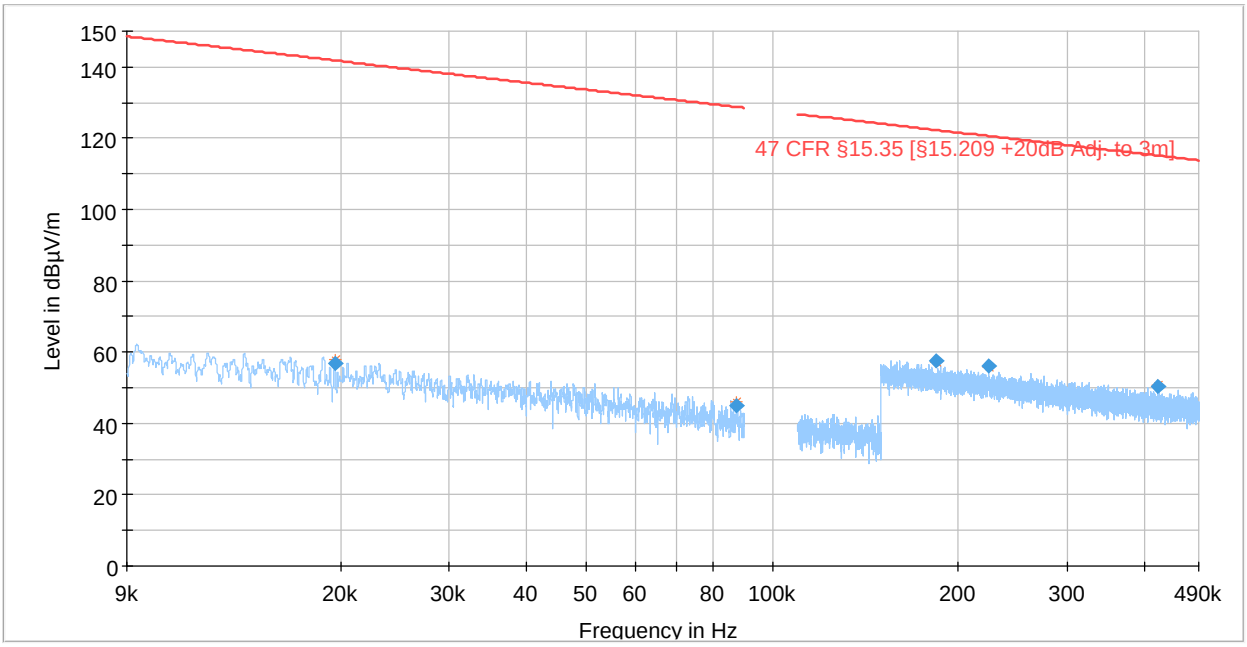
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.017065	59.15	142.96	83.81	1000.0	0.200	100.0	H	293.0
0.038144	52.26	135.98	83.72	1000.0	0.200	100.0	H	263.0
0.265153	52.25	119.13	66.88	1000.0	9.000	100.0	H	202.0
0.388445	50.39	115.82	65.42	1000.0	9.000	100.0	H	195.0
0.445256	48.16	114.63	66.47	1000.0	9.000	100.0	H	202.0

Test mode condition	Chirp mode	
Antenna orientation	Parallel to Floor_ Quasi Peak & Average Detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Fariborz Abasi	Date: 2019-12-27
Environmental conditions	Temperature: 20,3 ^{0}C	Humidity: 35,2 %
Chamber details	Chamber: SAC 5	



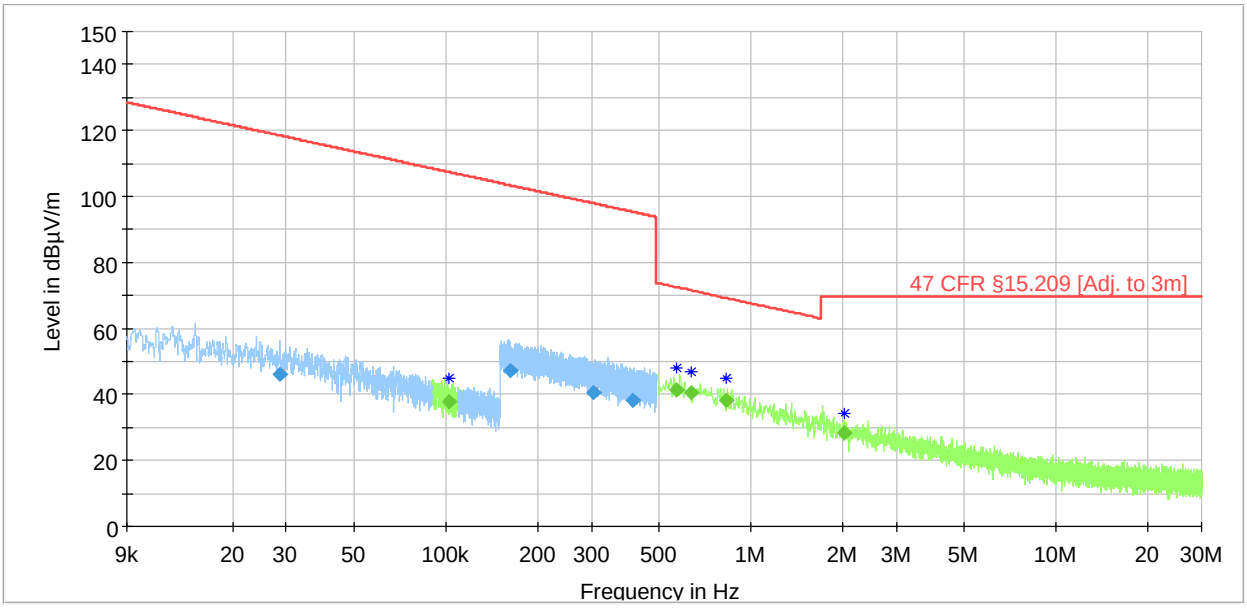
Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.101411	---	37.5	107.48	69.98	1000	0.2	100	H	203
0.226382	43.59	---	100.51	56.92	1000	9	100	H	247
0.336874	39.89	---	97.06	57.17	1000	9	100	H	202
0.435514	37.63	---	94.82	57.19	1000	9	100	H	39
0.629795	---	40.18	71.62	31.44	1000	9	100	H	-23
0.792951	---	37.93	69.62	31.69	1000	9	100	H	22

Test mode condition	Chirp mode	
Antenna orientation	Perpendicular to Axis_ Peak detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Fariborz Abasi	Date: 2019-12-27
Environmental conditions	Temperature: 20,3 ^{0}C	Humidity: 35,2 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.019610	56.75	141.76	85.00	1000.0	0.200	100.0	H	330.0
0.087381	44.91	128.78	83.87	1000.0	0.200	100.0	H	115.0
0.183869	57.56	122.31	64.75	1000.0	9.000	100.0	H	1.0
0.224421	55.95	120.58	64.63	1000.0	9.000	100.0	H	330.0
0.420616	50.38	115.13	64.74	1000.0	9.000	100.0	H	115.0

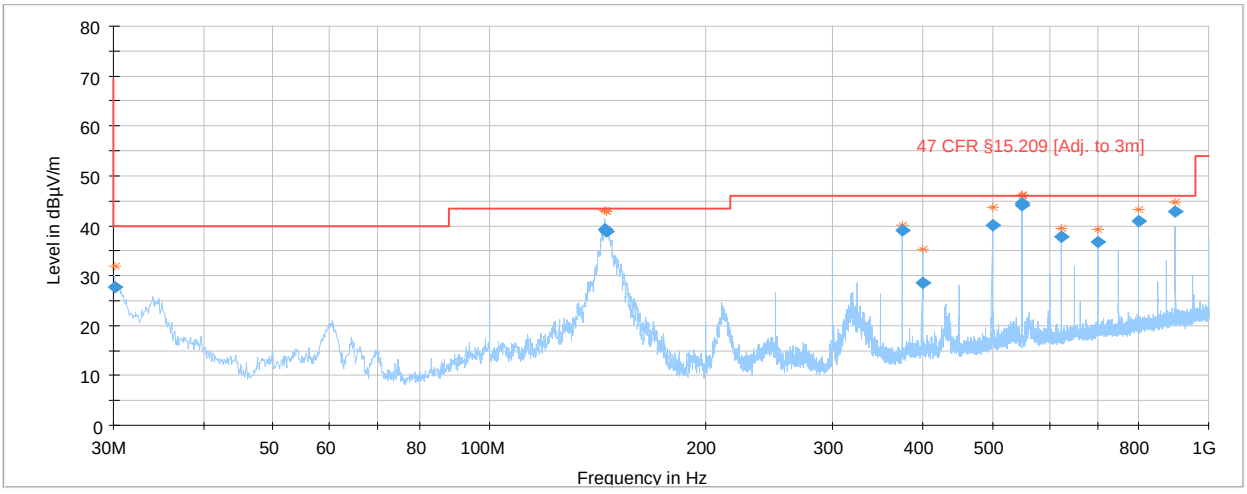
Test mode condition	Chirp mode	
Antenna orientation	Perpendicular to Axis _ Quasi Peak & Average Detector	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Fariborz Abasi	Date: 2019-12-27
Environmental conditions	Temperature: 20,3 ^{0}C	Humidity: 35,2 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.102276	---	37.84	107.41	69.57	1000	0.2	100	H	39
0.16332	47.07	---	103.34	56.28	1000	9	100	H	140
0.30445	40.67	---	97.93	57.26	1000	9	100	H	250
0.40924	38.38	---	95.37	56.99	1000	9	100	H	25
0.568448	---	41.29	72.51	31.22	1000	9	100	H	295
0.638273	---	40.44	71.5	31.06	1000	9	100	H	6

5.1.2 30 MHz - 1 GHz

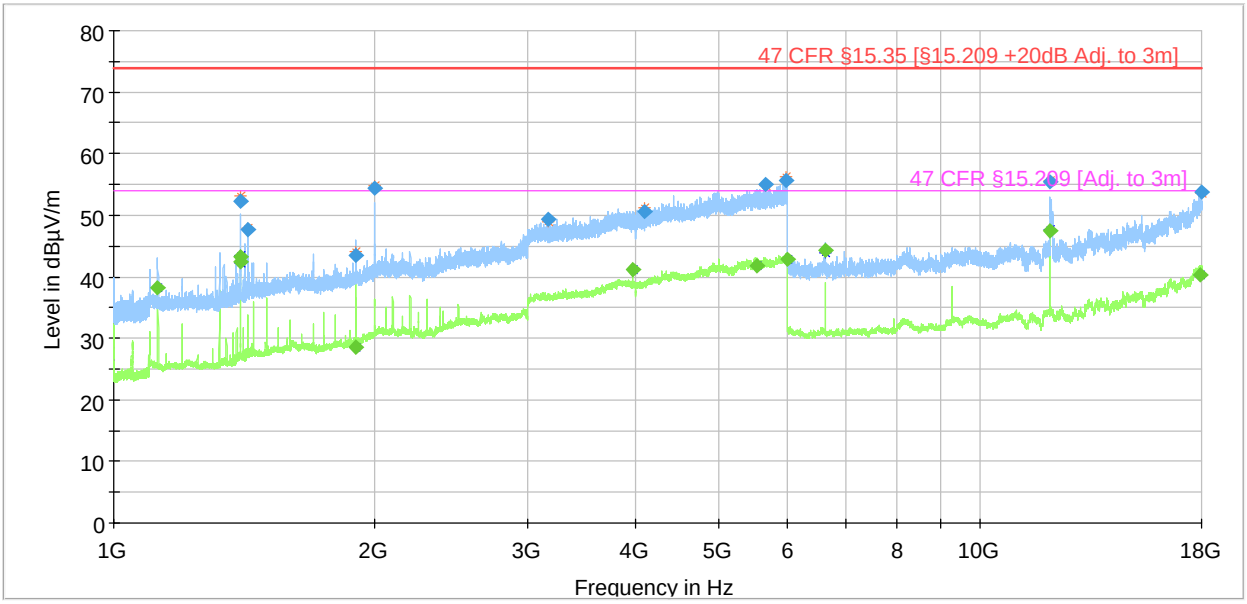
Test mode condition	Chirp mode	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30MHz-1GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Simon Palmhager	Date: 2019-12-18
Environmental conditions	Temperature: 20,7 °C	Humidity: 40,4 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
144.9084	39.2	43.52	4.32	1000	120	228	H	107
145.16632	38.95	43.52	4.57	1000	120	198	H	85
549.99584	44.59	46.02	1.43	1000	120	100	V	161
550.00668	44.16	46.02	1.86	1000	120	104	V	160
799.9998	40.95	46.02	5.07	1000	120	130	V	202
900.00672	42.85	46.02	3.17	1000	120	125	V	202

5.1.3 1 GHz – 18 GHz

Test mode condition	Chirp mode	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz-18 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-11
Environmental conditions	Temperature: 18,8 ^{0}C	Humidity: 38,1 %
Chamber details	Chamber: SAC 5	

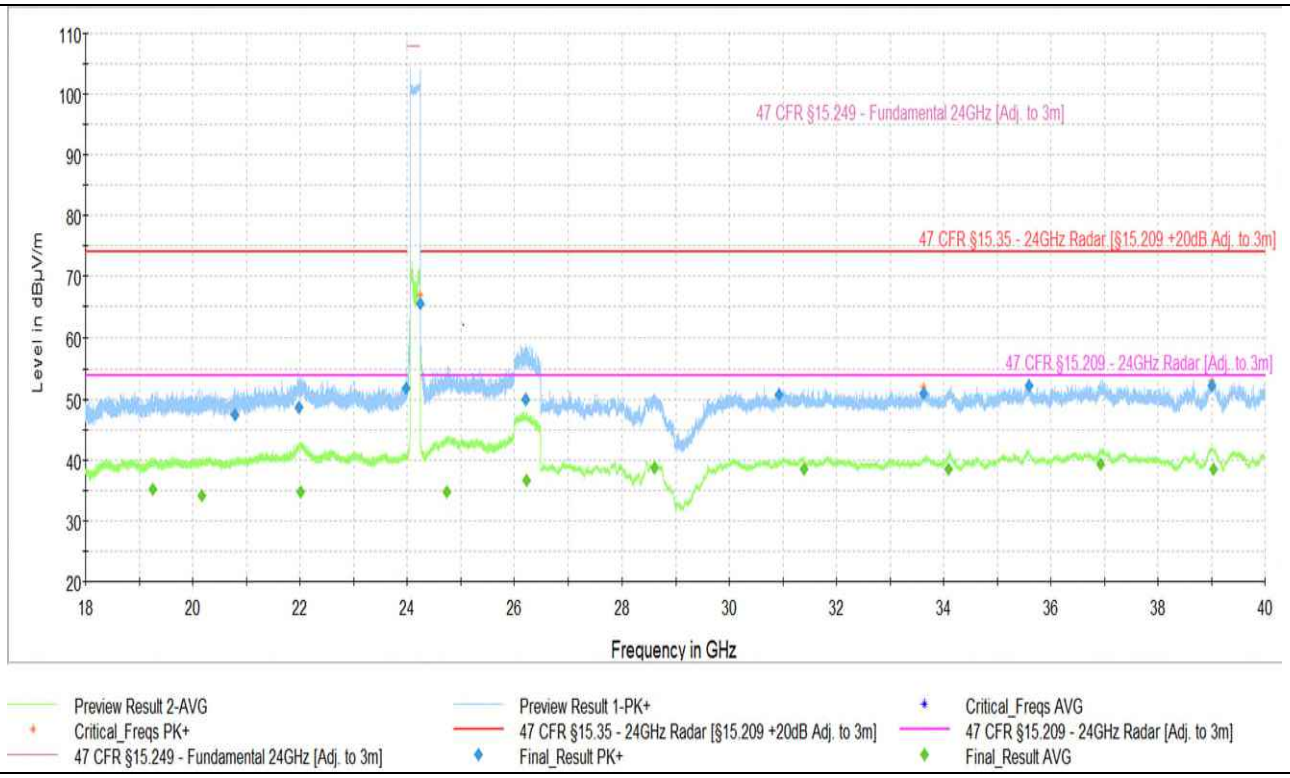


Preview Result 2-AVG
Critical_Freqs AVG
47 CFR §15.35 [§15.209 +20dB Adj. to 3m]
Final_Result PK+
Preview Result 1-PK+
Critical_Freqs PK+
47 CFR §15.209 [Adj. to 3m]
Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1399.985	---	43.34	53.98	10.64	1000	1000	100	V	140
1400.212	---	42.36	53.98	11.62	1000	1000	100	V	151
5527.033	---	41.73	53.98	12.25	1000	1000	112	V	250
5985.945	---	42.73	53.98	11.25	1000	1000	175	H	140
6624.947	---	44.28	53.98	9.7	1000	1000	175	V	138
12031.322	---	47.35	53.98	6.63	1000	1000	170	H	205

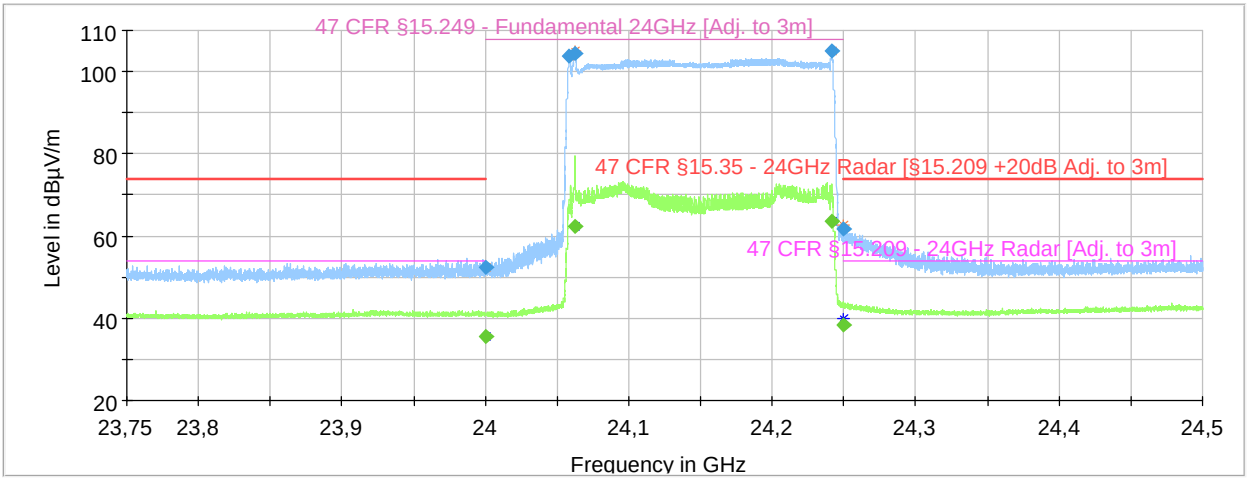
5.1.4 18 GHz – 40 GHz

Test mode condition	Chirp mode	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz-40 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-16
Environmental conditions	Temperature: 19,8 ^{0}C	Humidity: 38,7 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
26232.64	---	36.64	53.98	17.34	1000	1000	155	V	112
28596.906	---	38.79	53.98	15.19	1000	1000	155	V	52
31388.792	---	38.6	53.98	15.38	1000	1000	155	H	5
34087.577	---	38.4	53.98	15.58	1000	1000	155	V	338
36928.513	---	39.42	53.98	14.56	1000	1000	155	V	7
39032.421	---	38.6	53.98	15.38	1000	1000	155	H	277

Test mode condition	Chirp mode Band EDGE	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz- 40 GHz Band EDGE	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-17
Environmental conditions	Temperature: 18,7 ^{0}C	Humidity: 42,7 %
Chamber details	Chamber: SAC 5	

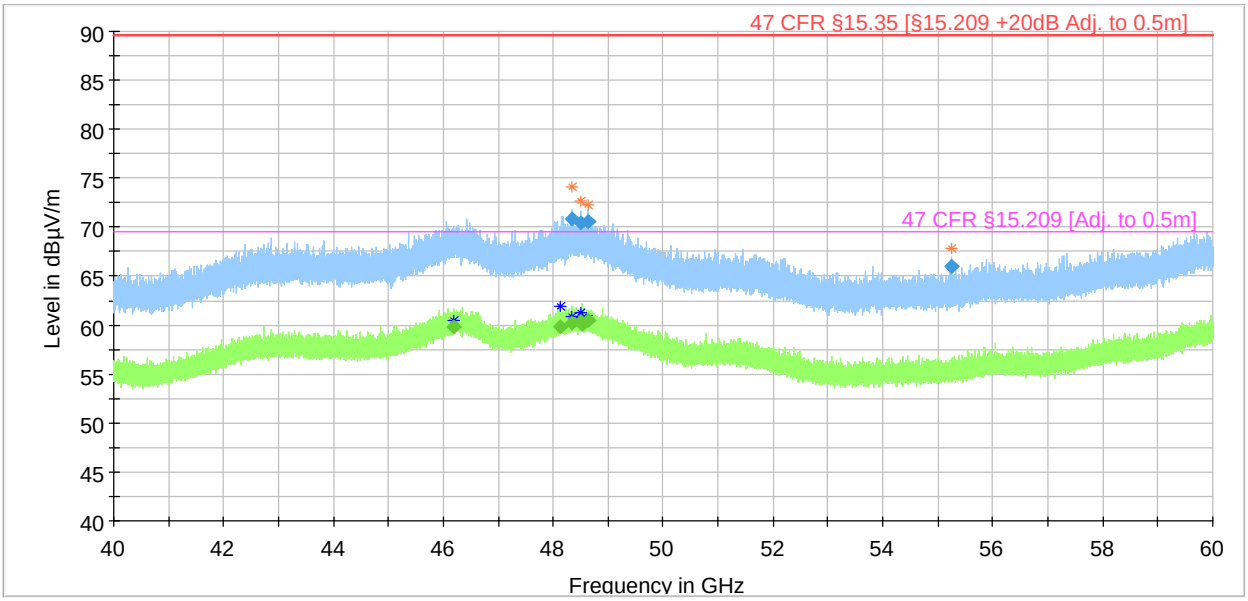


Preview Result 2-AVG
Preview Result 1-PK+
Critical_Freqs AVG
Critical_Freqs PK+
47 CFR §15.35 - 24GHz Radar [§15.209 +20dB Adj. to 3m]
47 CFR §15.209 - 24GHz Radar [Adj. to 3m]
47 CFR §15.249 - Fundamental 24GHz [Adj. to 3m]
Final_Result PK+
Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
24000.000000	---	35.45	53.98	18.53	1000.0	1000.000	155.0	V	-8.0
24000.000000	52.25	---	73.98	21.73	1000.0	1000.000	155.0	V	98.0
24241.400000	105.08	---	---	---	1000.0	1000.000	155.0	V	82.0
24241.775000	---	63.58	---	---	1000.0	1000.000	155.0	V	173.0
24250.000000	61.68	---	73.98	12.30	1000.0	1000.000	155.0	V	218.0
24250.000000	---	38.34	53.98	15.63	1000.0	1000.000	155.0	V	157.0

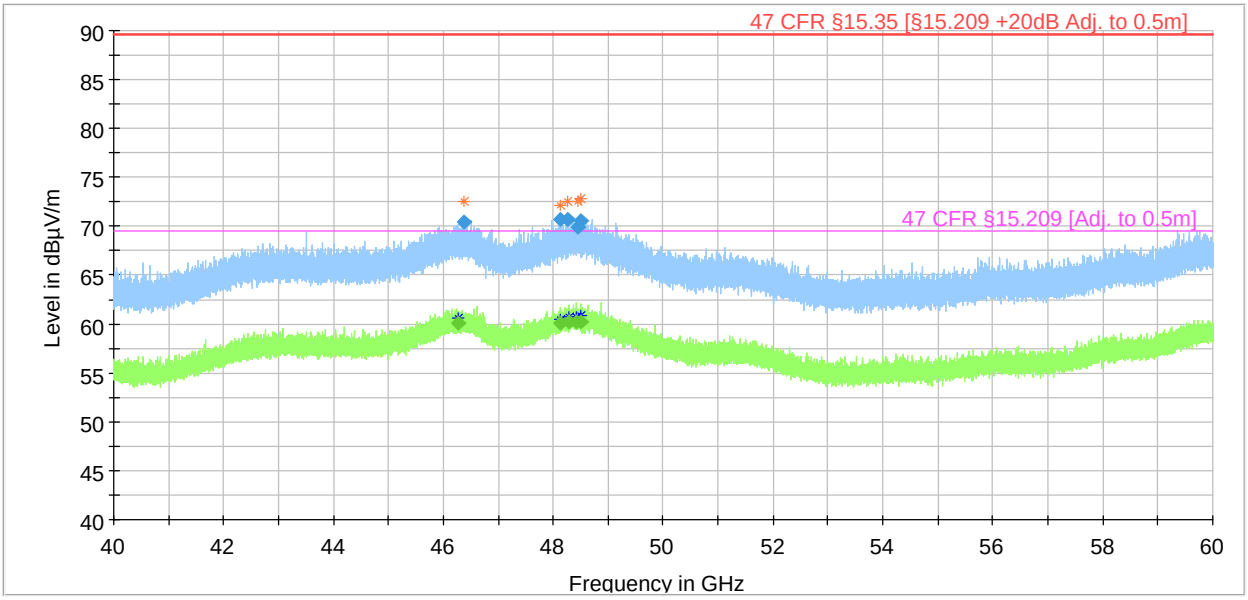
5.1.5 40 GHz – 60 GHz

Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.5m distance to DUT	
Sweep frequency	40 GHz- 60 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-17
Environmental conditions	Temperature: 18,7 °C	Humidity: 42,7 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
46185.454546	---	59.81	69.54	9.73	1000.0	1000.000	150.0	H	324.0
48125.454546	---	59.87	69.54	9.68	1000.0	1000.000	150.0	H	1.0
48332.727273	---	60.26	69.54	9.28	1000.0	1000.000	150.0	H	179.0
48502.181818	---	60.36	69.54	9.18	1000.0	1000.000	150.0	H	234.0
48525.090909	---	60.05	69.54	9.49	1000.0	1000.000	150.0	H	178.0
48632.363636	---	60.44	69.54	9.10	1000.0	1000.000	150.0	H	117.0

Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.5m distance to DUT	
Sweep frequency	40 GHz- 60 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2019-12-17
Environmental conditions	Temperature: 18,7 ^{0}C	Humidity: 42,7 %
Chamber details	Chamber: SAC 5	

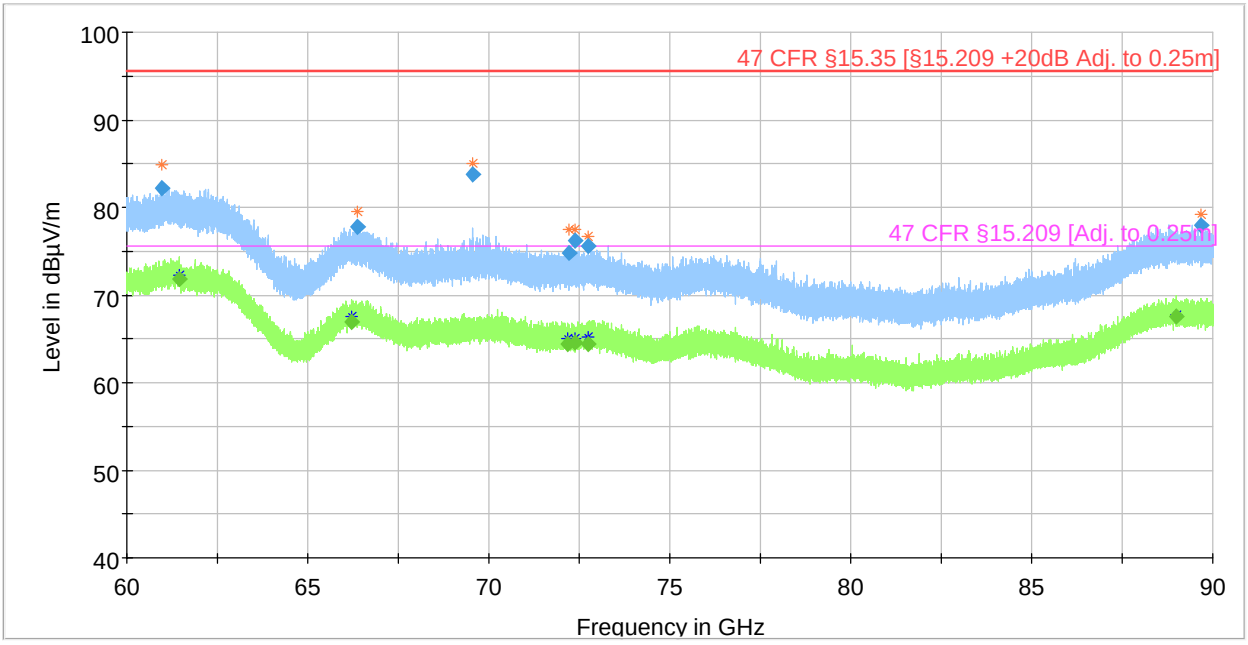


Preview Result 2-AVG
Critical_Freqs AVG
47 CFR §15.35 [§15.209 +20dB Adj. to 0.5m]
Final_Result PK+
Preview Result 1-PK+
Critical_Freqs PK+
47 CFR §15.209 [Adj. to 0.5m]
Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
46265.454546	---	60.04	69.54	9.50	1000.0	1000.000	150.0	V	186.0
48119.636364	70.74	---	89.54	18.80	1000.0	1000.000	150.0	V	280.0
48121.454546	---	60.05	69.54	9.49	1000.0	1000.000	150.0	V	13.0
48278.181818	---	60.22	69.54	9.32	1000.0	1000.000	150.0	V	325.0
48425.454546	---	60.16	69.54	9.38	1000.0	1000.000	150.0	V	225.0
48499.272727	---	60.15	69.54	9.39	1000.0	1000.000	150.0	V	354.0

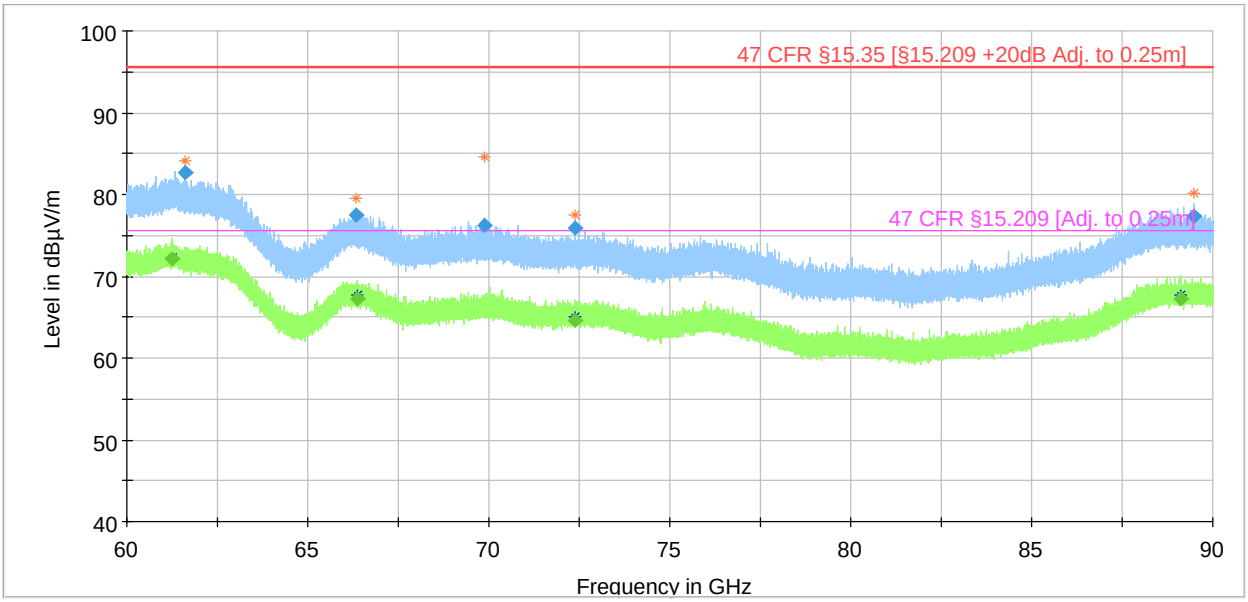
5.1.6 60 GHz – 90 GHz

Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.25m distance to DUT, 1.45m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-07
Environmental conditions	Temperature: 21,5 ^{0}C	Humidity: 34,0 %
Chamber details	Chamber: SAC 5	



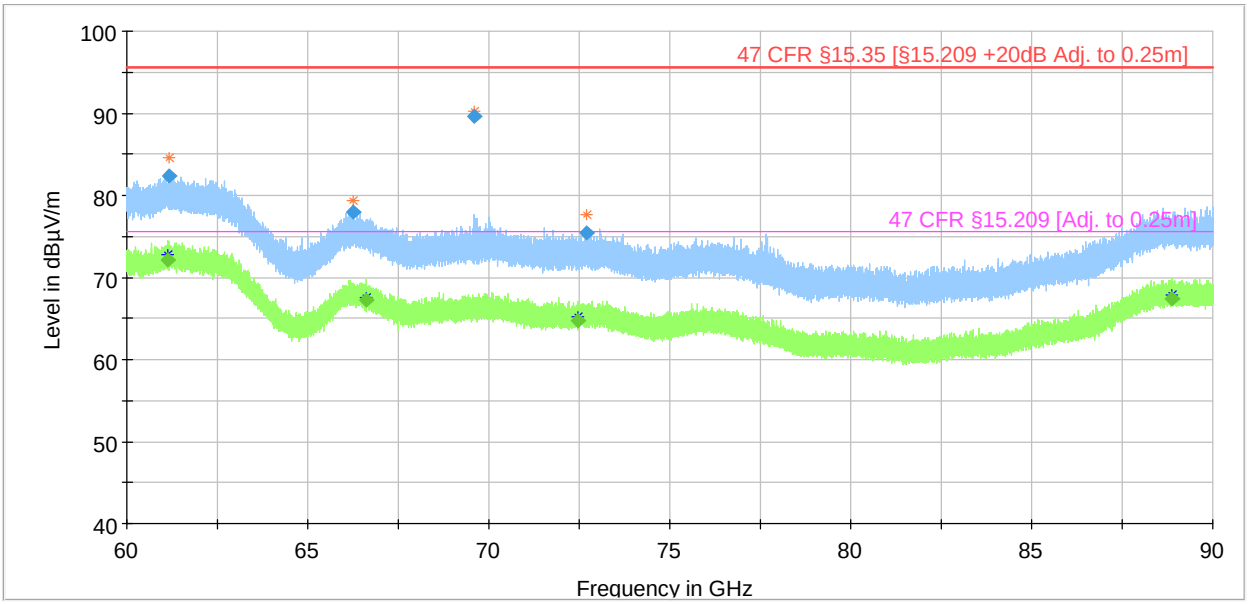
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61459.875000	---	71.82	75.56	3.74	1000.0	1000.000	145.0	H	284.0
66226.875000	---	66.95	75.56	8.61	1000.0	1000.000	145.0	H	355.0
72178.125000	---	64.48	75.56	11.09	1000.0	1000.000	145.0	H	250.0
72379.125000	---	64.53	75.56	11.03	1000.0	1000.000	145.0	H	67.0
72753.000000	---	64.42	75.56	11.14	1000.0	1000.000	145.0	H	40.0
88975.875000	---	67.50	75.56	8.06	1000.0	1000.000	145.0	H	107.0

Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.25m distance to DUT, 1.50 m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-07
Environmental conditions	Temperature: 21,5 ^{0}C	Humidity: 34,0 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61263.375000	---	72.09	75.56	3.47	1000.0	1000.000	150.0	H	1.0
61601.625000	82.66	---	95.56	12.90	1000.0	1000.000	150.0	H	234.0
66310.500000	77.53	---	95.56	18.03	1000.0	1000.000	150.0	H	250.0
66382.875000	---	67.22	75.56	8.35	1000.0	1000.000	150.0	H	240.0
72393.750000	---	64.51	75.56	11.05	1000.0	1000.000	150.0	H	260.0
89100.000000	---	67.25	75.56	8.31	1000.0	1000.000	150.0	H	241.0

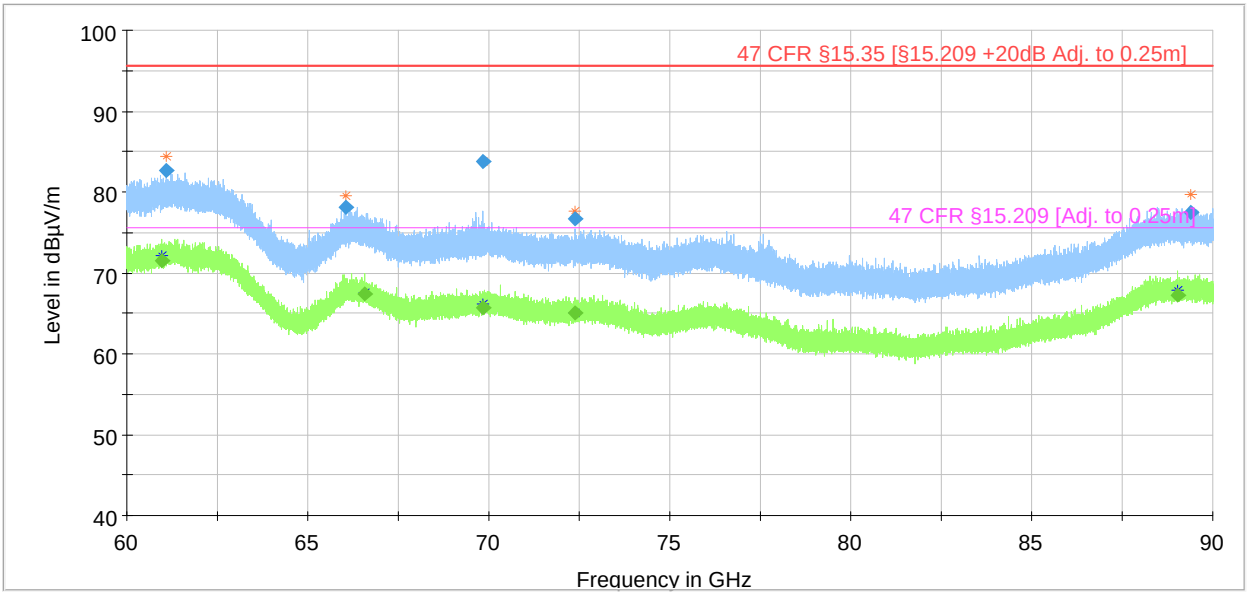
Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.25m distance to DUT, 1.55 m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-09
Environmental conditions	Temperature: 21,3 ^{0}C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	



Preview Result 2-AVG
Critical_Freqs AVG
47 CFR §15.35 [§15.209 +20dB Adj. to 0.25m]
Final_Result PK+
Preview Result 1-PK+
Critical_Freqs PK+
47 CFR §15.209 [Adj. to 0.25m]
Final_Result AVG

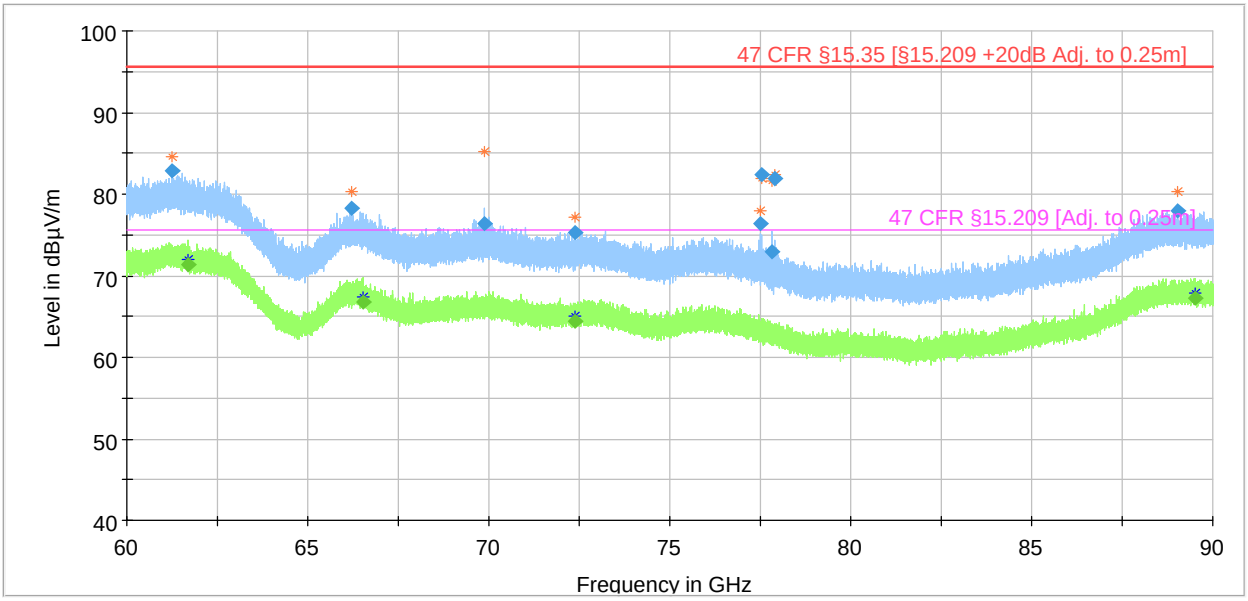
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61138.500000	---	72.11	75.56	3.46	1000.0	1000.000	155.0	H	26.0
61157.250000	82.33	---	95.56	13.24	1000.0	1000.000	155.0	H	152.0
66593.250000	---	67.17	75.56	8.39	1000.0	1000.000	155.0	H	195.0
69601.125000	89.62	---	95.56	5.94	1000.0	1000.000	155.0	H	106.0
72449.625000	---	64.79	75.56	10.77	1000.0	1000.000	155.0	H	81.0
88871.625000	---	67.38	75.56	8.18	1000.0	1000.000	155.0	H	194.0

Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.25m distance to DUT, 1.45 m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-09
Environmental conditions	Temperature: 21,5 ^{0}C	Humidity: 34,0 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
60962.625000	---	71.49	75.56	4.07	1000.0	1000.000	145.0	V	170.0
66567.000000	---	67.45	75.56	8.11	1000.0	1000.000	145.0	V	188.0
69847.875000	83.74	---	95.56	11.82	1000.0	1000.000	145.0	V	71.0
69850.125000	---	65.62	75.56	9.94	1000.0	1000.000	145.0	V	221.0
72380.625000	---	65.08	75.56	10.48	1000.0	1000.000	145.0	V	19.0
89029.500000	---	67.23	75.56	8.33	1000.0	1000.000	145.0	V	72.0

Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.25m distance to DUT, 1.50 m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-08
Environmental conditions	Temperature: 21,5 ^{0}C	Humidity: 34,0 %
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61238.250000	82.88	---	95.56	12.68	1000.0	1000.000	150.0	V	305.0
61684.500000	---	71.30	75.56	4.27	1000.0	1000.000	150.0	V	221.0
66538.875000	---	66.72	75.56	8.84	1000.0	1000.000	150.0	V	139.0
72373.125000	---	64.43	75.56	11.14	1000.0	1000.000	150.0	V	324.0
77554.125000	82.34	---	95.56	13.23	1000.0	1000.000	150.0	V	134.0
89525.250000	---	67.19	75.56	8.37	1000.0	1000.000	150.0	V	5.0