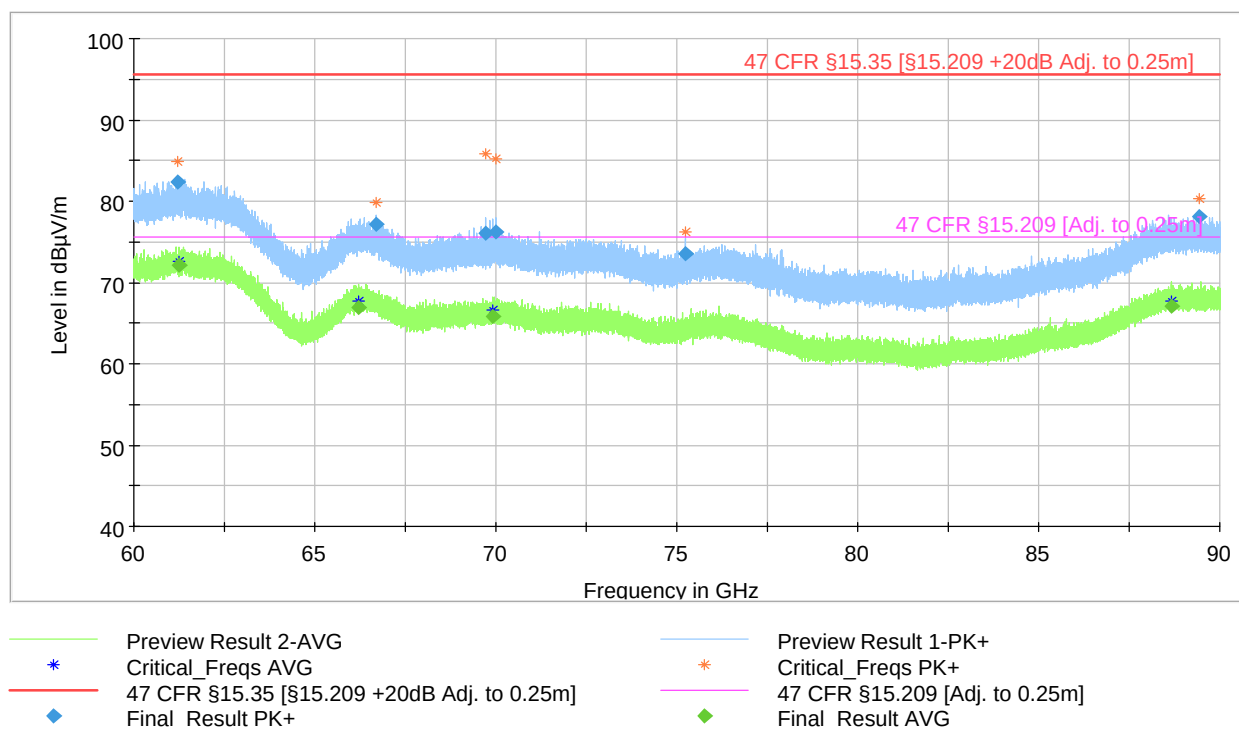


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Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.25m distance to DUT, 1.55 m height	
Sweep frequency	60 GHz- 90 GHz	
Standard	47 CFR Part 15 subpart C	
EUT	A000248144-001	
Ancillary Equipment	Power Supply; A000248144-002	
Test Engineer	Niall Forrester	Date: 2020-01-08
Environmental conditions	Temperature: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	



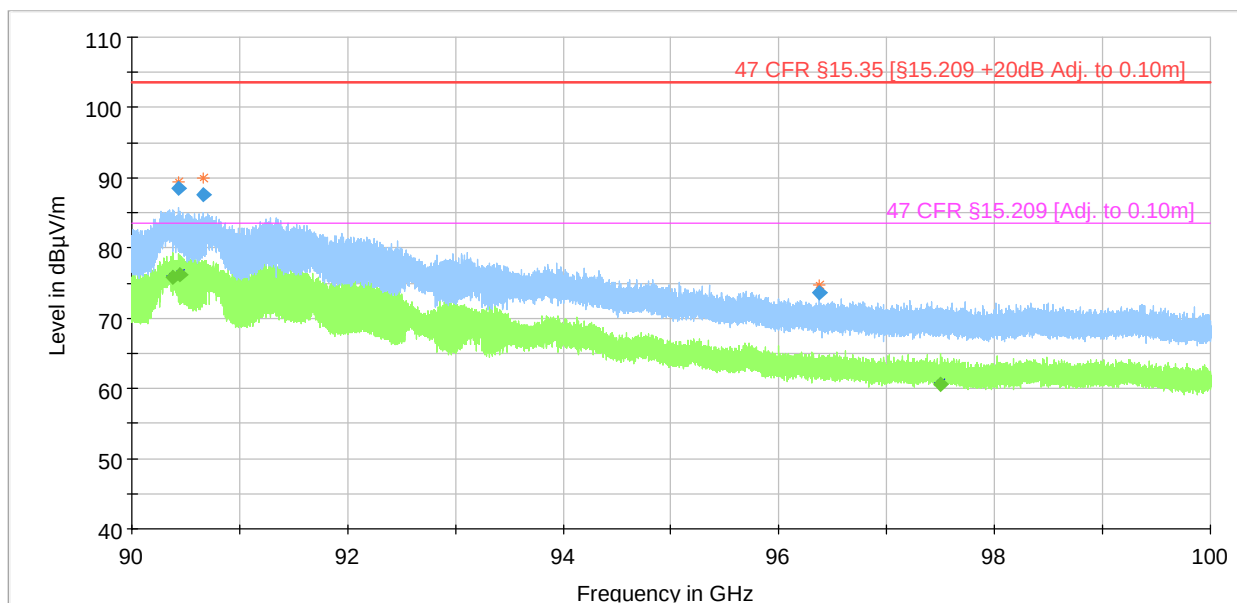
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61220.250000	82.41	---	95.56	13.16	1000.0	1000.000	155.0	V	152.0
66684.000000	77.22	---	95.56	18.34	1000.0	1000.000	155.0	V	130.0
69715.500000	76.03	---	95.56	19.54	1000.0	1000.000	155.0	V	65.0
69994.125000	76.18	---	95.56	19.38	1000.0	1000.000	155.0	V	82.0
75222.000000	73.47	---	95.56	22.09	1000.0	1000.000	155.0	V	193.0
89436.750000	78.06	---	95.56	17.50	1000.0	1000.000	155.0	V	186.0

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5.1.7 90 GHz – 100 GHz

Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.10 m distance to DUT, 1.45 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



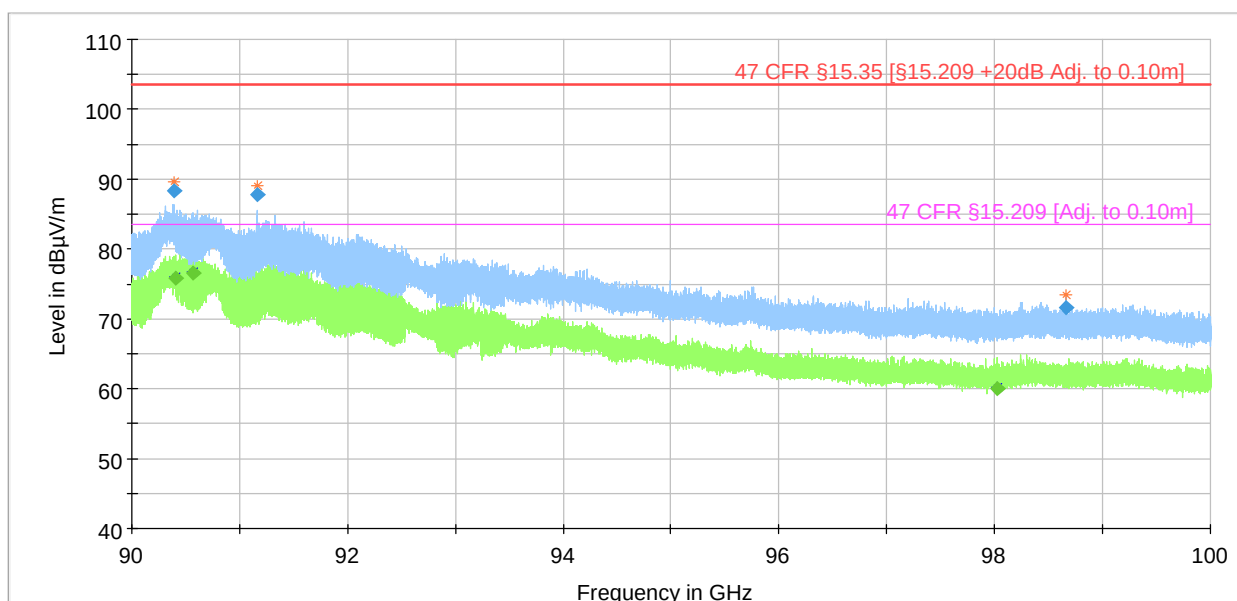
	Preview Result 2-AVG		Preview Result 1-PK+
	Critical_Freqs AVG		Critical_Freqs PK+
	47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]		47 CFR §15.209 [Adj. to 0.10m]
	Final_Result PK+		Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90385.400000	---	75.74	83.52	7.78	1000.0	100.000	145.0	H	326.0
90429.000000	88.46	---	103.52	15.06	1000.0	100.000	145.0	H	235.0
90444.000000	---	76.12	83.52	7.41	1000.0	100.000	145.0	H	204.0
90667.500000	87.66	---	103.52	15.86	1000.0	100.000	145.0	H	270.0
96372.000000	73.66	---	103.52	29.86	1000.0	100.000	145.0	H	259.0
97497.600000	---	60.51	83.52	23.01	1000.0	100.000	145.0	H	295.0

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Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.10 m distance to DUT, 1.50 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



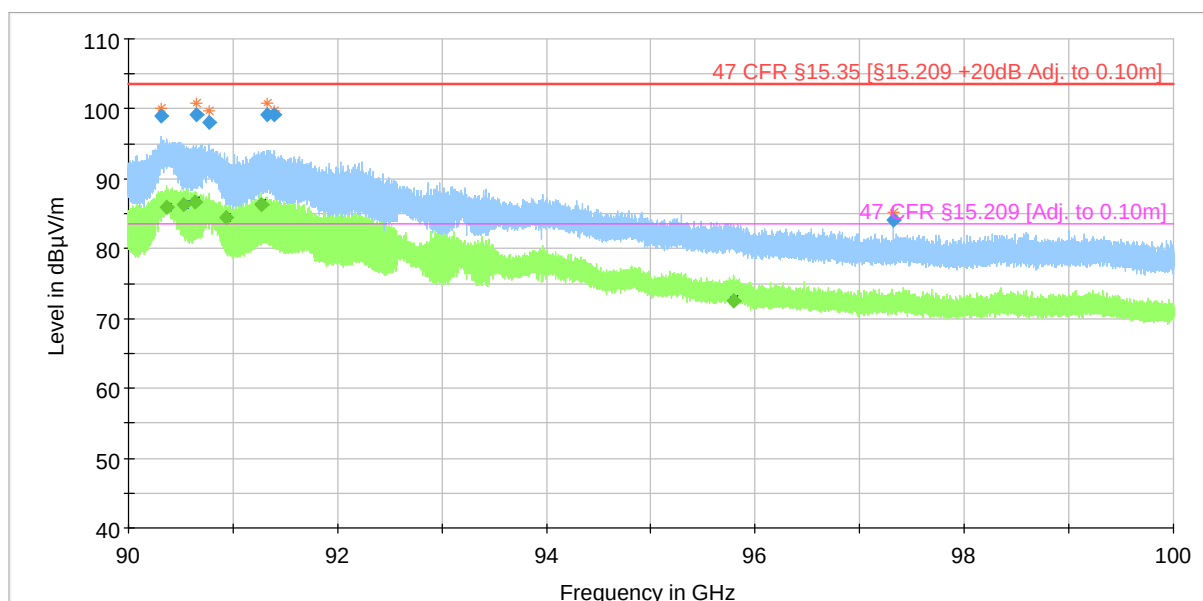
Preview Result 2-AVG	Preview Result 1-PK+
* Critical_Freqs AVG	* Critical_Freqs PK+
47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]	47 CFR §15.209 [Adj. to 0.10m]
◆ Final_Result PK+	◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90395.500000	88.29	---	103.52	15.23	1000.0	100.000	150.0	H	27.0
90409.500000	---	75.77	83.52	7.75	1000.0	100.000	150.0	H	329.0
90571.200000	---	76.64	83.52	6.89	1000.0	100.000	150.0	H	245.0
91157.000000	87.71	---	103.52	15.81	1000.0	100.000	150.0	H	110.0
98022.000000	---	60.10	83.52	23.42	1000.0	100.000	150.0	H	127.0
98662.800000	71.63	---	103.52	31.89	1000.0	100.000	150.0	H	286.0

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Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.10 m distance to DUT, 1.50 m height	
Sweep frequency	90 GHz- 100 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 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	Standard IF BW (1 MHz)	
Remark: See §4.4 for further information		



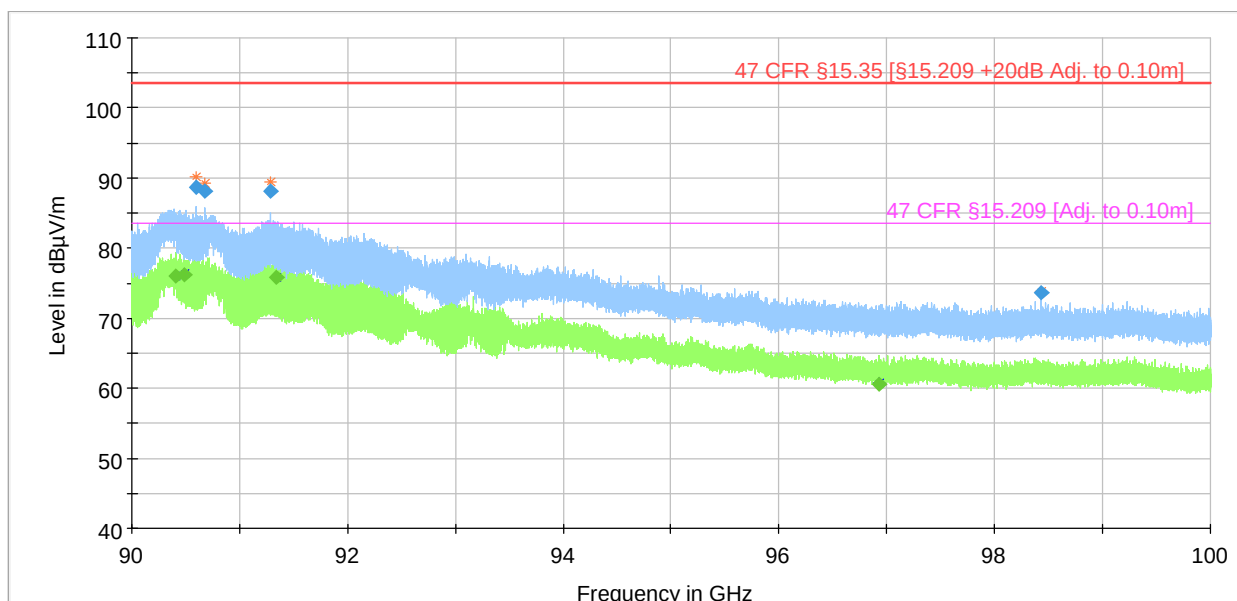
Preview Result 2-AVG	Preview Result 1-PK+
* Critical_Freqs AVG	* Critical_Freqs PK+
47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]	47 CFR §15.209 [Adj. to 0.10m]
◆ Final_Result PK+	◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90363.75	---	85.89	83.52	-2.36	1000	1000	150	H	306
90532	---	86.21	83.52	-2.69	1000	1000	150	H	166
90632.25	---	86.71	83.52	-3.19	1000	1000	150	H	299
90937.75	---	84.39	83.52	-0.87	1000	1000	150	H	313
91276.375	---	86.37	83.52	-2.85	1000	1000	150	H	231
91329.625	99.17	---	103.52	4.35	1000	1000	150	H	259

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Test mode condition	Chirp mode	
Antenna orientation	Horizontal, 0.10 m distance to DUT, 1.55 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



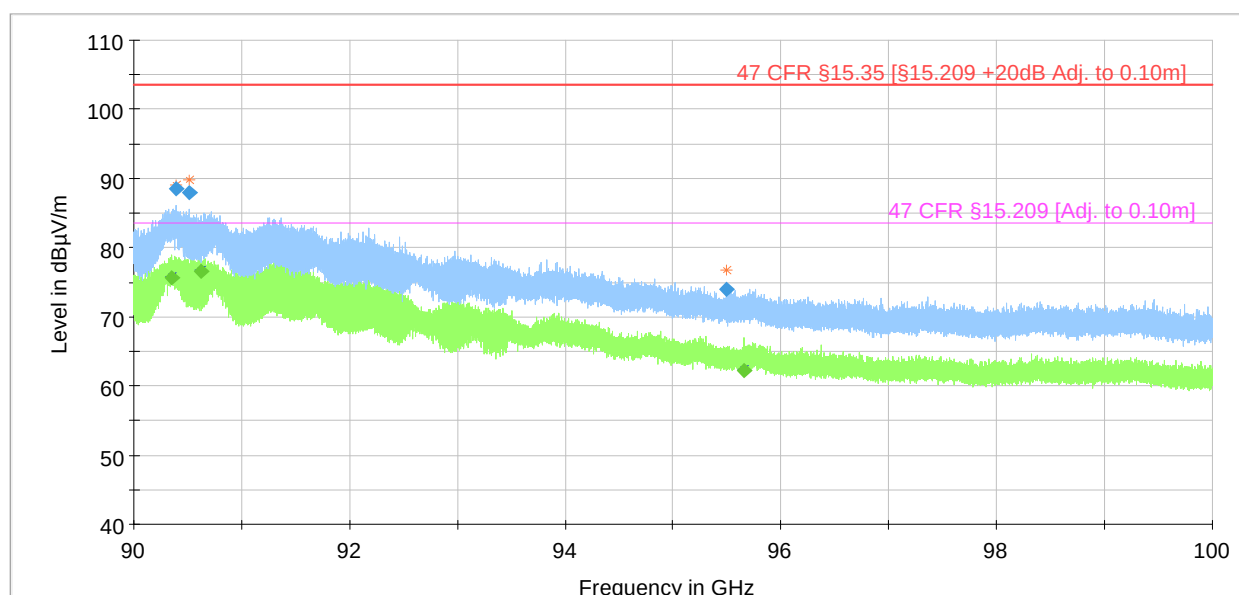
— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
◆ 47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]
◆ 47 CFR §15.209 [Adj. to 0.10m]
◆ Final_Result PK+
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90411.800000	---	75.95	83.52	7.57	1000.0	100.000	155.0	H	69.0
90481.300000	---	76.18	83.52	7.34	1000.0	100.000	155.0	H	143.0
90593.600000	88.69	---	103.52	14.83	1000.0	100.000	155.0	H	262.0
90670.600000	88.16	---	103.52	15.36	1000.0	100.000	155.0	H	71.0
91285.100000	88.11	---	103.52	15.42	1000.0	100.000	155.0	H	314.0
91344.600000	---	75.77	83.52	7.75	1000.0	100.000	155.0	H	351.0

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Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.10 m distance to DUT, 1.45 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



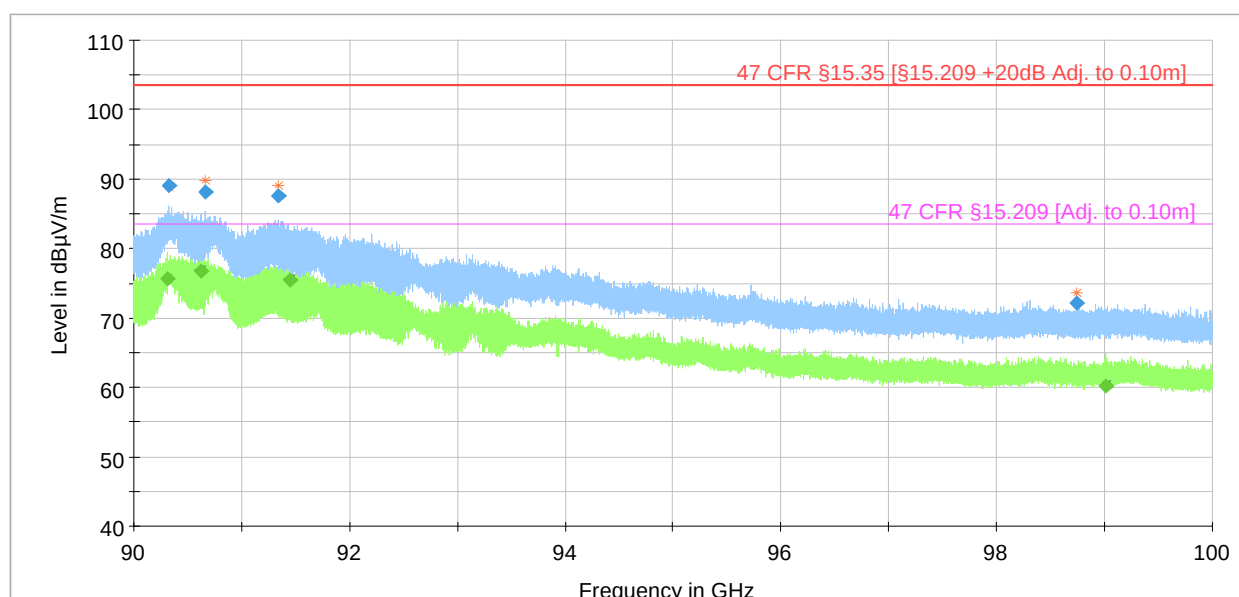
— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
◆ 47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]
◆ 47 CFR §15.209 [Adj. to 0.10m]
◆ Final_Result PK+
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90351.600000	---	75.57	83.52	7.95	1000.0	100.000	145.0	V	32.0
90393.400000	88.55	---	103.52	14.97	1000.0	100.000	145.0	V	281.0
90515.800000	87.90	---	103.52	15.63	1000.0	100.000	145.0	V	334.0
90626.600000	---	76.55	83.52	6.97	1000.0	100.000	145.0	V	134.0
95490.500000	74.08	---	103.52	29.44	1000.0	100.000	145.0	V	164.0
95655.400000	---	62.28	83.52	21.24	1000.0	100.000	145.0	V	102.0

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Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.10 m distance to DUT, 1.50 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



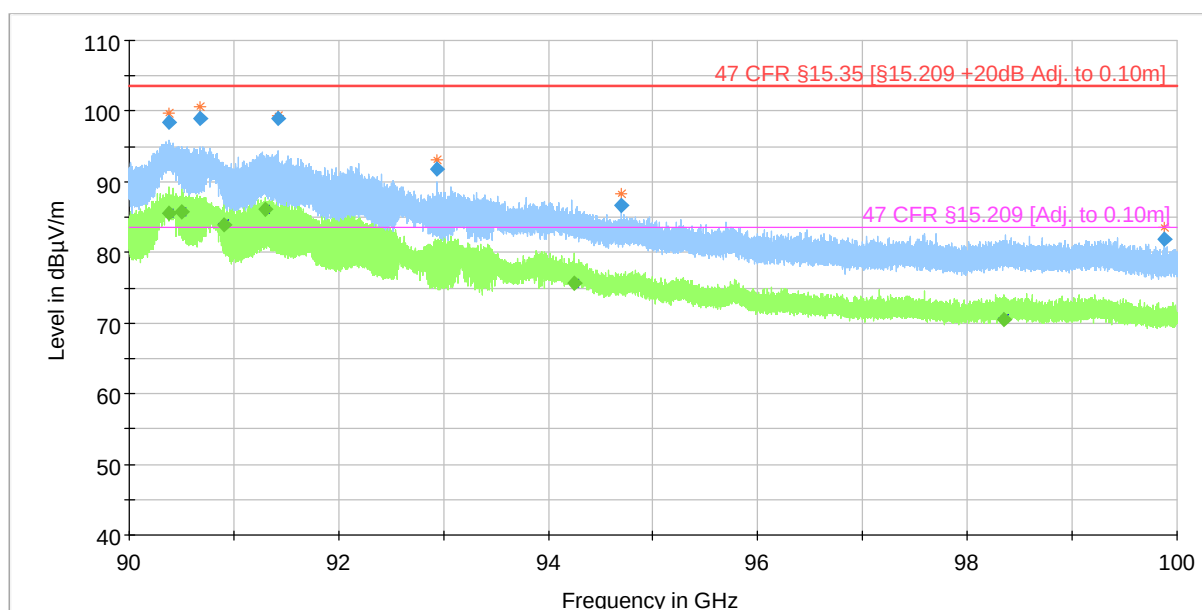
- Preview Result 2-AVG
- * Critical_Freqs AVG
- 47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]
- ◆ Final_Result PK+
- Preview Result 1-PK+
- * Critical_Freqs PK+
- 47 CFR §15.209 [Adj. to 0.10m]
- ◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90308.000000	---	75.60	83.52	7.93	1000.0	100.000	150.0	V	177.0
90327.200000	89.02	---	103.52	14.51	1000.0	100.000	150.0	V	201.0
90616.400000	---	76.70	83.52	6.82	1000.0	100.000	150.0	V	149.0
90659.800000	88.21	---	103.52	15.32	1000.0	100.000	150.0	V	166.0
91333.400000	87.50	---	103.52	16.02	1000.0	100.000	150.0	V	237.0
91443.000000	---	75.52	83.52	8.00	1000.0	100.000	150.0	V	7.0

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Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.10 m distance to DUT, 1.50 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	Standard IF BW (1MHz)	
Remark: See §4.4 for further information		



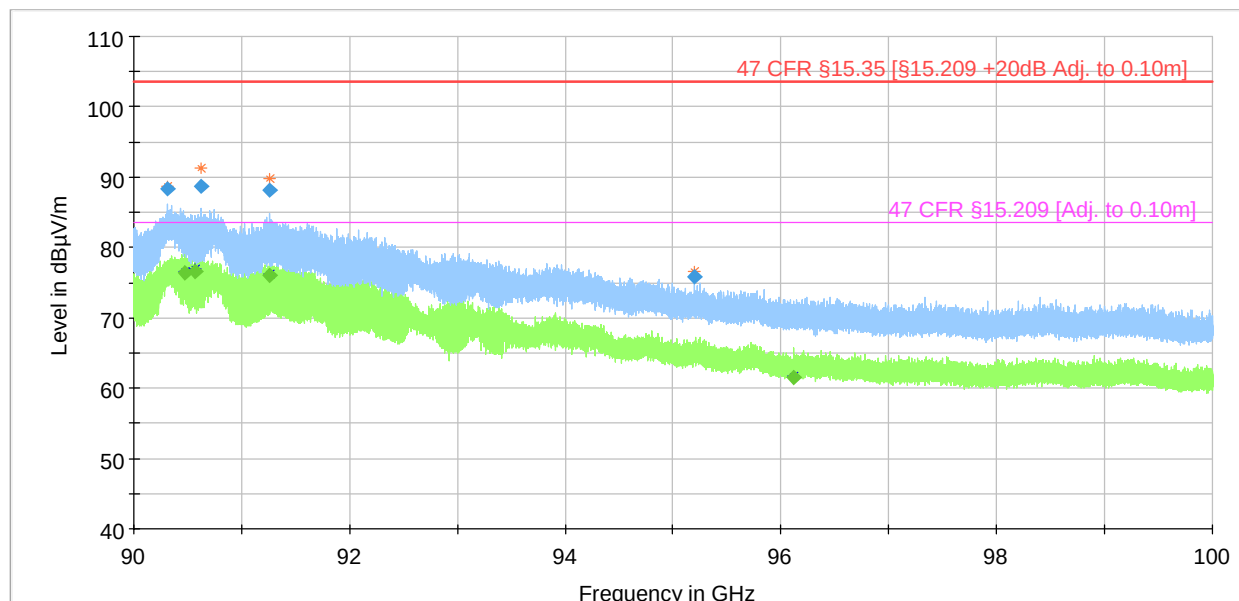
— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
— 47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]
— 47 CFR §15.209 [Adj. to 0.10m]
◆ Final_Result PK+
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90375.125	---	85.57	83.52	-2.05	1000	1000	150	V	139
90499	---	85.71	83.52	-2.19	1000	1000	150	V	120
90675.75	98.91	---	103.52	4.61	1000	1000	150	V	118
90905.25	---	83.99	83.52	-0.47	1000	1000	150	V	257
91298.5	---	86.11	83.52	-2.59	1000	1000	150	V	203
91421.625	99.02	---	103.52	4.5	1000	1000	150	V	195

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Test mode condition	Chirp mode	
Antenna orientation	Vertical, 0.10 m distance to DUT, 1.55 m height	
Sweep frequency	90 GHz- 100 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: 21,3 °C	Humidity: 35,1 %
Chamber details	Chamber: SAC 5	
Comment	IF BW Set to 100kHz (instead of 1MHz)	



— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
* Critical_Freqs PK+
◆ 47 CFR §15.35 [§15.209 +20dB Adj. to 0.10m]
◆ 47 CFR §15.209 [Adj. to 0.10m]
◆ 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)
90308.900000	88.33	---	103.52	15.20	1000.0	100.000	155.0	V	277.0
90477.900000	---	76.34	83.52	7.18	1000.0	100.000	155.0	V	96.0
90571.000000	---	76.65	83.52	6.87	1000.0	100.000	155.0	V	7.0
90622.000000	88.72	---	103.52	14.80	1000.0	100.000	155.0	V	2.0
91263.800000	---	75.97	83.52	7.55	1000.0	100.000	155.0	V	289.0
91263.800000	88.18	---	103.52	15.34	1000.0	100.000	155.0	V	169.0

6 TEST RESULTS - TRANSMITTER 99% BANDWIDTH

6.1 Transmitter 99% Bandwidth – Test summary

Result	Pass
Equipment under Test	A000248144-001
Test period	2020-02-04
Test Engineer	Per Isacson
Test Specification	FCC part 15 Subpart C Section 15.215 and FCC Part 2.1049
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	1 meter
Detector	Peak Max
Requirement	
EUT Operation mode	#1
Ancillary equipment	See section 2.2
Environmental conditions	Temperature: + 18 - 20 °C Relative Humidity: 20 - 40 %

6.2 Transmitter 99% Bandwidth – Test setup

Measurement was performed according to ANSI C63.10 section 6.9.2.

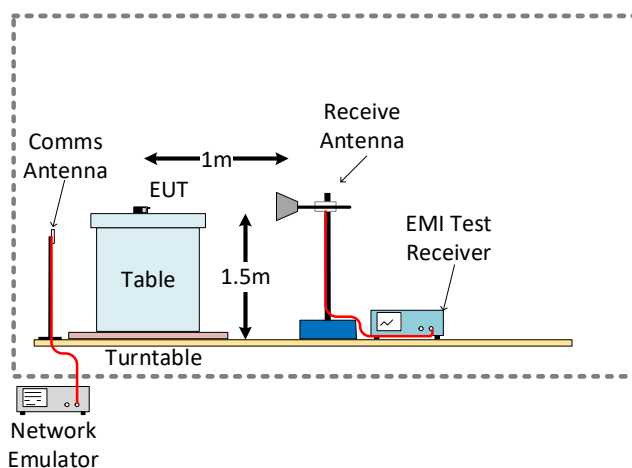


Figure: Test setup – Transmitter 99% Bandwidth

6.3 Transmitter 99% Bandwidth – Test details

Transmitter Frequency (MHz)	Start frequency 99% of BW (MHz)	Stop frequency 99% of BW (MHz)	99% Bandwidth (MHz)
24000	24057,459	24243,234	185,774

6.4 Transmitter 99% Bandwidth – Graphical result



7 TEST RESULTS - TRANSMITTER 20 DB BANDWIDTH

7.1 Transmitter 20 dB Bandwidth – Test summary

Result	Pass
Equipment under Test	A000248144-001
Test period	2020-02-04
Test Engineer	Per Isacsson
Test Specification	FCC part 15 Subpart C Section 15.215 and FCC Part 2.1049
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	1 meter
Detector	Quasi Peak
Requirement	
EUT Operation mode	#1
Ancillary equipment	See section 1.4
Environmental conditions	Temperature: + 18 - 20 °C Relative Humidity: 20 - 40 %

7.2 Transmitter 20 dB Bandwidth – Test setup

Measurement was performed according to ANSI C63.10 section 6.9.2.

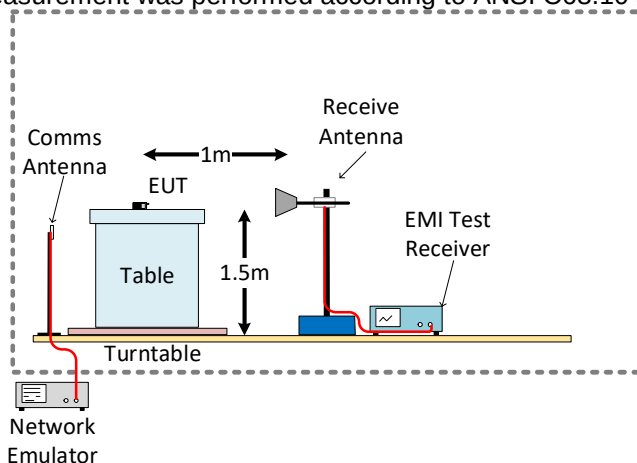
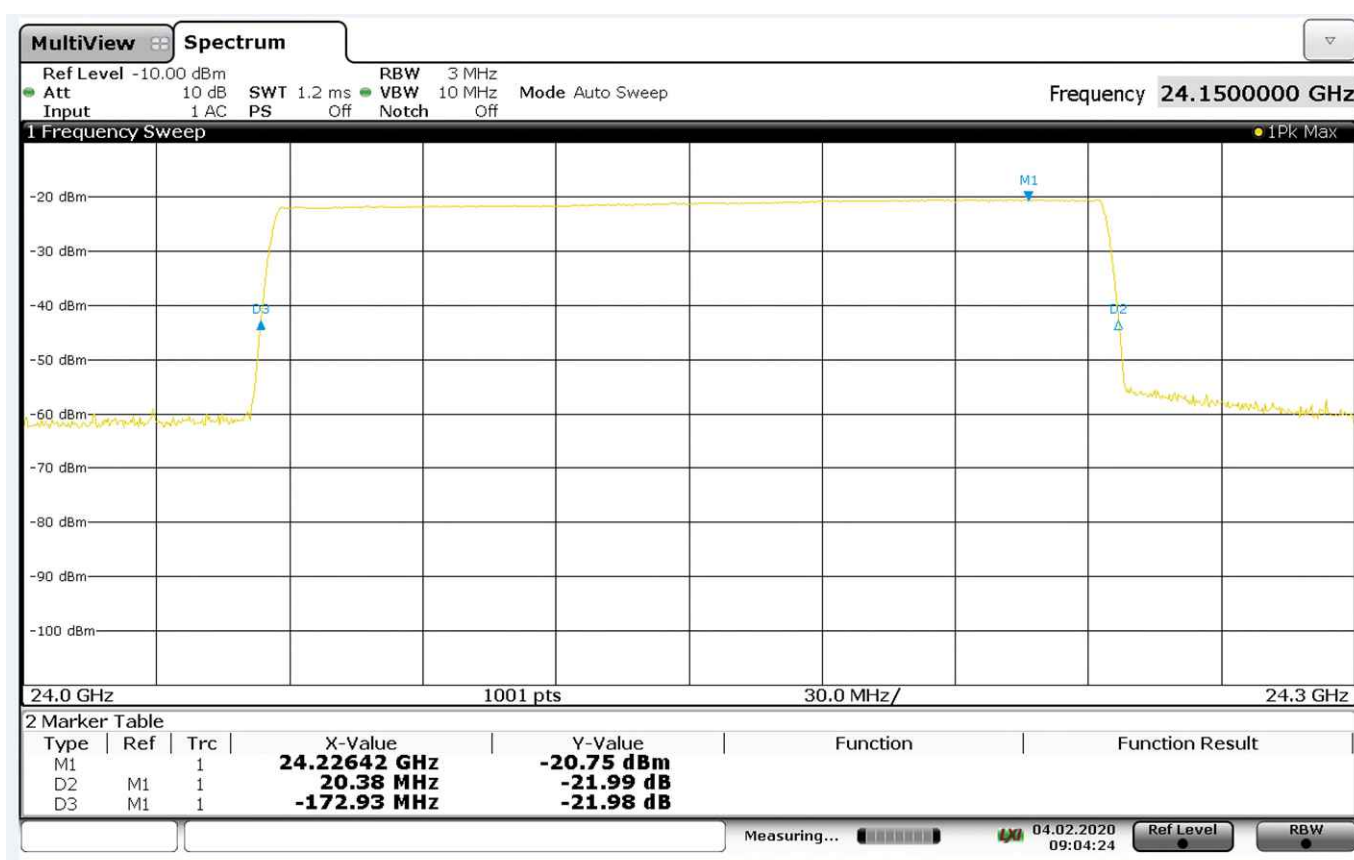


Figure: Test setup – Transmitter 20 dB Bandwidth

7.3 Transmitter 20 dB Bandwidth – Test details

Transmitter Frequency (GHz)	20 dB Bandwidth (MHz)
24.15	193.31



8 TEST RESULTS - TRANSMITTER FUNDAMENTAL FIELD STRENGTH

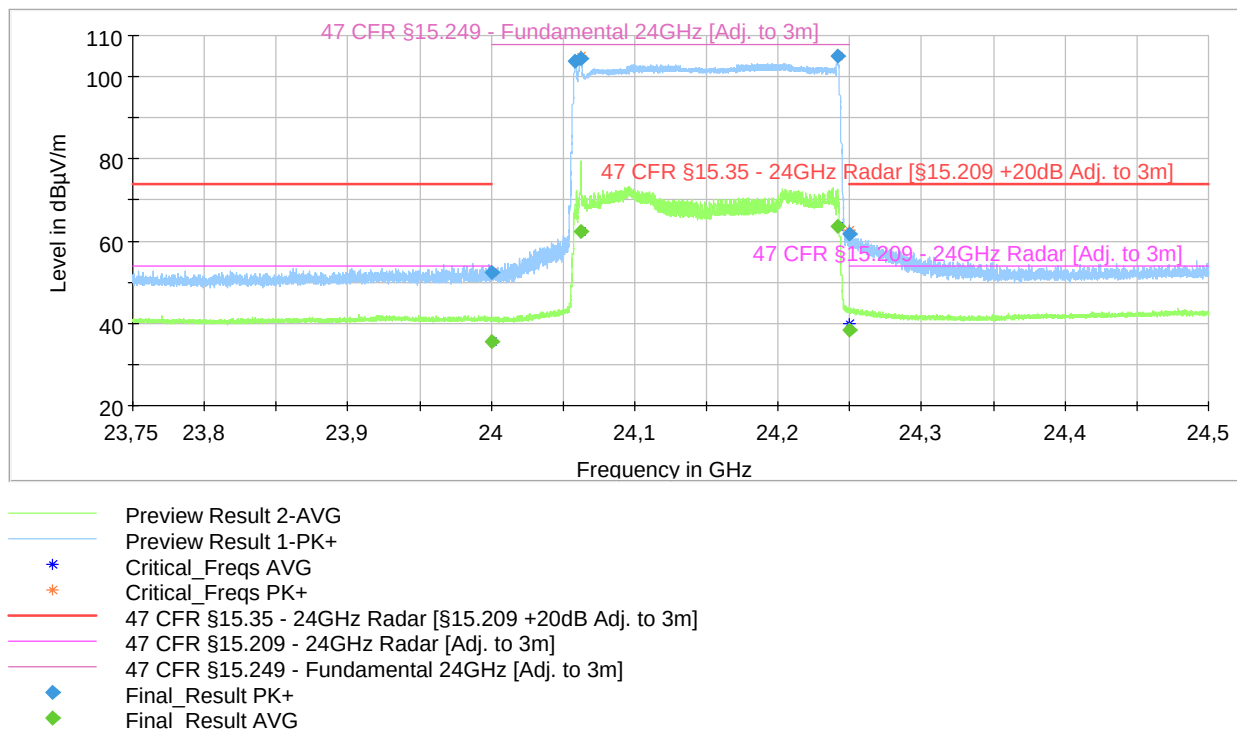
8.1 Transmitter Fundamental field strength – Test summary

Result	Pass
Equipment under Test	A000248144-001
Test period	2019-12-17
Test Engineer	Niall Forrester
Test Specification	FCC part 15 Subpart C 15.249 (a)
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	1 m
Detector	Peak Detector
EUT Operation mode	#1
Ancillary equipment	See section 2.3
Environmental conditions	Temperature: + 18 - 20 °C Relative Humidity: 20 - 45 %

8.2 Transmitter Fundamental field strength – Test Setup

Measurement was performed in a Semi Anechoic Chamber as per details described in section 4.2.

8.3 Transmitter Fundamental field strength – Test details



Transmitter Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
24241.4	Vertical	105.08	108	2.92	Compliant

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9 TEST EQUIPMENT LIST

SAC 5 – Radiated emissions

Type:	Manufacturer	Model	Serial Number	GTEM ID	Calibration date	Calibration Due:
EMI Test Receiver	Rohde & Schwarz	ESW44	101760	2881044	28.10.2019	28.10.2020
Harmonic Mixer - 40 GHz to 60 GHz	RPG	FS-Z60	100981	2916123	17.07.2019	17.07.2020
Harmonic Mixer - 60 GHz to 90 GHz	Rohde & Schwarz	FS-Z90	101850	2886130	09.07.2019	09.07.2020
Harmonic Mixer, 90 GHz to 140 GHz	RPG	RPG FS-Z140	101124	2892049	10.07.2019	10.07.2020
Ultra Broadband Antenna	Rohde & Schwarz	HL562E	100988	2823181	23.07.2019	23.07.2021
Double Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF907	102678	2823164	15.07.2019	15.07.2021
Control device	Maturo	NCD	NCD/393/2 372.01	2884216	N/A	N/A
Open Switch & Control Unit	Rohde & Schwarz	OSP150	100081	2884198	01.04.2019	01.04.2020
Open Switch & Control Unit	Rohde & Schwarz	OSP120	100084	2761253	01.04.2019	01.04.2020
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 1	101333	2761265	01.04.2019	01.04.2020
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 2	101335	2761266	01.04.2019	01.04.2020
Shielded Filter Unit	Rohde & Schwarz	OSP-F Base Unit	101330	2761262	01.04.2019	01.04.2020
Humidity Temperature Probe	Rotronic	HF532-DG1XX21X	006182928 0	2926379	14.08.2018	14.08.2020

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10 MEASUREMENT UNCERTAINTY

10.1 Radiated emissions - SAC5

Measurement Uncertainty for Radiated Emission (Coverage Factor k=2)	
Parameter	Uncertainty
Field Strength 10 Hz -9 kHz	3,38 dB
Field Strength 9 kHz -30 MHz	3,38 dB
Field Strength 30 MHz -1000 MHz	3,38 dB
Field Strength 1 GHz -18 GHz	4,88 dB
Field Strength 18 GHz - 40 GHz	5,14 dB
Field Strength 40 GHz - 100 GHz	5,43 dB

10.2 20 dB and 99% Bandwidth

Measurement Uncertainty for Radiated Emission (Coverage Factor k=2)	
Parameter	Uncertainty
Frequency (Hz)	5,81E-06 %

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11 TEST SETUP PHOTOS

See report 60338884-002 Appendix 1