FCC TEST REPORT No. 14/990	**2014**
for 47 CFR Part 90	November, 29

Model name:	ALLEGRO
Product description	The Water Meter
FCC ID	NTA2W4GB1
Applicant	Telematics Wireless Ltd., Israel
Manufacturer	Telematics Wireless Ltd., Israel

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Approved by
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Chief TC of PE TC "OMEGA"

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1 EQUIPMENT UNDER TEST

1.1 Basic description

Equipment Category	
Model name	**ALLEGRO 4G Interpreter**
Destination	**the Water Meter**
Configuration	**stand-alone device**
Serial numbers	**n/a**

1.2 Technical characteristics declared by manufacturer

Transmit Narrow Channel, complies Part 90

Parameter	Value
Transmit frequency band	450-470MHz
Channel Separation	6.25kHz
Modulation	4GFSK
Max Frequency deviation	±1.2kHz
Max Data rate	4.8kbps
Frequency stability (including initial stability, temperature)	<0.5 ppm
Peak output power	35.2dBm
Harmonics	< -62dBc

Transmit Narrow Channel, complies Part 15.231

Parameter	Value
Transmit frequency band	450-470MHz
Channel Separation	6.25kHz
Modulation	4GFSK
Max Frequency deviation	±1.2kHz
Max Data rate	6kbps
Frequency stability (including initial stability, temperature)	<0.5 ppm
Peak output power	-17dBm
Harmonics	< -62dBc

Receiver

Parameter	Value
Receive frequency	Programmable in the range 450-470MHz
Sensitivity (BER 1E-3)	-120 dBm
Modulation	4GFSK
Frequency deviation	1.2kHz

1.3 Photos

Figure 1.3.1 External photo

Figure 1.3.2 External photo

2 GENERAL INFORMATION ABOUT TESTS

2.1 Test program and results of the tests

Number of test	FCC rule	Description of test	Result (Pass, Fail, N/A)
1	90.210(e)	Radiated Spurious Emissions	**Pass**
2	15.231b	Field strength of emissions	**Pass**

Tested by:
tests No. 1: Laboratory engineer Boris Trifonov

tests No. 1, 2: Laboratory engineer Vladimir Osaulko

Checked by:
Leading engineer Fjodor Shubin

2.2 Test conditions and test modes

Operating Temperature: -30 °C to + 85 °C
Storage Temperature: -40 °C to +85 °C
Humidity: Up to 95%

Normal power source:
- Unom = +3.6 V

Extreme temperature:
- minimum temperature Tmin = minus 30 °C;
- maximum temperature Tmax = +85 °C.

Extreme power source:
- minimum voltage Umin = 2.7 V
- maximum voltage Umax = 3.6 V

The frequencies for the testing

Channel, No.	Frequency, MHz
Low	450
Mid	460
High	470

2.3 Test equipment used

№	Name	Model	Inventory or serial No.
1.	EMI Test receiver/spectrum analyzer	R&S ESU-26	100260
2.	Spectrum analyzer	R&S FSV40	105763
3.	Radiocommunication service monitor	R&S CMS-54	100033
4.	Vector Signal Generator	SMBV100A	100216
5.	Signal Generator	SMB100A	100217
6.	Oscilloscope	TDS1002	C041673
7.	Frequency meter	Ч3-64	100056
8.	Dual directional coupler	778D-012	101895
9.	Attenuator	Agilent 8496B	100103
10.	Attenuator	6N25W	100196
11.	Attenuator	PE7014-10	101692
12.	Detector	Agilent 8471E	100104
13.	RF Trigger	-	111008
14.	Antenna (30 – 1000) MHz	Schwarzbeck UBAA 9114	9111-214
15.	Antenna (1000 - 6000) MHz	HP11966 model 3115	9903-5701
16.	Antenna (1000 - 6000) MHz	ETS-Lindgren 3117	100200
17.	Antenna (1000 - 6000) MHz	ETS-Lindgren 3117	100201
18.	Digital multimeter	FLUKE 189	89750179
19.	Preamplifier (0.1-18) GHz	Agilent 87405c	MY47010400
20.	Psychrometer	ВИТ-2	B931
21.	Shielded Semi-Anechoic Chamber	"DON"	1

All listed above test equipment is calibrated and certified in accordance with established procedure. The equipment has certificates currently in force.

Ancillary equipment

№	Name	Model
1.	Test load	Telematics Wireless RTU_S
2.	Notebook	IBM ThinkPad

2.4 Measurement uncertainty

Parameter	Maximum uncertainty
Radiated emission	± 5.2 dB
Conducted emission	± 2.7 dB
Frequency	$\pm 1.5 \times 10^{-7}$
Temperature	± 1 °C
Humidity	± 2 %
Voltage supply DC	± 2 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

2.5 Photo of test site

Figure 2.5.1 Radiated measurement

Figure 2.5.2 Radiated measurement

3 REPORT OF MEASUREMENTS AND EXAMINATIONS

3.1 Radiated Spurious Emissions

3.1.1 Test requirements 90.210 (e)

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating in the frequency bands governed under this part.

Frequency band (MHz)	Mask for equipment with Audio low pass filter	Mask for equipment without audio low pass filter
Below 25 [1]	A or B	A or C
25-50	B	C
72-76	B	C
150-174 [2]	B, D, or E	C, D, or E
150 Paging-only	B	C
220-222	F	F
421-512 [2]	B, D, or E	C, D, or E
450 Paging-only	B	G
806-809/851-854	B	H
809-824/854-869 [3]	B	G
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M.
5850-5925 [4]		
All other bands	B	C

[2] Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.

(e) Emission Mask E—6.25 kHz or less channel bandwidth equipment. For transmitters designed to operate with a 6.25 kHz or less bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 3.0 kHz removed from f0: Zero dB.

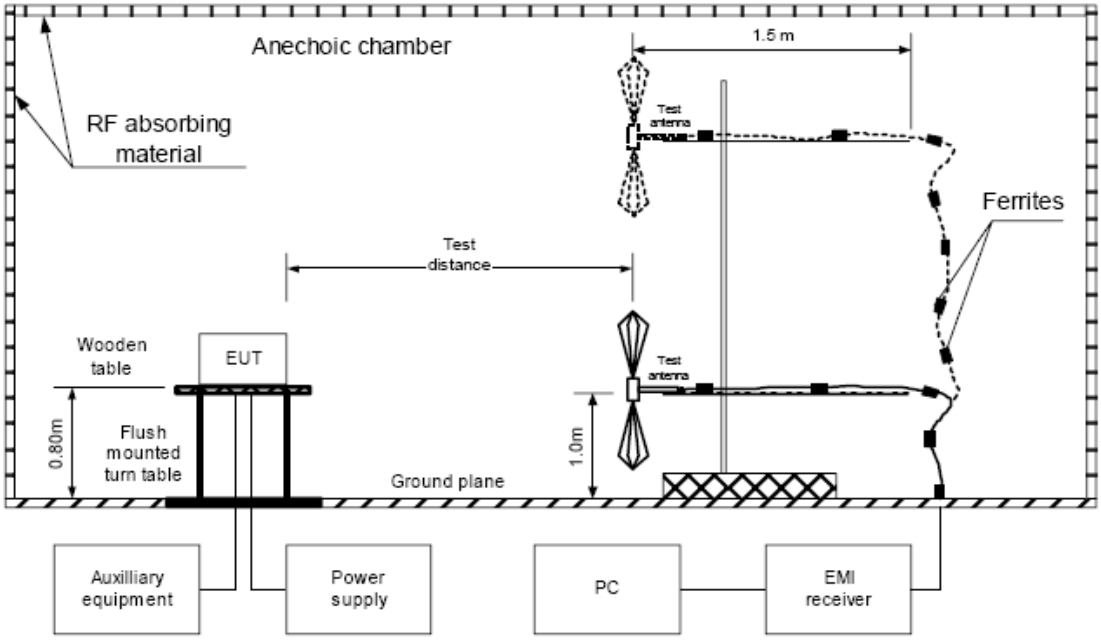
(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 3.0 kHz but no more than 4.6 kHz: At least 30 + 16.67(fd −3 kHz) or 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.

(3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two to three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient

number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For frequencies more than 50 kHz removed from the edge of the authorized bandwidth a resolution of at least 100 kHz must be used for frequencies below 1000 MHz. Above 1000 MHz the resolution bandwidth of the instrumentation must be at least 1 MHz. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used provided prior Commission approval is obtained.

3.1.2 Test setup layout



3.1.3 Test result

Temperature: +18 °C Relative humidity: 65 %

Plot 3.1.1 Radiated Spurious Emissions (Frequency 470 MHz)

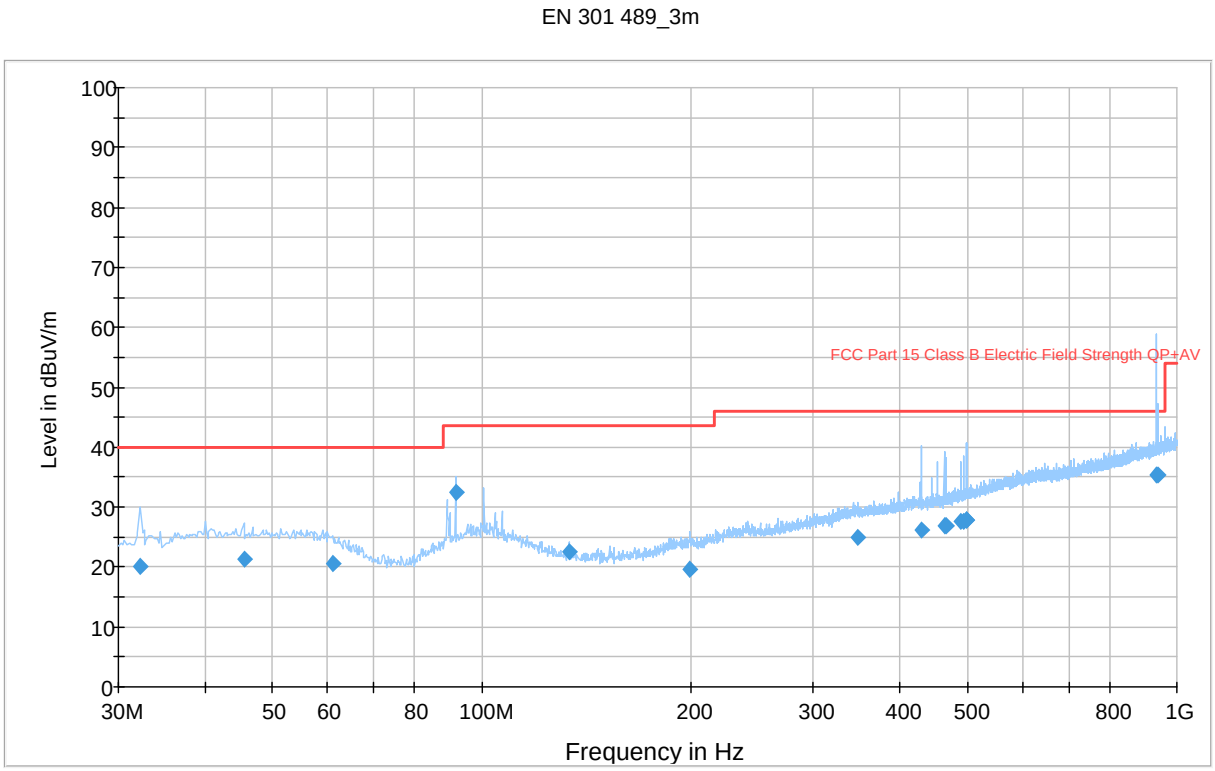


Table 3.1.1 Radiated Spurious Emissions (Frequency 470 MHz)

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
32.240000	20.1	1000.0	120.000	100.0	V	14.5	-107.04	-60	Pass
45.520000	21.4	1000.0	120.000	100.0	H	15.7	-105.74	-60	Pass
60.960000	20.5	1000.0	120.000	150.0	H	14.6	-106.64	-60	Pass
91.720000	32.4	1000.0	120.000	100.0	V	14.5	-94.74	-60	Pass
133.400000	22.4	1000.0	120.000	100.0	V	11.3	-104.74	-60	Pass
199.360000	19.7	1000.0	120.000	150.0	H	13.6	-107.44	-60	Pass
347.240000	24.9	1000.0	120.000	350.0	H	18.2	-102.24	-60	Pass
429.120000	26.2	1000.0	120.000	150.0	V	19.8	-100.94	-60	Pass
462.800000	26.8	1000.0	120.000	300.0	V	20.1	-100.34	-60	Pass
466.560000	26.9	1000.0	120.000	400.0	V	20.2	-100.24	-60	Pass
470.000000	127.14								
488.440000	27.6	1000.0	120.000	100.0	V	20.8	-99.54	-60	Pass
492.760000	27.7	1000.0	120.000	250.0	V	20.9	-99.44	-60	Pass
498.040000	27.8	1000.0	120.000	350.0	V	21.1	-99.34	-60	Pass
499.120000	27.9	1000.0	120.000	150.0	V	21.1	-99.24	-60	Pass
936.640000	35.3	1000.0	120.000	300.0	V	28.1	-91.84	-60	Pass
940.560000	35.4	1000.0	120.000	400.0	V	28.1	-91.74	-60	Pass

Plot 3.1.2 Radiated Spurious Emissions (Frequency 470 MHz)

FCC CFR 47 part 15.209 1-18 GHz

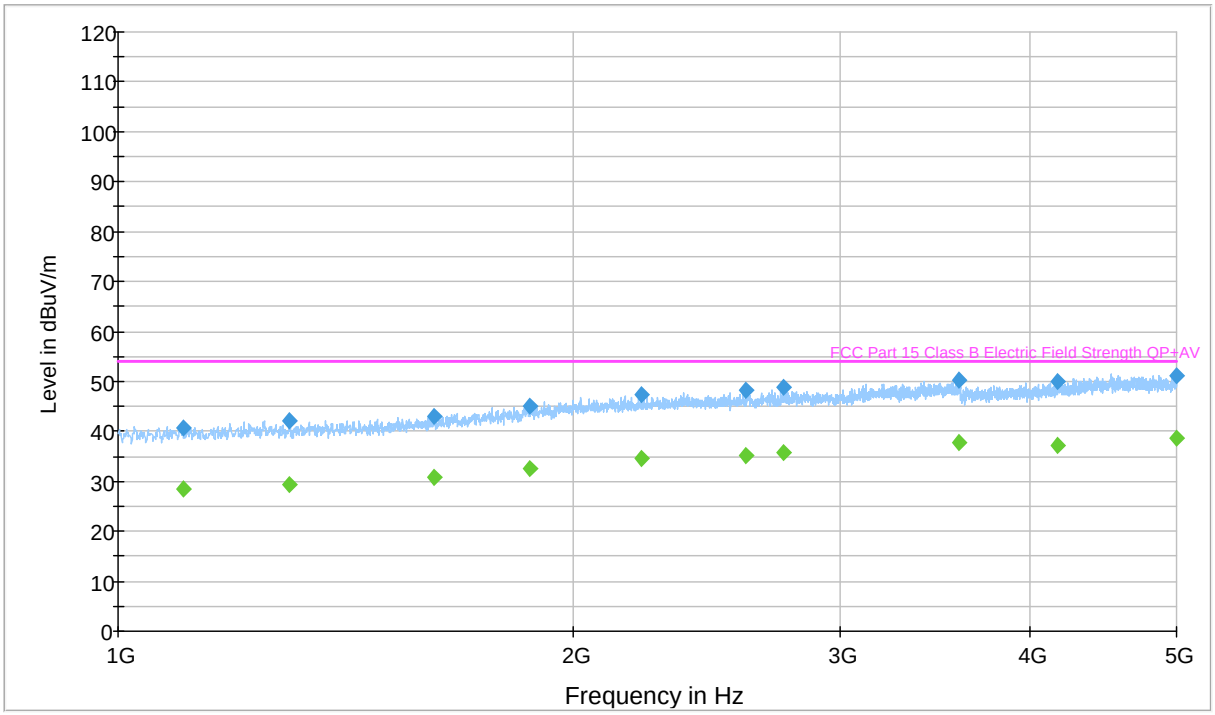


Table 3.1.2 Radiated Spurious Emissions (Frequency 470 MHz) (Peak)

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1104.000000	40.7	500.0	1000.000	100.0	H	6.9	-86.44	-60	Pass
1298.500000	42.2	500.0	1000.000	100.0	H	7.4	-84.94	-60	Pass
1616.500000	43.1	500.0	1000.000	150.0	V	8.9	-84.04	-60	Pass
1872.000000	45.0	500.0	1000.000	150.0	V	10.8	-82.14	-60	Pass
2215.000000	47.4	500.0	1000.000	150.0	H	12.5	-79.74	-60	Pass
2597.500000	48.3	500.0	1000.000	100.0	V	13.6	-78.84	-60	Pass
2751.000000	48.7	500.0	1000.000	100.0	V	13.9	-78.44	-60	Pass
3590.500000	50.2	500.0	1000.000	100.0	V	16.0	-76.94	-60	Pass
4169.000000	49.9	500.0	1000.000	150.0	V	17.4	-77.24	-60	Pass
4996.500000	51.2	500.0	1000.000	150.0	H	19.0	-75.94	-60	Pass

Table 3.1.3 Radiated Spurious Emissions (Frequency 470 MHz) (Average)

Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1104.000000	28.4	500.0	1000.000	100.0	H	6.9	-98.74	-60	Pass
1298.500000	29.5	500.0	1000.000	100.0	H	7.4	-97.64	-60	Pass
1616.500000	30.8	500.0	1000.000	150.0	V	8.9	-96.34	-60	Pass
1872.000000	32.6	500.0	1000.000	150.0	V	10.8	-94.54	-60	Pass
2215.000000	34.5	500.0	1000.000	150.0	H	12.5	-92.64	-60	Pass
2597.500000	35.3	500.0	1000.000	100.0	V	13.6	-91.84	-60	Pass
2751.000000	35.8	500.0	1000.000	100.0	V	13.9	-91.34	-60	Pass
3590.500000	37.7	500.0	1000.000	100.0	V	16.0	-89.44	-60	Pass
4169.000000	37.3	500.0	1000.000	150.0	V	17.4	-89.84	-60	Pass
4996.500000	38.6	500.0	1000.000	150.0	H	19.0	-88.54	-60	Pass

Plot 3.1.3 Radiated Spurious Emissions (Frequency 460 MHz)

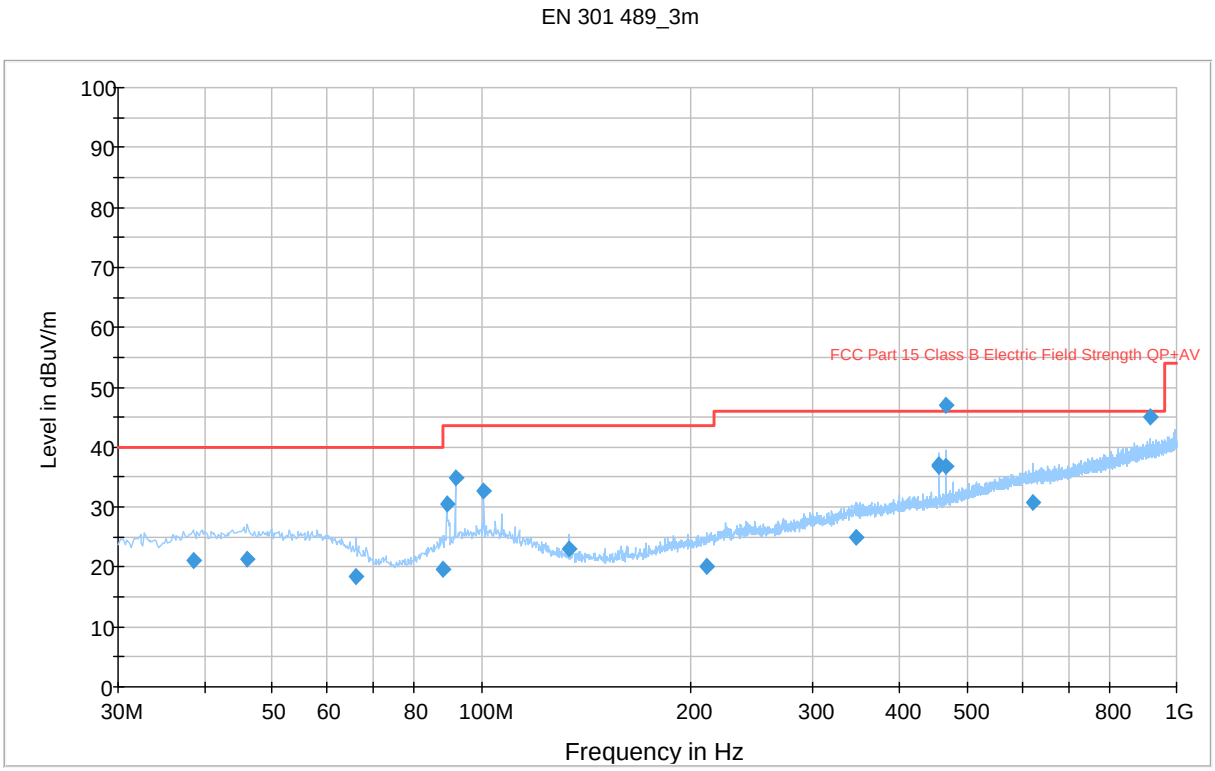


Table 3.1.4 Radiated Spurious Emissions (Frequency 460 MHz)

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
38.480000	21.0	1000.0	120.000	300.0	H	15.4	-107.6	-60	Pass
45.960000	21.4	1000.0	120.000	150.0	V	15.7	-107.2	-60	Pass
66.080000	18.4	1000.0	120.000	100.0	V	12.5	-110.2	-60	Pass
87.880000	19.6	1000.0	120.000	200.0	V	13.5	-109	-60	Pass
89.120000	30.4	1000.0	120.000	100.0	V	13.9	-98.2	-60	Pass
91.720000	34.7	1000.0	120.000	100.0	V	14.5	-93.9	-60	Pass
100.800000	32.8	1000.0	120.000	100.0	V	15.4	-95.8	-60	Pass
133.360000	22.9	1000.0	120.000	100.0	V	11.3	-105.7	-60	Pass
211.080000	20.2	1000.0	120.000	300.0	V	14.0	-108.4	-60	Pass
346.040000	24.9	1000.0	120.000	400.0	V	18.2	-103.7	-60	Pass
454.120000	37.0	1000.0	120.000	400.0	V	20.0	-91.6	-60	Pass
454.960000	36.7	1000.0	120.000	100.0	H	20.0	-91.9	-60	Pass
460.000000	128.6								
466.080000	36.9	1000.0	120.000	250.0	H	20.2	-91.7	-60	Pass
466.880000	46.9	1000.0	120.000	300.0	V	20.2	-81.7	-60	Pass
621.560000	30.7	1000.0	120.000	350.0	H	23.7	-97.9	-60	Pass
918.720000	45.0	1000.0	120.000	250.0	V	27.9	-83.6	-60	Pass

Plot 3.1.4 Radiated Spurious Emissions (Frequency 460 MHz)

FCC CFR 47 part 15.209 1-18 GHz

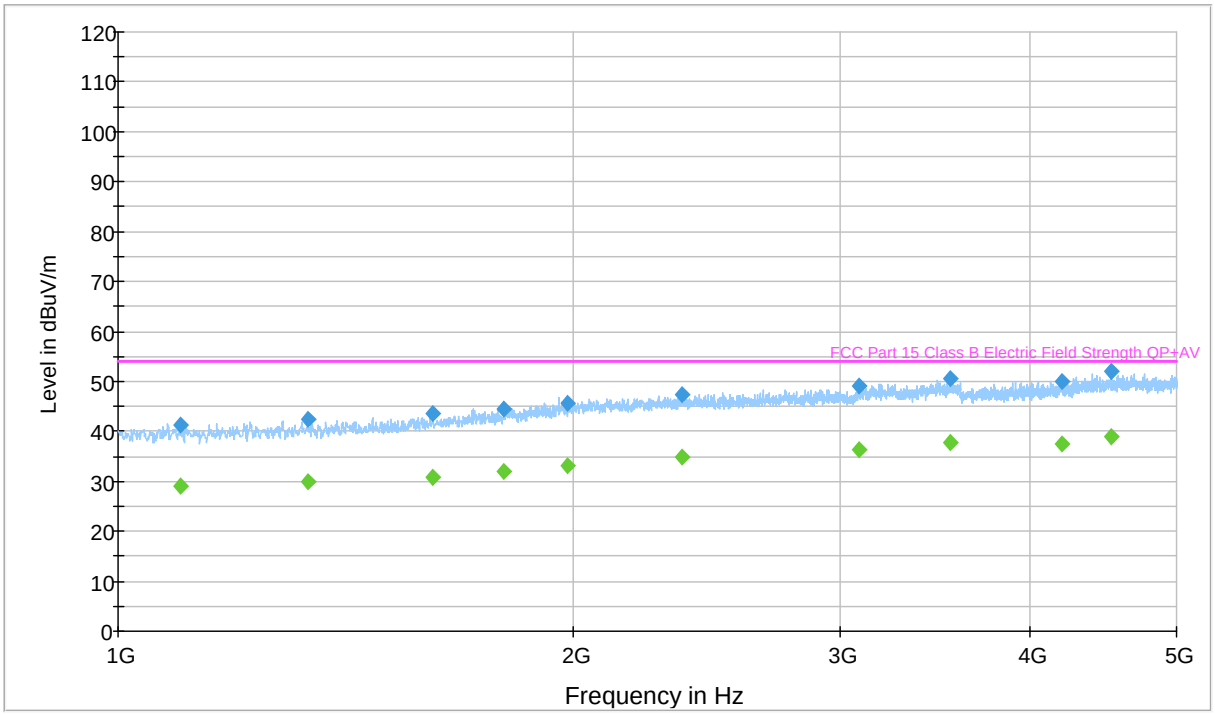


Table 3.1.5 Radiated Spurious Emissions (Frequency 460 MHz) (Peak)

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1100.000000	41.4	500.0	1000.000	150.0	V	6.9	-87.2	-60	Pass
1334.500000	42.4	500.0	1000.000	100.0	H	7.5	-86.2	-60	Pass
1613.500000	43.5	500.0	1000.000	150.0	V	8.9	-85.1	-60	Pass
1797.000000	44.4	500.0	1000.000	100.0	V	10.3	-84.2	-60	Pass
1982.000000	45.7	500.0	1000.000	150.0	H	11.7	-82.9	-60	Pass
2355.500000	47.3	500.0	1000.000	100.0	H	12.9	-81.3	-60	Pass
3082.000000	49.0	500.0	1000.000	150.0	V	14.6	-79.6	-60	Pass
3542.500000	50.7	500.0	1000.000	100.0	V	15.9	-77.9	-60	Pass
4204.000000	50.0	500.0	1000.000	150.0	H	17.5	-78.6	-60	Pass
4528.000000	51.9	500.0	1000.000	100.0	V	18.6	-76.7	-60	Pass

Table 3.1.6 Radiated Spurious Emissions (Frequency 460 MHz) (Average)

Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1100.000000	29.1	500.0	1000.000	150.0	V	6.9	-99.5	-60	Pass
1334.500000	29.9	500.0	1000.000	100.0	H	7.5	-98.7	-60	Pass
1613.500000	30.7	500.0	1000.000	150.0	V	8.9	-97.9	-60	Pass
1797.000000	31.9	500.0	1000.000	100.0	V	10.3	-96.7	-60	Pass
1982.000000	33.2	500.0	1000.000	150.0	H	11.7	-95.4	-60	Pass
2355.500000	35.0	500.0	1000.000	100.0	H	12.9	-93.6	-60	Pass
3082.000000	36.2	500.0	1000.000	150.0	V	14.6	-92.4	-60	Pass
3542.500000	37.7	500.0	1000.000	100.0	V	15.9	-90.9	-60	Pass
4204.000000	37.4	500.0	1000.000	150.0	H	17.5	-91.2	-60	Pass
4528.000000	38.9	500.0	1000.000	100.0	V	18.6	-89.7	-60	Pass

Plot 3.1.5 Radiated Spurious Emissions (Frequency 450 MHz)

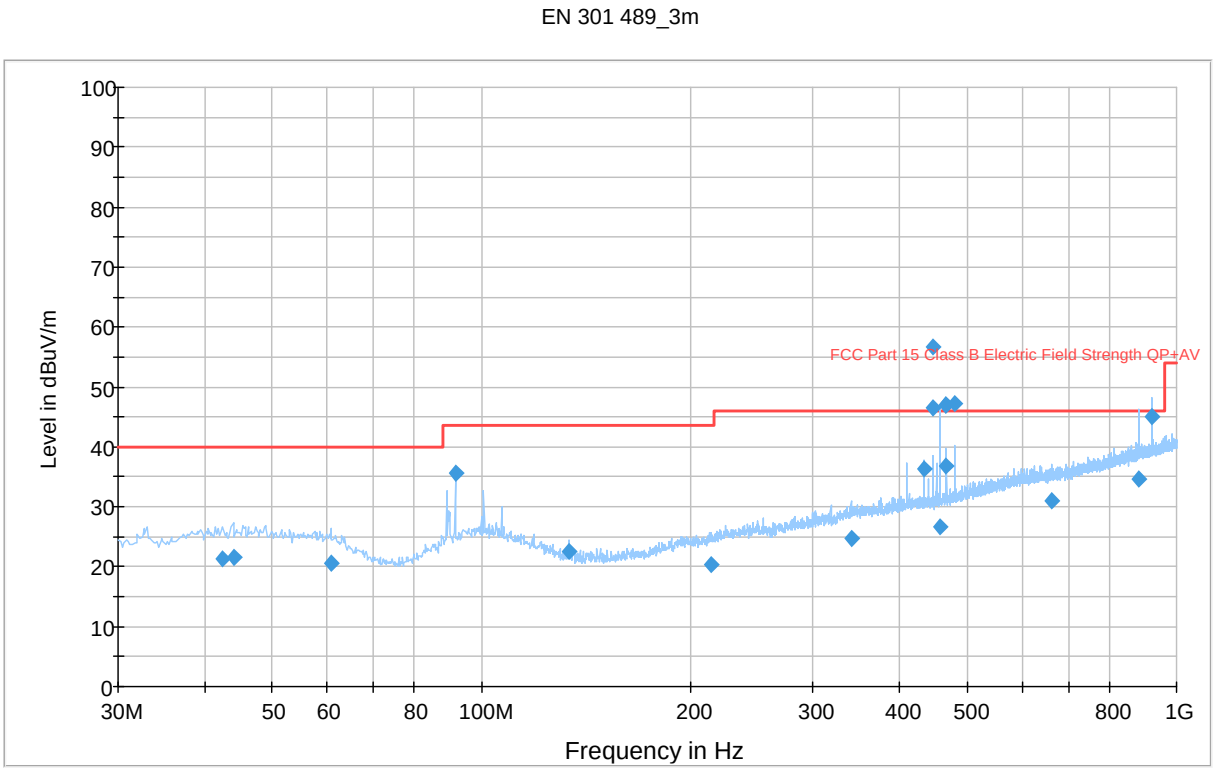


Table 3.1.7 Radiated Spurious Emissions (Frequency 450 MHz)

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
42.400000	21.3	1000.0	120.000	250.0	V	15.8	-107.54	-60	Pass
43.960000	21.5	1000.0	120.000	250.0	V	15.8	-107.34	-60	Pass
60.760000	20.6	1000.0	120.000	150.0	H	14.6	-108.24	-60	Pass
91.720000	35.5	1000.0	120.000	100.0	V	14.5	-93.34	-60	Pass
133.400000	22.5	1000.0	120.000	100.0	V	11.3	-106.34	-60	Pass
213.840000	20.4	1000.0	120.000	100.0	H	14.1	-108.44	-60	Pass
340.200000	24.7	1000.0	120.000	350.0	H	18.0	-104.14	-60	Pass
433.600000	36.4	1000.0	120.000	300.0	V	19.9	-92.44	-60	Pass
446.120000	46.5	1000.0	120.000	400.0	V	20.0	-82.34	-60	Pass
446.760000	56.6	1000.0	120.000	200.0	V	20.0	-72.24	-60	Pass
450.000000	128.84								
456.080000	26.6	1000.0	120.000	100.0	H	20.0	-102.24	-60	Pass
466.080000	46.9	1000.0	120.000	100.0	V	20.2	-81.94	-60	Pass
466.280000	46.9	1000.0	120.000	250.0	V	20.2	-81.94	-60	Pass
466.800000	36.9	1000.0	120.000	350.0	V	20.2	-91.94	-60	Pass
479.280000	47.3	1000.0	120.000	150.0	V	20.5	-81.54	-60	Pass
662.440000	30.9	1000.0	120.000	150.0	H	24.1	-97.94	-60	Pass
884.520000	34.5	1000.0	120.000	150.0	V	27.3	-94.34	-60	Pass
922.680000	45.0	1000.0	120.000	200.0	V	27.9	-83.84	-60	Pass

Plot 3.1.6 Radiated Spurious Emissions (Frequency 450 MHz)

FCC CFR 47 part 15.209 1-18 GHz

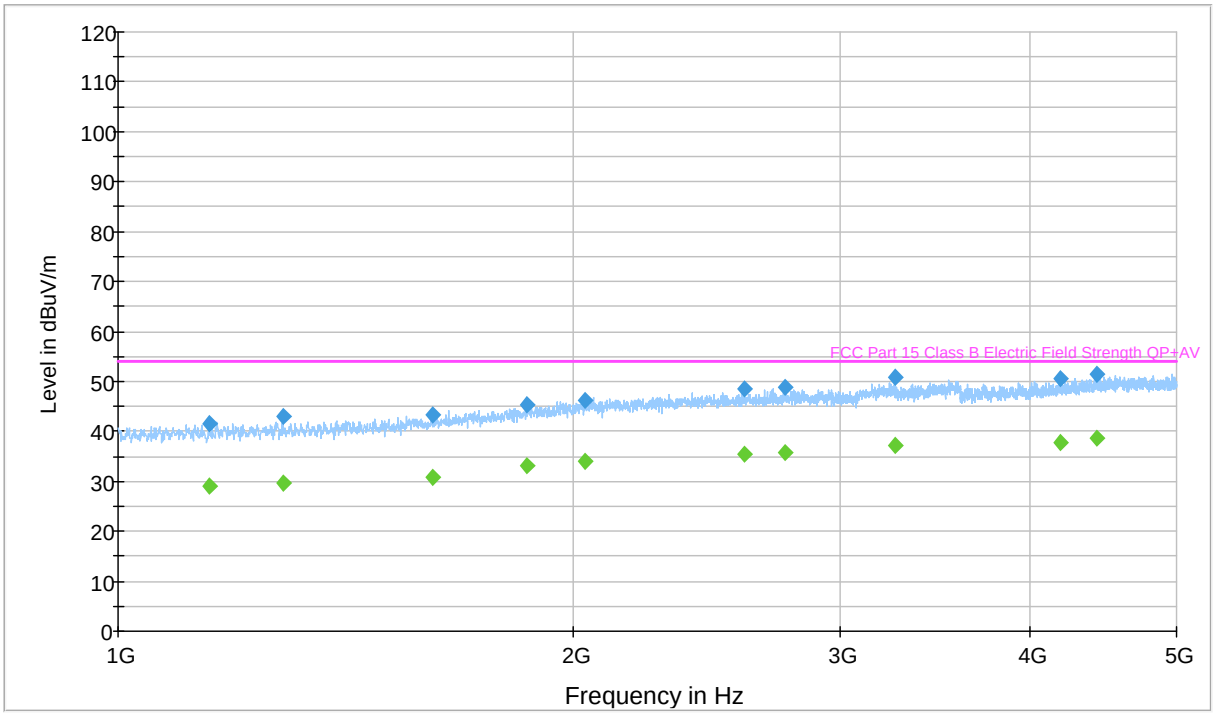


Table 3.1.8 Radiated Spurious Emissions (Frequency 450 MHz) (Peak)

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1149.500000	41.5	500.0	1000.000	100.0	H	7.0	-87.34	-60	Pass
1286.000000	42.9	500.0	1000.000	100.0	H	7.4	-85.94	-60	Pass
1612.500000	43.3	500.0	1000.000	100.0	V	8.9	-85.54	-60	Pass
1864.000000	45.3	500.0	1000.000	100.0	V	10.8	-83.54	-60	Pass
2035.500000	46.2	500.0	1000.000	100.0	H	11.9	-82.64	-60	Pass
2593.000000	48.6	500.0	1000.000	150.0	V	13.6	-80.24	-60	Pass
2759.500000	48.8	500.0	1000.000	150.0	H	13.9	-80.04	-60	Pass
3256.500000	50.9	500.0	1000.000	150.0	V	15.1	-77.94	-60	Pass
4191.000000	50.6	500.0	1000.000	100.0	V	17.5	-78.24	-60	Pass
4431.500000	51.4	500.0	1000.000	100.0	H	18.3	-77.44	-60	Pass

Table 3.1.9 Radiated Spurious Emissions (Frequency 450 MHz) (Average)

Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Att. (dBc)	Limit (dBc)	Comment
1149.500000	29.1	500.0	1000.000	100.0	H	7.0	-99.74	-60	Pass
1286.000000	29.6	500.0	1000.000	100.0	H	7.4	-99.24	-60	Pass
1612.500000	30.7	500.0	1000.000	100.0	V	8.9	-98.14	-60	Pass
1864.000000	33.1	500.0	1000.000	100.0	V	10.8	-95.74	-60	Pass
2035.500000	34.1	500.0	1000.000	100.0	H	11.9	-94.74	-60	Pass
2593.000000	35.5	500.0	1000.000	150.0	V	13.6	-93.34	-60	Pass
2759.500000	35.8	500.0	1000.000	150.0	H	13.9	-93.04	-60	Pass
3256.500000	37.1	500.0	1000.000	150.0	V	15.1	-91.74	-60	Pass
4191.000000	37.8	500.0	1000.000	100.0	V	17.5	-91.04	-60	Pass
4431.500000	38.7	500.0	1000.000	100.0	H	18.3	-90.14	-60	Pass

3.2 Field strength of emissions

3.2.1 Test requirements § 15.231(b)

Fundamental frequency (MHz)	Field strength of fundamental (μV/m)	(dBμV/m)	Field strength of spurious emissions (μV/m)	(dBμV/m)
40.66–40.70	2,250	67	225	47
70–130	1,250	61.9	125	41.9
130–174	1,250 to 3,750*	61.9 to 71.5*	125 to 375*	41.9 to 51.5*
174–260	3,750	71.5	375	51.5
260–470	3,750 to 12,500*	71.5 to 81.9*	375 to 1,250*	51.5 to 61.9*
Above 470	12,500	81.9	1,250	61.9

Notes: * Linear interpolations

3.2.2 Test procedure (ANSI C63.4)

The test was performed to measure radiated emissions from the equipment under test enclosure. The measurement was made in the anechoic chamber at measurement distance of 3m in two bands: (30 - 1000) MHz, (1000 - 6000) MHz.

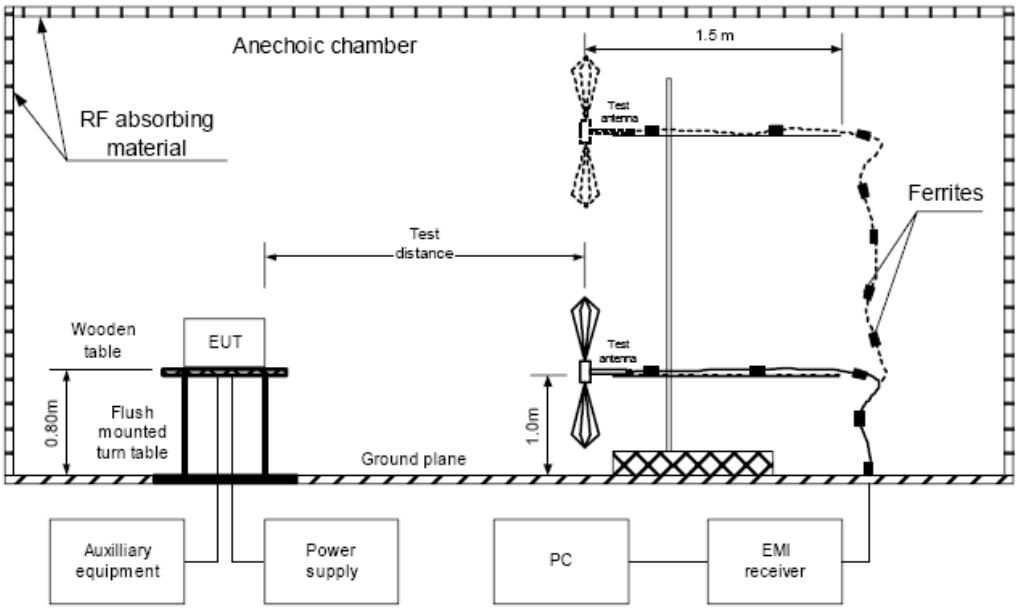
1) The equipment under test was set to transmission mode Pout = -17 dBm.

2) In the band of (30 - 1000) MHz the measurement was made in anechoic chamber with metal floor. The turntable was rotated, the antenna height was altered in the range of 1m - 4m, the polarization of biconical antenna was changed from horizontal to vertical in a process of seeking for the maximum result. Settings of the test receiver: RBW = 120 kHz; Video Detector = Positive Peak during prequalification measurement, Quasi-Peak - during final measurement.

3) In the band of (1000 - 6000) MHz the measurement was made in fully anechoic chamber. The height of test antenna was fixed while the turntable was rotated and the polarization of horn test antenna was changed from horizontal to vertical in a process of seeking for the maximum result. Settings of the test receiver: RBW = 1000 kHz; Video Detector = Positive Peak during prequalification measurement, Average - during final measurement.

4) The worst test results (the lowest margins) were recorded and shown in the associated plots.

Figure 3.2.1 Test setup layout (above 30 MHz and below 10 GHz)

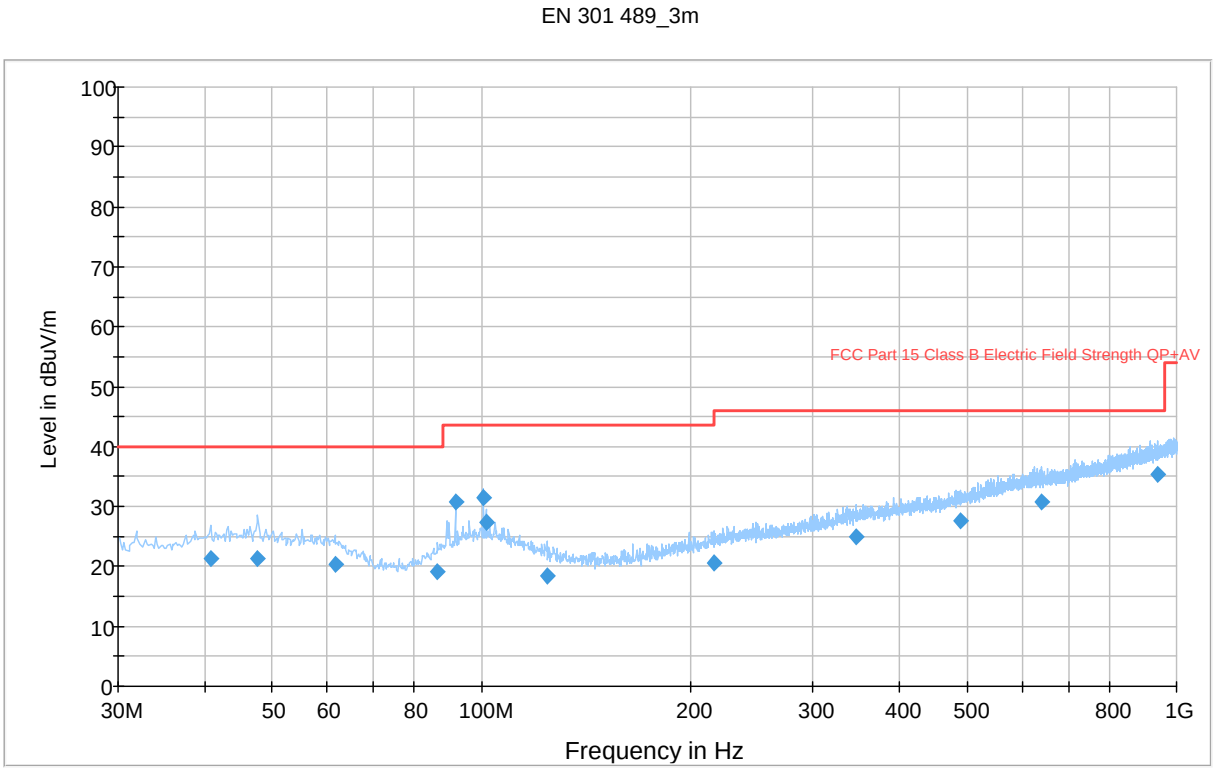


3.2.3 Test result

Temperature: +18 °C Relative humidity: 67 %

EUT OPERATING MODE: transmission mode
Pout = -17 dBm

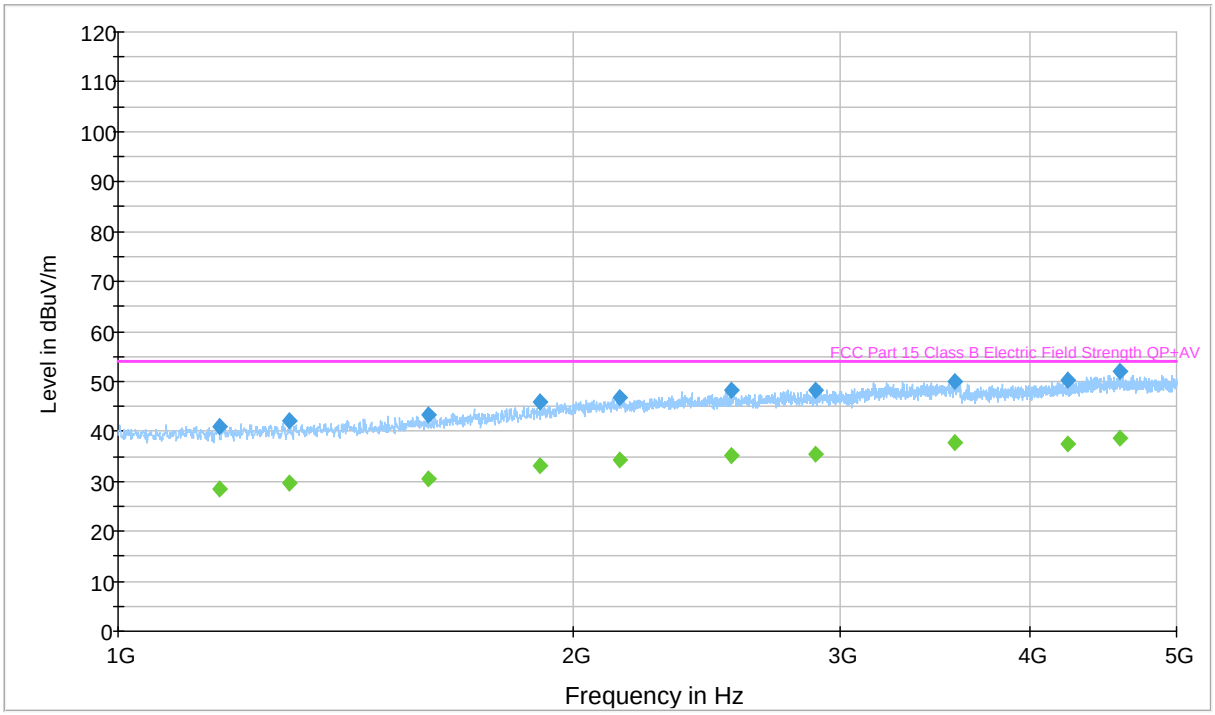
Plot 3.2.1 Radiated emission test result (450 MHz)



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
40.760000	21.2	1000.0	120.000	100.0	H	15.8	39.9	61.1	Pass
47.680000	21.3	1000.0	120.000	100.0	V	15.6	39.8	61.1	Pass
61.520000	20.3	1000.0	120.000	100.0	V	14.3	40.8	61.1	Pass
86.480000	19.2	1000.0	120.000	100.0	V	13.1	41.9	61.1	Pass
91.720000	30.6	1000.0	120.000	100.0	V	14.5	30.5	61.1	Pass
100.800000	31.5	1000.0	120.000	100.0	V	15.4	29.6	61.1	Pass
101.480000	27.3	1000.0	120.000	100.0	V	15.3	33.8	61.1	Pass
124.360000	18.5	1000.0	120.000	100.0	H	12.3	42.6	61.1	Pass
215.760000	20.5	1000.0	120.000	100.0	H	14.2	40.6	61.1	Pass
345.760000	24.8	1000.0	120.000	150.0	H	18.2	36.3	61.1	Pass
450.000000	33.6	1000.0	120.000	150.0	V	19.4	47.5	81.1	Pass
489.280000	27.6	1000.0	120.000	150.0	V	20.8	33.5	61.1	Pass
639.320000	30.8	1000.0	120.000	150.0	H	23.8	30.3	61.1	Pass
940.560000	35.3	1000.0	120.000	150.0	V	28.1	25.8	61.1	Pass

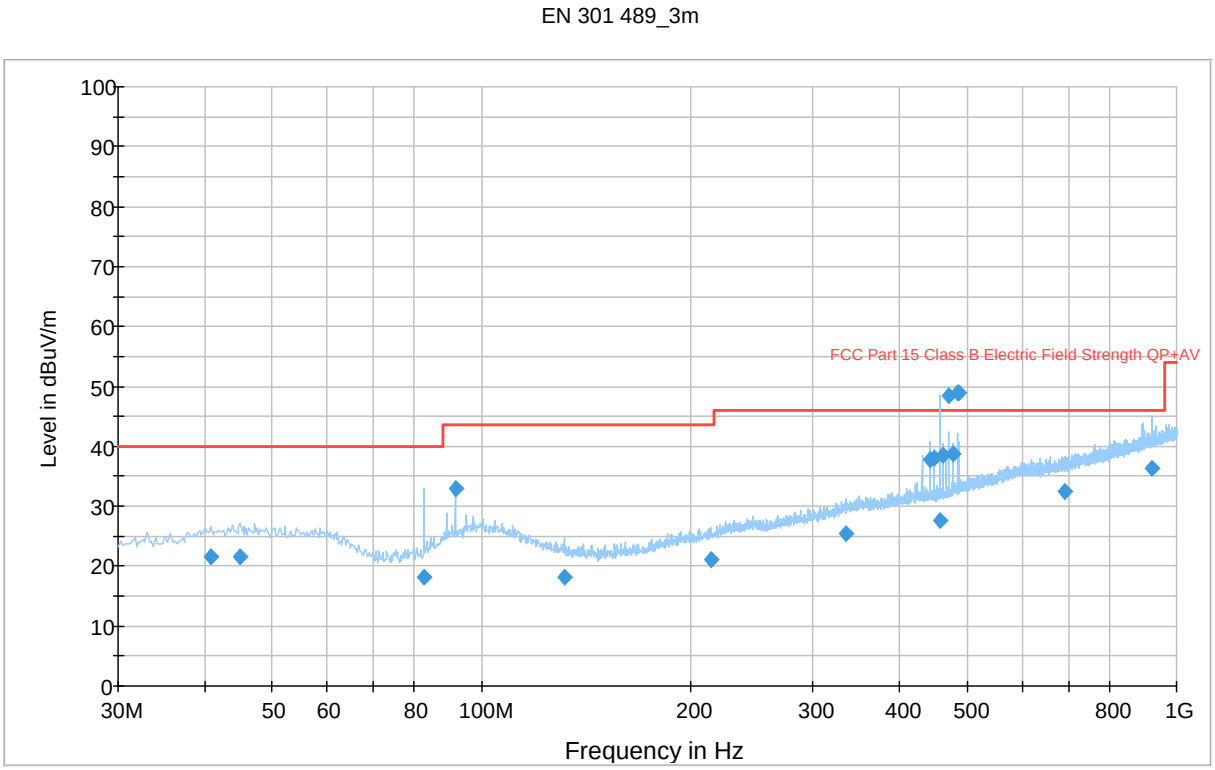
Plot 3.2.2 Radiated emission test result (450 MHz)

FCC CFR 47 part 15.209 1-18 GHz



Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
1166.500000	28.5	500.0	1000.000	100.0	V	7.1	32.4	61.1	Pass
1297.500000	29.6	500.0	1000.000	150.0	H	7.4	32.0	61.1	Pass
1602.000000	30.5	500.0	1000.000	150.0	V	8.8	31.5	61.1	Pass
1901.000000	33.2	500.0	1000.000	150.0	V	11.0	28.8	61.1	Pass
2145.000000	34.3	500.0	1000.000	150.0	H	12.3	27.4	61.1	Pass
2539.500000	35.1	500.0	1000.000	100.0	H	13.5	27.0	61.1	Pass
2886.000000	35.5	500.0	1000.000	100.0	V	14.2	25.9	61.1	Pass
3566.500000	37.7	500.0	1000.000	100.0	H	15.9	25.0	61.1	Pass
4235.500000	37.4	500.0	1000.000	100.0	V	17.6	24.1	61.1	Pass
4589.000000	38.6	500.0	1000.000	100.0	H	18.6	23.6	61.1	Pass

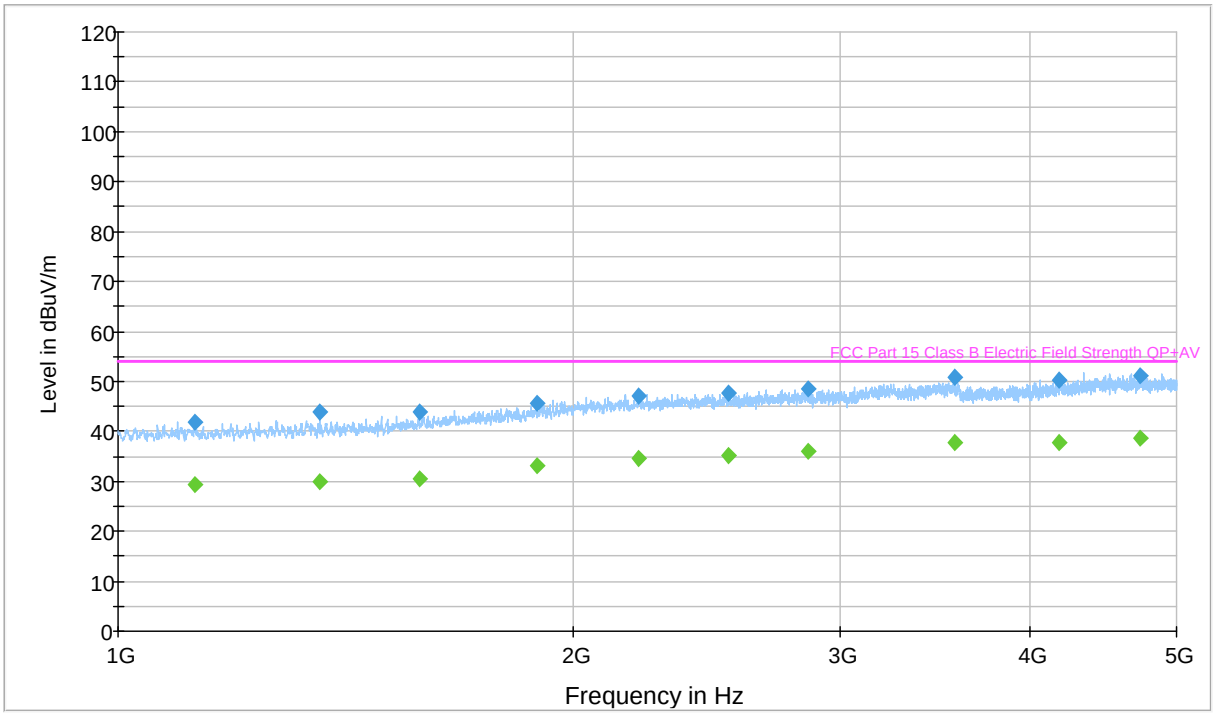
Plot 3.2.3 Radiated emission test result (460 MHz)



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
40.760000	21.4	1000.0	120.000	300.0	V	15.8	40.1	61.5	Pass
45.000000	21.6	1000.0	120.000	300.0	H	15.8	39.9	61.5	Pass
82.760000	18.2	1000.0	120.000	350.0	V	11.8	43.3	61.5	Pass
91.680000	33.0	1000.0	120.000	100.0	V	14.5	28.5	61.5	Pass
131.440000	18.3	1000.0	120.000	200.0	V	11.4	43.2	61.5	Pass
214.080000	21.1	1000.0	120.000	350.0	V	14.1	40.4	61.5	Pass
333.680000	25.5	1000.0	120.000	350.0	V	17.7	36.0	61.5	Pass
442.160000	37.9	1000.0	120.000	250.0	V	19.9	23.6	61.5	Pass
447.920000	37.9	1000.0	120.000	400.0	V	20.0	23.6	61.5	Pass
456.080000	27.7	1000.0	120.000	250.0	H	20.0	33.8	61.5	Pass
460.000000	33.4	1000.0	120.000	250.0	H	20.0	48.1	81.5	Pass
461.800000	38.6	1000.0	120.000	150.0	H	20.1	22.9	61.5	Pass
469.640000	48.3	1000.0	120.000	300.0	V	20.3	13.2	61.5	Pass
478.040000	38.8	1000.0	120.000	350.0	V	20.5	22.7	61.5	Pass
485.080000	48.9	1000.0	120.000	100.0	V	20.7	12.6	61.5	Pass
487.160000	48.9	1000.0	120.000	150.0	V	20.8	12.6	61.5	Pass
691.640000	32.5	1000.0	120.000	250.0	V	24.4	29.0	61.5	Pass
920.640000	36.4	1000.0	120.000	100.0	H	27.9	25.1	61.5	Pass

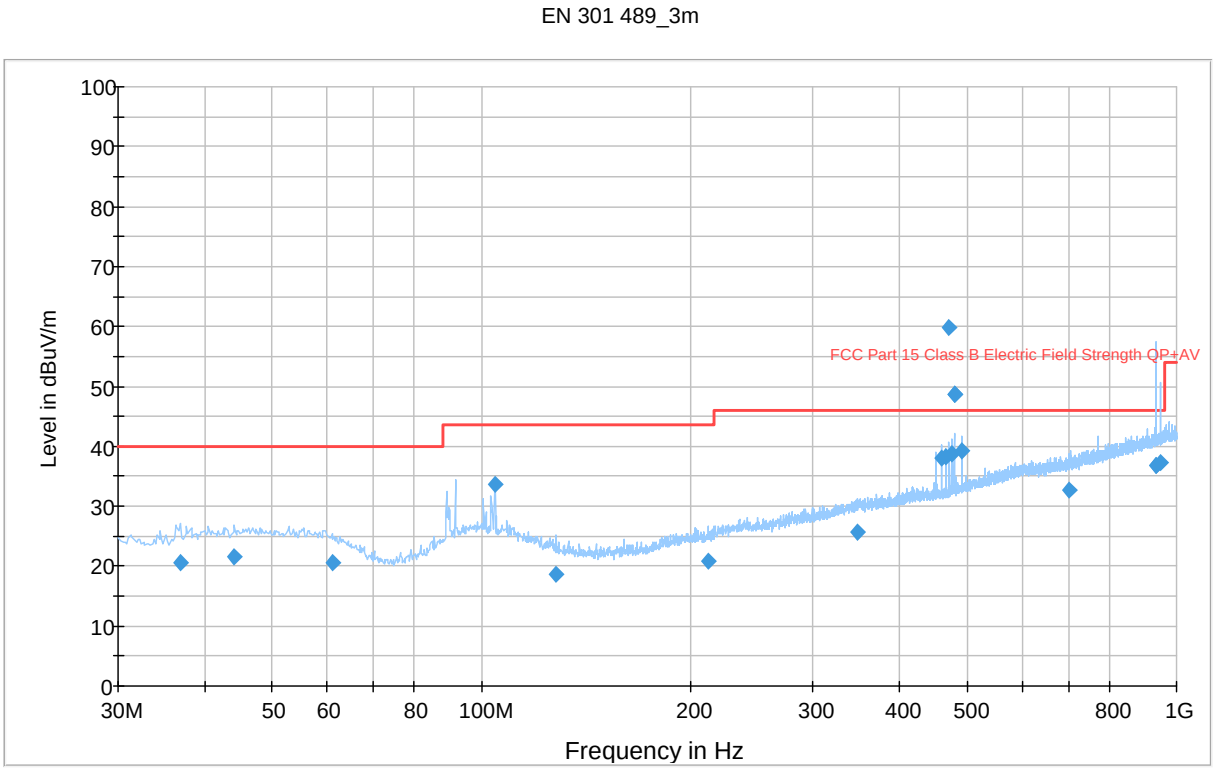
Plot 3.2.4 Radiated emission test result (460 MHz)

FCC CFR 47 part 15.209 1-18 GHz



Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
1123.500000	29.3	500.0	1000.000	150.0	V	6.9	32.2	61.5	Pass
1358.500000	30.0	500.0	1000.000	150.0	V	7.6	31.5	61.5	Pass
1581.500000	30.6	500.0	1000.000	150.0	V	8.6	30.9	61.5	Pass
1891.000000	33.1	500.0	1000.000	100.0	V	11.0	28.4	61.5	Pass
2205.500000	34.6	500.0	1000.000	150.0	V	12.5	26.9	61.5	Pass
2532.500000	35.3	500.0	1000.000	150.0	V	13.5	26.2	61.5	Pass
2853.000000	35.9	500.0	1000.000	100.0	H	14.1	25.6	61.5	Pass
3567.500000	37.7	500.0	1000.000	150.0	H	15.9	23.8	61.5	Pass
4185.000000	37.8	500.0	1000.000	100.0	H	17.4	23.7	61.5	Pass
4734.000000	38.7	500.0	1000.000	100.0	V	18.8	22.8	61.5	Pass

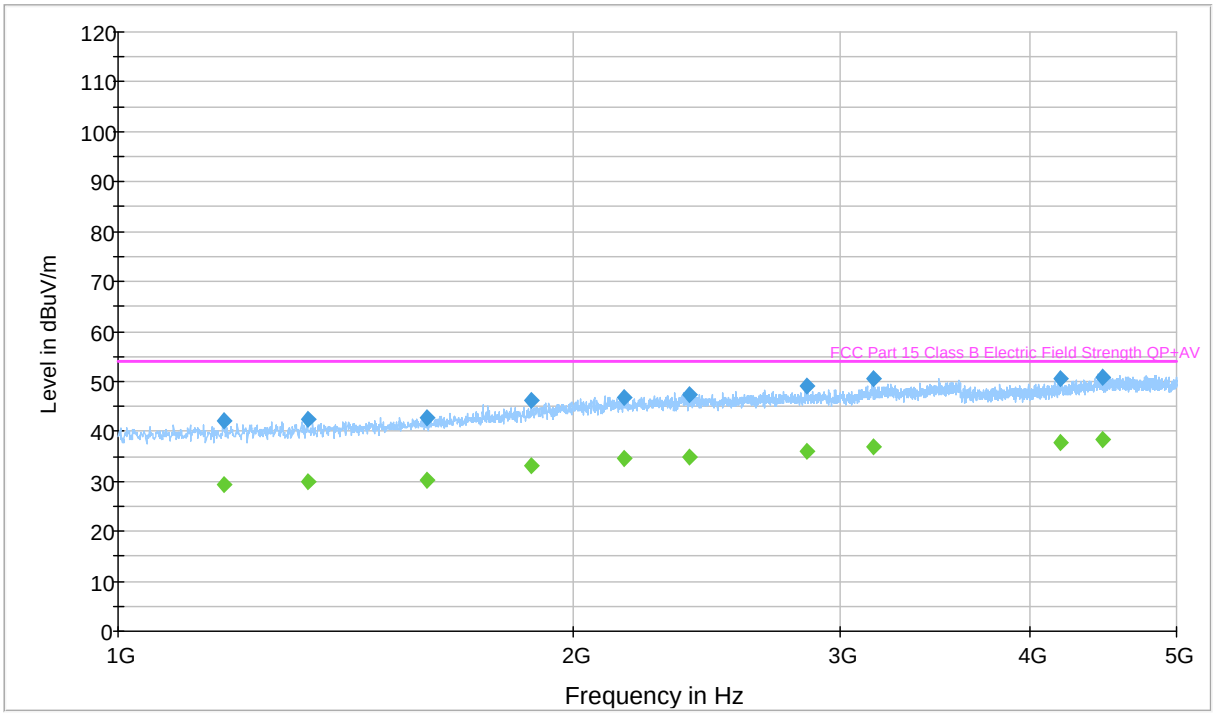
Plot 3.2.5 Radiated emission test result (470 MHz)



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
36.960000	20.5	1000.0	120.000	300.0	V	15.0	41.4	61.9	Pass
44.000000	21.5	1000.0	120.000	200.0	H	15.8	40.4	61.9	Pass
60.960000	20.7	1000.0	120.000	300.0	H	14.6	41.2	61.9	Pass
104.480000	33.7	1000.0	120.000	150.0	H	15.1	28.2	61.9	Pass
128.240000	18.6	1000.0	120.000	300.0	H	11.7	43.3	61.9	Pass
211.960000	20.9	1000.0	120.000	350.0	V	14.0	41.0	61.9	Pass
347.520000	25.8	1000.0	120.000	200.0	V	18.2	36.1	61.9	Pass
459.680000	38.0	1000.0	120.000	350.0	V	20.0	23.9	61.9	Pass
466.400000	38.3	1000.0	120.000	250.0	H	20.2	23.6	61.9	Pass
470.000000	31.9	1000.0	120.000	100.0	V	20.3	50.0	81.9	Pass
471.440000	59.8	1000.0	120.000	100.0	V	20.3	2.1	61.9	Pass
475.720000	38.7	1000.0	120.000	150.0	H	20.4	23.2	61.9	Pass
478.640000	48.7	1000.0	120.000	250.0	V	20.5	13.2	61.9	Pass
478.880000	48.7	1000.0	120.000	300.0	V	20.5	13.2	61.9	Pass
491.440000	39.1	1000.0	120.000	150.0	V	20.9	22.8	61.9	Pass
701.840000	32.7	1000.0	120.000	350.0	V	24.5	29.2	61.9	Pass
935.840000	36.8	1000.0	120.000	200.0	V	28.1	25.1	61.9	Pass
936.960000	36.7	1000.0	120.000	350.0	V	28.1	25.2	61.9	Pass
948.240000	37.2	1000.0	120.000	100.0	V	28.3	24.7	61.9	Pass

Plot 3.2.6 Radiated emission test result (470 MHz)

FCC CFR 47 part 15.209 1-18 GHz



Frequency (MHz)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
1174.000000	29.5	500.0	1000.000	150.0	H	7.1	32.4	61.9	Pass
1335.000000	29.9	500.0	1000.000	150.0	V	7.5	32.0	61.9	Pass
1598.500000	30.4	500.0	1000.000	150.0	V	8.7	31.5	61.9	Pass
1875.000000	33.1	500.0	1000.000	150.0	H	10.9	28.8	61.9	Pass
2159.500000	34.5	500.0	1000.000	100.0	H	12.3	27.4	61.9	Pass
2384.500000	34.9	500.0	1000.000	100.0	V	13.0	27.0	61.9	Pass
2850.500000	36.0	500.0	1000.000	100.0	H	14.1	25.9	61.9	Pass
3151.500000	36.9	500.0	1000.000	150.0	V	14.8	25.0	61.9	Pass
4190.000000	37.8	500.0	1000.000	150.0	V	17.5	24.1	61.9	Pass
4468.500000	38.3	500.0	1000.000	150.0	H	18.4	23.6	61.9	Pass