

FCC RADIO TEST REPORT

For

FCC ID: 2A6Y2-990057

Report Reference No..... : 22EFSS05056 05251

Date of issue..... : 2022-05-16

Date of Tested : From 2022-05-16 to 2022-05-25

Date of issue..... : 2022-06-23

Testing Laboratory..... : DongGuan ShuoXin Electronic Technology Co., Ltd.

Address..... : Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn
District, ChangAn Town, DongGuan City, GuangDong, China

Applicant's name.....: Round 2. LLC.

Address.....: 4073 Meghan Beeler CourtSouth Bend, IN 46628

Manufacturer.....: Round 2. LLC.

Test specification:

Test item description..... : 5" End Gate

Trade Mark : N/A

Model/Type reference..... : 990057

Ratings..... :
I/P: DC5V

Test Engineer:


Blue Qiu

Responsible Engineer :


Smile Wang

Authorized Signatory:

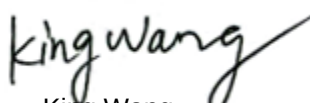

King Wang

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TEST REPORT DECLARE

T	Applicant	:	Round 2. LLC.
	Address	:	4073 Meghan Beeler CourtSouth Bend, IN 46628
	Manufacturer	:	Round 2. LLC.
	Address	:	4073 Meghan Beeler CourtSouth Bend, IN 46628
	Factory	:	Huizhou Childford Electronics Co., Ltd.
	Address	:	18th Childford Road, Longhu Development area, shuikou, Huicheng district, Huizhou city, Guangdong, China
	Equipment under Test	:	5" End Gate
	Test Model No	:	990057
	Standard	:	FCC Part15, Subpart C (15.249)
		:	ANSI C63.10-2013

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd(ATT). and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd.(ATT) is assumed of full responsibility for the accuracy and completeness of these tests.

ATT is not responsible for the sampling stage, so the results only apply to the sample as received.

ATT's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. ATT shall have no liability for any declarations, inferences or generalizations drawn by the client or others from ATT issued reports.

1. Summary of test Standards and results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
Restricted bands of operation	FCC Part 15.205,	PASS
AC Line Conducted Emissions	FCC Part 15.207 (a),	PASS
99% Bandwidth	15.215(c),	PASS
Radiated emission	FCC Part 15.209, 15.249 (a),	PASS
Bandedge	15.249(d)	PASS

NOTE: "N/A" denotes test is not applicable in this Test Report

2. General test information

2.1. Description of EUT

EUT* Name	:	5" End Gate
Model Number	:	990057
EUT function description	:	Please reference user manual of this device
Power supply	:	DC5V
Adaptor	:	N/A
Radio Technology	:	SRD
Operation frequency	:	2409-2467MHz
Modulation	:	GFSK
Antenna Type	:	Internal Antenna, maximum PK gain: 0dBi
Sample Type	:	Single production
Hardware Version	:	V1.0
Software Version	:	V1.0

Note: EUT is the ab. of equipment under test.

Channle information							
CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency
0	2409	3	2423	6	2453	9	2467
1	2413	4	2437	7	2457	/	/
2	2419	5	2443	8	2461	/	/

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Block diagram of EUT configuration for test



EUT enters the engineering interface by clicking the system version to control EUT work in test mode as blow table.

Tested mode, channel, and data rate information			
Mode	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
TX Mode	1	Low: CH 0	2409
TX Mode	1	Medium: CH 5	2443
TX Mode	1	High: CH 9	2467
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.			

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: V)
	4.60 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	6.10 dB (Polarize: V)
	5.08 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: V)
	5.01 dB (Polarize: H)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: V)
	5.26 dB (Polarize: H)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: V)
	5.06 dB (Polarize: H)
Uncertainty for radio frequency	$\pm 0.048\text{kHz}$
Uncertainty for conducted RF Power	$\pm 0.32\text{dB}$

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

2.7. Table Of Parameters Of Test Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

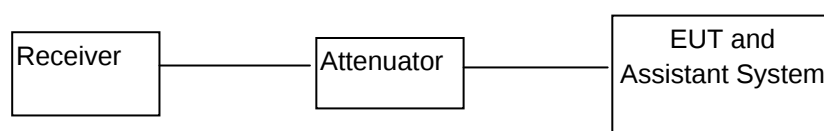
Test Software Version	N/A		
Frequency (MHz)	2409	2443	2467
Power Parameters	default	default	default

3. 99% Occupied Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	05/26/2023	05/27/2022
2	Attenuator	Mini-Circuits	BW-S10W2	101109	/	/
3	RF Cable	Micable	C10-01-01-1	100309	/	/

3.2. Block diagram of test setup



3.3. Limits

N/A

3.4. Test Procedure

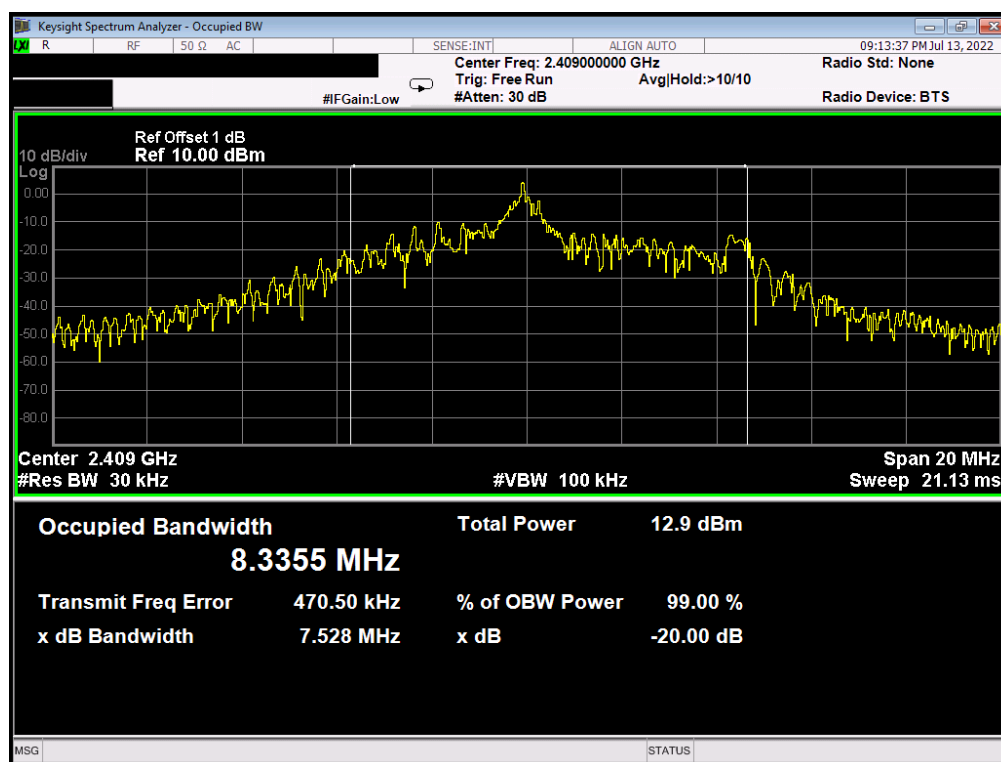
- (1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- (2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- (3) Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
- (4) Repeat above procedures until all frequencies measured were complete.

3.5. Test Result

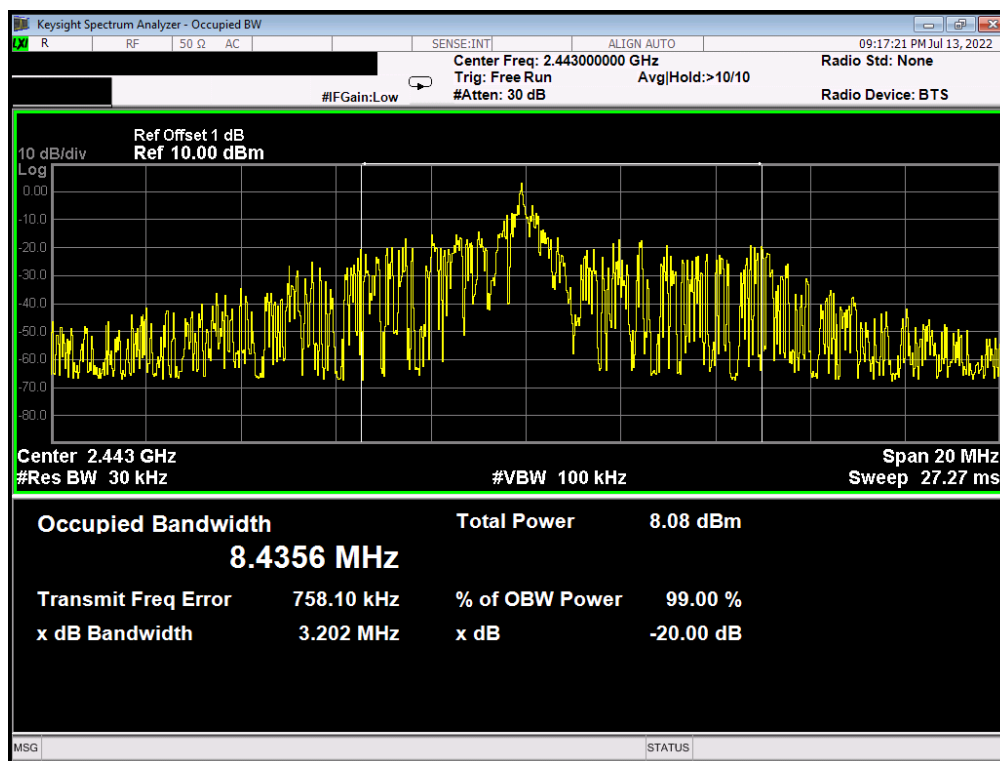
Frequency (MHz)	99% bandwidth (MHz)	20 dB bandwidth (MHz)
2409	8.3355	7.528
2443	8.4356	3.202
2467	8.0519	4.296

3.6. Original test data

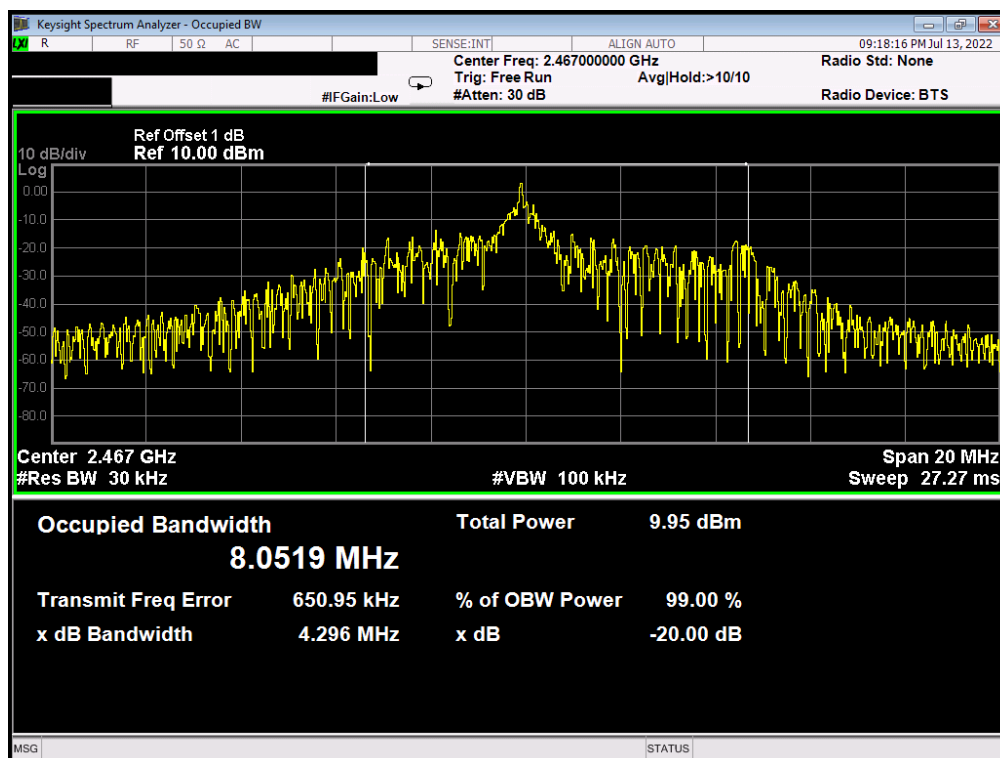
CH 0



CH 5



CH 8



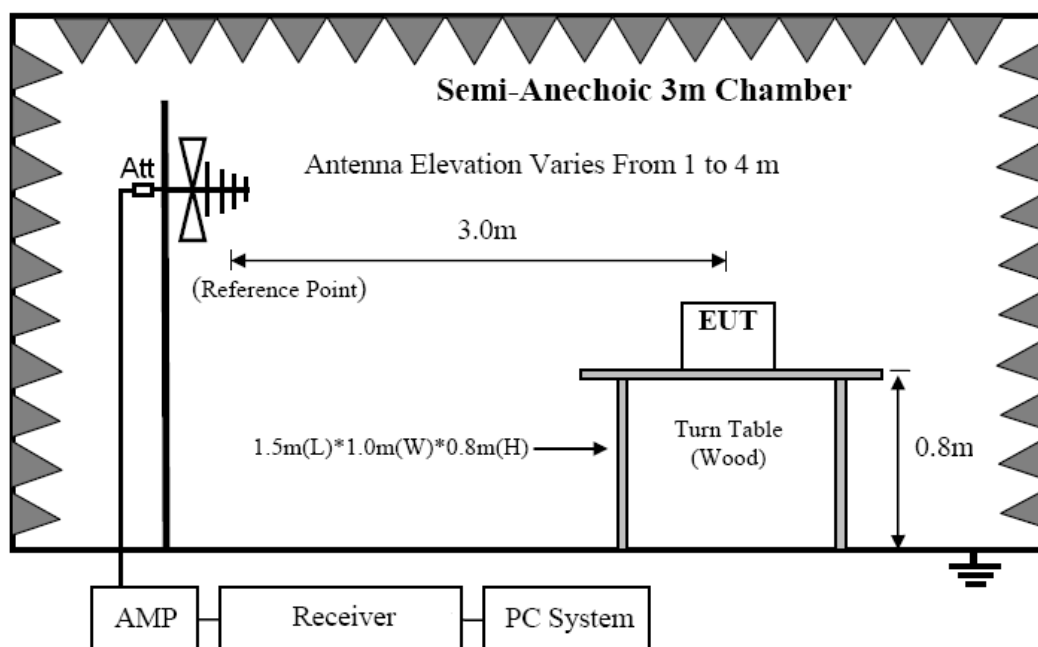
4. Field Strength of Spurious Emissions And Field Strength of Fundamental

4.1. Test equipment

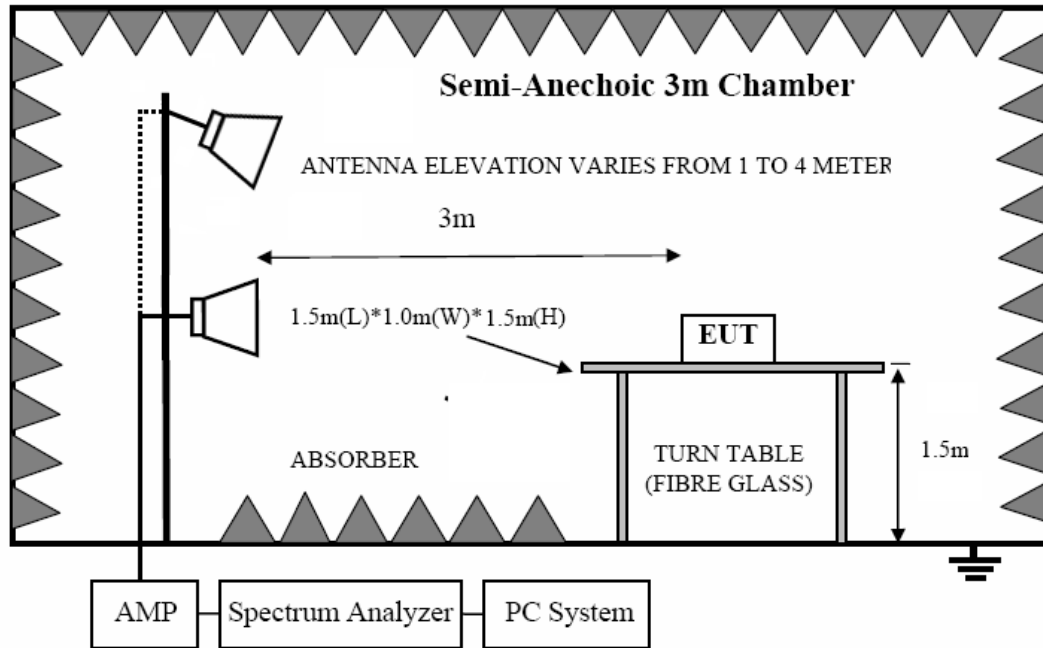
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	12/19/2022
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/16/2022
3	Loop antenna	SCHWARZBECK K	FMZB1519	1519-062	12/14/2022
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	08/05/2022
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	04/18/2023
6	Preamplifier Amplifier	HP	8447F	3113A05680	12/19/2022
7	Pre-Amplifier	EMEC	EM01G26G	60679	04/18/2023
8	RF Cable	R&S	Test Cable 4	4	12/19/2022
9	RF Cable	R&S	Test Cable 5	5	12/19/2022
10	RF Cable	R&S	Test Cable 9	9	04/18/2023
11	RF Cable	R&S	Test Cable 10	10	12/19/2022
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

4.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.3. Limit

6.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

6.3.2 FCC 15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

6.3.3 FCC 15.249(a) limit

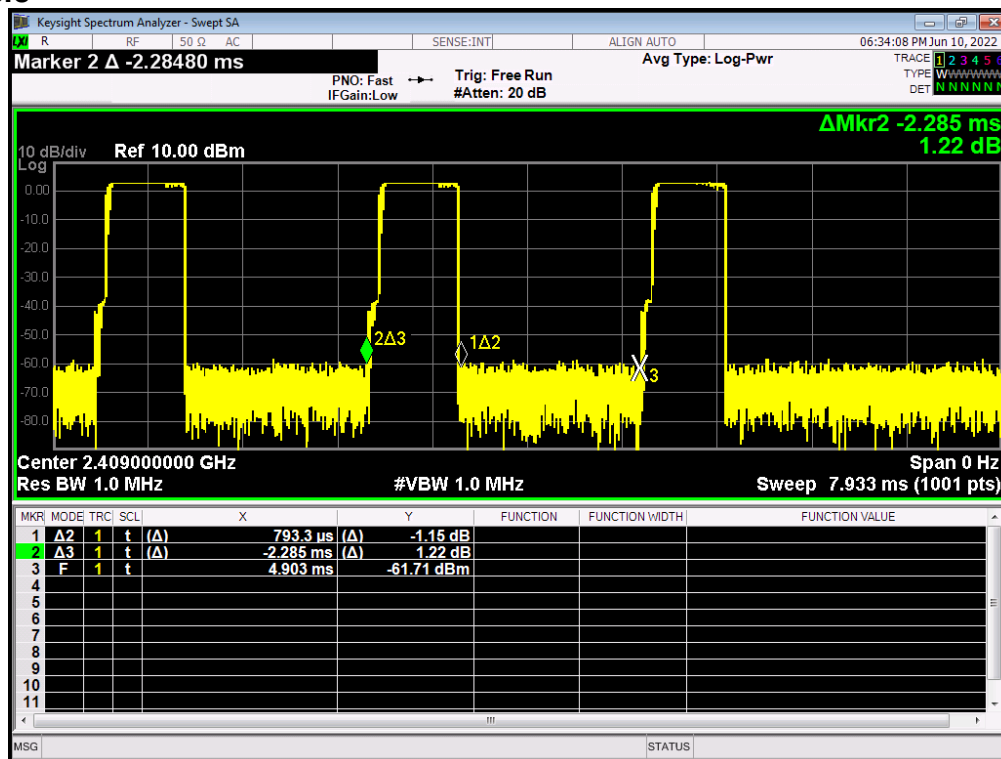
Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24.0-24.25	250	2500

4.4. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.
- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, Detector is at PK; RBW is set at 1MHz, VBW is set at 3MHz for Average measure, Detector is at RMS..
- (8) For Field Strength of Fundamental were measured with Spectrum Analyzer, and the RBW is set at 8MHz, VBW is set at equal to RBW for Peak measure, Detector is at PK

4.5. Test result

Duty Cycle



$$\text{Duty Cycle} = \text{on time} / \text{total time} = 0.7933\text{ms} / 2.285\text{ms} = 0.347$$

$$\text{AVG} = \text{Peak} + 20\text{Log}(\text{Duty Cycle}) = \text{Peak} + 20\text{Log}(0.347) = \text{Peak} - 9.19$$

Below 30M

EUT:	5" End Gate	Model No.:	990057
Temperature:	24°C	Relative Humidity:	55%
Distance:	3m	Test Power:	DC 5V
Polarization:	--	Test Result:	Pass
Test Mode:	Keeping TX mode	Test By:	Leo

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

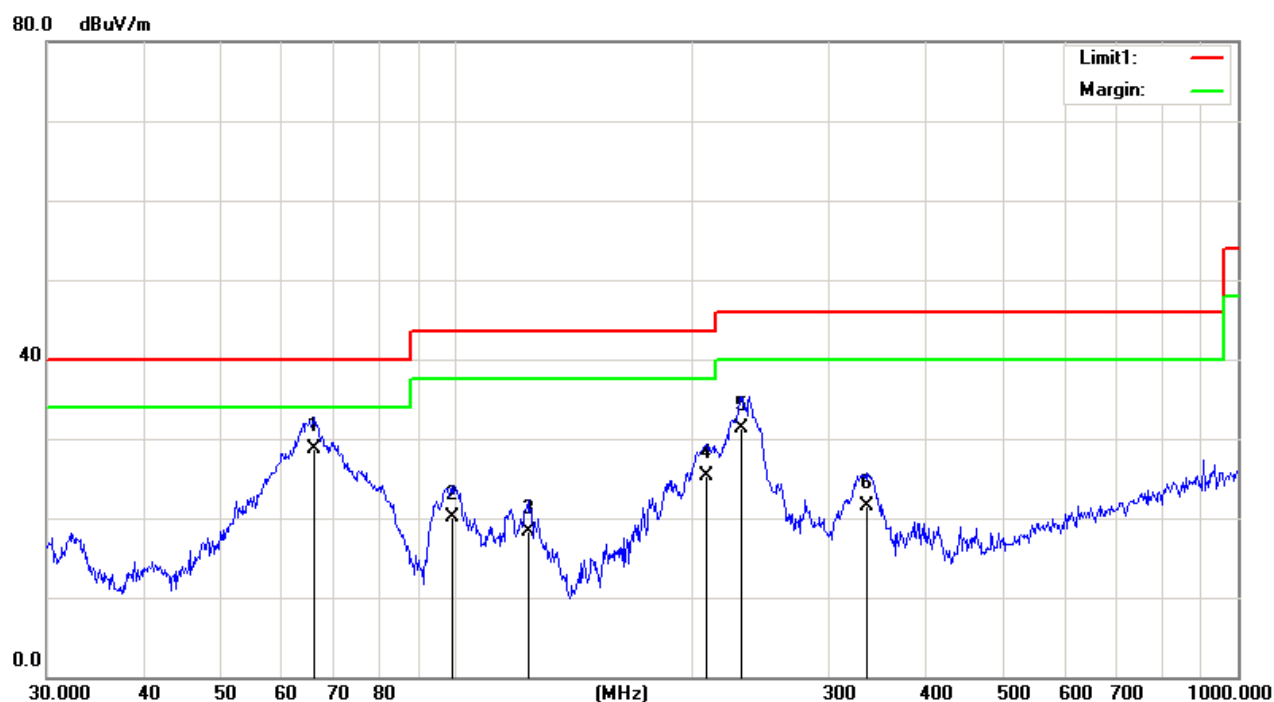
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor

Between 30M – 1000 MHz

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/6/21	Test By:	LEO
Standard:	(RE)FCC PART 15 class B 3m		
Test Mode:	TX Mode		

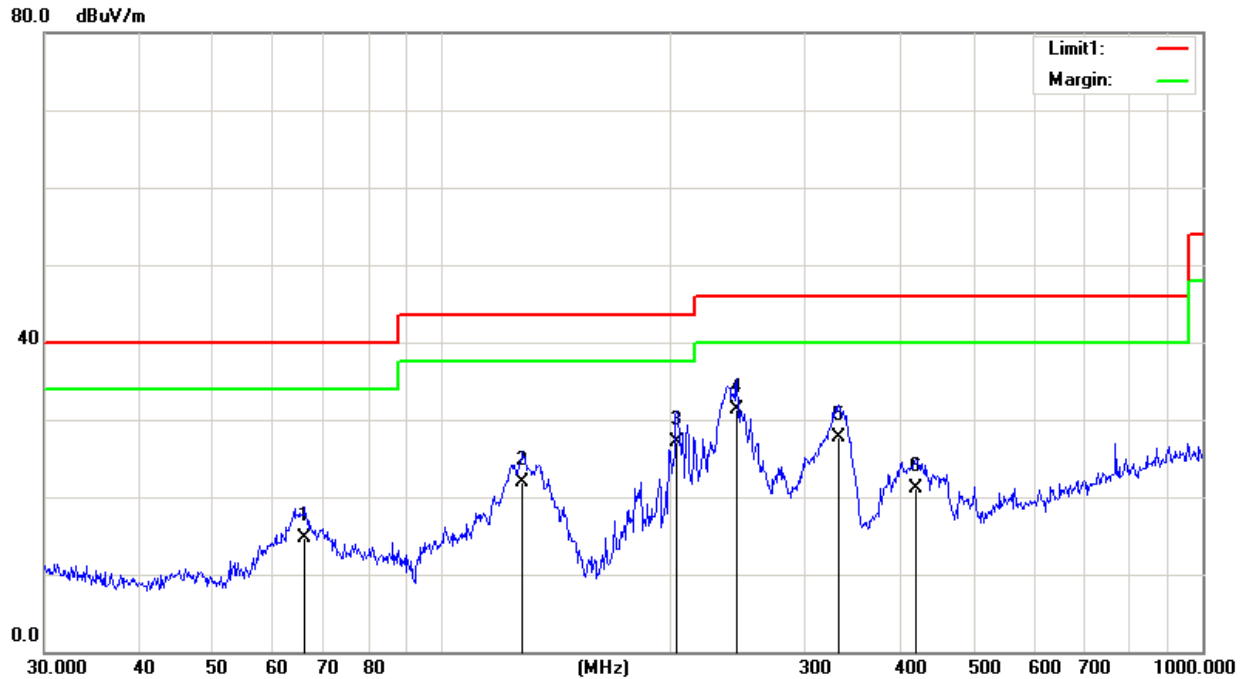


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	66.0340	42.58	-13.95	28.63	40.00	-11.37	QP
2	98.8324	36.07	-15.89	20.18	43.50	-23.32	QP
3	123.6984	31.61	-13.39	18.22	43.50	-25.28	QP
4	209.3129	38.02	-12.81	25.21	43.50	-18.29	QP
5	231.7178	41.90	-10.50	31.40	46.00	-14.60	QP
6	336.0350	31.57	-10.14	21.43	46.00	-24.57	QP

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/6/21	Test By:	LEO
Standard:	(RE)FCC PART 15 class B 3m		
Test Mode:	TX Mode		



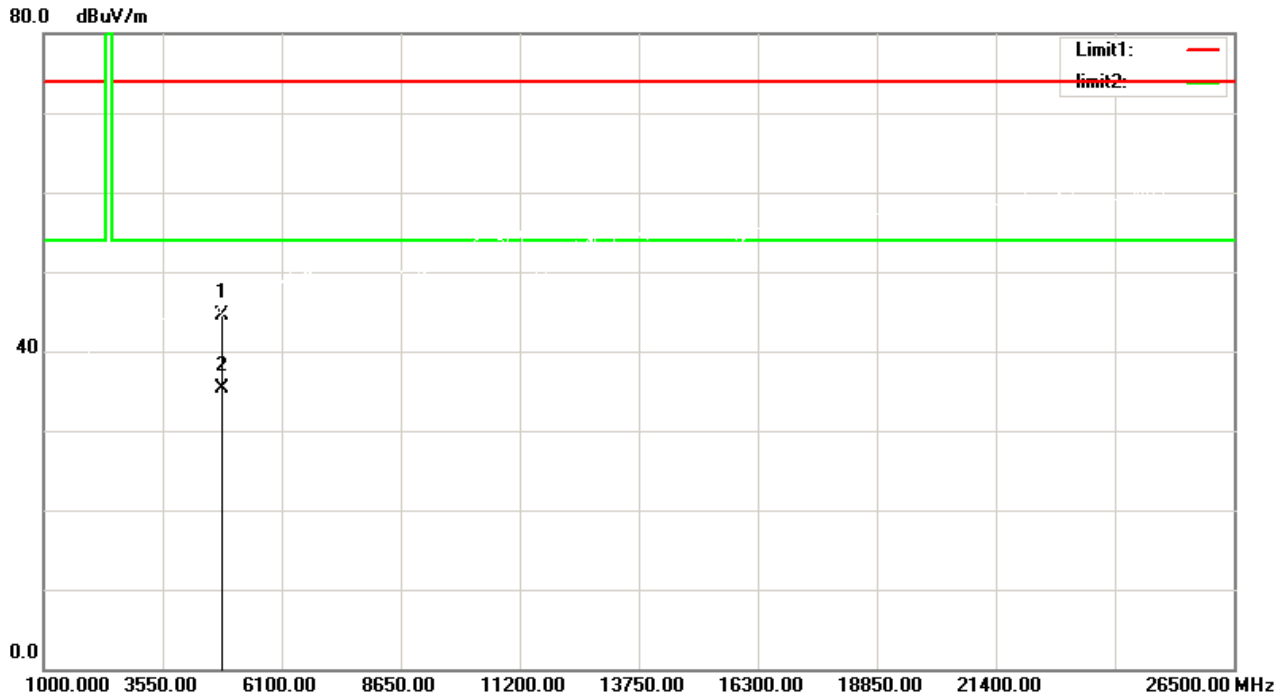
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	66.0342	31.21	-16.54	14.67	40.00	-25.33	QP
2	127.6645	36.34	-14.41	21.93	43.50	-21.57	QP
3	203.5228	38.80	-11.66	27.14	43.50	-16.36	QP
4	244.2321	39.51	-8.26	31.25	46.00	-14.75	QP
5	332.5187	38.72	-10.92	27.80	46.00	-18.20	QP
6	419.1081	30.65	-9.63	21.02	46.00	-24.98	QP

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

Between 1000M – 25000 MHz

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2409		
Note:	TX		

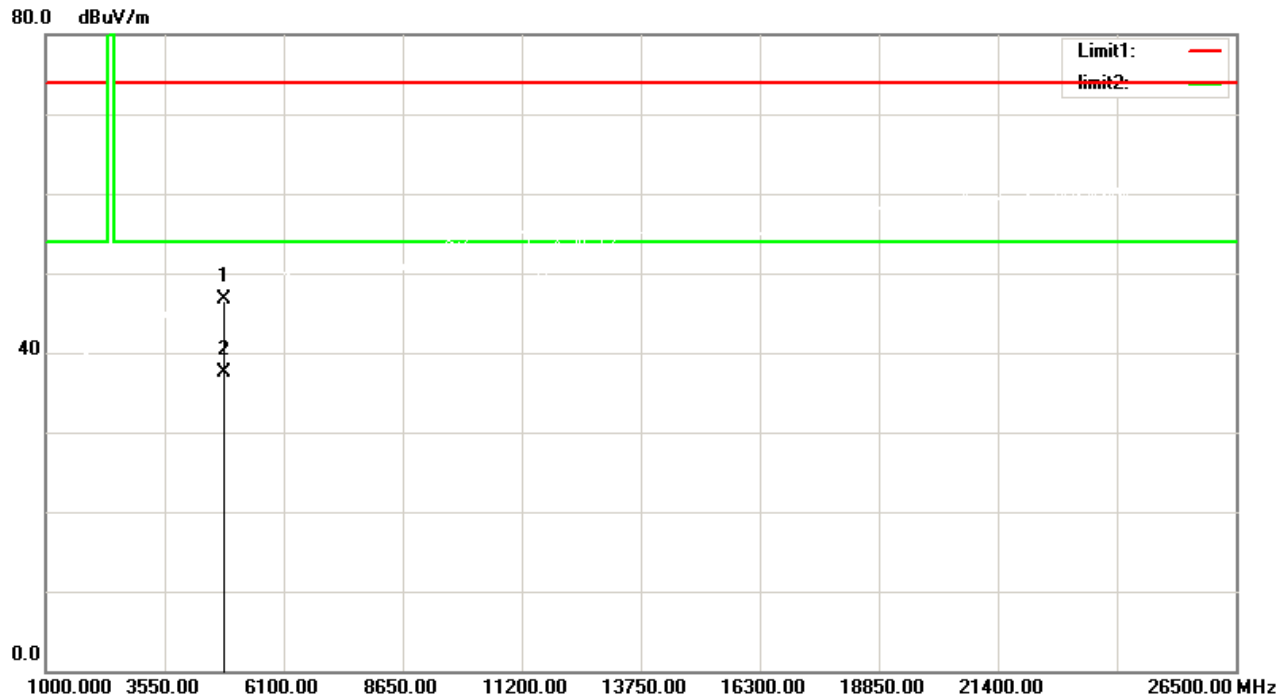


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4818.000	52.48	-8.00	44.48	74.00	-29.52	peak
2	4818.000	/	/	35.29	54.00	-18.71	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2409		
Note:	TX		

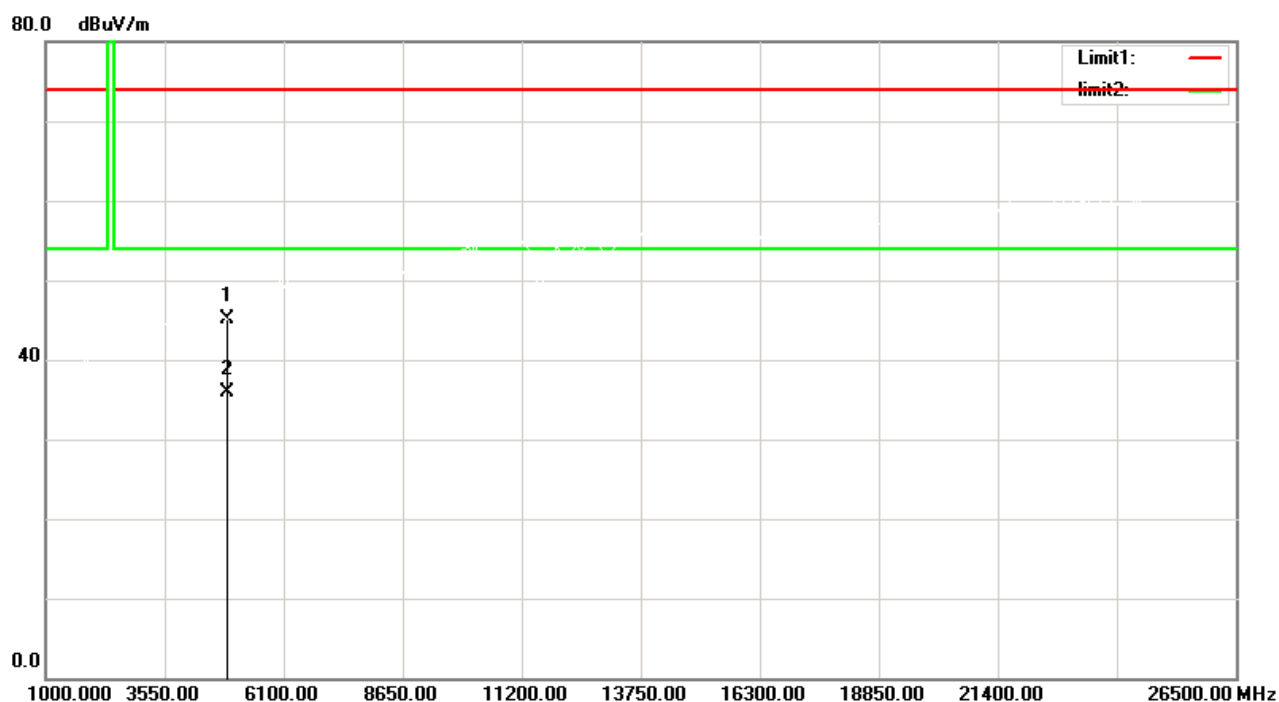


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4818.000	54.69	-8.00	46.69	74.00	-27.31	peak
2	4818.000	/	/	37.50	54.00	-16.50	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2443		
Note:	TX		

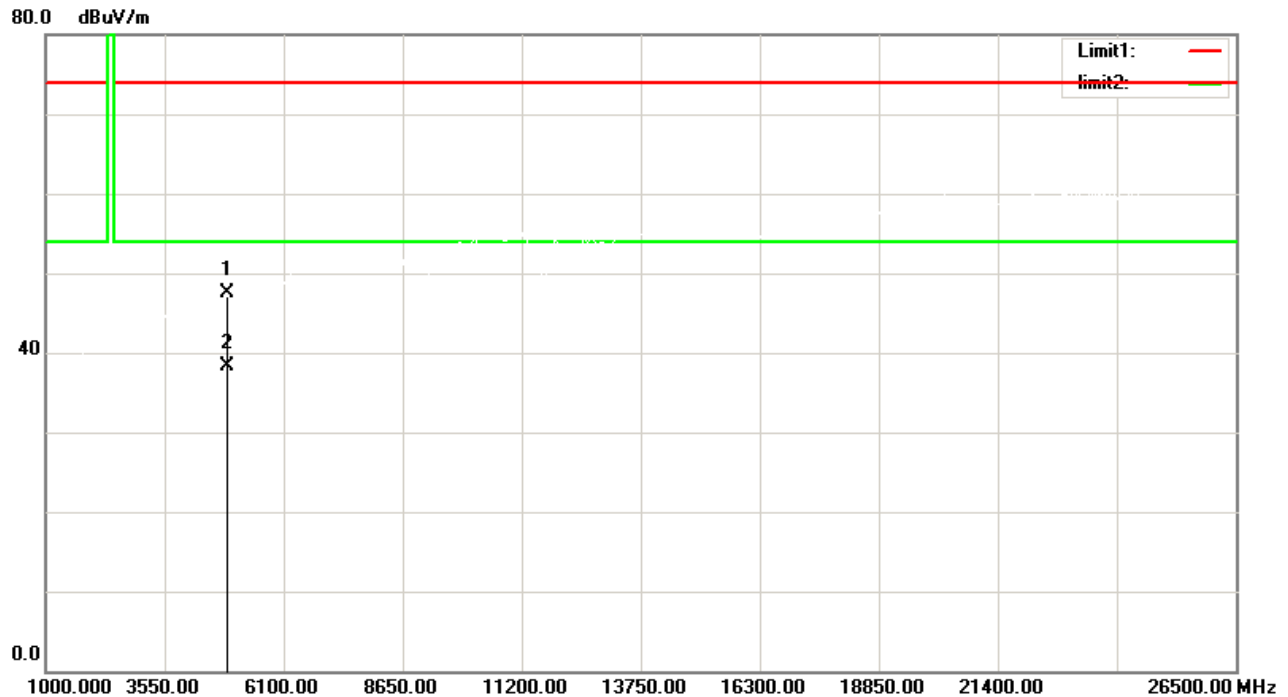


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4886.000	53.03	-7.86	45.17	74.00	-28.83	peak
2	4886.000	/	/	35.98	54.00	-18.02	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2443		
Note:	TX		

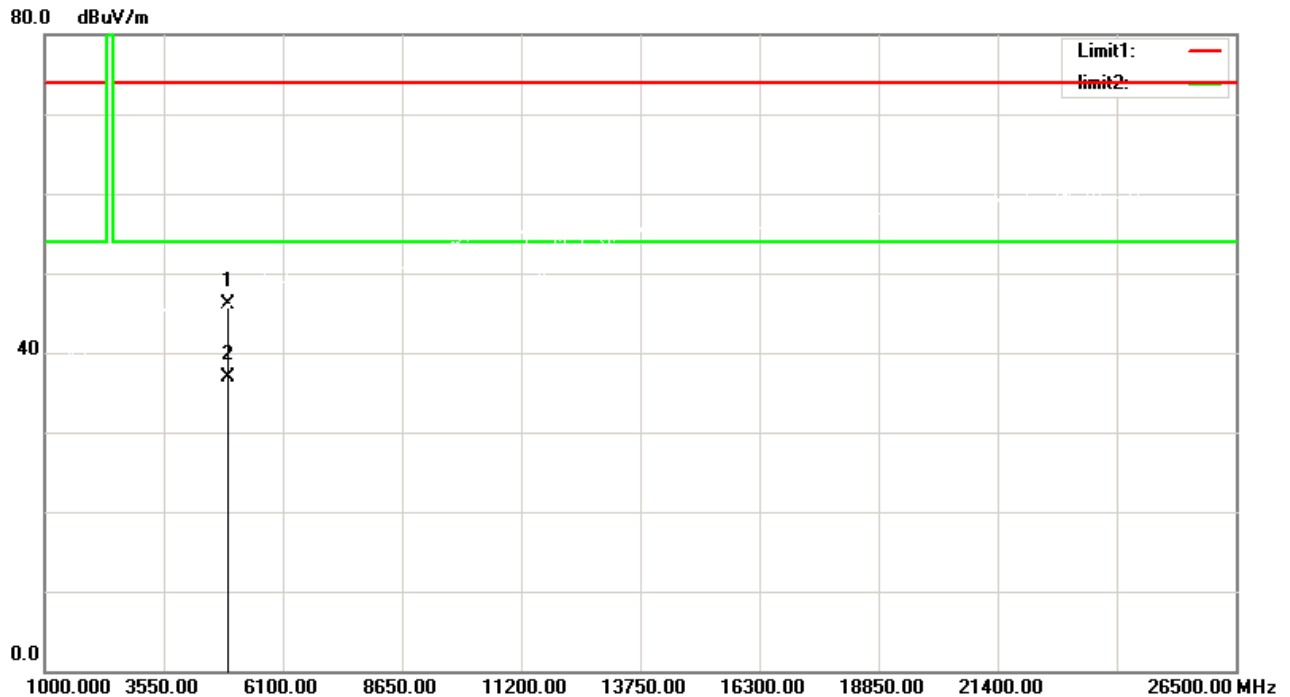


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4886.000	55.40	-7.86	47.54	74.00	-26.46	peak
2	4886.000	/	/	38.35	54.00	-15.65	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2467		
Note:	TX		

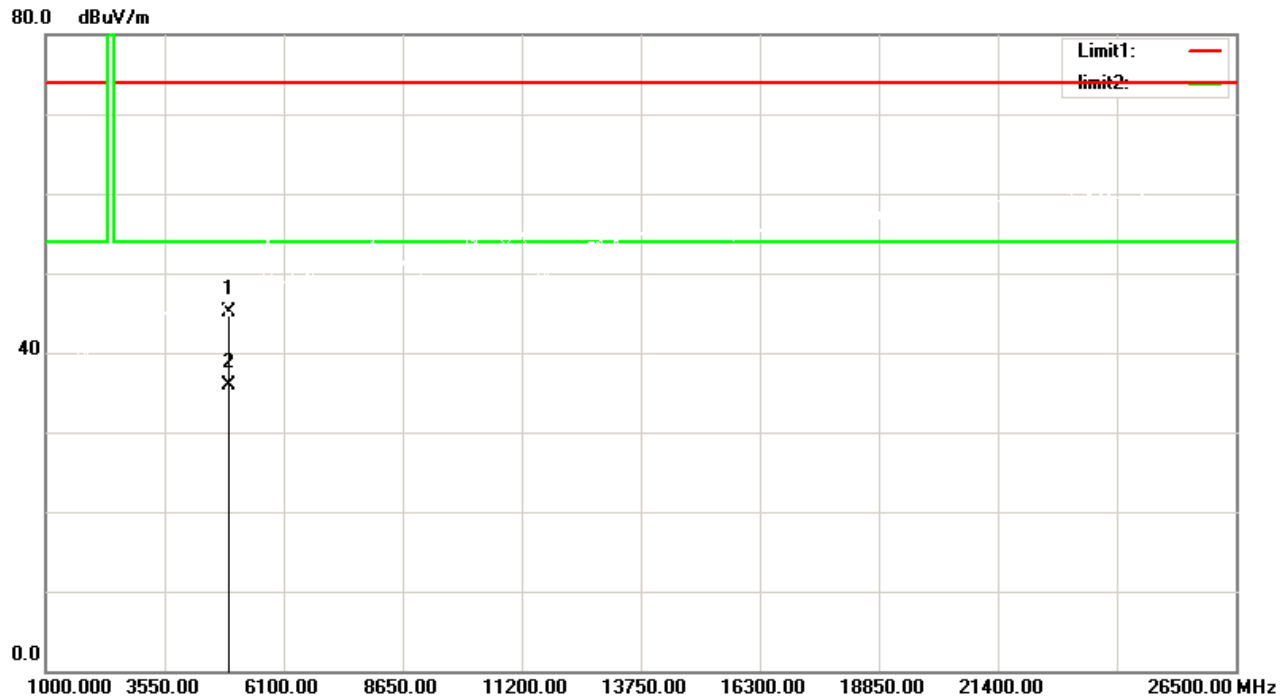


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4934.000	53.90	-7.76	46.14	74.00	-27.86	peak
2	4934.000	44.71	-7.76	36.95	54.00	-17.05	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/27	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2467		
Note:	TX		



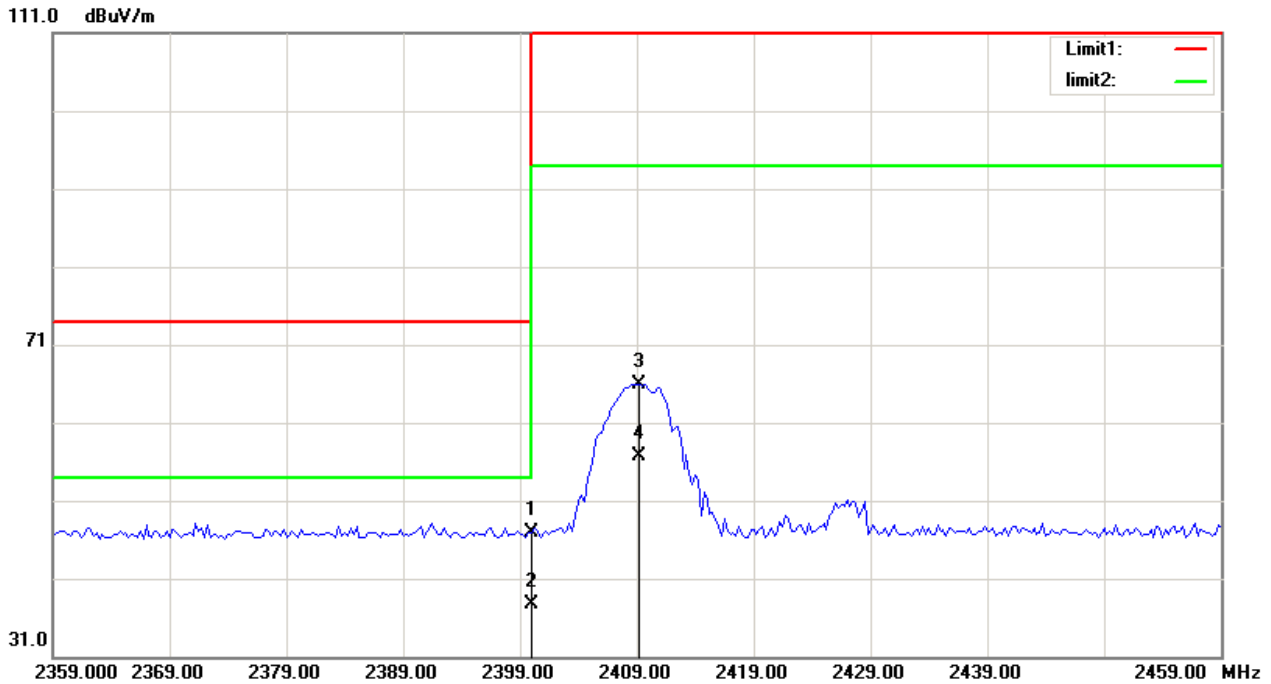
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4934.000	52.94	-7.76	45.18	74.00	-28.82	peak
2	4934.000	/	/	36.00	54.00	-18.00	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

Radiated band edge and Field Strength of Fundamental

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2409		
Note:	TX		

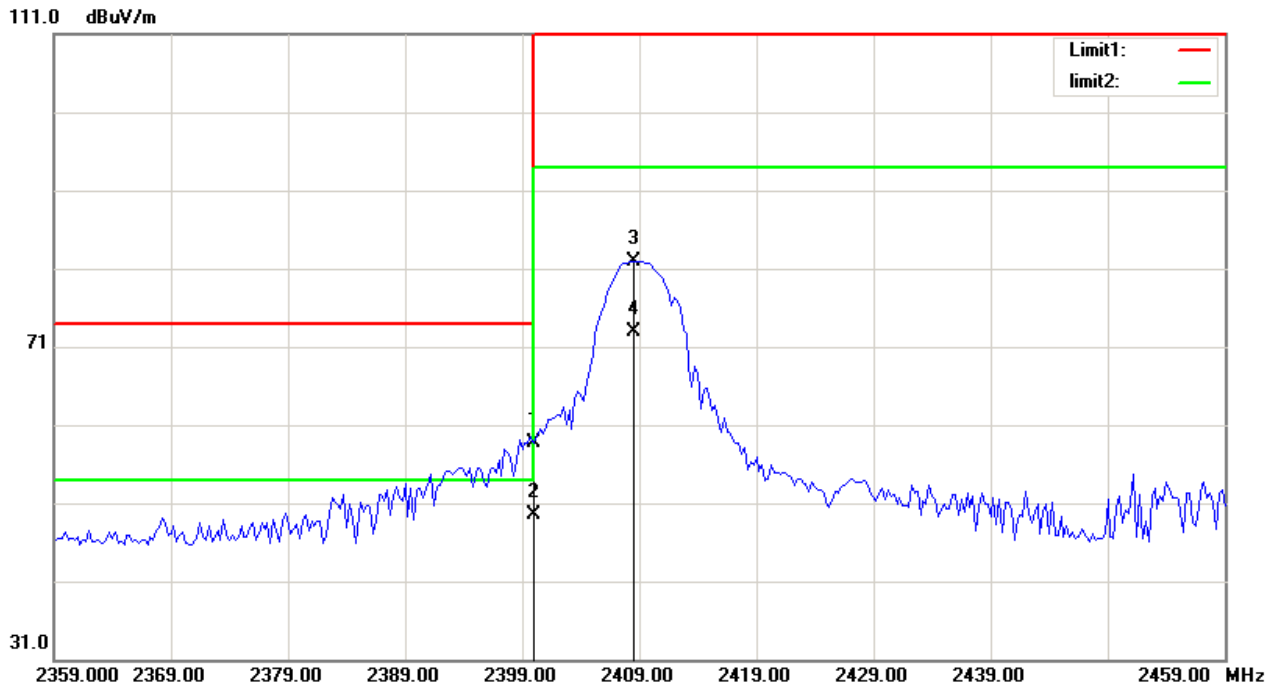


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	59.30	-12.42	46.88	74.00	-27.12	peak
2	2400.000	/	/	37.69	54.00	-16.31	AVG
3	2409.250	78.33	-12.39	65.94	114.00	-48.06	peak
4	2409.250	/	/	56.75	94.00	-37.25	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2409		
Note:	TX		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	71.07	-12.42	58.65	74.00	-15.35	peak
2	2400.000	/	/	49.46	54.00	-4.54	AVG
3	2408.500	94.39	-12.39	82.00	114.00	-32.00	peak
4	2408.500	/	/	72.81	94.00	-21.19	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23.2	Relative Humidity:	53%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	TX		
Note:	2443		

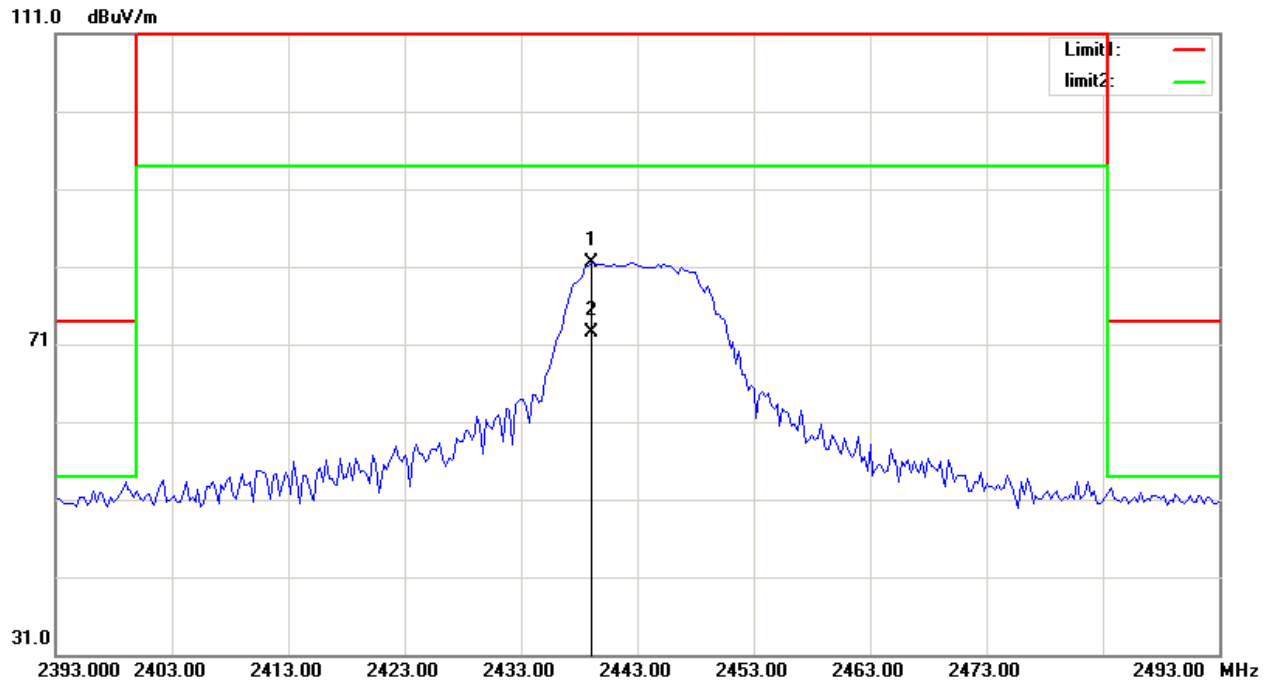


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2443.000	78.93	-12.27	66.66	114.00	-47.34	peak
2	2443.000	/	/	57.47	94.00	-36.53	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23.2	Relative Humidity:	53%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	TX		
Note:	2443		

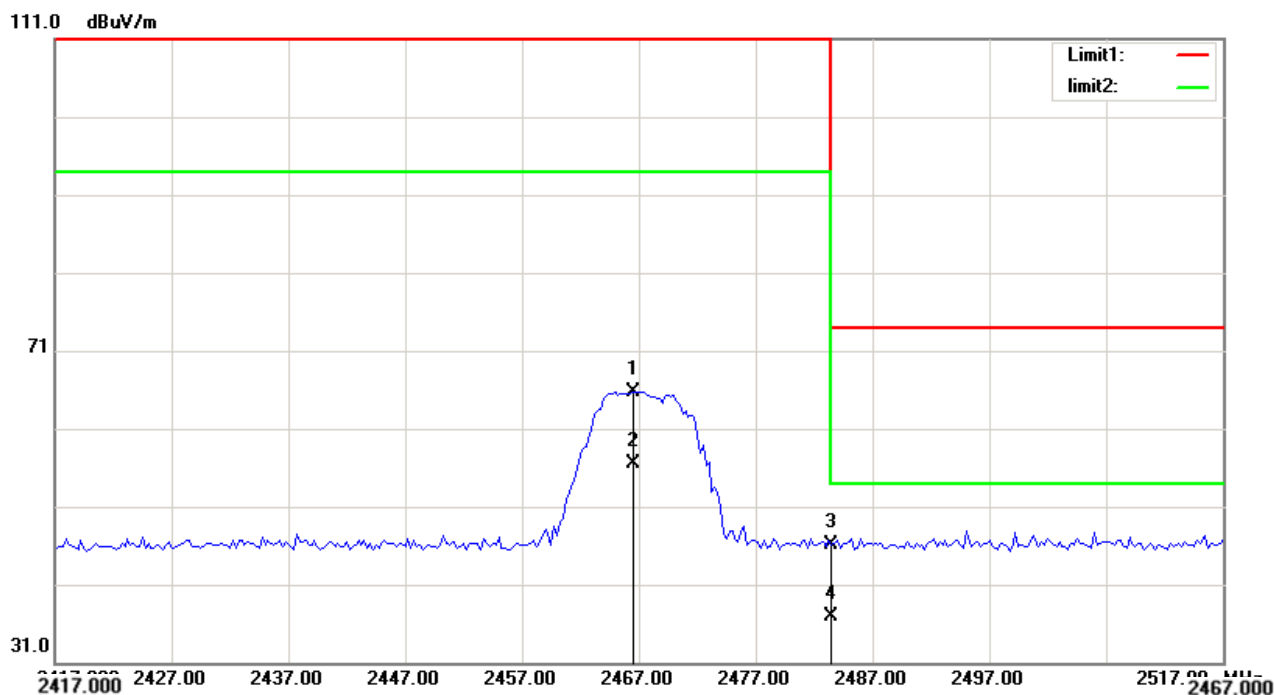


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2439.000	93.88	-12.28	81.60	114.00	-32.40	peak
2	2443.000	/	/	72.41	94.00	-21.59	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2467		
Note:	TX		

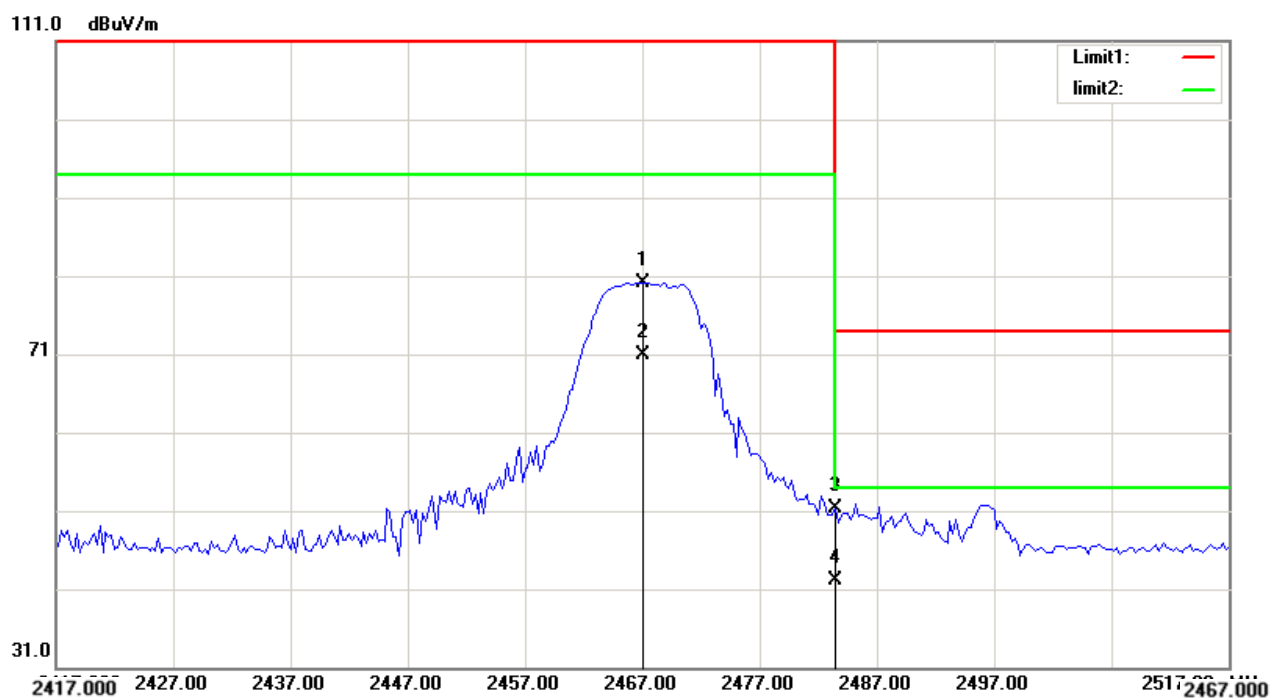


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2466.500	77.92	-12.19	65.73	114.00	-48.27	peak
2	2466.500	/	/	56.54	94.00	-37.46	AVG
3	2483.500	58.25	-12.13	46.12	74.00	-27.88	peak
4	2483.500	/	/	36.93	54.00	-17.07	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

EUT:	5" End Gate	Model No.:	990057
Temperature:	23	Relative Humidity:	54%
Distance:	3m	Test Power:	DC 5V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2022/5/26	Test By:	LEO
Standard:	FCC PART 15.249 PK		
Test Mode:	2467		
Note:	TX		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2467.000	92.36	-12.19	80.17	114.00	-33.83	peak
2	2467.000	/	/	70.98	94.00	-23.02	AVG
3	2483.500	63.42	-12.13	51.29	74.00	-22.71	peak
4	2483.500	/	/	42.10	54.00	-11.90	AVG

The test result is calculated as the following:

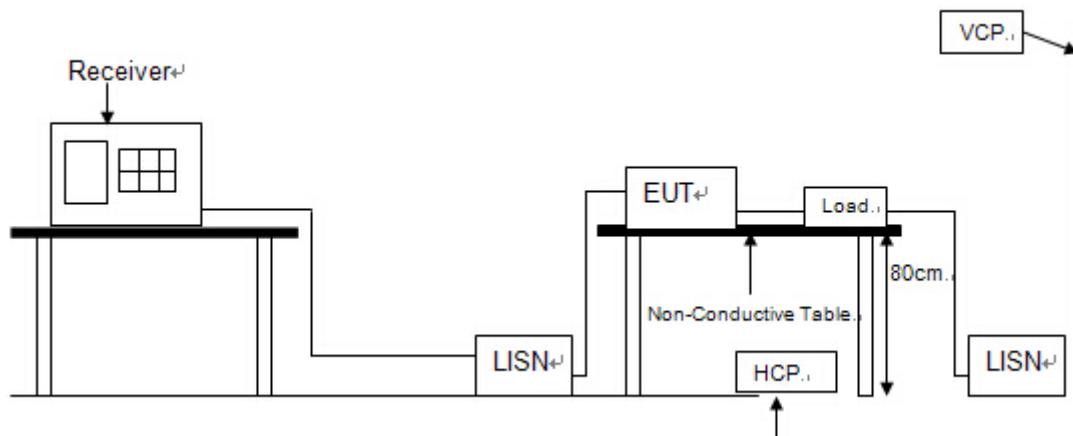
- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result – Limit
- (4) AVG=Peak+20Log(Duty Cycle)=Peak+20Log(0.347)=Peak-9.19

5 POWER LINE CONDUCTED EMISSION

5.1 Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/19/2022
2	EMI Test Receiver	R&S	ESCI	101308	12/17/2022
3	LISN	AFJ	LS16	16011103219	05/26/2023
4	LISN	Schwarzbeck	NSLK 8127	8127-432	12/17/2022
5	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

5.2 Block diagram of test setup



5.3 Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

5.4 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

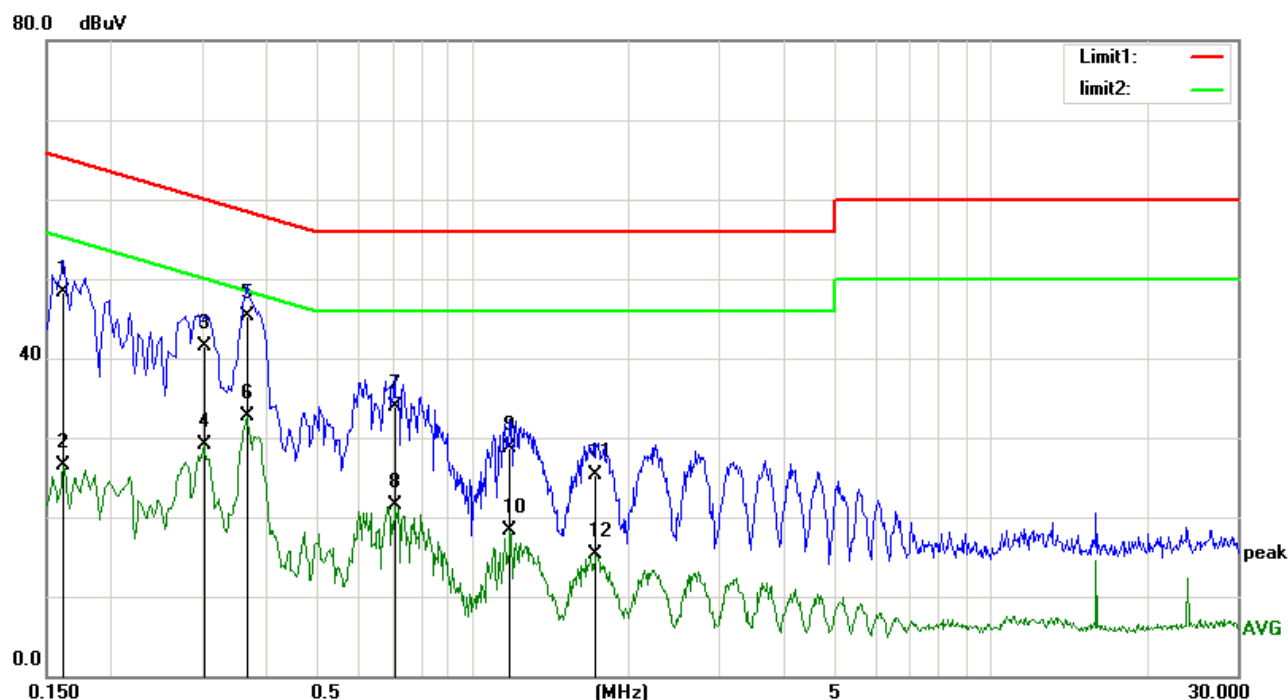
5.5 Test Result

PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “----” means peak detection; “----” mans average detection

EUT:	5" End Gate	Model No.:	990057
Temperature:	24.3	Relative Humidity:	59%
Probe:	L1	Test Power:	DC 5V(AC120V 60Hz)
Test Time:	2022/6/22	Test Result:	Pass
Standard:	(CE)FCC PART 15 class B_QP		
Test Mode:	TX Mode		

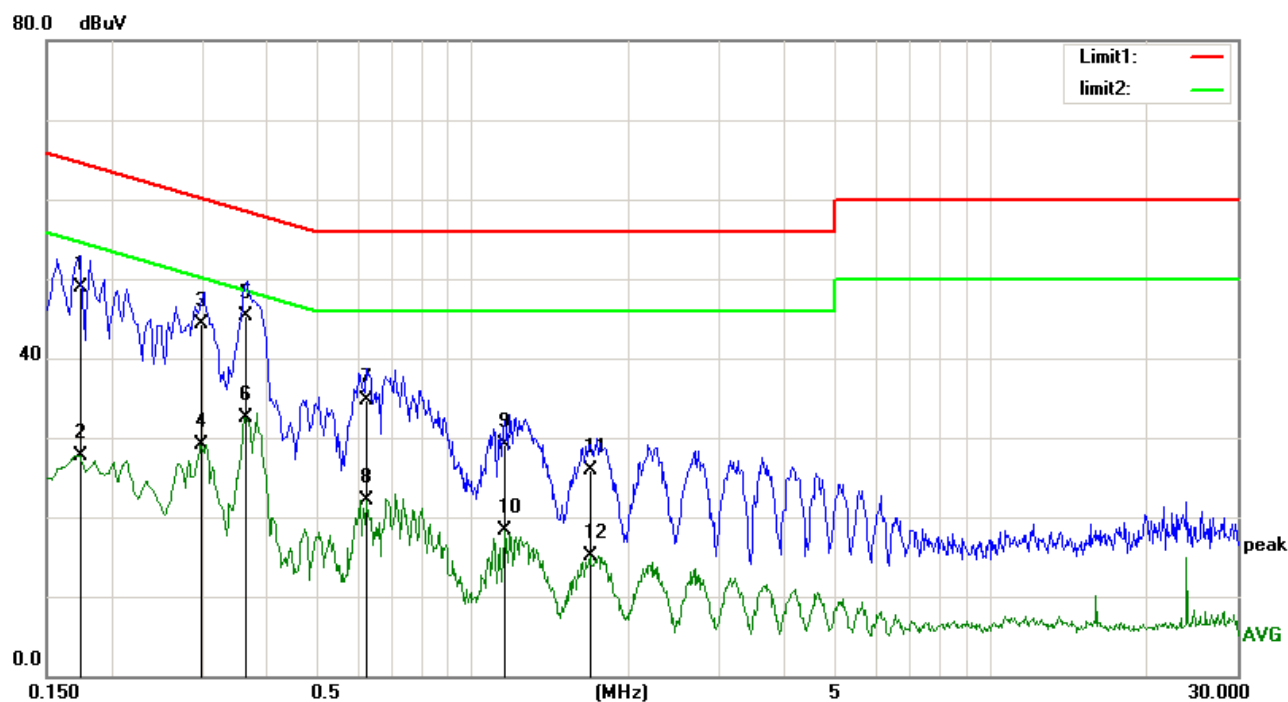


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1620	36.73	11.49	48.22	65.36	-17.14	QP
2	0.1620	14.98	11.49	26.47	55.36	-28.89	AVG
3	0.3020	30.87	10.55	41.42	60.19	-18.77	QP
4	0.3020	18.49	10.55	29.04	50.19	-21.15	AVG
5	0.3660	34.83	10.46	45.29	58.59	-13.30	QP
6	0.3660	22.18	10.46	32.64	48.59	-15.95	AVG
7	0.7100	23.64	10.24	33.88	56.00	-22.12	QP
8	0.7100	11.32	10.24	21.56	46.00	-24.44	AVG
9	1.1820	18.48	10.21	28.69	56.00	-27.31	QP
10	1.1820	8.07	10.21	18.28	46.00	-27.72	AVG
11	1.7260	15.12	10.22	25.34	56.00	-30.66	QP
12	1.7260	5.03	10.22	15.25	46.00	-30.75	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss +Attenuator
- (3) Margin = Result - Limit

EUT:	5" End Gate	Model No.:	990057
Temperature:	24.3	Relative Humidity:	59%
		Test Power:	DC 5V(AC120V 60Hz)
Probe:	N	Test Result:	Pass
Test Time:	2022/6/20	Test By:	LEO
Standard:	(CE)FCC PART 15 class B_QP		
Test Mode:	TX Mode		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1740	37.53	11.40	48.93	64.76	-15.83	QP
2	0.1740	16.39	11.40	27.79	54.76	-26.97	AVG
3	0.2980	33.80	10.56	44.36	60.30	-15.94	QP
4	0.2980	18.60	10.56	29.16	50.30	-21.14	AVG
5	0.3620	34.76	10.47	45.23	58.68	-13.45	QP
6	0.3620	21.99	10.47	32.46	48.68	-16.22	AVG
7	0.6260	24.51	10.26	34.77	56.00	-21.23	QP
8	0.6260	11.79	10.26	22.05	46.00	-23.95	AVG
9	1.1580	18.83	10.20	29.03	56.00	-26.97	QP
10	1.1580	8.01	10.20	18.21	46.00	-27.79	AVG
11	1.6860	15.76	10.22	25.98	56.00	-30.02	QP
12	1.6860	4.97	10.22	15.19	46.00	-30.81	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = (LISN, ISN, PLC or Current Probe) Factor + Cable Loss + Attenuator
- (3) Margin = Result - Limit

END OF REPORT