

FCC AND ISED CERTIFICATION TEST REPORT

FOR

Applicant	:	LOUD AUDIO, LLC
Address	:	19820 North Creek Parkway, Suite #201, Bothell, WA 98011-8227, USA
Equipment under Test	:	LAVALIER WIRELESS MICROPHONE
Model No.	:	EleMent Wave LAV
Trade Mark	:	
FCC ID	:	2AD4XLAVX
IC	:	12714A-LAVX
Manufacturer	:	LOUD AUDIO, LLC
Address	:	19820 North Creek Parkway, Suite #201, Bothell, WA 98011-8227, USA

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, SongshanLake Sci&Tech, IndustryPark, Dongguan
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REPORT

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Test Report Declare

Applicant	:	LOUD AUDIO, LLC
Address	:	19820 North Creek Parkway, Suite #201, Bothell, WA 98011-8227, USA
Equipment under Test	:	LAVALIER WIRELESS MICROPHONE
Model No.	:	EleMent Wave LAV
Trade Mark	:	
Manufacturer	:	LOUD AUDIO, LLC
Address	:	19820 North Creek Parkway, Suite #201, Bothell, WA 98011-8227, USA

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

Test Procedure Used:

ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021).

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&ISED standards.

Report No.:	DDT-R21063010-2E04		
Date of Receipt:	Jul. 01, 2021	Date of Test:	Jul. 01, 2021 ~ Sep. 02, 2021

Prepared By:

Jacky Huang

Jacky Huang/Engineer

Approved By:



Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Sep. 02, 2021	

1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Verdict
6 dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247 ANSI C63.10:2013 RSS-247 Issue 2	Pass
Peak Output Power	FCC Part 15: 15.247 ANSI C63.10:2013 RSS-247 Issue 2	Pass
Power Spectral Density	FCC Part 15:15.247 ANSI C63.10:2013 RSS-247 Issue 2	Pass
Band Edge Compliance (conducted method)	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 RSS-Gen Issue 5	Pass
Radiation Emission	FCC Part 15: 15.247 ANSI C63.10:2013 RSS-247 Issue 2 RSS-Gen Issue 5	Pass
RF Conducted Spurious Emissions	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 RSS-Gen Issue 5	Pass
Emission in Restricted Frequency Bands	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 RSS-Gen Issue 5	Pass
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10: 2013 RSS-Gen Issue 5	Pass
Antenna Requirement	FCC Part 15: 15.203 RSS-Gen Issue 5	Pass

2. General Test Information

2.1. Description of EUT

EUT* Name	: LAVALIER WIRELESS MICROPHONE
Model Number	: EleMent Wave LAV
EUT Function Description	: Please reference user manual of this device
Power Supply	: DC 5V by external adapter DC 3.7V Li-ion built-in battery
Radio Specification	: 2.4GHz SRD
Operation Frequency	: 2409 MHz - 2475 MHz
Modulation	: GFSK
Data Rate	: 2 Mbps
Antenna Gain	: 0 dBi
Serial Number	: N/A
Sample Type	: Series production

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2409	18	2443
2	2411	19	2445
3	2413	20	2447
4	2415	21	2449
5	2417	22	2451
6	2419	23	2453
7	2421	24	2455
8	2423	25	2457
9	2425	26	2459
10	2427	27	2461
11	2429	28	2463
12	2431	29	2465
13	2433	30	2467
14	2435	31	2469
15	2437	32	2471
16	2439	33	2473
17	2441	34	2475

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
USB cable	N/A	N/A	Length: 1.00m, unshielded
MIC cable	N/A	N/A	Length: 1.20m, unshielded
Aux in cable	N/A	N/A	Length: 0.30m, unshielded

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
N/A	N/A	N/A	N/A	N/A

2.4. Block diagram of EUT configuration for test

EUT

Test software: test software has been burned into the product, the product through the button switch test channel and wireless mode as below table.

Tested mode, channel, information			
Mode	Channel	Frequency (MHz)	Power setting
GFSK Tx mode	CH0	2409	/
	CH16	2441	/
	CH33	2475	/

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

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

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

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, G-20118

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 22 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1-6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.32 dB (150 kHz - 30 MHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

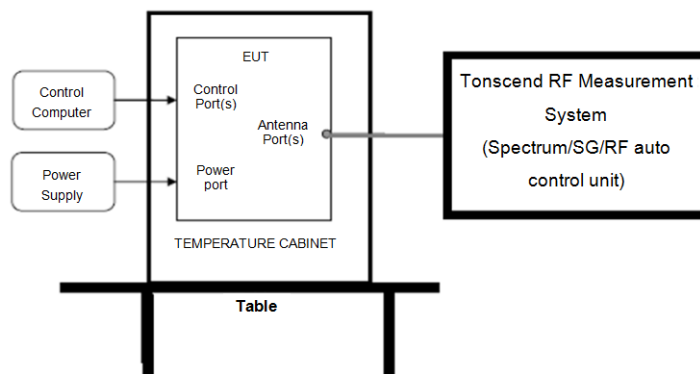
3. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☐ RF Connected Test (Tonscend RF Measurement System 1#)					
Spectrum analyzer	R&S	FSU26	200071	Sep. 25, 2020	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Jun. 01, 2021	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Sep. 24, 2020	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jun. 01, 2021	1 Year
RF Control Unit	Tonsend	JS0806-2	DDT-ZC0290	Jun. 01, 2021	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDDS-150L	ZX170110-A	Jun. 01, 2021	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
☒ RF Connected Test (Tonscend RF Measurement System 2#)					
Spectrum analyzer	R&S	FSU26	101472	Jun. 01, 2021	1 Year
Wideband Radio Communication tester	R&S	CMW500	120259	Jan. 19, 2021	1 Year
Vector Signal Generator	Agilent	N5182A	MY19060405	Jun. 01, 2021	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180912	Jun. 01, 2021	1 Year
RF Control Unit	Tonsend	JS0806-2	DDT-ZC01449	Jun. 01, 2021	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDDS-150L	ZX170110-A	Jun. 01, 2021	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
☐ Radiation 1#chamber					
EMI Test Receiver	R&S	ESU8	100316	Sep. 24, 2020	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 01, 2021	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Nov. 13, 2020	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Nov. 18, 2020	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 13, 2020	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	May 07, 2021	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Sep. 28, 2020	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	Sep. 24, 2020	1 Year
RF Cable	N/A	5m+6m+1m	06270619	Sep. 30, 2020	1 Year

MI Cable	HUBSER	C10-01-01-1M	1091629	Sep. 30, 2020	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
☑Radiation 2#chamber					
EMI Test Receiver	R&S	ESCI	101364	Sep. 28, 2020	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 01, 2021	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	9163-994	Nov. 13, 2020	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Nov. 18, 2020	1 Year
Double Ridged Horn Antenna	Schwarzbeck	BBHA9120	02108	Jul. 17, 2021	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	May 07, 2021	1 Year
Pre-amplifier	TERA-MW	TRLA-0040G35	101303	Sep. 28, 2020	1 Year
RF Cable	N/A	14+1.5m	06270619	Sep. 28, 2020	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
☑Power Line Conducted Emissions Test 1#					
EMI Test Receiver	R&S	ESU8	100316	Sep. 24, 2020	1 Year
LISN 1	R&S	ENV216	101109	Sep. 28, 2020	1 Year
LISN 2	R&S	ESH2-Z5	100309	Sep. 28, 2020	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Sep. 24, 2020	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Sep. 24, 2020	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
☐Power Line Conducted Emissions Test 2#					
Test Receiver	R&S	ESPI	101761	Sep. 24, 2020	1 Year
LISN 1	R&S	ENV216	101170	Sep. 28, 2020	1 Year
LISN 2	R&S	ESH2-Z5	100309	Sep. 28, 2020	1 Year
Pulse Limiter	R&S	KH43101	431011801568-12#	Jun. 01, 2021	1 Year
CE Cable 2	HUBSER	N/A	W11.02	Sep. 24, 2020	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

4. 6 dB Bandwidth and 99% Bandwidth

4.1. Block diagram of test setup



4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

4.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) 99% Bandwidth set the spectrum analyzer as follows:

RBW:	30 kHz
VBW:	100 kHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) 6 dB Bandwidth set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

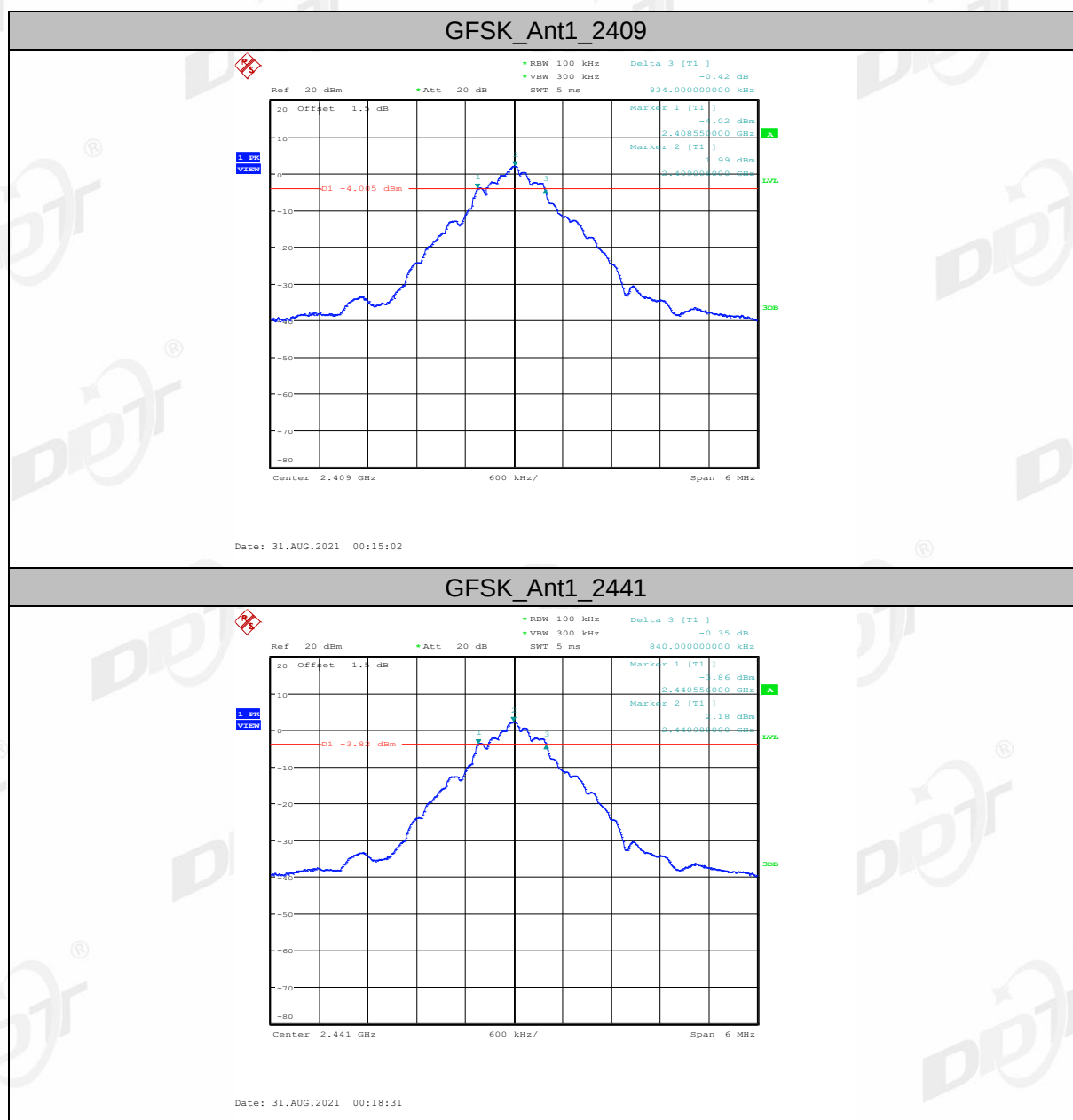
(4) Allow the trace to stabilize, measure the 6 dB and 99% bandwidth of signal.

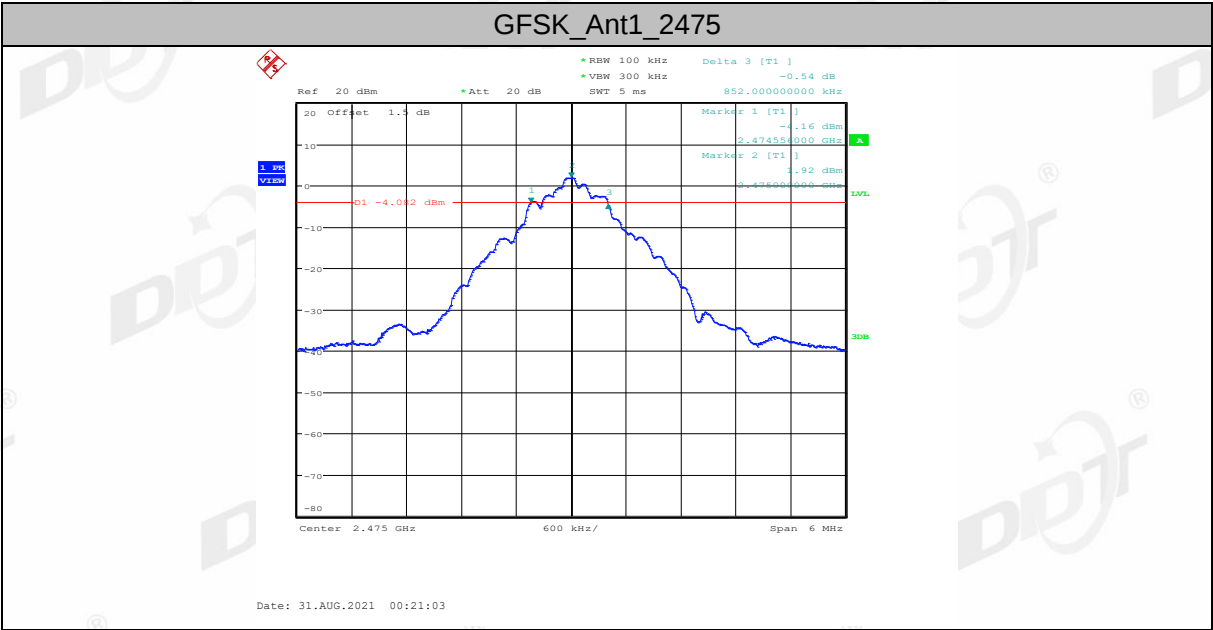
4.4. Test result

Mode	Channel	6 dB bandwidth Result (MHz)	99% bandwidth Result (MHz)	6dB width Limit (MHz)	Verdict
GFSK	CH1	0.834	1.698	>0.5	Pass
	CH17	0.840	1.698	>0.5	Pass
	CH34	0.852	1.704	>0.5	Pass

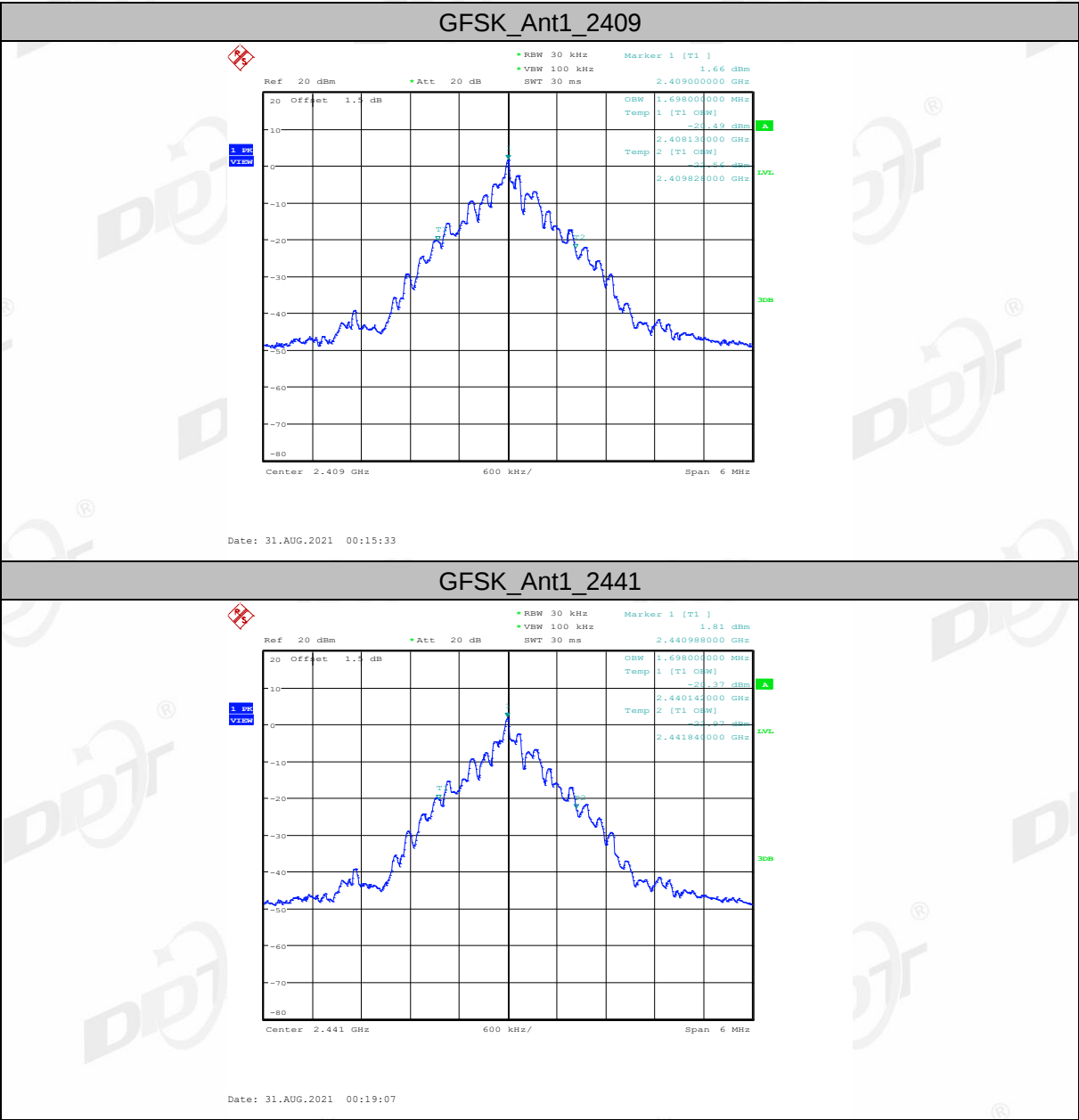
4.5. Test graphs

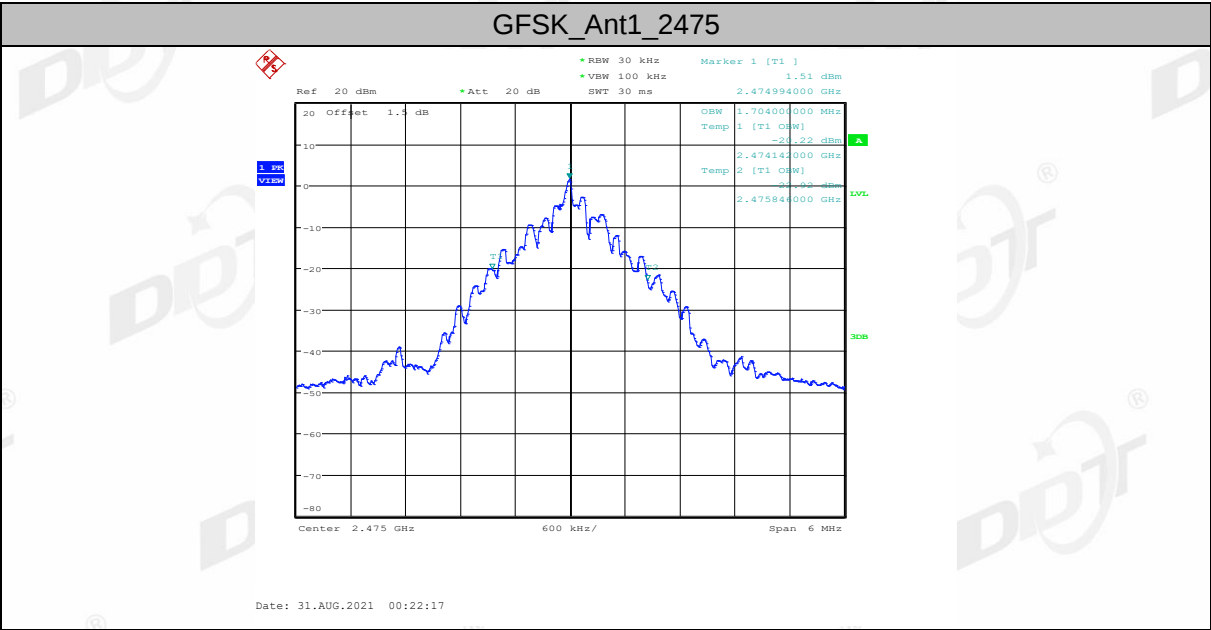
6 dB bandwidth:





99% bandwidth:





5. Maximum Peak Output Power

5.1. Block diagram of test setup

Same with 4.1

5.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

RBW: $\geq$ DTS bandwidth

VBW: $\geq 3 \times$ RBW

Span $\geq 3 \times$ RBW

Detector Mode: Peak

Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges measure out the PK output power.

5.4. Test result

Maximum peak conducted output power:

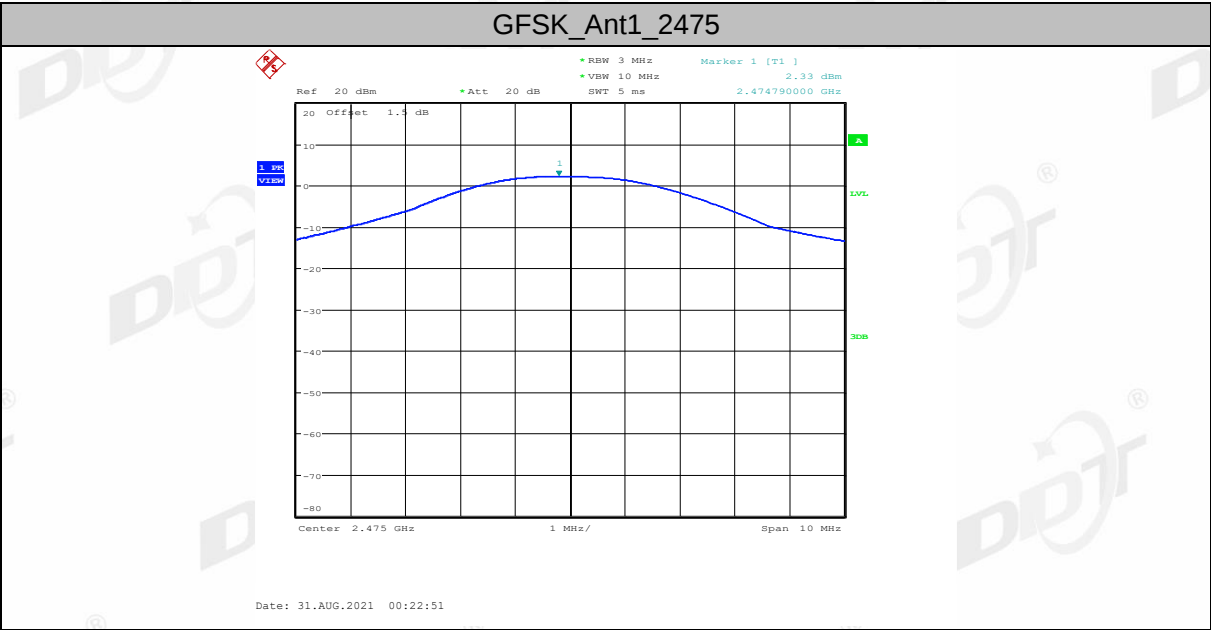
Test Mode	Antenna	Channel	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	2409	2.39	≤ 30	Pass
		2441	2.53	≤ 30	Pass
		2475	2.33	≤ 30	Pass

e.i.r.p:

Test Mode	Antenna	Channel	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	2409	2.39	≤ 30	Pass
		2441	2.53	≤ 30	Pass
		2475	2.33	≤ 30	Pass

5.5. Test graphs





6. Power Spectral Density

6.1. Block diagram of test setup

Same with 4.1

6.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

6.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	$3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

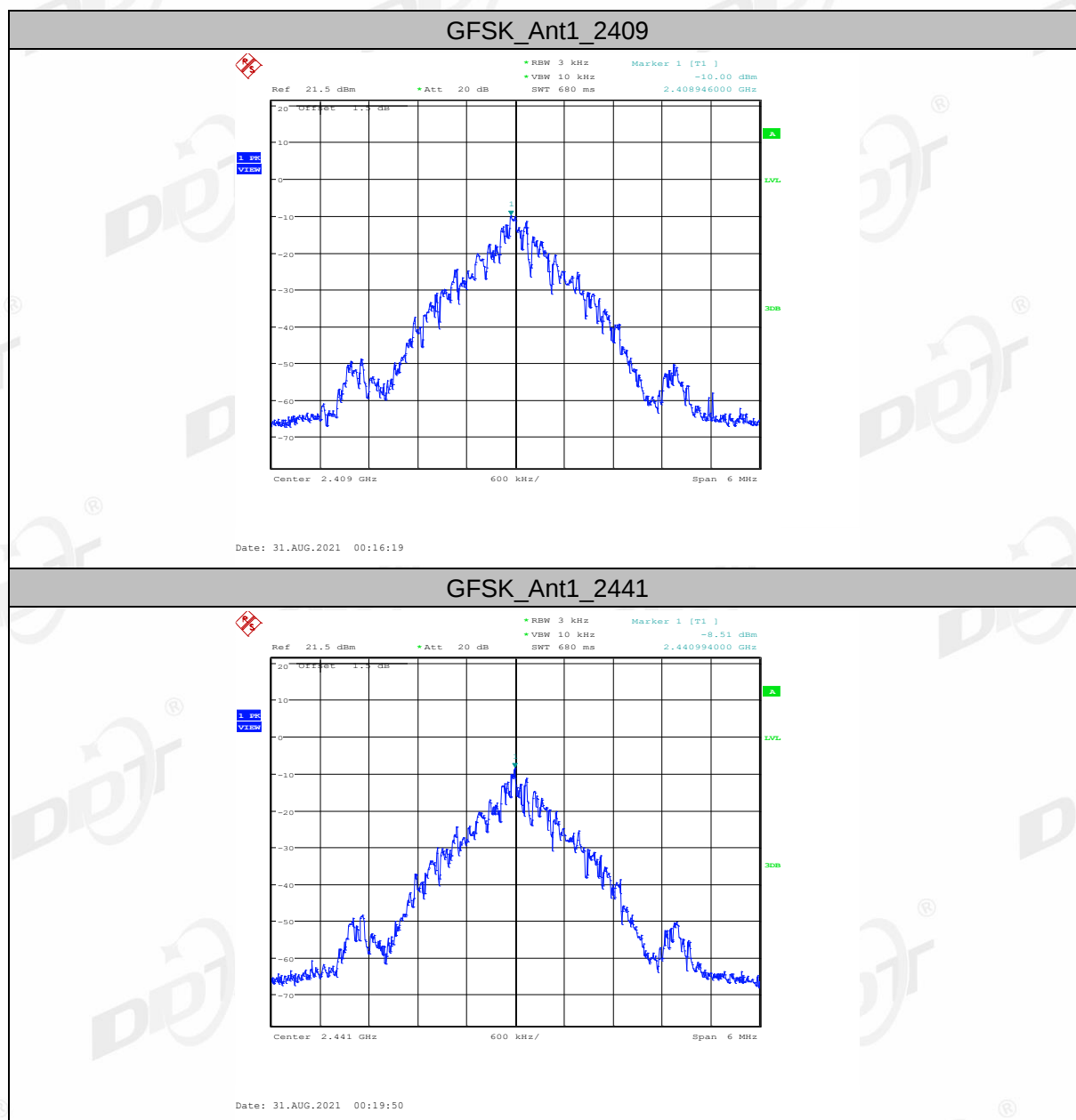
(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

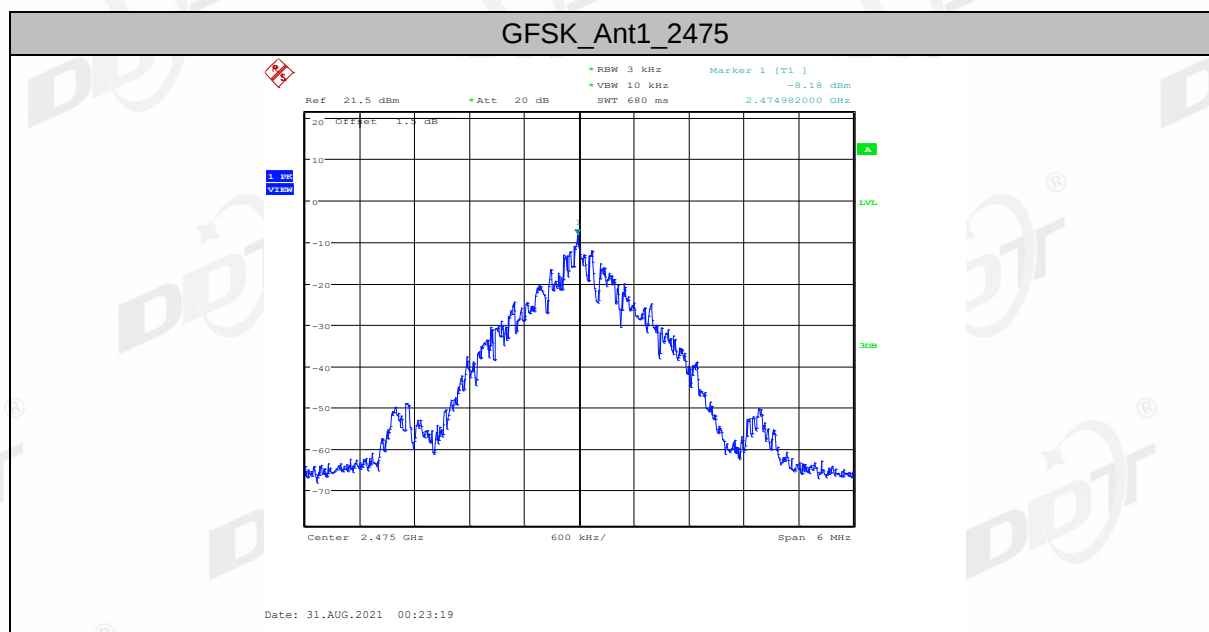
(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.4. Test result

Test Mode	Antenna	Channel	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
GFSK	Ant1	2409	-10.0	≤ 8	Pass
		2441	-8.51	≤ 8	Pass
		2475	-8.18	≤ 8	Pass

6.5. Test graphs





7. Band Edge Compliance (Conducted Method)

7.1. Block diagram of test setup

Same with 4.1

7.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

7.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW:	100 kHz
VBW:	300 kHz
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

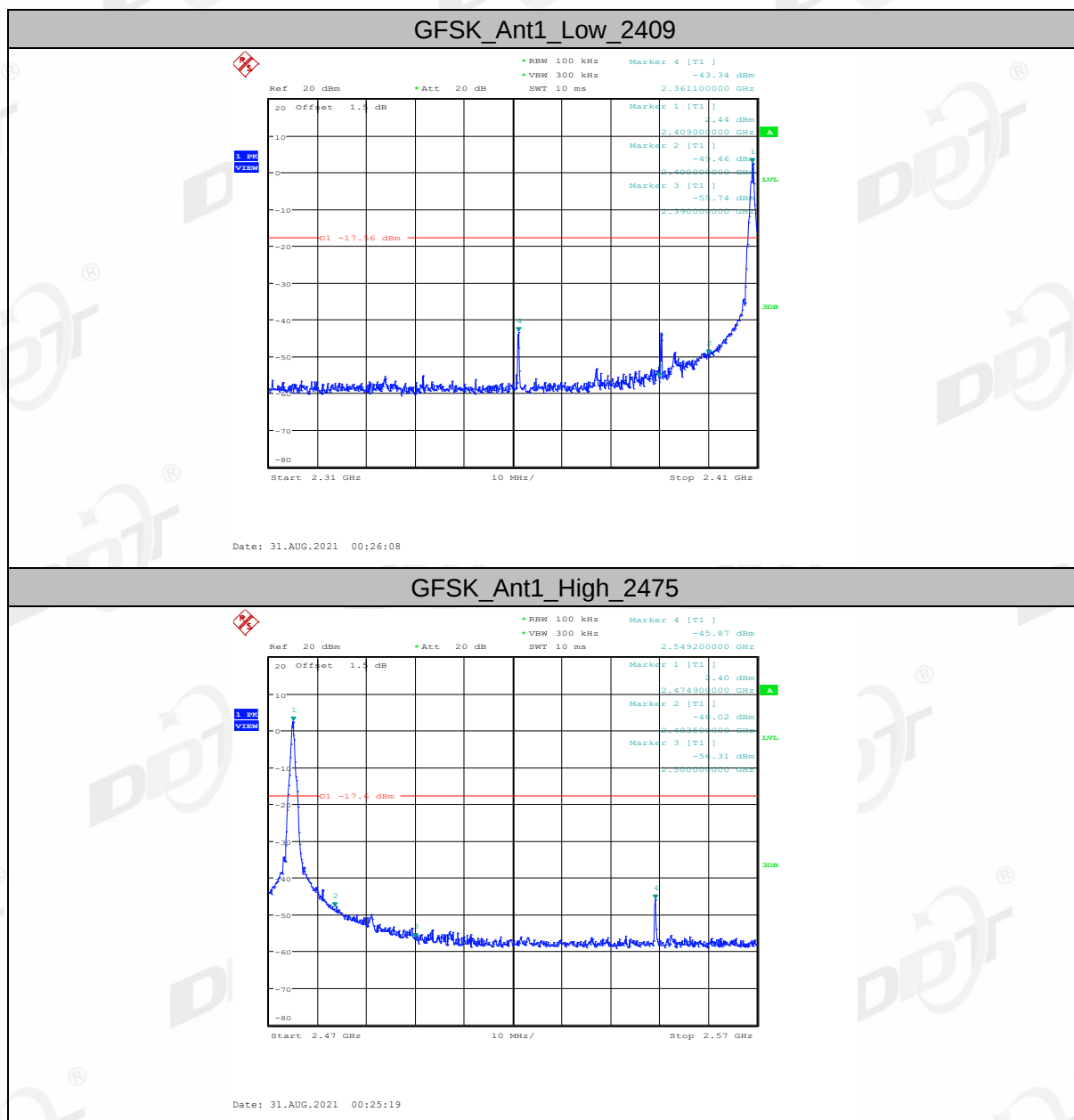
RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{span/RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

7.5. Test result

Test Mode	Antenna	Channel Name	Channel	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	Low	2409	2.44	-43.34	<=-17.56	Pass
		High	2475	2.40	-45.87	<=-17.6	Pass

7.6. Test graphs



8. RF Conducted Spurious Emissions

8.1. Block diagram of test setup

Same as section 4.1

8.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

8.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

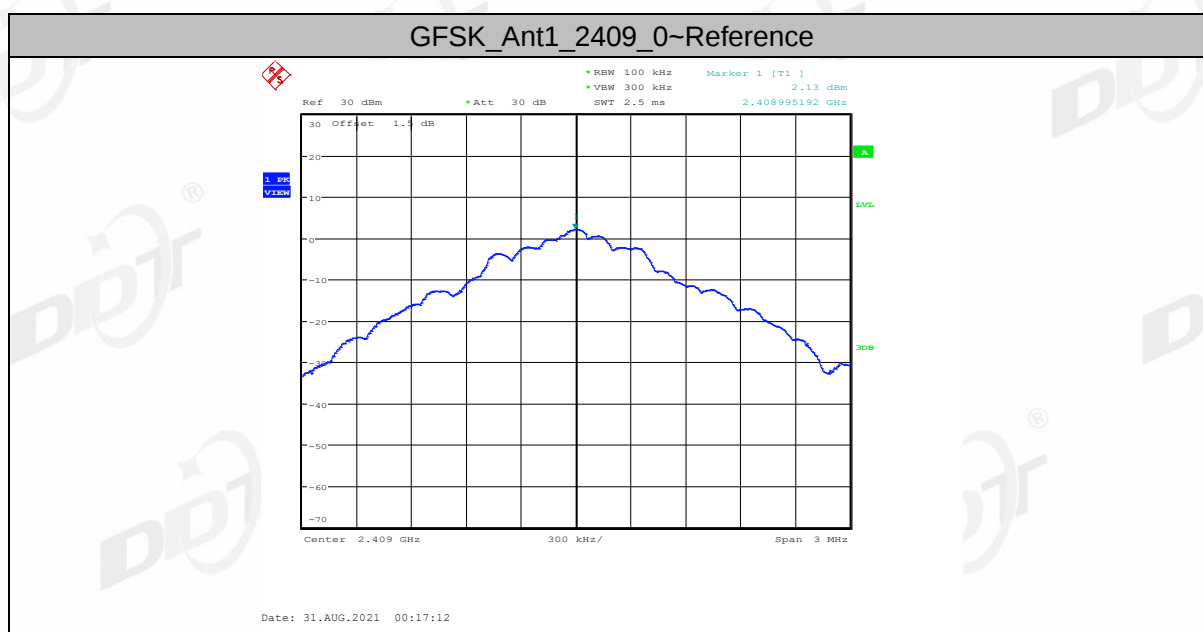
RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{span}/\text{RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

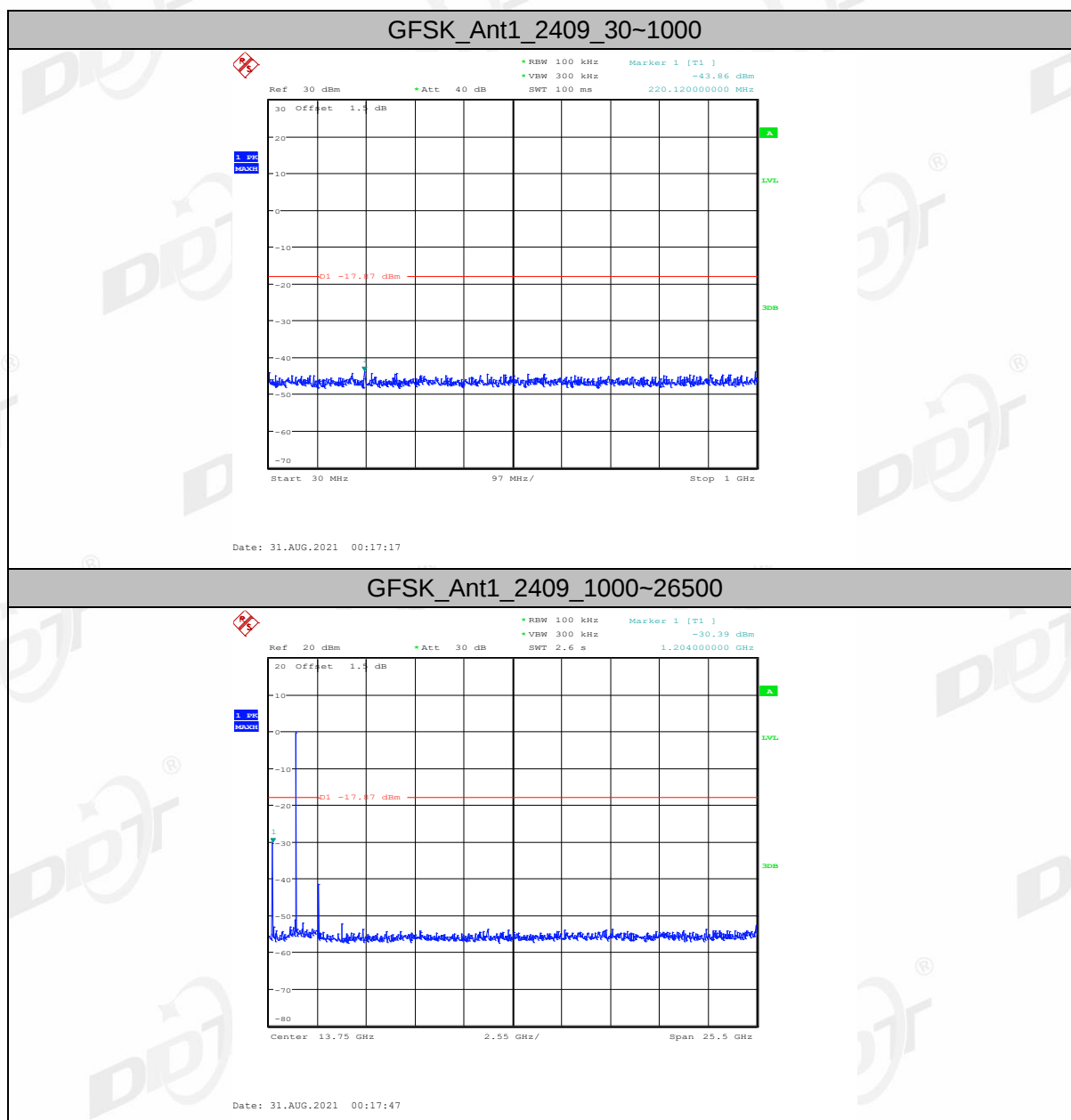
(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

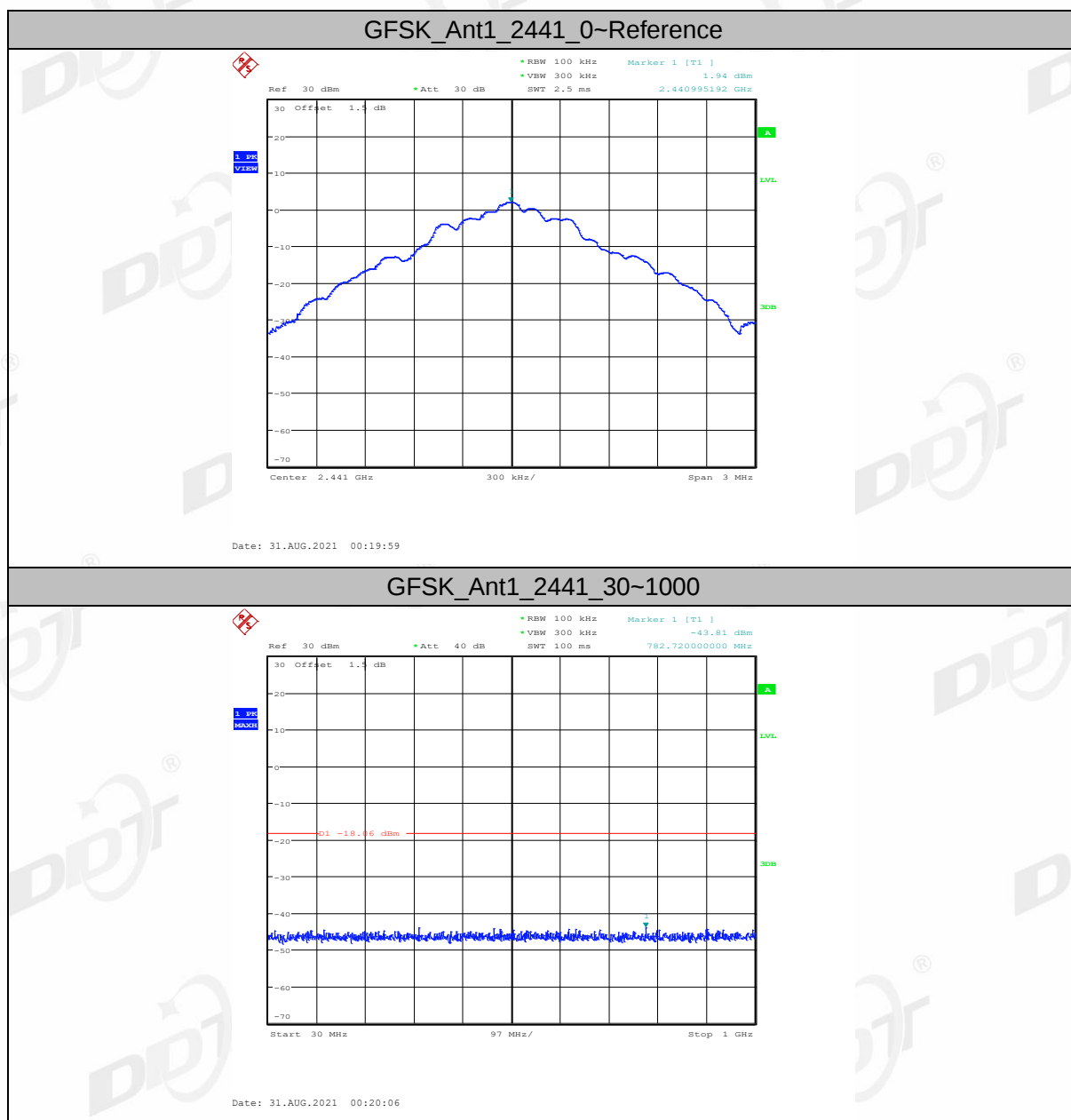
8.4. Test result

Test Mode	Antenna	Channel	Freq Range [MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	2409	Reference	2.13	2.13	---	Pass
			30~1000	30~1000	-43.86	≤ -17.87	Pass
			1000~26500	1000~26500	-30.39	≤ -17.87	Pass
		2441	Reference	1.94	1.94	---	Pass
			30~1000	30~1000	-43.81	≤ -18.06	Pass
			1000~26500	1000~26500	-29.75	≤ -18.06	Pass
		2475	Reference	2.06	2.06	---	Pass
			30~1000	30~1000	-44.1	≤ -17.94	Pass
			1000~26500	1000~26500	-28.42	≤ -17.94	Pass

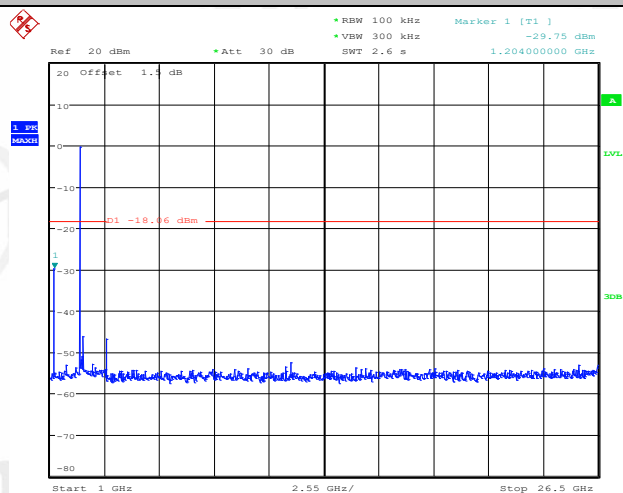
8.5. Test graphs





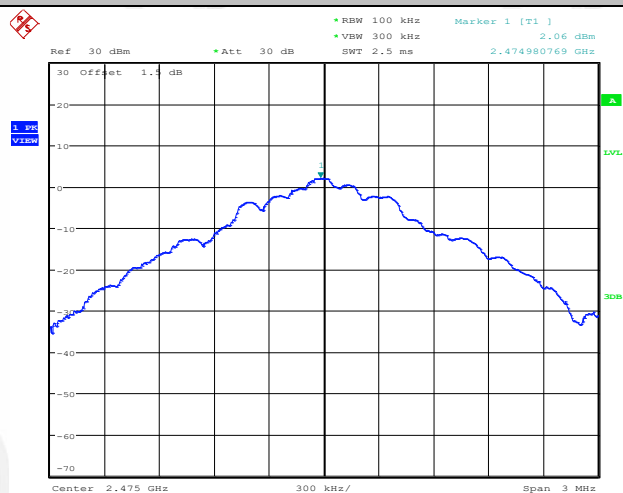


GFSK_Ant1_2441_1000~26500

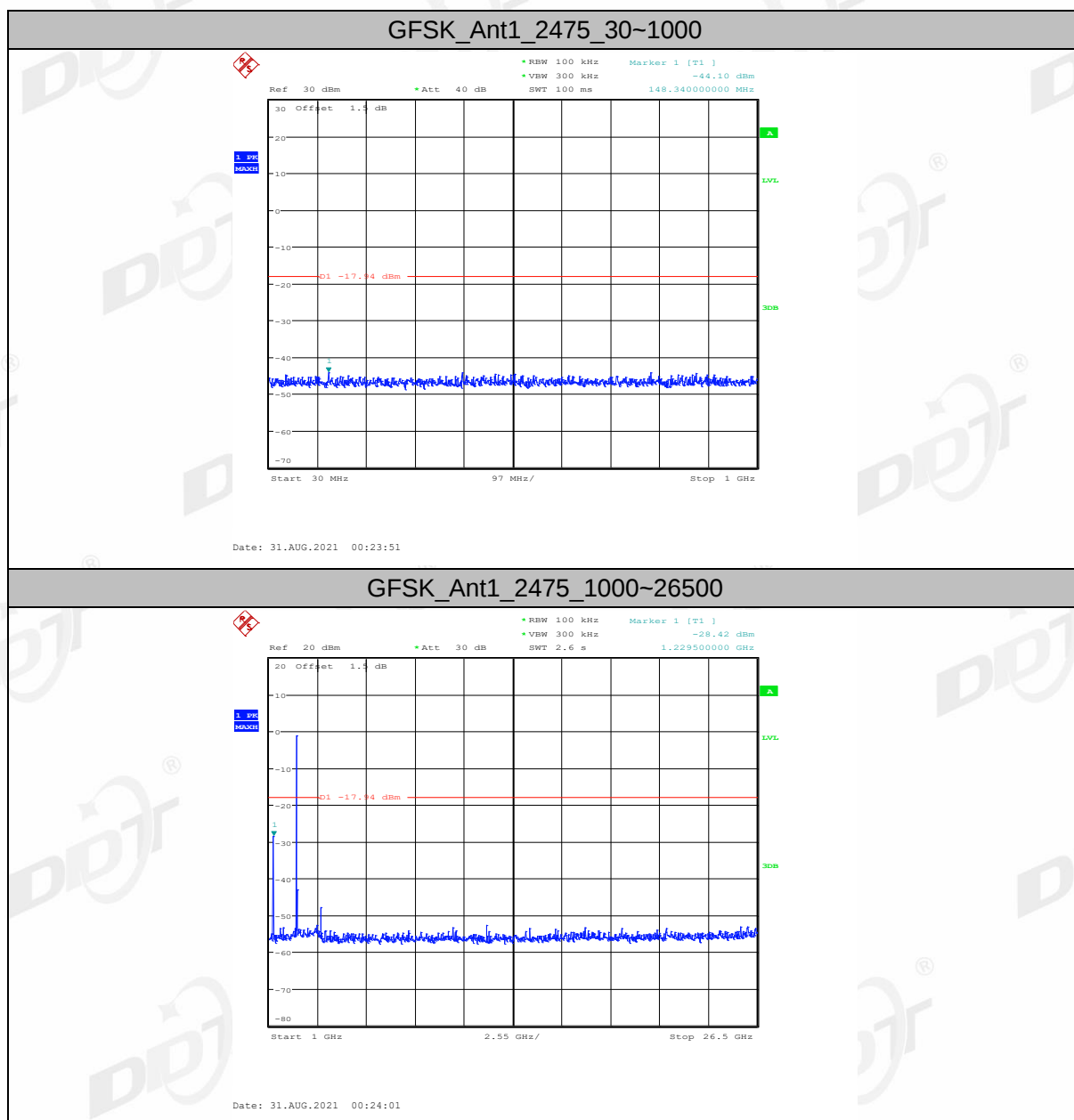


Date: 31.AUG.2021 00:20:20

GFSK_Ant1_2475_0~Reference



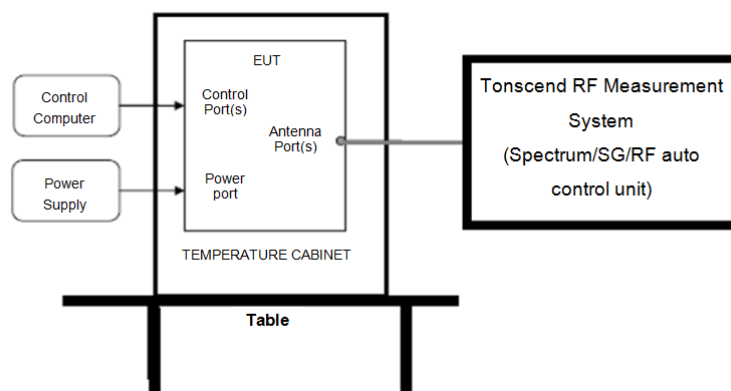
Date: 31.AUG.2021 00:23:46



9. Duty cycle

This is not a test project, just a test reference.

9.1. Block diagram of test setup



9.2. Test procedure

- (1) Connect each EUT's antenna output to power sensor by RF cable and attenuator.
- (2) For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) is captured.

Note: The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the middle hopping channel.

Resolution BW: 1 MHz.

Video BW: 1 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Max Hold.

Sweep: Video Trigger

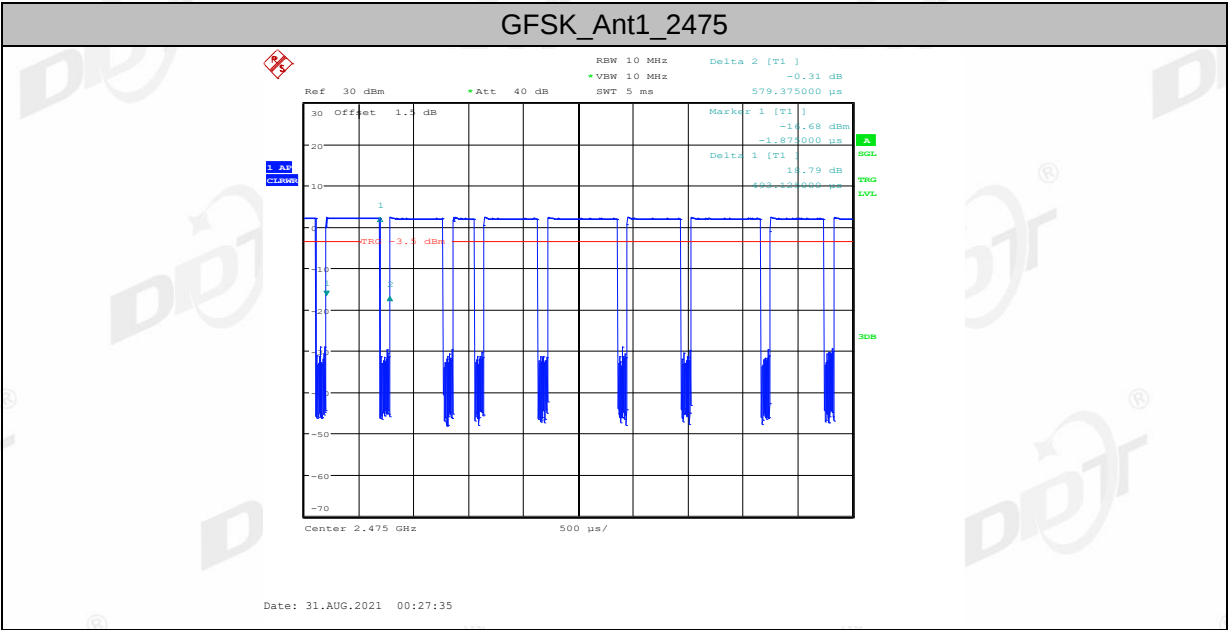
- (2) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.
- (3) Calculate dwell time follow below formula: Duty cycle= Pulse's on time / Burst cycle

9.3. Test result

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
GFSK	Ant1	2409	0.49	0.58	84.93	---	Pass
		2441	0.49	0.58	84.93	---	Pass
		2475	0.49	0.58	85.11	---	Pass

9.4. Test graphs

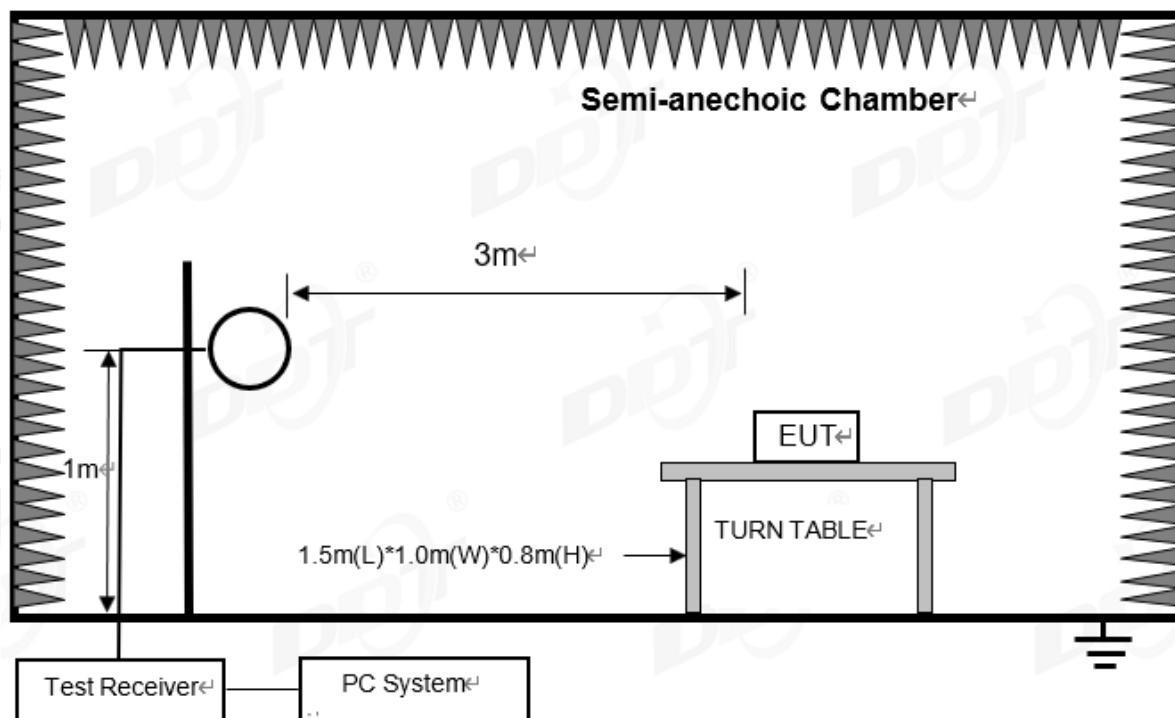




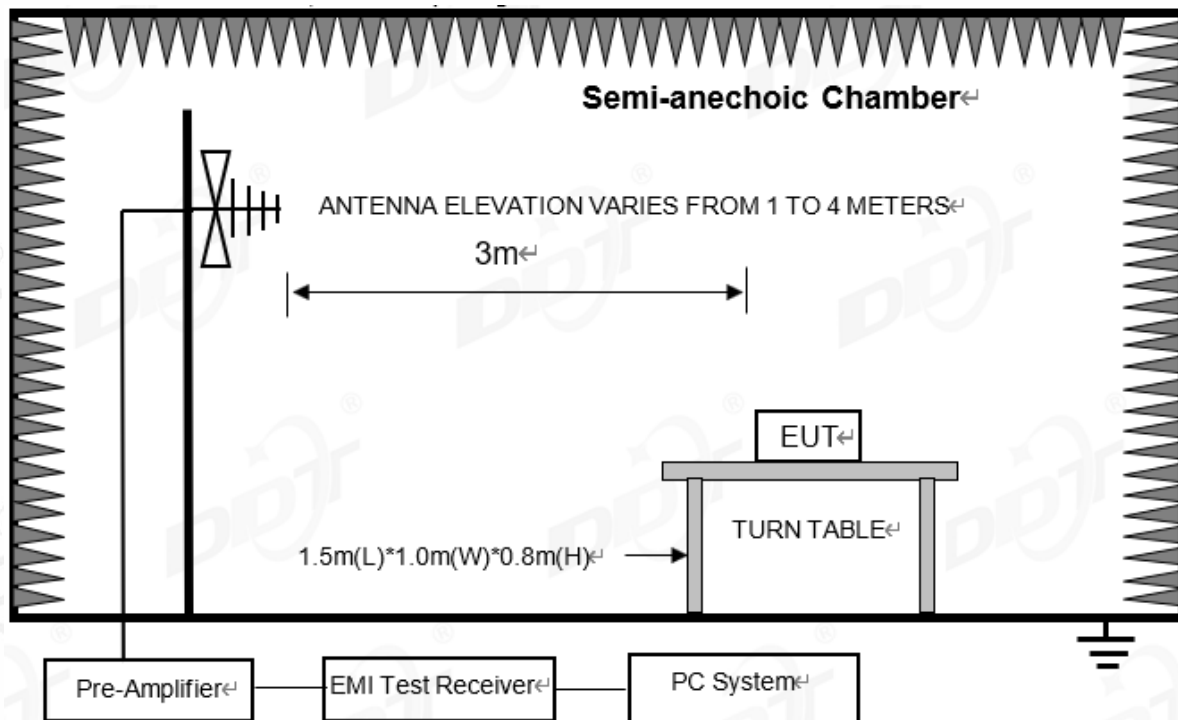
10. Radiated Emission

10.1. Block diagram of test setup

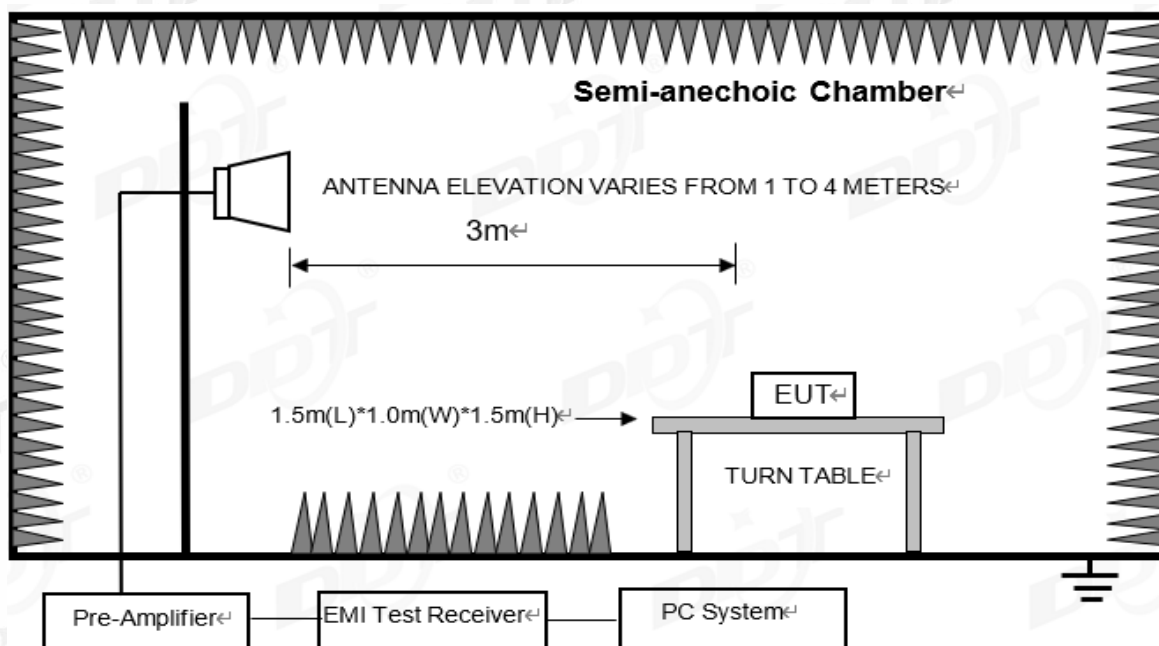
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:



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

10.2. Limit

(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
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&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)
13.36-13.41			

RSS FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	12.51975-12.52025	240-285	3500-4400
¹ 0.495-0.505	12.57675-12.57725	322-335.4	4.5-5.15
2.1735-2.1905	13.36-13.41	399.9-410	5.35-5.46
3.020-3.026	16.42-16.423	608-614	7.25-7.75
4.125-4.128	16.69475-16.69525	960-1427	8.025-8.5
4.1772&4.17775	16.80425-16.80475	1435-1626.5	9.0-9.2
4.2072&4.20775	25.5-25.67	1645.5-1646.5	9.3-9.5
5.677-5.683	37.5-38.25	1660-1710	10.6-12.7
6.215-6.218	73-74.6	1718.8-1722.2	13.25-13.4
6.26775-6.26825	74.8-75.2	2200-2300	14.47-14.5
6.31175-6.31225	108-138	2310-2390	15.35-16.2
8.291-8.294	149.9-150.05	2483.5-2500	17.7-21.4
8.362-8.366	156.52475-156.52525	2655-2900	22.01-23.12
8.37625-8.38675	156.7-156.9	3260-3267	23.6-24.0
8.41425-8.41475	162.0125-167.17	3332-3339	31.2-31.8
12.29-12.293	167.72-173.2	3345.8-3358	36.43-36.5
			(²)

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

(2) FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
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)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by this formula: $\text{Limit}_{3m}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30m}(\text{dB}\mu\text{V}/\text{m}) + 40\text{Log}(30m/3m)$

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits.

10.3. Test procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a semi-anechoic chamber for above 1G.

(2) Test antenna was located 3 m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test antenna distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna (1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna (18GHz-40GHz)	1m

According ANSI C63.10:2013 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also is positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. For measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9kHz 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.

(4) For final emissions measurements at each frequency of interest, the EUT was 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.

(5) The emissions from 9 kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz, 110 kHz-490 kHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9 kHz-150 kHz	200Hz
150 kHz-30MHz	9 kHz
30MHz-1GHz	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; According ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure.

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

10.4. Test result

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limit.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9kHz to 30MHz and 18GHz to 25GHz, so the final test was performed with frequency range from 30MHz to 18 GHz and recorded in below.

Note2: For emissions below 1GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1GHz, the final test was only performed with EUT working in GFSK, Tx 2441 MHz mode.

Note3: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

Radiated Emission test (below 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 report data\Q21063010-2E LOUD Fast
Tracker\FCC SRD BELOW 1G\FCC BELOW
1G_00001.EMI

Test Date : 2021-08-29

Tested By : Sanvin Zheng

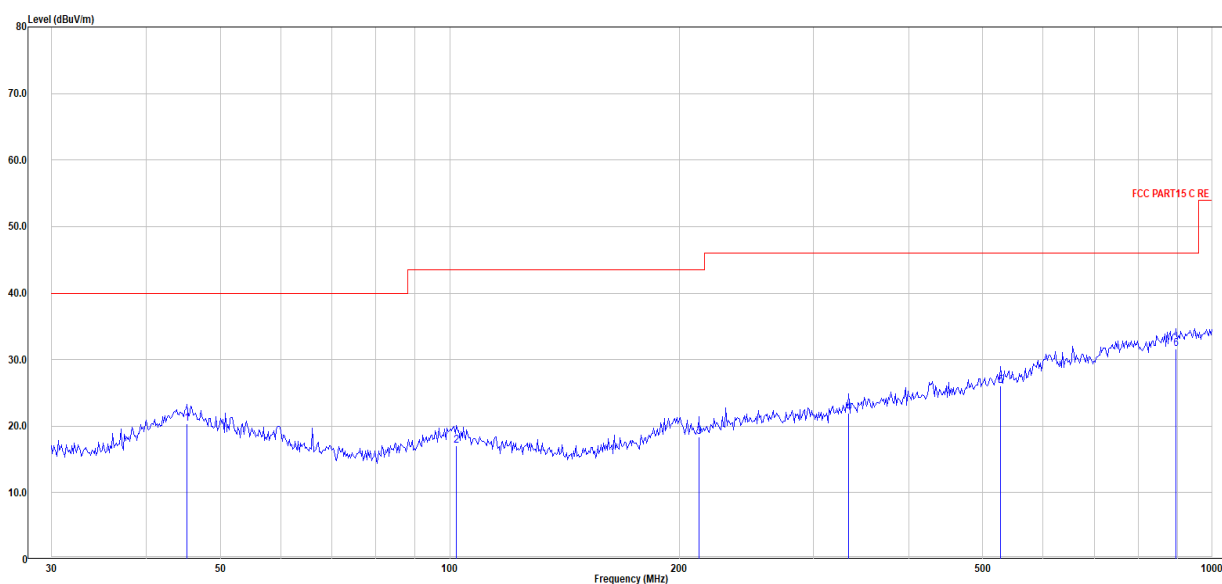
EUT : LAVALIER WIRELESS MICROPHONE Model Number : EleMent Wave LRV

Power Supply : DC 3.7V

Test Mode : TX mode

Condition : Temp:24.5°,Humi:55%,Press:100.1kPa Antenna/Distance : VLUB 9163 3#/3m/HORIZONTAL

Memo :



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	45.22	1.66	14.99	3.67	20.32	40.00	-19.68	QP	HORIZONTAL
2	102.00	1.57	11.60	3.90	17.06	43.50	-26.44	QP	HORIZONTAL
3	212.27	3.09	10.95	4.39	18.43	43.50	-25.07	QP	HORIZONTAL
4	333.69	2.92	14.17	4.82	21.91	46.00	-24.09	QP	HORIZONTAL
5	528.25	3.29	17.30	5.42	26.01	46.00	-19.99	QP	HORIZONTAL
6	897.00	3.29	21.98	6.36	31.64	46.00	-14.36	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 report data\Q21063010-2E LOUD Fast
Tracker\FCC SRD BELOW 1G\FCC BELOW
1G_00002.EMI

Test Date : 2021-08-29

Tested By : Sanvin Zheng

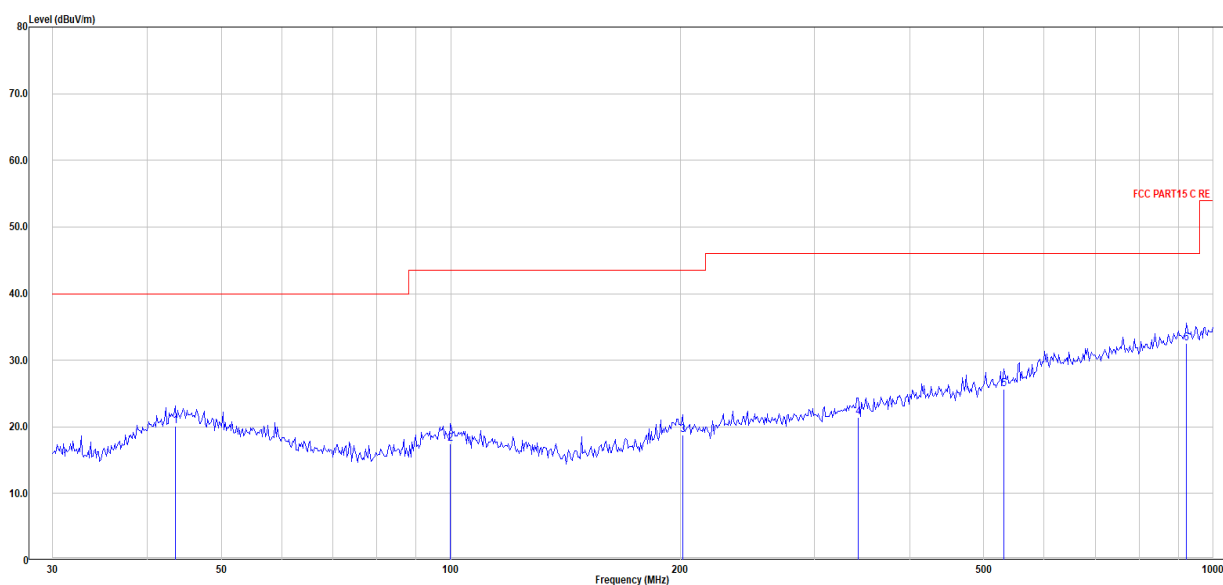
EUT : LAVALIER WIRELESS MICROPHONE **Model Number** : EleMent Wave LRV

Power Supply : DC 3.7V

Test Mode : TX mode

Condition : Temp:24.5°,Humi:55%,Press:100.1kPa **Antenna/Distance** : VLUB 9163 3#/3m/VERTICAL

Memo :



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	43.51	1.72	14.70	3.65	20.08	40.00	-19.92	QP	VERTICAL
2	99.88	2.05	11.50	3.89	17.44	43.50	-26.06	QP	VERTICAL
3	201.39	2.87	11.59	4.35	18.82	43.50	-24.68	QP	VERTICAL
4	341.98	1.95	14.58	4.85	21.38	46.00	-24.62	QP	VERTICAL
5	531.96	2.92	17.34	5.43	25.69	46.00	-20.31	QP	VERTICAL
6	922.52	3.68	22.40	6.43	32.51	46.00	-13.49	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

Radiated Emission test (above 1GHz)

Freq. (MHz)	Read level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector type	Polarization
Tx mode 2409MHz									
4818.00	53.79	32.34	43.33	6.81	49.61	74.00	-24.39	Peak	HORIZONTAL
7664.00	46.23	37.36	42.52	8.77	49.84	74.00	-24.16	Peak	HORIZONTAL
10469.00	45.90	39.55	42.54	10.36	53.27	74.00	-20.73	Peak	HORIZONTAL
13614.00	44.65	40.96	42.69	11.74	54.66	74.00	-19.34	Peak	HORIZONTAL
13614.00	35.57	40.96	42.69	11.74	45.58	54.00	-8.42	Average	HORIZONTAL
15654.00	42.43	39.42	42.10	12.46	52.21	74.00	-21.79	Peak	HORIZONTAL
17711.00	41.30	46.79	42.42	13.94	59.61	74.00	-14.39	Peak	HORIZONTAL
17711.00	31.77	46.79	42.42	13.94	50.08	54.00	-3.92	Average	HORIZONTAL
4995.00	48.61	32.69	43.20	7.03	45.13	74.00	-28.87	Peak	VERTICAL
7664.00	46.92	37.36	42.52	8.77	50.53	74.00	-23.47	Peak	VERTICAL
9789.00	45.91	38.80	42.12	10.02	52.61	74.00	-21.39	Peak	VERTICAL
13546.00	44.88	40.86	42.72	11.64	54.66	74.00	-19.34	Peak	VERTICAL
13546.00	35.97	40.86	42.72	11.64	45.75	54.00	-8.25	Average	VERTICAL
15824.00	43.53	39.21	42.20	12.56	53.10	74.00	-20.90	Peak	VERTICAL
17881.00	41.31	47.50	42.47	14.35	60.69	74.00	-13.31	Peak	VERTICAL
17881.00	30.97	47.50	42.47	14.35	50.35	54.00	-3.65	Average	VERTICAL

Tx mode 2441MHz									
4944.00	55.15	32.59	43.24	6.97	51.47	74.00	-22.53	Peak	HORIZONTAL
4944.00	52.16	32.59	43.24	6.97	48.48	54.00	-5.52	Average	HORIZONTAL
7749.00	46.95	37.50	42.47	8.73	50.71	74.00	-23.29	Peak	HORIZONTAL
10299.00	45.66	39.28	42.42	10.33	52.85	74.00	-21.15	Peak	HORIZONTAL
12101.00	46.49	39.46	41.57	11.28	55.66	74.00	-18.34	Peak	HORIZONTAL
12101.00	36.97	39.46	41.57	11.28	46.14	54.00	-7.86	Average	HORIZONTAL
15450.00	43.45	39.68	41.97	12.45	53.61	74.00	-20.39	Peak	HORIZONTAL
17779.00	41.37	47.07	42.44	14.10	60.10	74.00	-13.90	Peak	HORIZONTAL
17779.00	31.88	47.07	42.44	14.10	50.61	54.00	-3.39	Average	HORIZONTAL
5046.00	48.15	32.72	43.22	7.05	44.70	74.00	-29.30	Peak	VERTICAL
7834.00	47.12	37.63	42.41	8.70	51.04	74.00	-22.96	Peak	VERTICAL
10061.00	45.96	38.90	42.24	10.29	52.91	74.00	-21.09	Peak	VERTICAL
12271.00	45.99	39.22	41.85	11.63	54.99	74.00	-19.01	Peak	VERTICAL
12271.00	36.08	39.22	41.85	11.63	45.08	54.00	-8.92	Average	VERTICAL
15654.00	43.38	39.42	42.10	12.46	53.16	74.00	-20.84	Peak	VERTICAL
17711.00	41.80	46.79	42.42	13.94	60.11	74.00	-13.89	Peak	VERTICAL
17711.00	32.37	46.79	42.42	13.94	50.68	54.00	-3.32	Average	VERTICAL

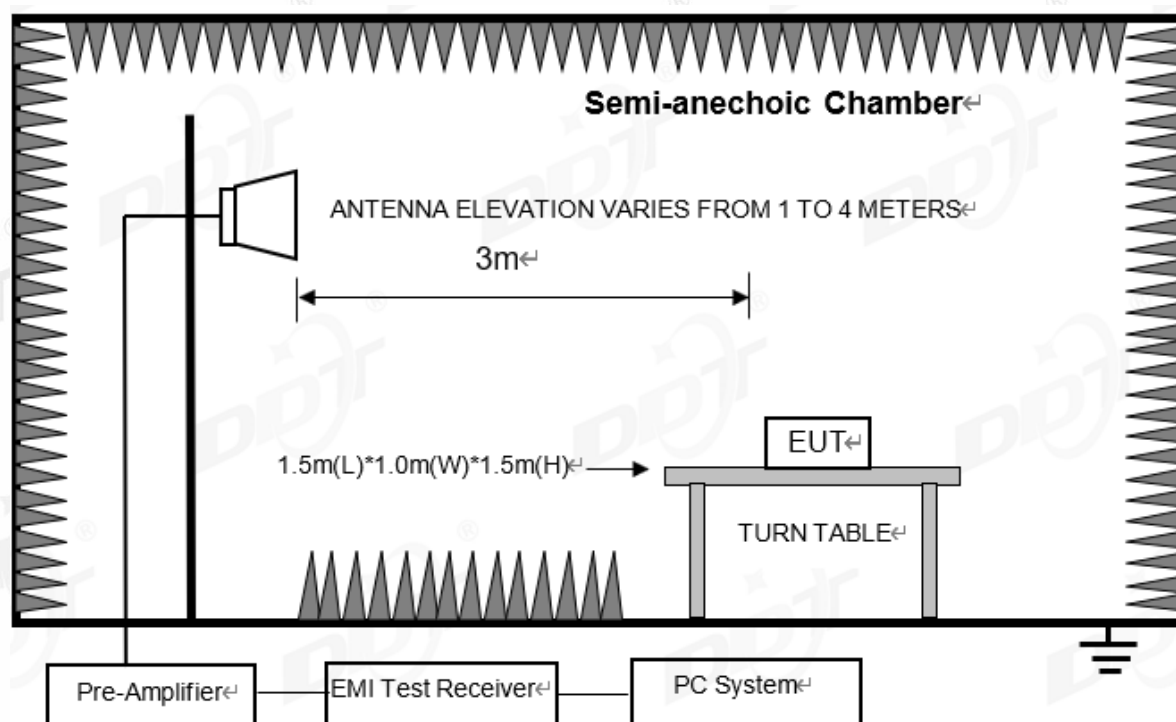
Tx mode 2475MHz									
4944.00	52.79	32.59	43.24	6.97	49.11	74.00	-24.89	Peak	HORIZONTAL
7851.00	46.89	37.66	42.40	8.69	50.84	74.00	-23.16	Peak	HORIZONTAL
11370.00	46.62	39.80	42.33	10.98	55.07	74.00	-18.93	Peak	HORIZONTAL
11370.00	37.17	39.80	42.33	10.98	45.62	54.00	-8.38	Average	HORIZONTAL
13529.00	42.85	40.84	42.73	11.61	52.57	74.00	-21.43	Peak	HORIZONTAL
15875.00	43.31	39.15	42.23	12.58	52.81	74.00	-21.19	Peak	HORIZONTAL
17711.00	41.85	46.79	42.42	13.94	60.16	74.00	-13.84	Peak	HORIZONTAL
17711.00	32.47	46.79	42.42	13.94	50.78	54.00	-3.22	Average	HORIZONTAL
5420.00	48.35	32.87	43.33	7.11	45.00	74.00	-29.00	Peak	VERTICAL
8140.00	46.36	37.93	42.23	8.68	50.74	74.00	-23.26	Peak	VERTICAL
10401.00	45.87	39.44	42.49	10.34	53.16	74.00	-20.84	Peak	VERTICAL
12220.00	46.66	39.29	41.76	11.53	55.72	74.00	-18.28	Peak	VERTICAL
12220.00	36.87	39.29	41.76	11.53	45.93	54.00	-8.07	Average	VERTICAL
15790.00	43.26	39.25	42.18	12.54	52.87	74.00	-21.13	Peak	VERTICAL
17660.00	42.50	46.57	42.40	13.82	60.49	74.00	-13.51	Peak	VERTICAL
17660.00	32.77	46.57	42.40	13.82	50.76	54.00	-3.24	Average	VERTICAL
Verdict: Pass									

Note:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

11. Emissions in Restricted Frequency Bands

11.1. Block diagram of test setup



11.2. Limit

All restriction band should comply with 15.209, other emission should be at least 20 dB below the fundamental.

11.3. Test procedure

Same with clause 8.3 except change investigated frequency range from 2310MHz to 2410 MHz and 2475 MHz to 2500 MHz.

11.4. Test result

Pass. (See below detailed test result)

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 RE2# Report Data\Q21063010-2E Fast Tracker\FCC ABOVE 1G.EM6

Test Date : 2021-07-13

Tested By : Zi qin

EUT : LAVALIER WIRELESS MICROPHONE

Model Number : EleMent Wave LRV

Power Supply : DC 3.7V

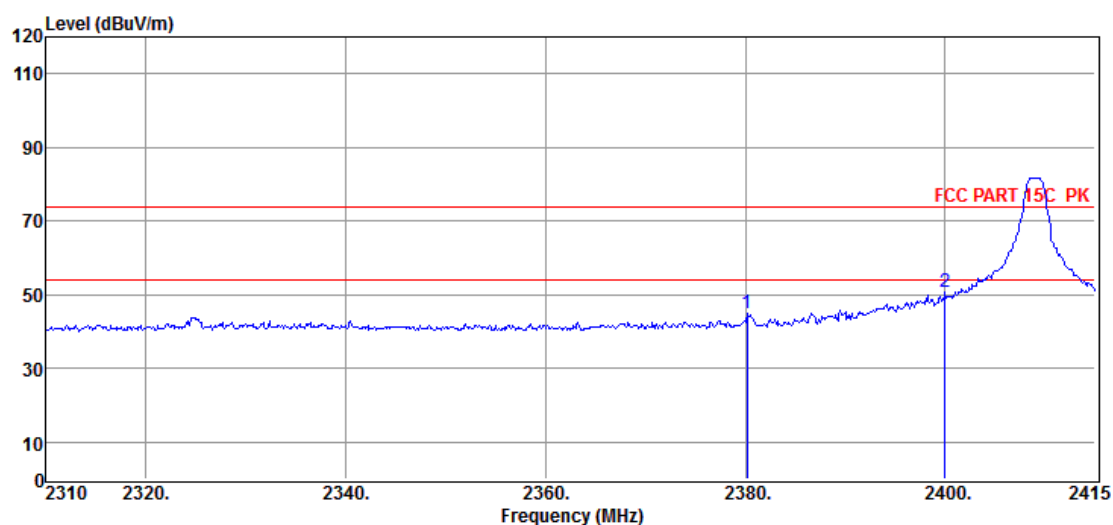
Test Mode : Tx mode

Condition : Temp:24.5°C,Humi:55%,Press:100.1kPa

Antenna/Distance : 2020 BBHA9120D/3m/VERTICAL

Memo : SRD 2409 VBW:5100HZ

Data: 3



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2380.14	55.23	27.88	43.13	4.79	44.77	74.00	-29.23	Peak	VERTICAL
2	2399.99	61.27	27.90	43.15	4.81	50.83	74.00	-23.17	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 RE2# Report Data\Q21063010-2E Fast Tracker\FCC ABOVE 1G.EM6

Test Date : 2021-07-13

Tested By : Zi qin

EUT : LAVALIER WIRELESS MICROPHONE

Model Number : EleMent Wave LRV

Power Supply : DC 3.7V

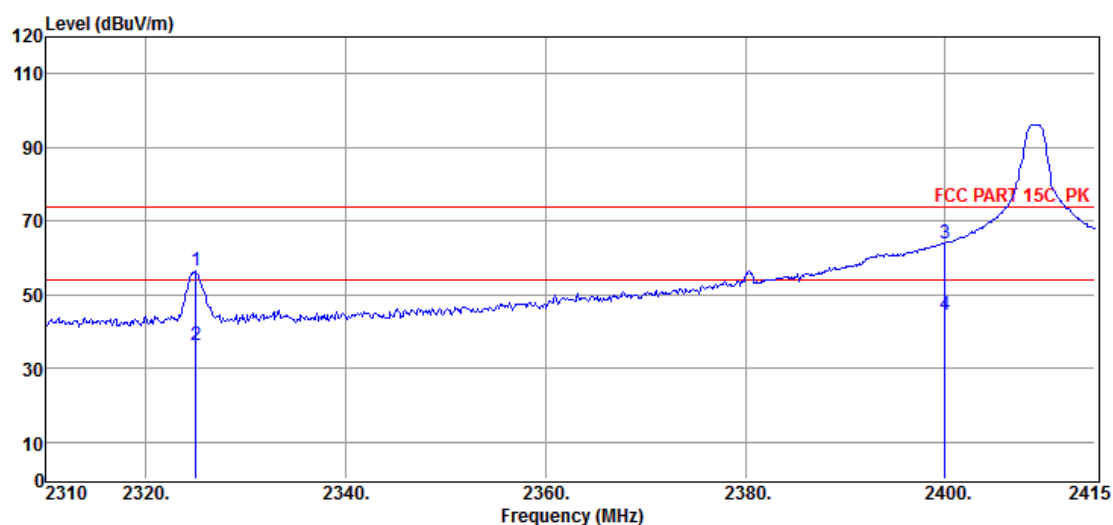
Test Mode : Tx mode

Condition : Temp:24.5°C,Humi:55%,Press:100.1kPa

Antenna/Distance : 2020 BBHA9120D/3m/HORIZONTAL

Memo : SRD 2409 VBW:5100HZ

Data: 4



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2325.02	66.90	27.83	43.07	4.72	56.38	74.00	-17.62	Peak	HORIZONTAL
2	2325.02	46.69	27.83	43.07	4.72	36.17	54.00	-17.83	Average	HORIZONTAL
3	2399.99	74.47	27.90	43.15	4.81	64.03	74.00	-9.97	Peak	HORIZONTAL
4	2399.99	54.97	27.90	43.15	4.81	44.53	54.00	-9.47	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 RE2# Report Data\Q21063010-2E Fast Tracker\FCC ABOVE 1G.EM6

Test Date : 2021-07-13

Tested By : Zi qin

EUT : LAVALIER WIRELESS MICROPHONE

Model Number : EleMent Wave LRV

Power Supply : DC 3.7V

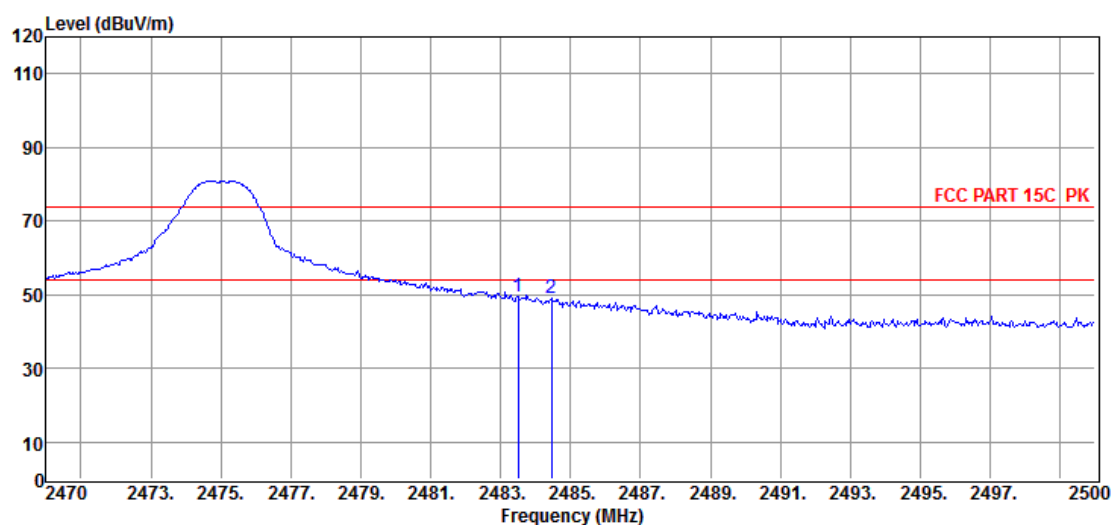
Test Mode : Tx mode

Condition : Temp:24.5°C,Humi:55%,Press:100.1kPa

Antenna/Distance : 2020 BBHA9120D/3m/VERTICAL

Memo : SRD 2475 VBW:5100HZ

Data: 5



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	59.89	27.98	43.23	4.90	49.54	74.00	-24.46	Peak	VERTICAL
2	2484.46	59.50	27.98	43.23	4.90	49.15	74.00	-24.85	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 2#

D:\2021 RE2# Report Data\Q21063010-2E Fast Tracker\FCC ABOVE 1G.EM6

Test Date : 2021-07-13

Tested By : Zi qin

EUT : LAVALIER WIRELESS MICROPHONE

Model Number : EleMent Wave LRV

Power Supply : DC 3.7V

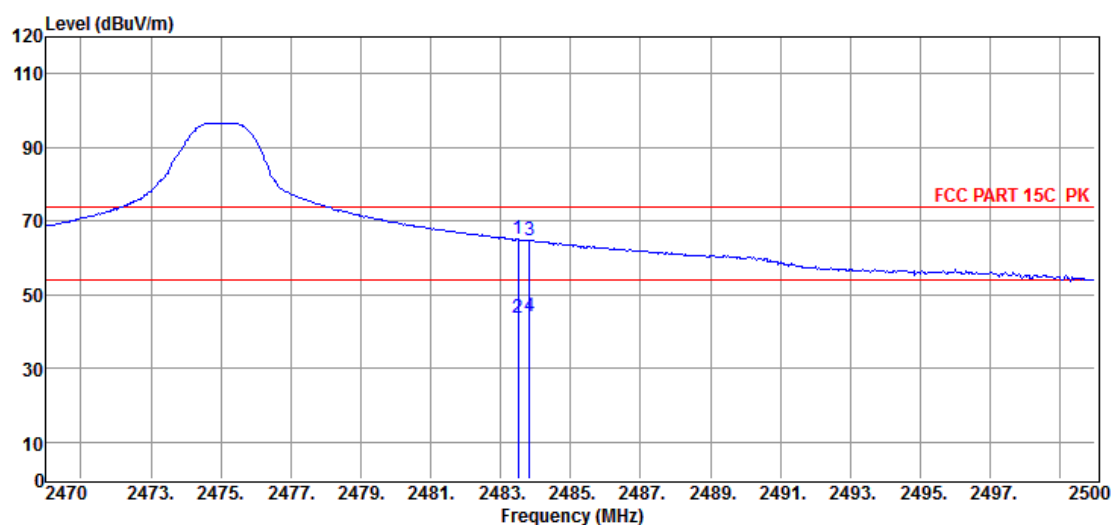
Test Mode : Tx mode

Condition : Temp:24.5°C,Humi:55%,Press:100.1kPa

Antenna/Distance : 2020 BBHA9120D/3m/HORIZONTAL

Memo : SRD 2475 VBW:5100HZ

Data: 6



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	75.38	27.98	43.23	4.90	65.03	74.00	-8.97	Peak	HORIZONTAL
2	2483.50	54.18	27.98	43.23	4.90	43.83	54.00	-10.17	Average	HORIZONTAL
3	2483.83	75.02	27.98	43.23	4.90	64.67	74.00	-9.33	Peak	HORIZONTAL
4	2483.83	54.30	27.98	43.23	4.90	43.95	54.00	-10.05	Average	HORIZONTAL

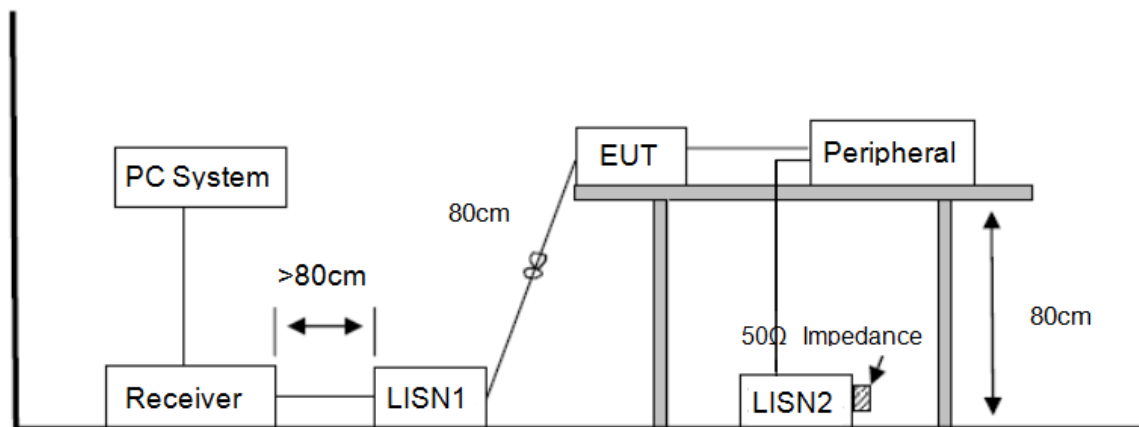
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

12. Power Line Conducted Emission

12.1. Block diagram of test setup



12.2. Power line conducted emission limits

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.

12.3. 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 C63.10.

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.

12.4. Test result

Pass. (See below detailed test result)

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

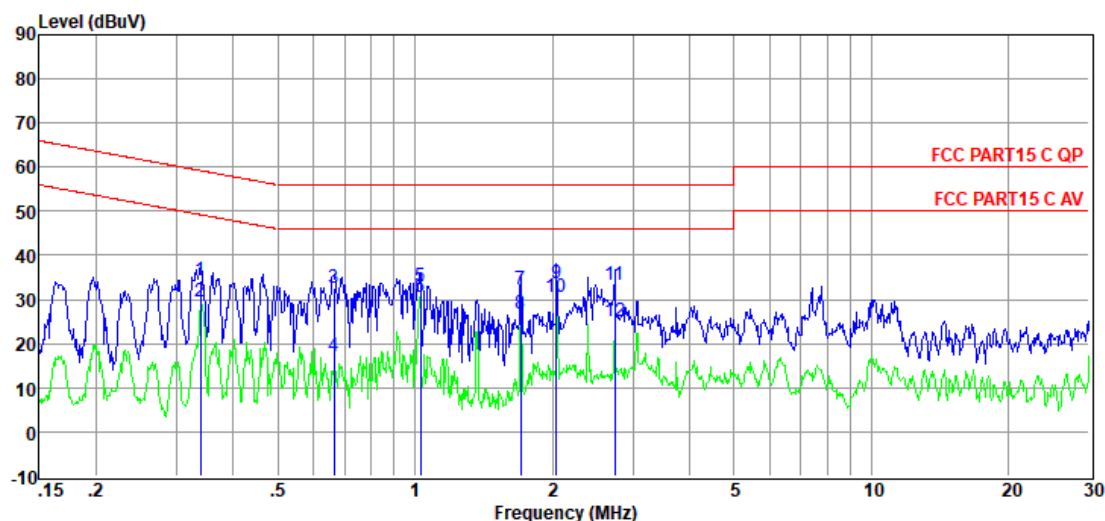
Note2: “----” means Peak detection; “----” means Average detection.

Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worse case.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room
Test Date : 2021-08-02
EUT : LAVALIER WIRELESS MICROPHONE
Power Supply : AC 240V/50Hz
Condition : TEMP:23.1°C, RH:52.4%, BP:101.4kPa
Memo :

D:\2021 CE report date\Q21063010-2E\FCC PART 15C FM6
Tested By : Ziqin
Model Number : EleMent Wave LRV
Test Mode : TX mode
LISN : 2020 ENV 216 1#/LINE



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.34	15.12	9.41	0.02	9.86	34.41	59.22	-24.81	QP	LINE
2	0.34	10.40	9.41	0.02	9.86	29.69	49.22	-19.53	Average	LINE
3	0.66	13.19	9.42	0.03	9.86	32.50	56.00	-23.50	QP	LINE
4	0.66	-2.21	9.42	0.03	9.86	17.10	46.00	-28.90	Average	LINE
5	1.03	13.66	9.42	0.03	9.86	32.97	56.00	-23.03	QP	LINE
6	1.03	11.20	9.42	0.03	9.86	30.51	46.00	-15.49	Average	LINE
7	1.71	13.06	9.42	0.05	9.86	32.39	56.00	-23.61	QP	LINE
8	1.71	7.32	9.42	0.05	9.86	26.65	46.00	-19.35	Average	LINE
9	2.04	14.39	9.42	0.05	9.87	33.73	56.00	-22.27	QP	LINE
10	2.04	11.38	9.42	0.05	9.87	30.72	46.00	-15.28	Average	LINE
11	2.74	14.09	9.44	0.06	9.87	33.46	56.00	-22.54	QP	LINE
12	2.74	5.79	9.44	0.06	9.87	25.16	46.00	-20.84	Average	LINE

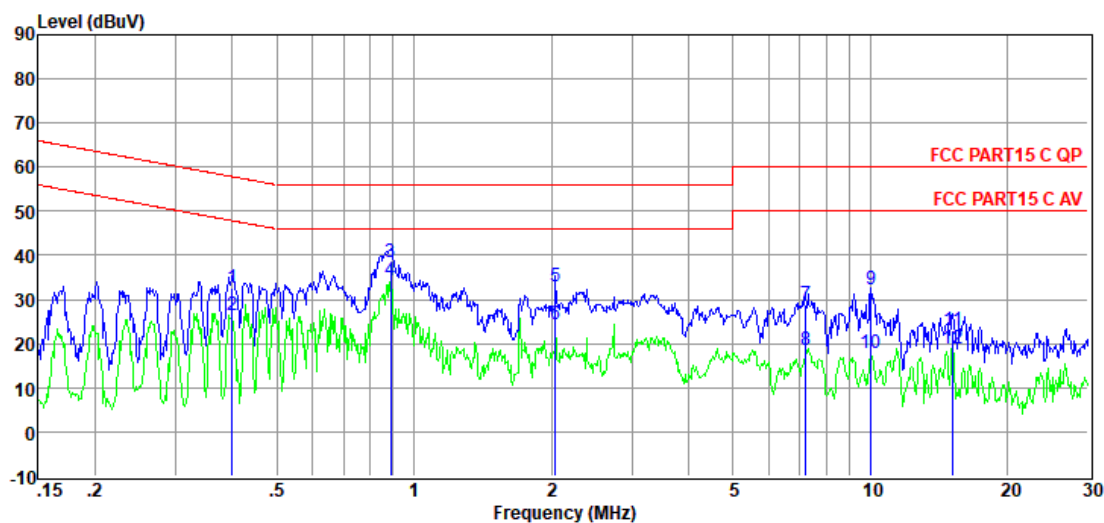
Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room
Test Date : 2021-08-02
EUT : LAVALIER WIRELESS MICROPHONE
Power Supply : AC 240V/50Hz
Condition : TEMP:23.1°C, RH:52.4%, BP:101.4kPa
Memo :

D:\2021 CE report date\Q21063010-2E\FCC PART 15C FM6
Tested By : Ziqin
Model Number : EleMent Wave LRV
Test Mode : TX mode
LISN : 2020 ENV 216 1#/NEUTRAL



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.40	13.47	9.39	0.02	9.86	32.74	57.86	-25.12	QP	NEUTRAL
2	0.40	7.31	9.39	0.02	9.86	26.58	47.86	-21.28	Average	NEUTRAL
3	0.89	19.03	9.39	0.03	9.86	38.31	56.00	-17.69	QP	NEUTRAL
4	0.89	15.17	9.39	0.03	9.86	34.45	46.00	-11.55	Average	NEUTRAL
5	2.04	13.49	9.40	0.05	9.87	32.81	56.00	-23.19	QP	NEUTRAL
6	2.04	5.18	9.40	0.05	9.87	24.50	46.00	-21.50	Average	NEUTRAL
7	7.21	9.49	9.52	0.10	9.88	28.99	60.00	-31.01	QP	NEUTRAL
8	7.21	-1.02	9.52	0.10	9.88	18.48	50.00	-31.52	Average	NEUTRAL
9	10.02	12.62	9.57	0.11	9.89	32.19	60.00	-27.81	QP	NEUTRAL
10	10.02	-1.83	9.57	0.11	9.89	17.74	50.00	-32.26	Average	NEUTRAL
11	15.15	3.32	9.63	0.14	9.92	23.01	60.00	-36.99	QP	NEUTRAL
12	15.15	-0.79	9.63	0.14	9.92	18.90	50.00	-31.10	Average	NEUTRAL

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

13. Antenna Requirements

13.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

13.2. Result

The antenna used for this product and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0 dBi.