

TECHNICAL REPORT



Report No.: FCC 1901184-02
File reference No.: 2019-02-22

Applicant: GLORY STAR TECHNICS (SHENZHEN) CO., LTD.

Product: 21.5' Advertising Displayer

Model No.: ULT215

Trademark: N/A

Test Standards: FCC Part 15.247

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15.247 for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: February 22, 2019

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Special Statement:

The testing quality ability of our laboratory meet with “Quality Law of People’s Republic of China” Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.



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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China
Telephone: (755) 83448688
Fax: (755) 83442996

1.2 Applicant Details

Applicant: GLORY STAR TECHNICS (SHENZHEN) CO., LTD.
Address: 4/Floor,west block,Longzhu Road,Xin WuCun Industry Building,NanShan District,ShenZhen
Telephone: (755)-26001808-305
Fax: (755)-26002933

1.3 Description of EUT

Product: 21.5' Advertising Displayer
Manufacturer: GLORY STAR TECHNICS (SHENZHEN) CO., LTD.
Address: 4/Floor,west block,Longzhu Road,Xin WuCun Industry Building,NanShan District,ShenZhen
Brand Name: N/A
Additional Brand Name: N/A
Model Number: ULT215
Additional Model Number: N/A
Type of Modulation GFSK (Bluetooth BLE)
Frequency range 2402-2480MHz
Frequency Selection By software
Channel Number 40

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2019-01-21 to 2019-02-22

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB
Radiated Emissions below 1GHz Uncertainty =4.7dB
Radiated Emissions above 1GHz Uncertainty =6.0dB
Conducted Power Uncertainty =6.0dB

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Occupied Channel Bandwidth Uncertainty =5%

1.7 Test Engineer

Terry Tang

The sample tested by _____

Print Name: Terry Tang

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2018-06-22	2019-06-21
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2018-06-22	2019-06-21
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2018-06-22	2019-06-21
Ultra Broadband ANT	R&S	HL562	100157	2018-06-18	2019-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2018-06-22	2019-06-21
Loop Antenna	EMCO	6507	00078608	2018-06-25	2019-06-24
Spectrum	R&S	FSIQ26	100292	2018-06-22	2019-06-21
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2018-06-25	2019-06-24
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-08-24	2019-08-23
Power meter	Anritsu	ML2487A	6K00003613	2018-08-22	2019-08-21
Power sensor	Anritsu	MA2491A	32263	2018-08-22	2019-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2019-07-03
9*6*6 Anechoic	--	--	N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2018-06-22	2019-06-21
EMI Test Receiver	RS	ESH3	860904/006	2018-06-22	2019-06-21
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2018-06-22	2019-06-21
Spectrum	HP/Agilent	E4407B	MY50441392	2018-03-27	2019-03-26
Spectrum	RS	FSP	1164.4391.38	2019-01-20	2020-01-19
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2018-05-24	2019-05-23
RF Cable	Zhengdi	7m	--	2018-03-17	2019-03-16
RF Switch	EM	EMSW18	060391	2018-06-22	2019-06-21
Pre-Amplifier	Schwarebeck	BBV9743	#218	2018-06-22	2019-06-21
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2018-08-05	2019-08-04
LISN	SCHAFFNER	NNB42	00012	2019-01-08	2020-01-07

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107 & 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 EUT Modification

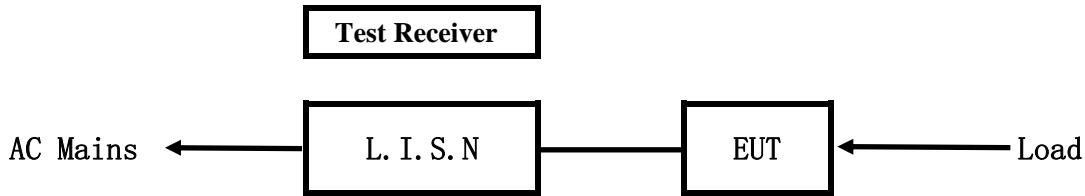
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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5. Power Line Conducted Emission Test

5.1 Schematics of the test



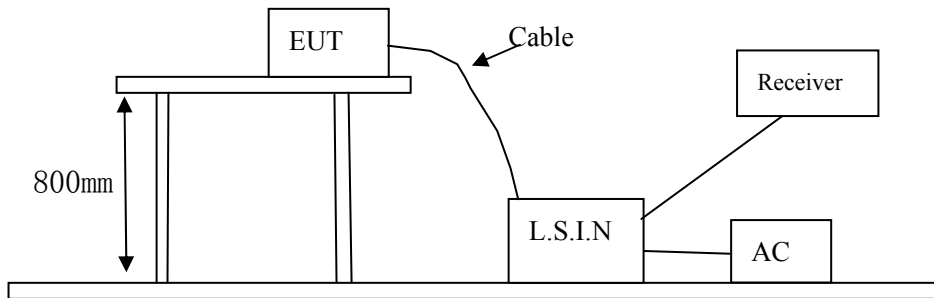
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 –2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
21.5' Advertising Displayer	GLORY STAR TECHNICS (SHENZHEN) CO., LTD.	ULT215	2AACS-ULT215

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B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	SOY	SUN-1200500	Input:100-240VV~, 50/60Hz, 1.7A; Output:DC12V,5A

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.



A: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

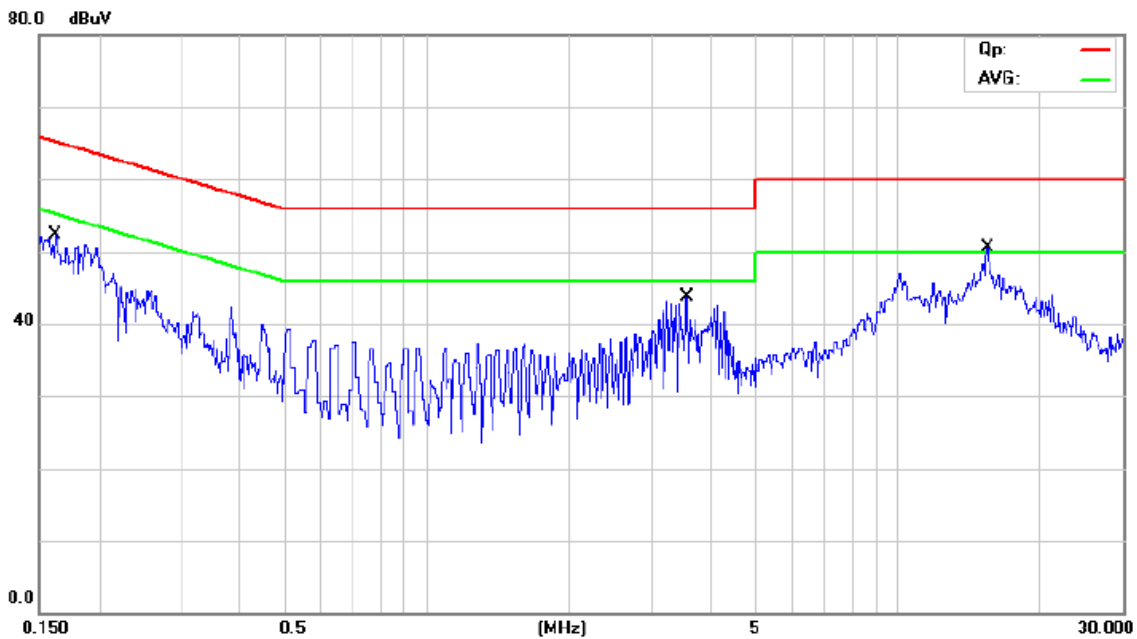
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep Bluetooth Transmitting

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1613	31.50	9.78	41.28	65.40	-24.12	QP	
2		0.1613	-1.60	9.78	8.18	55.40	-47.22	AVG	
3	*	3.5495	30.80	9.87	40.67	56.00	-15.33	QP	
4		3.5495	5.40	9.87	15.27	46.00	-30.73	AVG	
5		15.3522	32.70	10.40	43.10	60.00	-16.90	QP	
6		15.3522	9.90	10.40	20.30	50.00	-29.70	AVG	

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

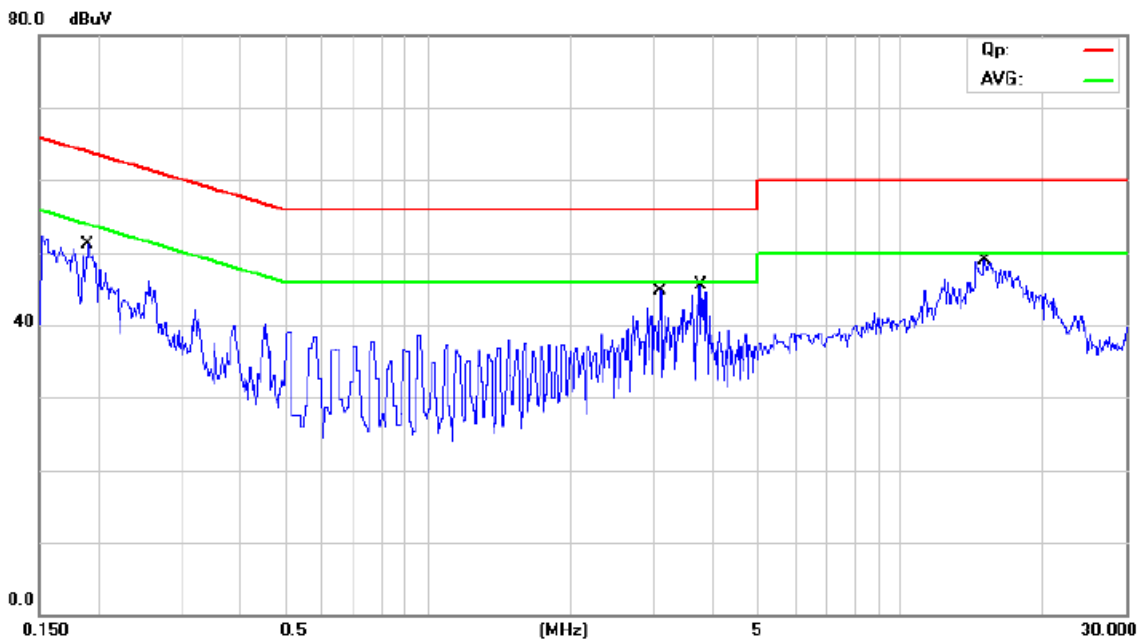
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep Bluetooth Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1900	35.70	9.76	45.46	64.04	-18.58	QP	
2		0.1900	-2.40	9.76	7.36	54.04	-46.68	AVG	
3		3.0917	28.30	9.85	38.15	56.00	-17.85	QP	
4		3.0917	-4.40	9.85	5.45	46.00	-40.55	AVG	
5	*	3.7416	32.50	9.88	42.38	56.00	-13.62	QP	
6		3.7416	4.50	9.88	14.38	46.00	-31.62	AVG	
7		15.0264	34.60	10.38	44.98	60.00	-15.02	QP	
8		15.0264	11.90	10.38	22.28	50.00	-27.72	AVG	

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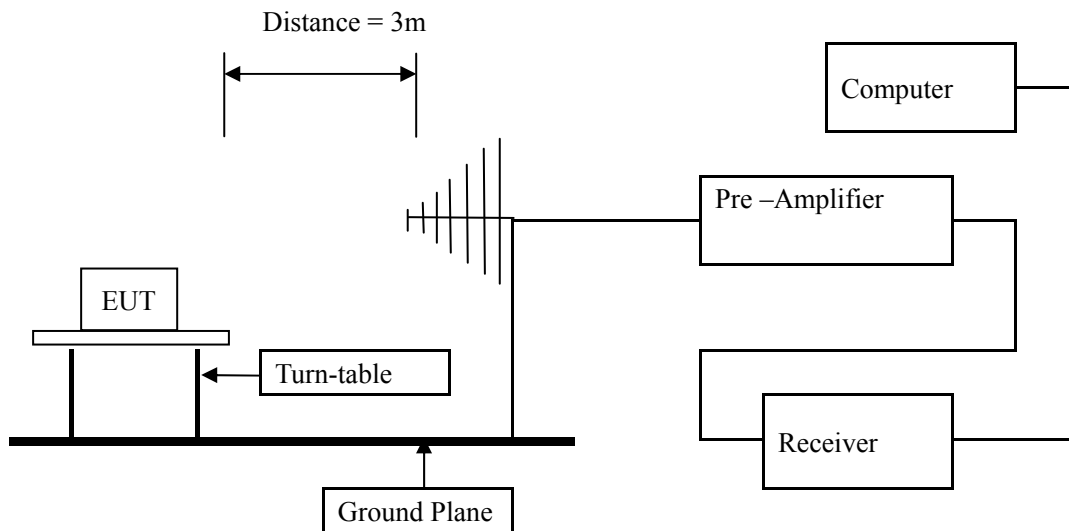


6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No.744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a “QP” in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT
Same as section 5.3 of this report

6.3 EUT Operating Condition
Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the higher limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT



Test result

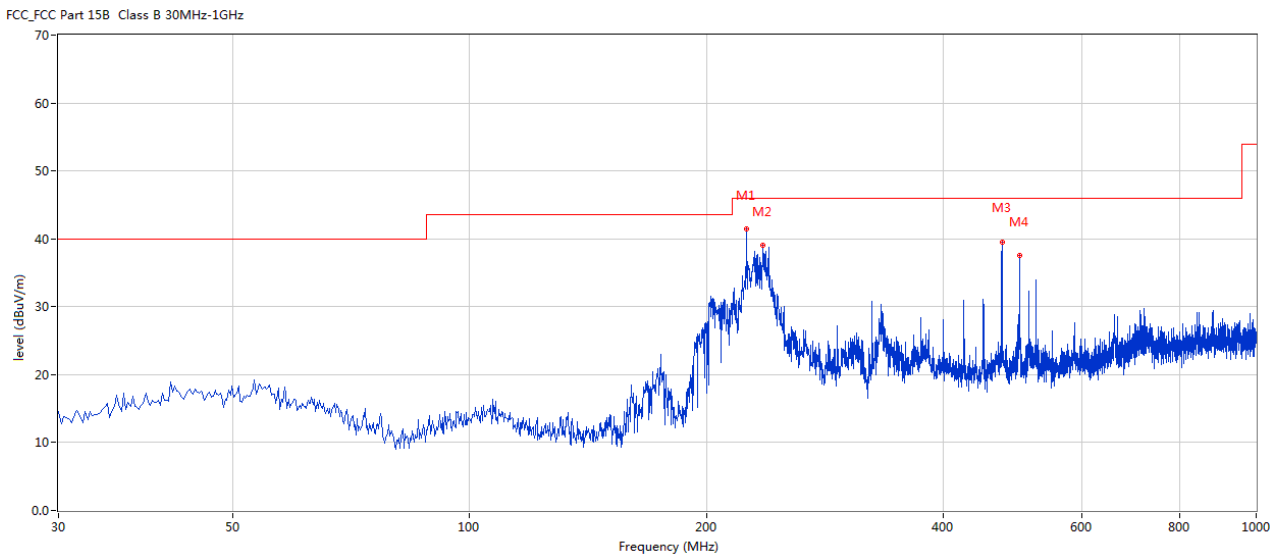
General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Bluetooth Transmitting

Results: Pass

Test Figure:



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	224.921	41.48	-12.93	46.0	-4.52	Peak	0.00	100	H	Pass
2	236.073	39.00	-12.42	46.0	-7.00	Peak	0.00	100	H	Pass
3	475.119	39.56	-7.41	46.0	-6.44	Peak	17.00	100	H	Pass
4	500.090	37.56	-6.91	46.0	-8.44	Peak	17.00	100	H	Pass

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Test result

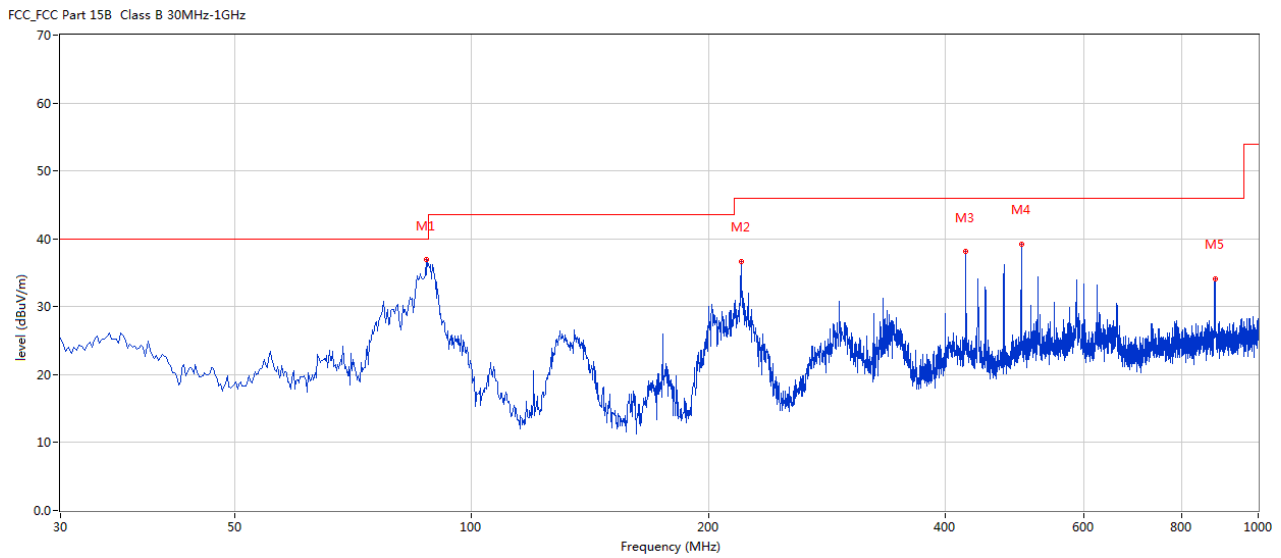
General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: **Keep Transmitting**

Results: Pass

Test Figure:



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	87.458	36.95	-15.72	40.0	-3.05	Peak	0.00	100	V	Pass
2	220.072	36.69	-13.32	46.0	-9.31	Peak	0.00	100	V	Pass
3	424.934	38.18	-8.20	46.0	-7.82	Peak	0.00	100	V	Pass
4	500.090	39.24	-6.91	46.0	-6.76	Peak	0.00	100	V	Pass
5	880.962	34.16	-2.03	46.0	-11.84	Peak	11.00	100	V	Pass

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Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
4804	--	H/V	74(Peak)/ 54(AV)
7206	--	H/V	74(Peak)/ 54(AV)
9608	--	H/V	74(Peak)/ 54(AV)
12010	--	H/V	74(Peak)/ 54(AV)
14412	--	H/V	74(Peak)/ 54(AV)
16814	--	H/V	74(Peak)/ 54(AV)
9216	--	H/V	74(Peak)/ 54(AV)
21618	--	H/V	74(Peak)/ 54(AV)
24020	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
 2. Remark “---” means that the emissions level is too low to be measured

Operation Mode: Transmitting under Middle Channel (2440MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
4880	--	H/V	74(Peak)/ 54(AV)
7320	--	H/V	74(Peak)/ 54(AV)
9760	--	H/V	74(Peak)/ 54(AV)
12200	--	H/V	74(Peak)/ 54(AV)
14640	--	H/V	74(Peak)/ 54(AV)
17080	--	H/V	74(Peak)/ 54(AV)
19520	--	H/V	74(Peak)/ 54(AV)
21960	--	H/V	74(Peak)/ 54(AV)
24400	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
 2. Remark “---” means that the emissions level is too low to be measured

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Operation Mode: Transmitting under High Channel (2480MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
4960	--	H/V	74(Peak)/ 54(AV)
7440	--	H/V	74(Peak)/ 54(AV)
9920	--	H/V	74(Peak)/ 54(AV)
12400	--	H/V	74(Peak)/ 54(AV)
14880	--	H/V	74(Peak)/ 54(AV)
17360	--	H/V	74(Peak)/ 54(AV)
19840	--	H/V	74(Peak)/ 54(AV)
22320	--	H/V	74(Peak)/ 54(AV)
24800	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark “---” means that the emissions level is too low to be measured

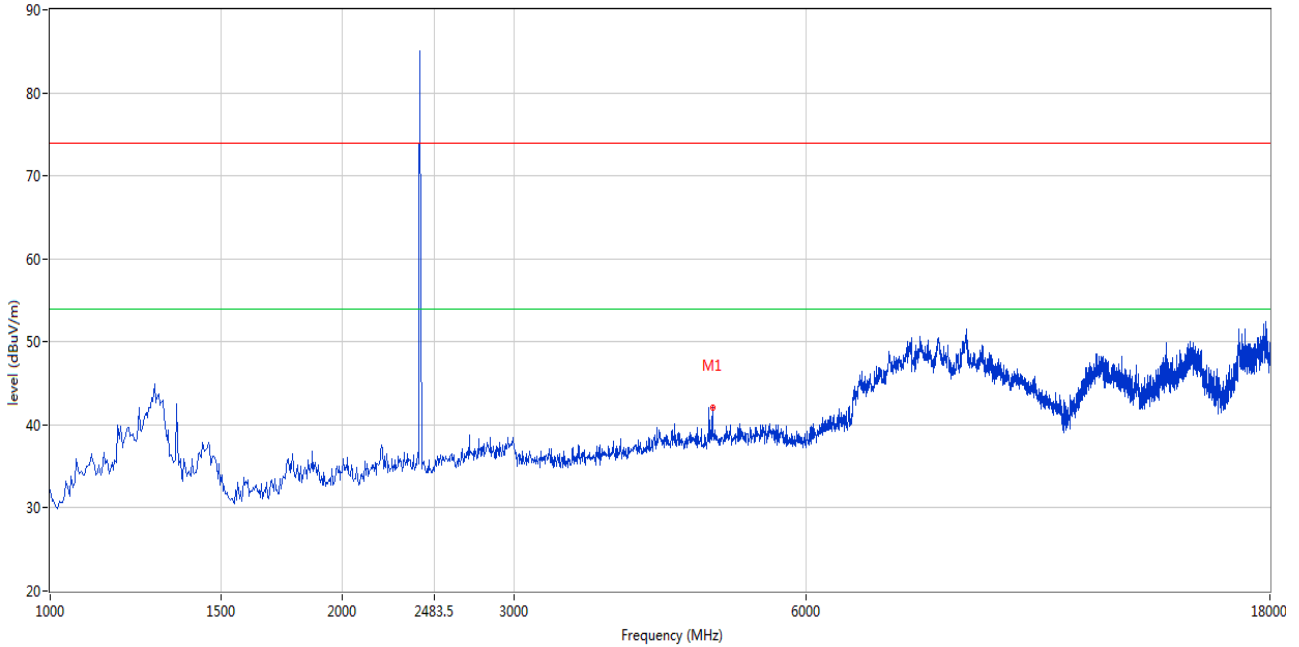
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Please refer to the following test plots for details:

Low Channel: Vertical

FCC Part 15B Class B 1GHz-18GHz - 2



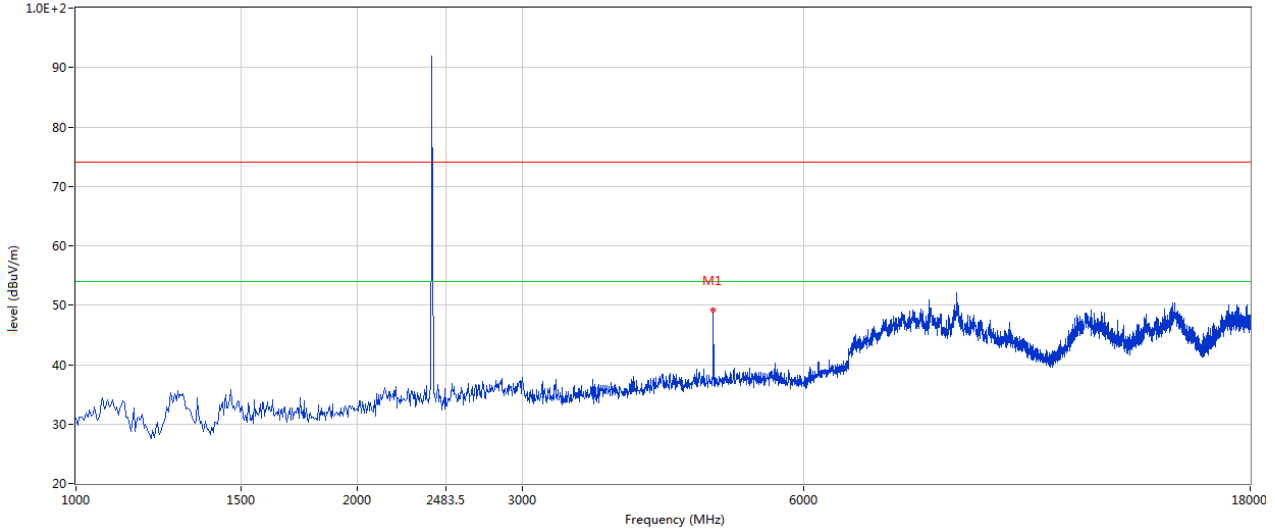
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4803.799	42.11	3.12	74.0	-31.89	Peak	101.00	100	V	Pass

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Low Channel : Horizontal

FCC Part 15B Class B 1GHz-18GHz - 2



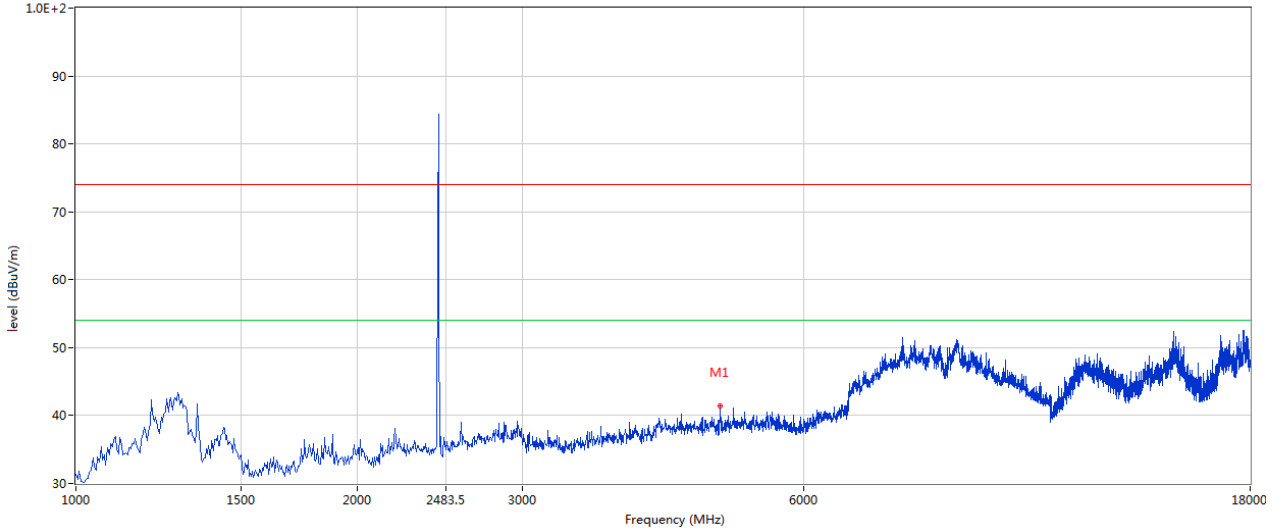
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4803.799	49.12	3.12	74.0	-24.88	Peak	351.00	100	H	Pass

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Middle Channel : Vertical

FCC Part 15B Class B 1GHz-18GHz - 2



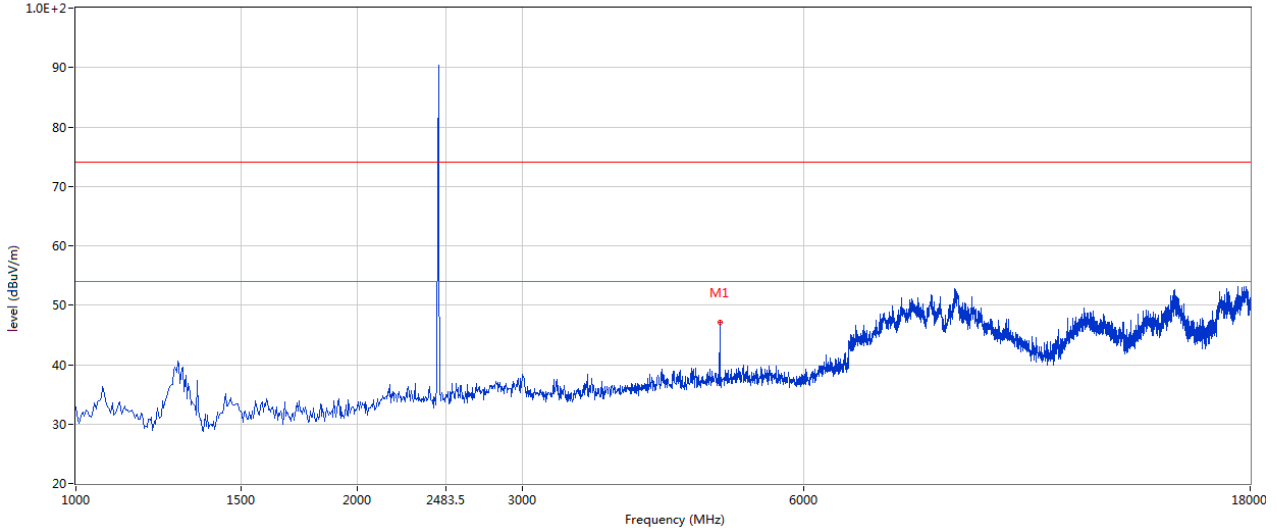
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4879.280	41.40	3.20	74.0	-32.60	Peak	323.00	100	V	Pass

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Middle Channel : Horizontal

FCC Part 15B Class B 1GHz-18GHz - 2



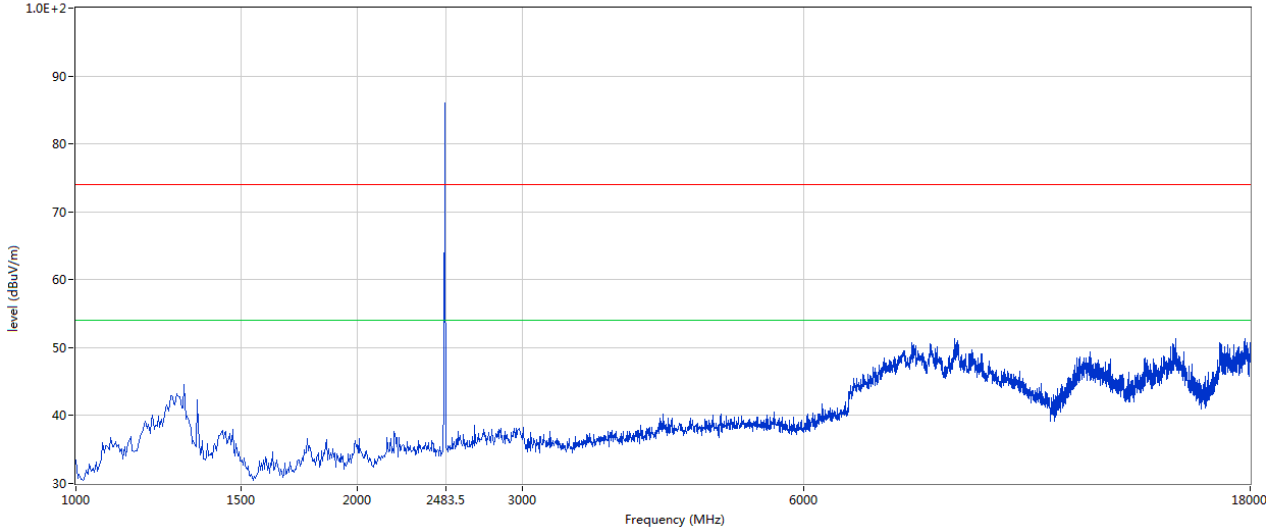
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4879.280	47.16	3.20	74.0	-26.84	Peak	360.00	100	H	Pass

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High Channel : Vertical

FCC Part 15B Class B 1GHz-18GHz - 2



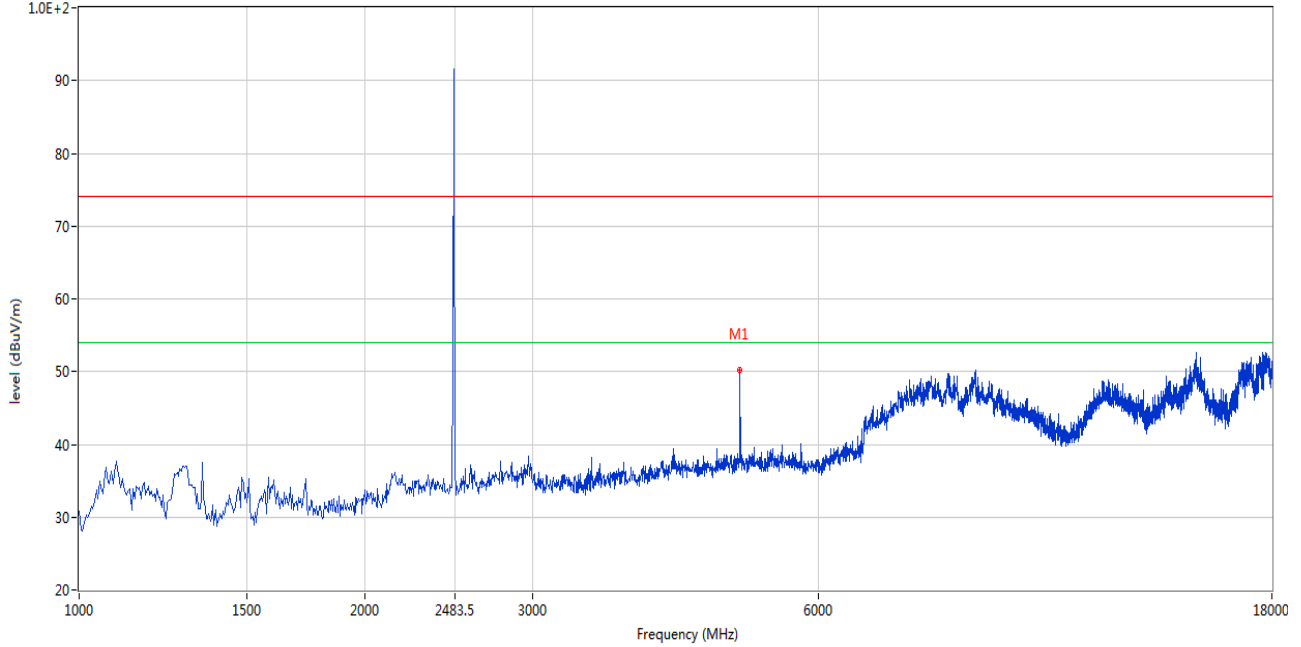
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4960.761	39.96	3.35	74.0	-34.04	Peak	222.00	100	V	Pass

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High Channel : Horizontal

FCC Part 15B Class B 1GHz-18GHz - 2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	4960.010	50.18	3.36	74.0	-23.82	Peak	0.00	100	H	Pass

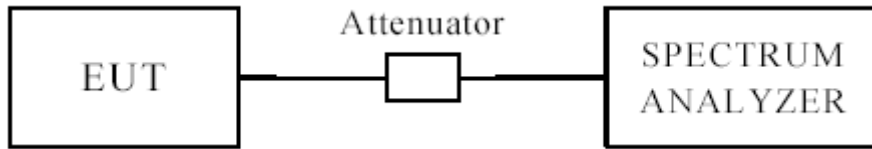
Note: for the radiated emissions above 18G, it is the floor noise.

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7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.4 Test Result

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6dB BW

EUT	21.5' Advertising Displayer		Model	ULT215
Mode	Keep Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/ Fail
Low	2402	733	0.5	Pass
Middle	2440	733	0.5	Pass
High	2480	739	0.5	Pass

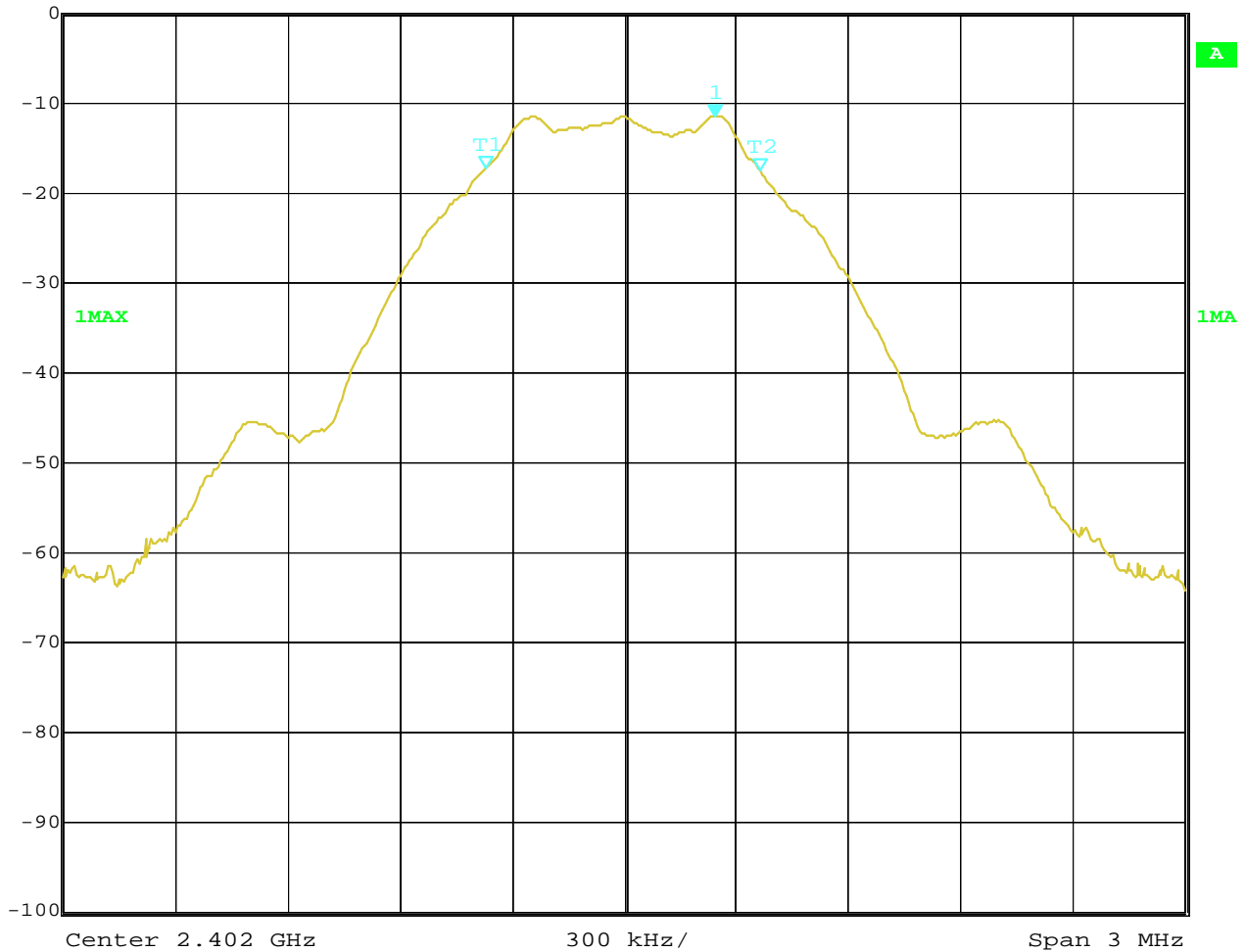
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Test Figure:

1. Condition: Low Channel

	Ref Lvl	0 dBm	Marker 1 [T1 ndB]	6.00 dB	RBW	100 kHz	RF Att	20 dB
			BW	733.46693387 kHz	VBW	300 kHz	Unit	
					SWT	5 ms		dBm



Date: 18.FEB.2019 09:54:35

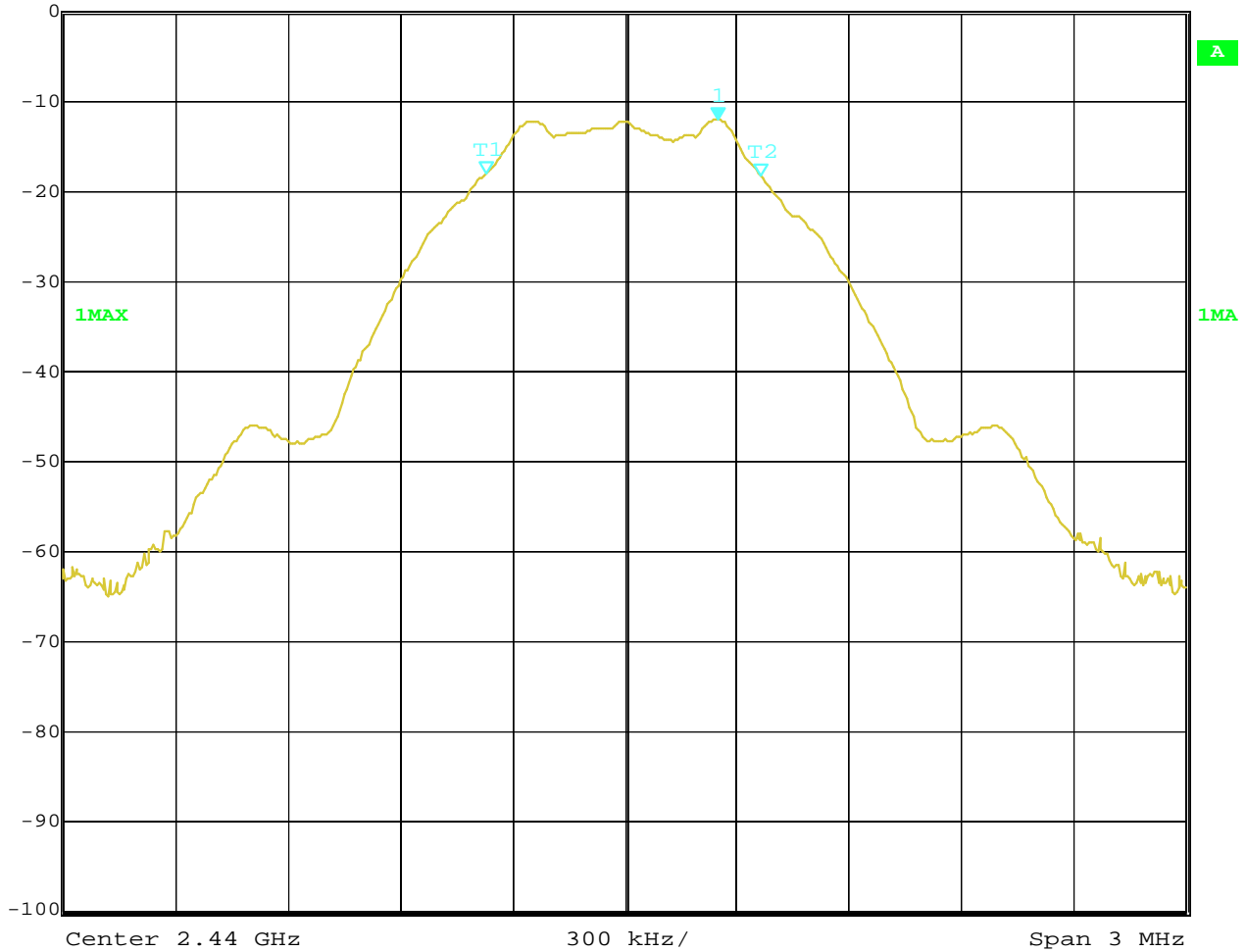
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2. Condition: Middle Channel



Ref Lvl	0 dBm	Marker 1 [T1 ndB]	6.00 dB	RBW	100 kHz	RF Att	20 dB
		BW	733.46693387 kHz	VBW	300 kHz	Unit	dBm
		SWT	5 ms				



Date: 18.FEB.2019 09:55:59

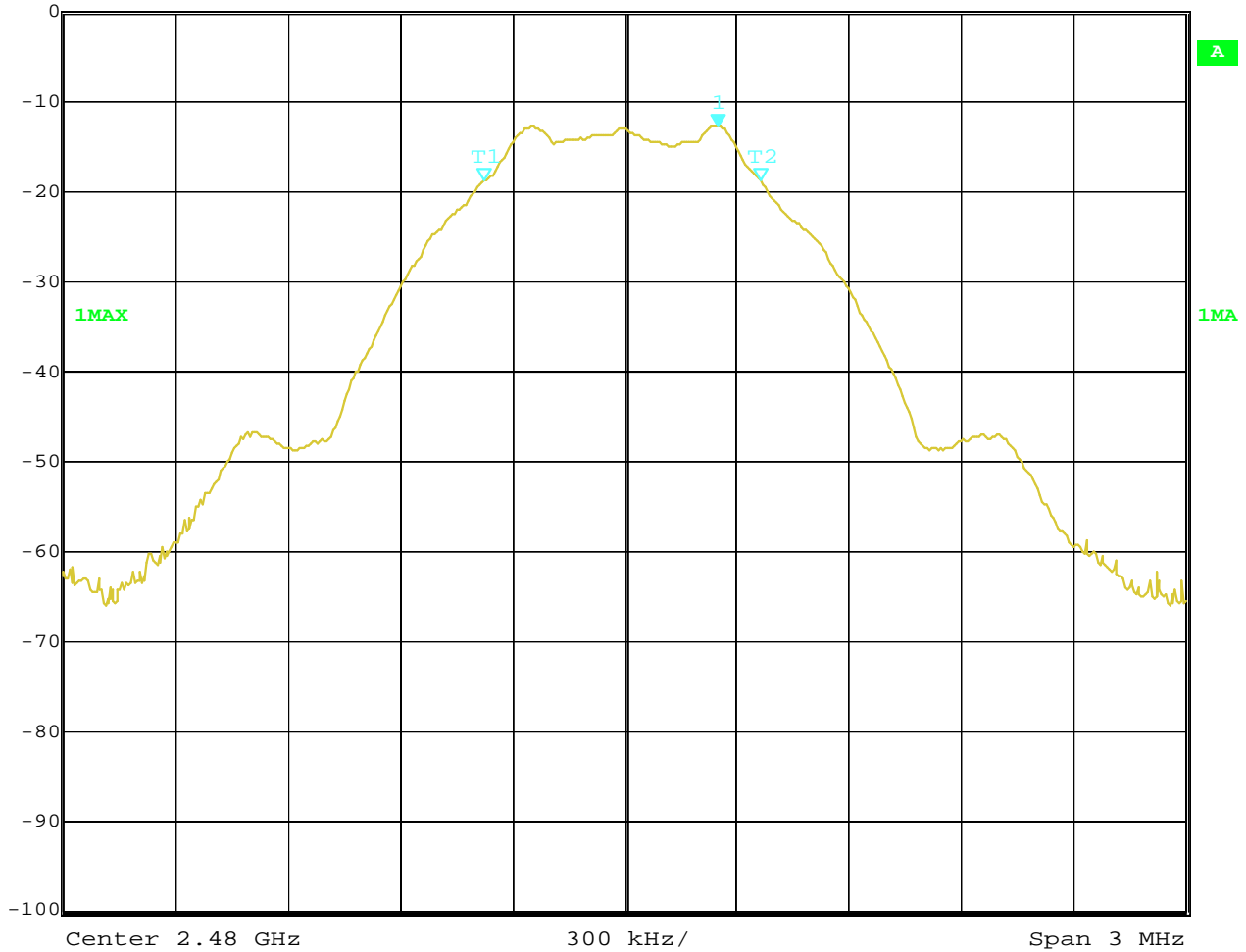
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3. High Channel



Ref Lvl	0 dBm	Marker 1 [T1 ndB]	6.00 dB	RBW	100 kHz	RF Att	20 dB
		BW	739.47895792 kHz	VBW	300 kHz	Unit	dBm
		SWT	5 ms				



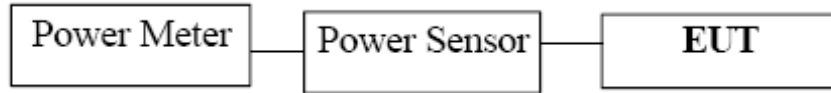
Date: 18.FEB.2019 09:56:32

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8. Maximum Output Power

8.1 Test Setup



8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the Peak power were measured.

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8.4 Test Results

EUT	21.5' Advertising Displayer		Model	ULT215	
Mode	Keep Transmitting		Input Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Max. Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail
		Peak			
Low	2402	-8.80		30	Pass
Middle	2440	-9.41		30	Pass
High	2480	-10.01		30	Pass

Note: 1. the result basic equation calculation as follow:

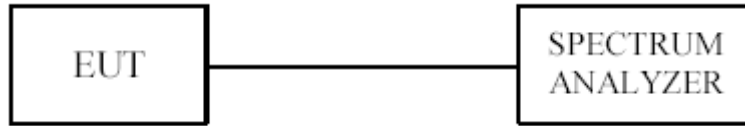
$$\text{Max. Power Output} = \text{Power Reading} + \text{Cable loss} + \text{Attenuator}$$

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9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 10 kHz.
3. Set the VBW \geq 30 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be \leq 8 dBm.

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9.4 Test Result

EUT	21.5' Advertising Displayer		Model	ULT215	
Mode	Keep Transmitting		Input Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Peak Power Reading (dBm)	Cable Loss (dB)	Final Power Spectral Density (dBm)	Maximum Limit (dBm)	Pass/ Fail
Low	-20.79	0.2	-20.59	8	Pass
Middle	-21.42	0.2	-21.22	8	Pass
High	-22.20	0.2	-22.00	8	Pass

Note: The result basic equation calculation as follow:

$$\text{Peak Power Output} = \text{Peak Power Reading} + \text{Cable loss}$$

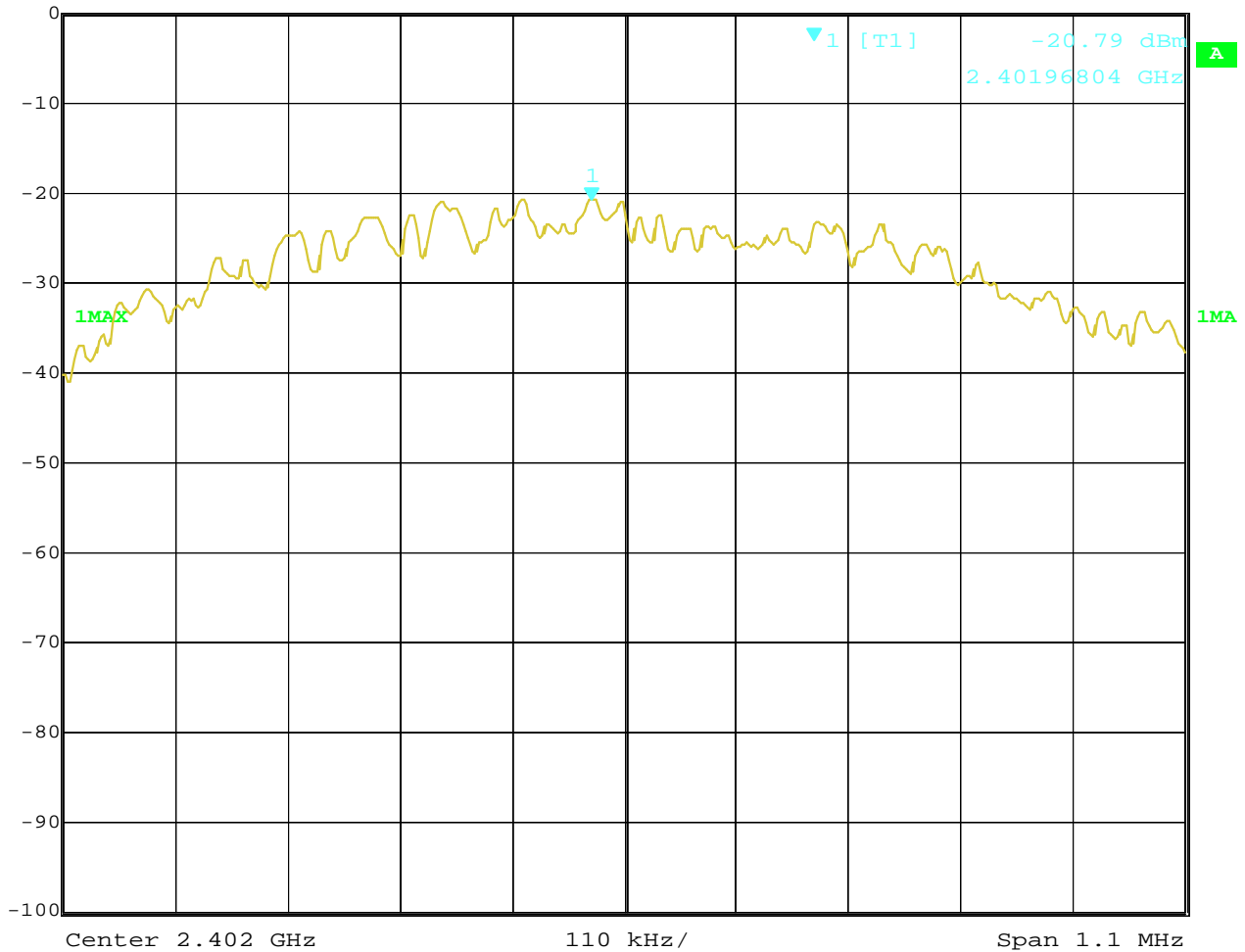
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Test Figure:

1. Condition: Low Channel

	Marker 1 [T1]	RBW	10 kHz	RF Att	20 dB
	Ref Lvl	-20.79 dBm	VBW	30 kHz	
	0 dBm	2.40196804 GHz	SWT	28 ms	Unit dBm



Date: 18.FEB.2019 10:02:20

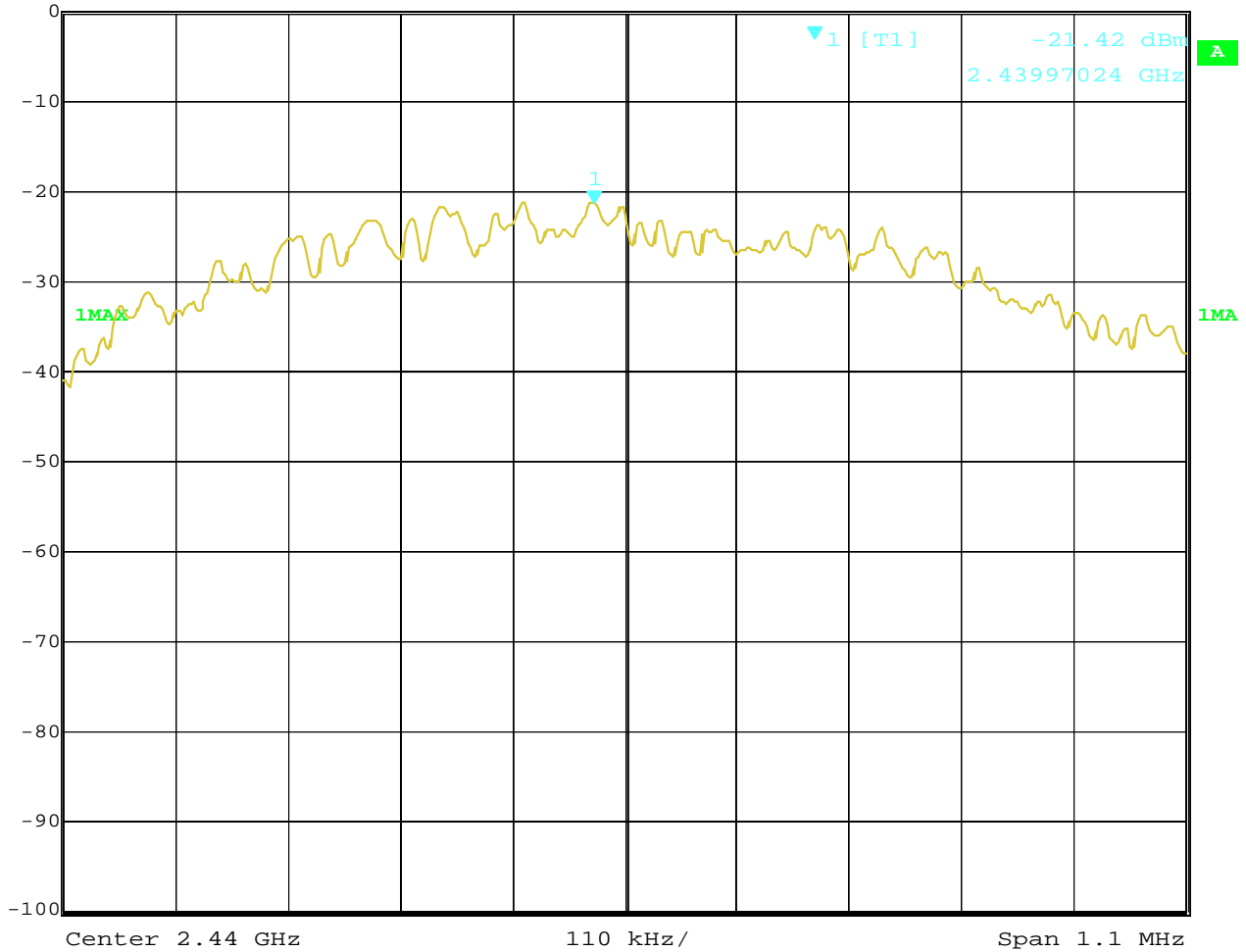
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2. Condition: Middle Channel



Ref Lvl	0 dBm	Marker 1 [T1]	-21.42 dBm	RBW	10 kHz	RF Att	20 dB
			2.43997024 GHz	VBW	30 kHz	Unit	dBm
				SWT	28 ms		



Date: 18.FEB.2019 10:03:08

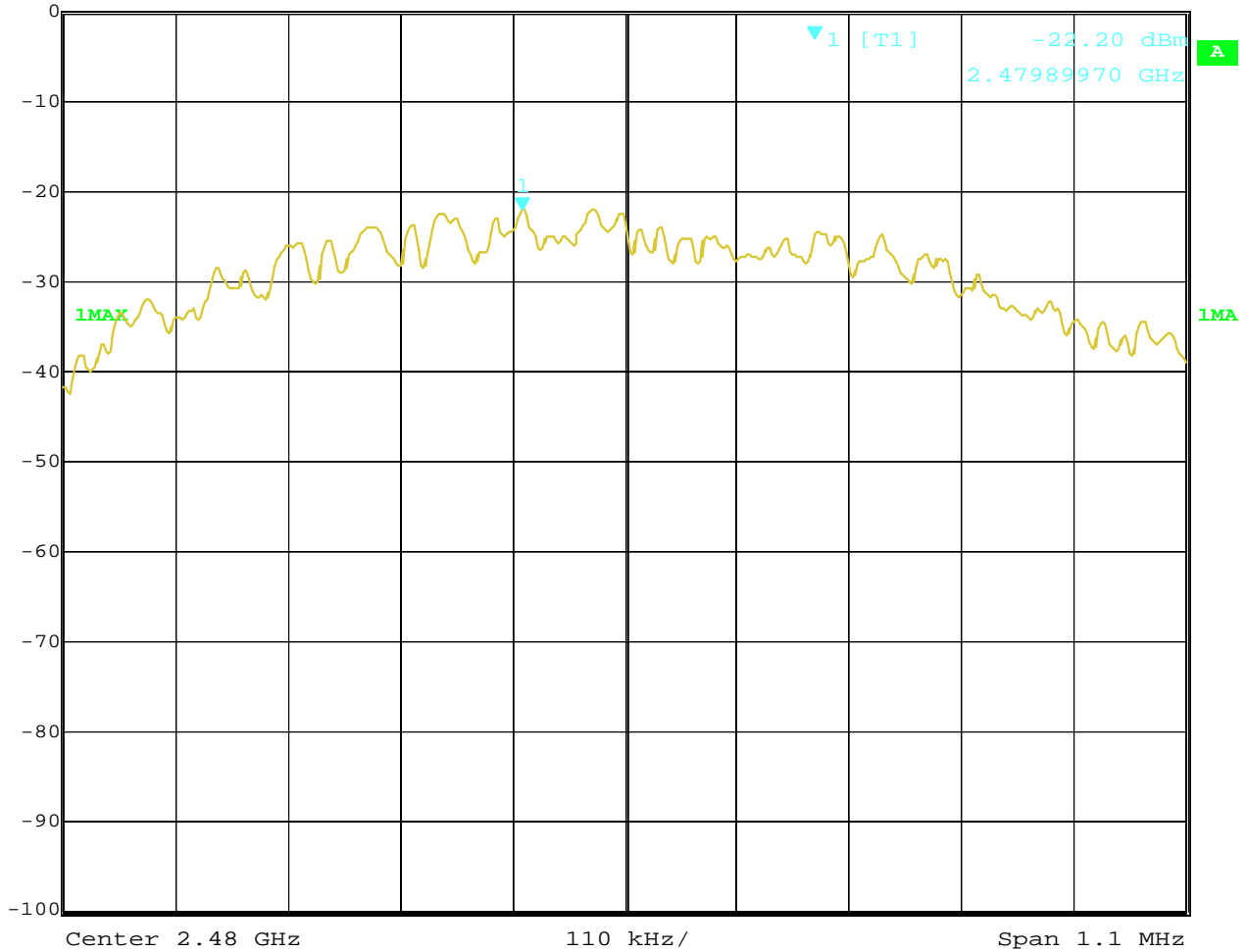
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3. High Channel



Ref Lvl	0 dBm	Marker 1 [T1]	2.47989970 GHz	RBW	10 kHz	RF Att	20 dB
				VBW	30 kHz		
				SWT	28 ms	Unit	dBm



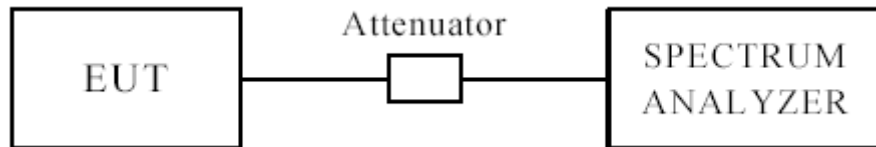
Date: 18.FEB.2019 10:03:38

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10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of Radiated emission test. (Peak values with RBW=1MHz, VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector)

For bandage test, the spectrum set as follows: RBW=100 kHz, VBW=300 kHz. A conducted measurement used

10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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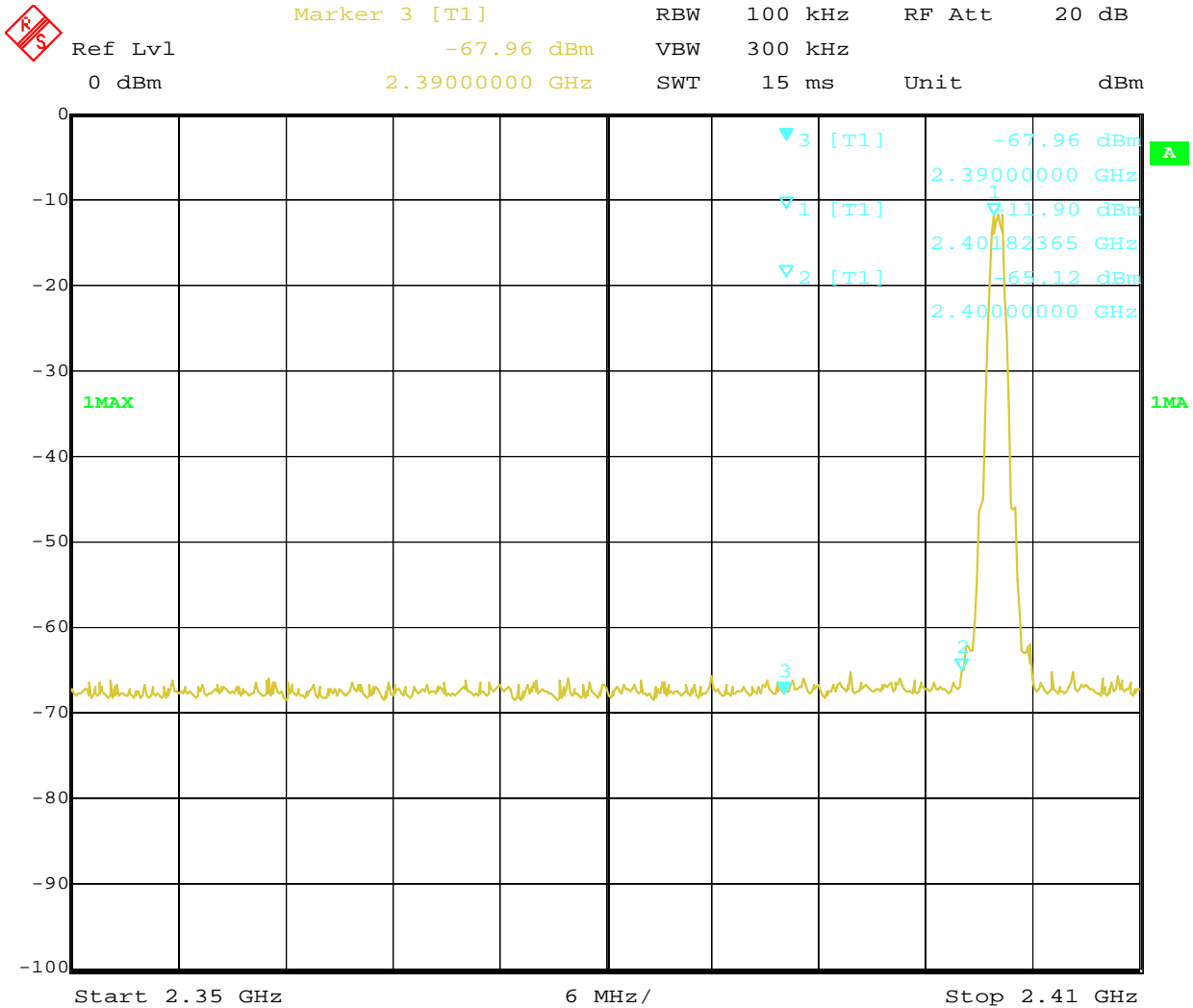
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10.4 Band-edge Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 18.FEB.2019 10:05:28

Note: The Max. FS in Restrict Band are measured in conventional method.

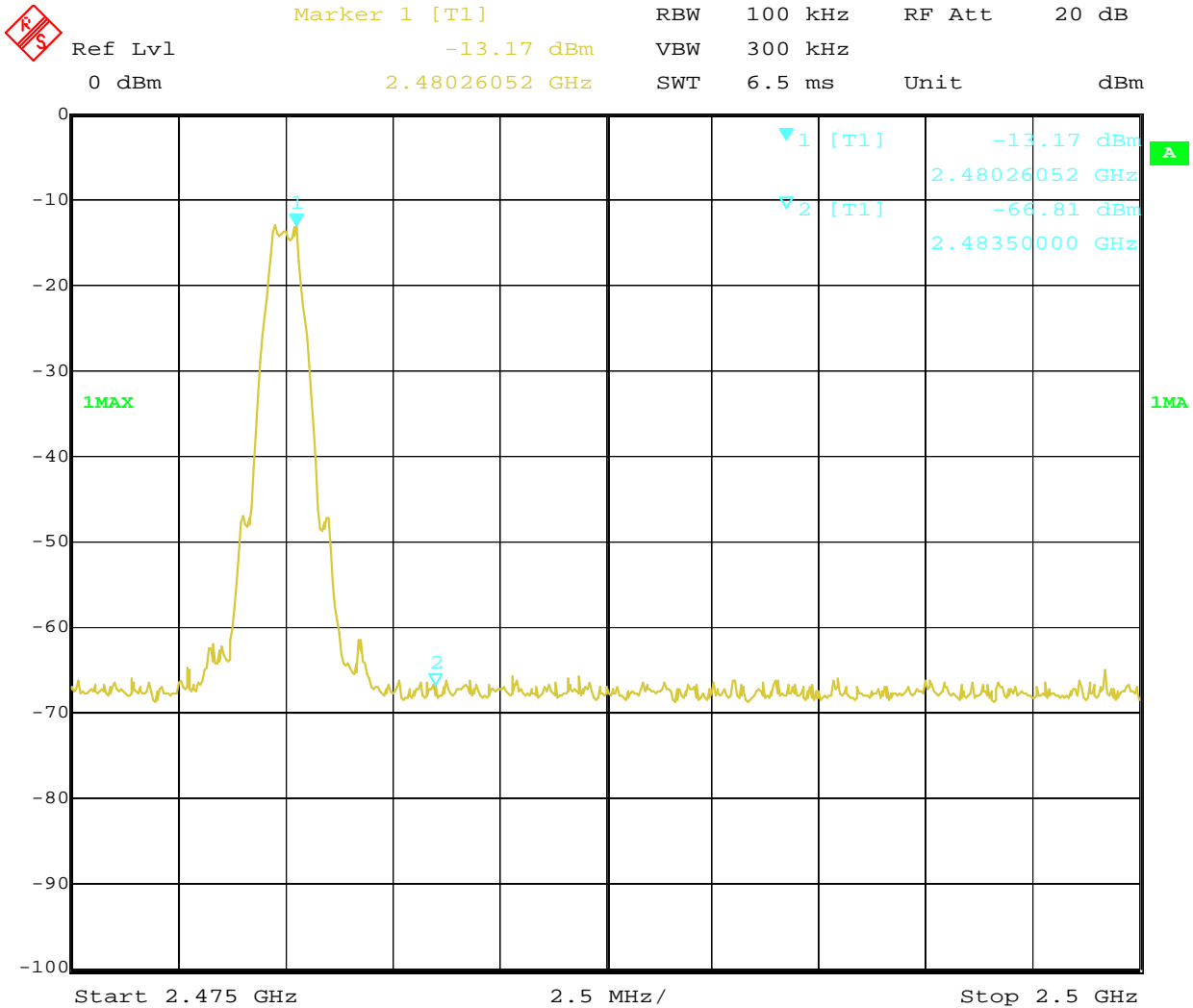
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10.4 Band-edge Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 18.FEB.2019 10:04:43

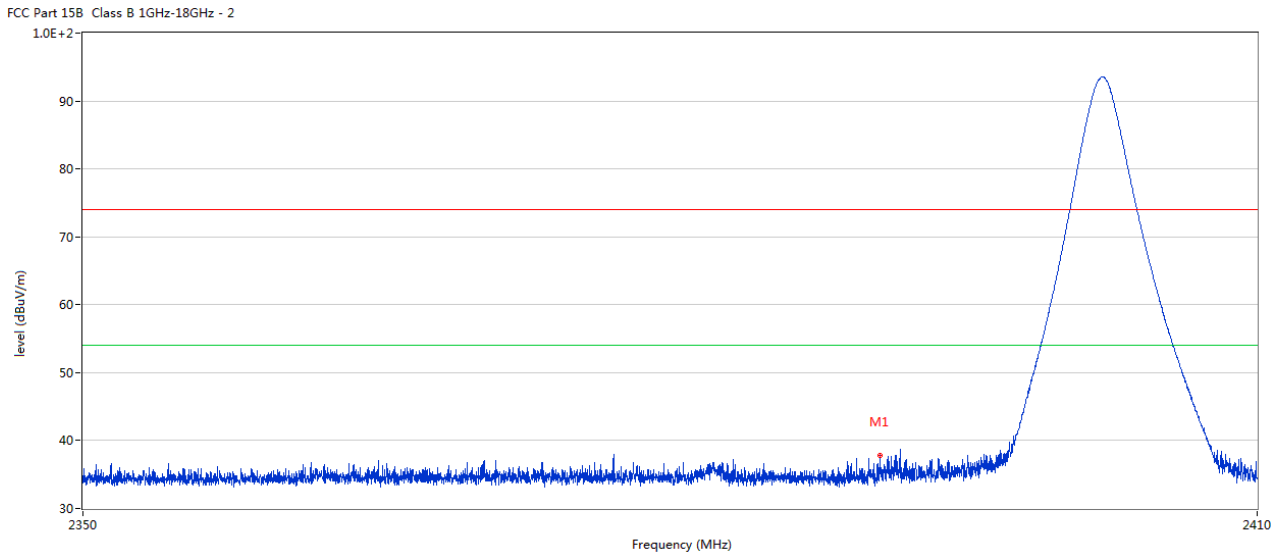
Note: The Max. FS in Restrict Band are measured in conventional method.

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10.4 Restrict Band Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	2390.000	37.76	-3.53	74.0	-36.24	Peak	267.00	100	H	Pass

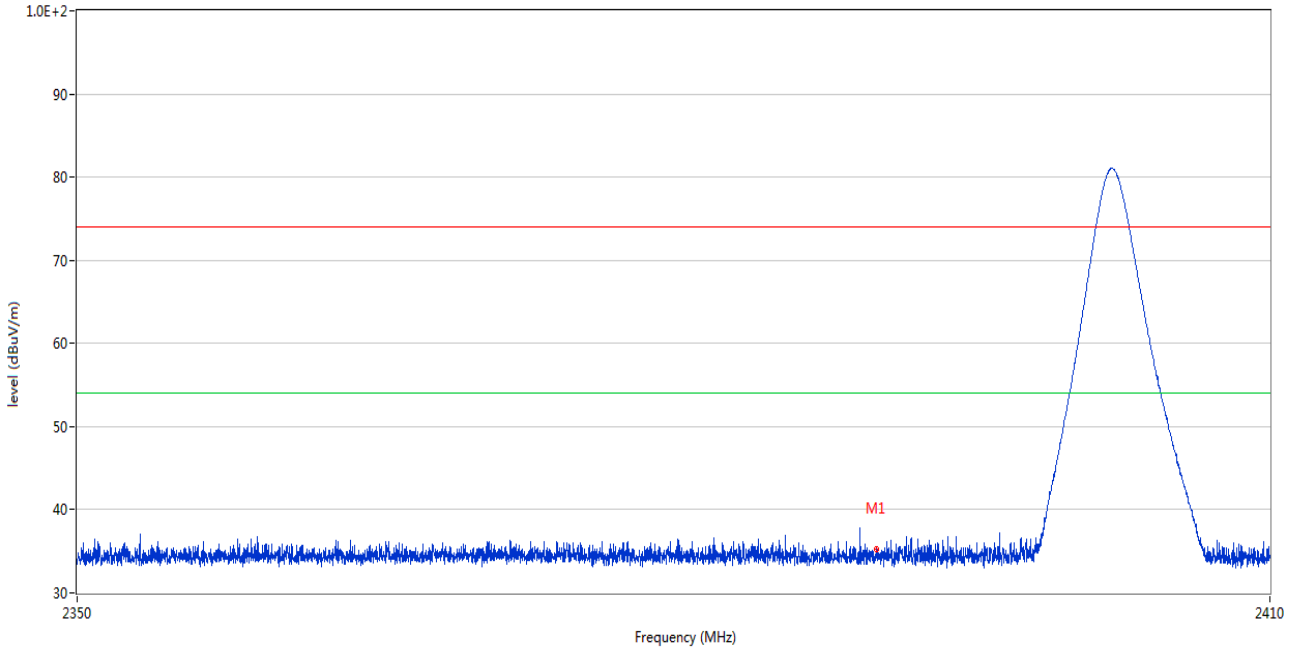
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10.4 Restrict Band Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		

FCC Part 15B Class B 1GHz-18GHz - 2



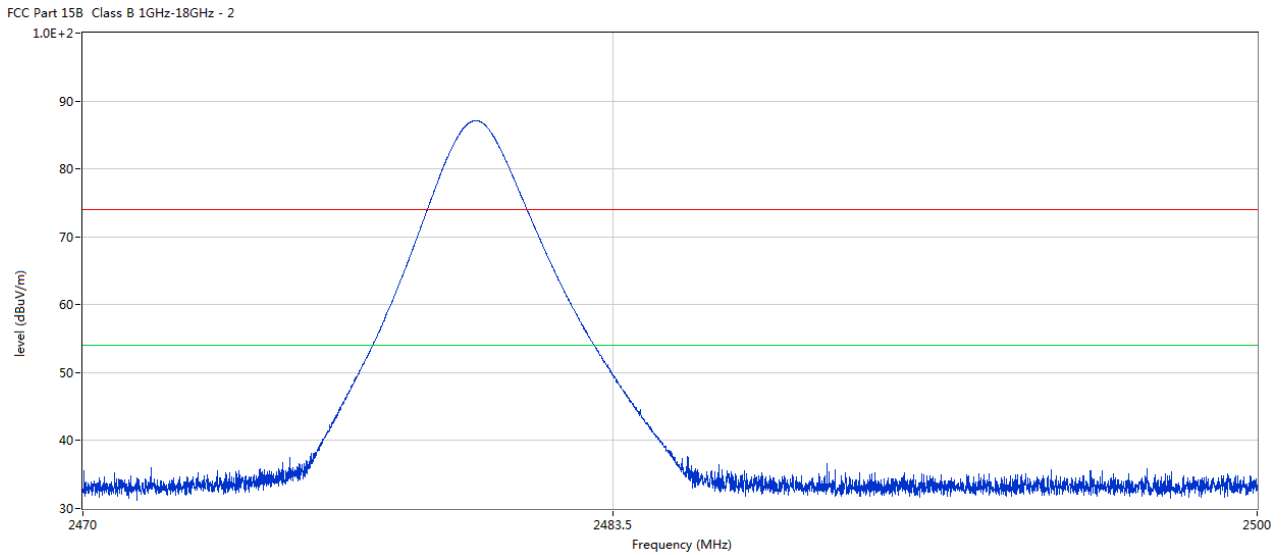
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	2390.000	35.26	-3.53	74.0	-38.74	Peak	284.00	100	V	Pass

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10.4 Restrict Band Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



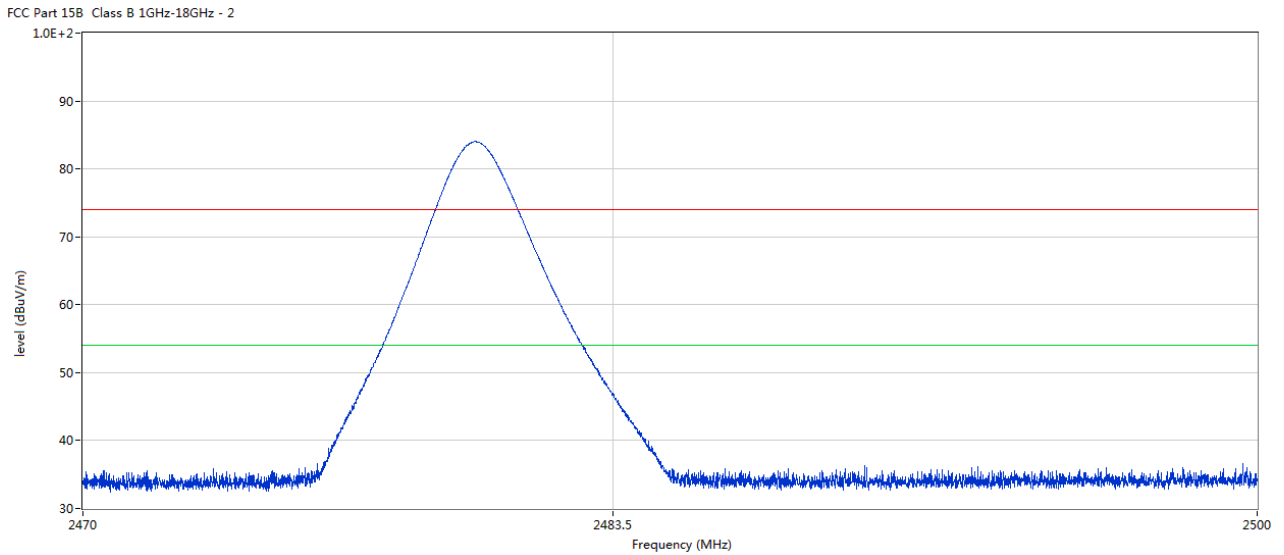
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	2483.500	50.24	-3.57	74.0	-23.76	Peak	360.00	100	H	Pass

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10.4 Restrict Band Measurement

EUT	21.5' Advertising Displayer	Model	ULT215
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	2483.500	47.34	-3.57	74.0	-26.66	Peak	326.00	100	V	Pass

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11.0 Antenna Requirement

11.1 Standard Applicable

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 transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

Dipole antenna used. The gain of the antennas is 2.0dBi.

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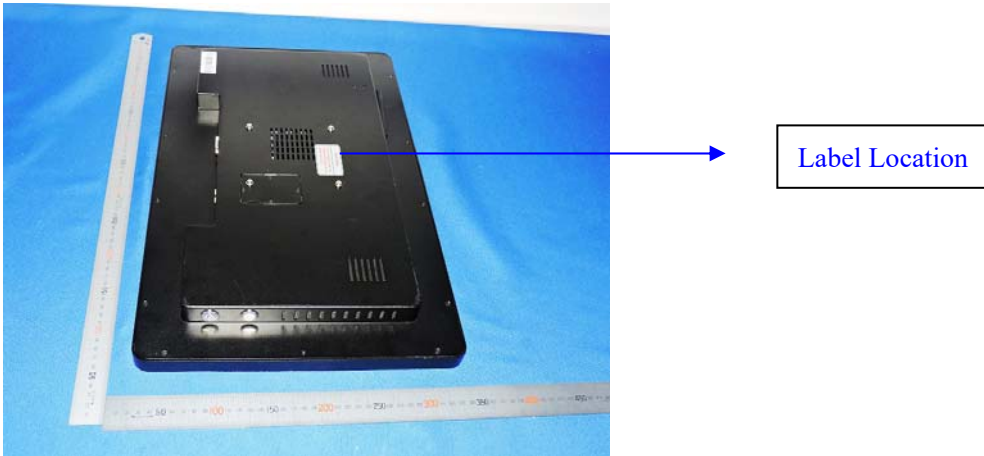
12.0 FCC ID Label

FCC ID: 2AACS-ULT215

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



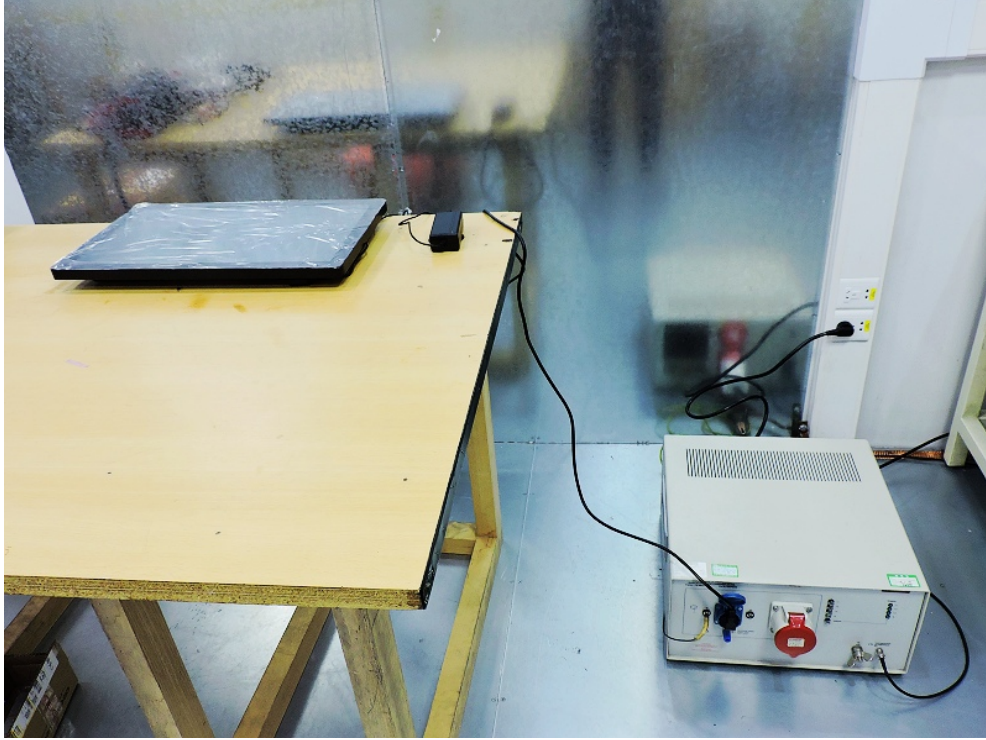
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13.0 Photo of testing

Conducted Emission Test Setup:



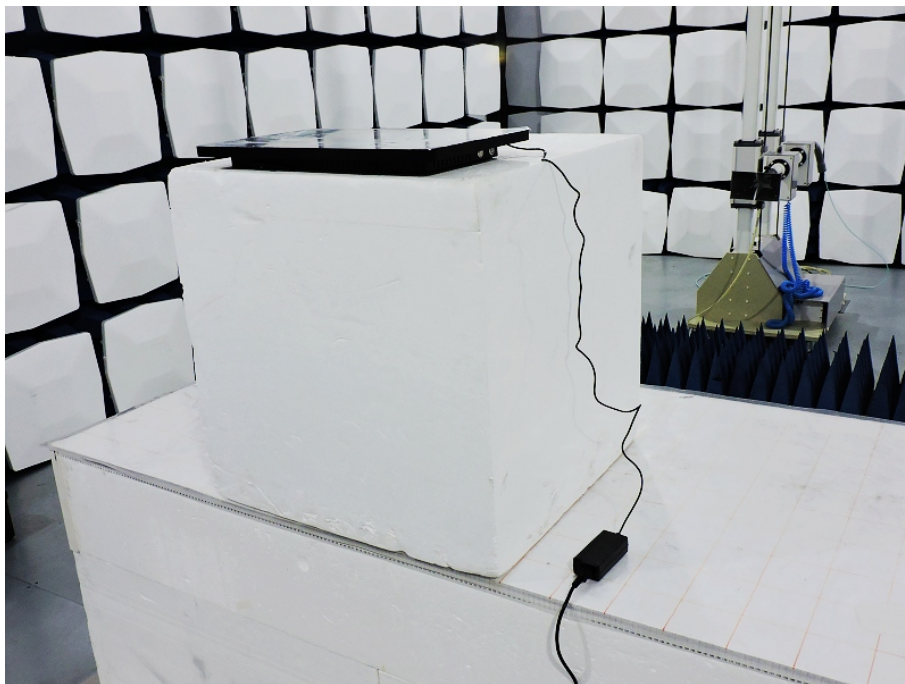
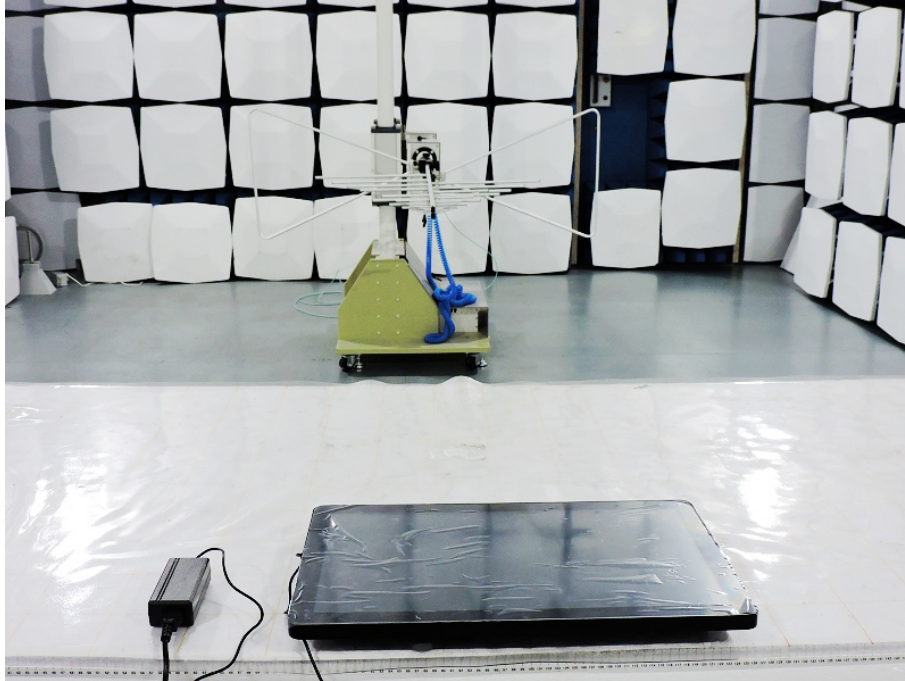
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Radiated Emission Test Setup:



Photographs – EUT

Please see test report EMC1901184-01

End of the report

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