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	For Bluetooth-LE		
Report No	CHTEW22090122	Report Verification:	
Project No	SHT2208193404EW		
FCC ID	2ASRT-NPX320		Reportivo: Chitty22000122
Applicant's name:	Screeneo Innovation SA		
Address	Route de Lully 5C, 1131 Tolo	chenaz, Switzerland	d
Product Name	Digital Projector		
Trade Mark	PHILIPS		
Model No	NeoPix 320		
Listed Model(s)	NPX320		
Standard:	FCC CFR Title 47 Part 15 St	ubpart C Section 1	5.247
Date of receipt of test sample	Aug.22, 2022		
Date of testing	Aug.22, 2022- Sep.26, 2022		
Date of issue	Sep.27, 2022		
Result	PASS		
Compiled by (Position+Printed name+Signature):	File administrator Echo Wei	Eul	ho Wei kong
Supervised by (Position+Printed name+Signature):	Project Engineer Kiki Kong	121/02	, konf
Approved by		Lto	MSHU
(Position+Printed name+Signature):	RF Manager Hans Hu	F U	
Testing Laboratory Name :	Shenzhen Huatongwei Inter	rnational Inspectio	n Co., Ltd.
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Shenzhen Huatongwei International Inspe			
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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- <u>FCC Rules Part 15.247</u>: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices
- <u>KDB 558074 D01 15.247 Meas Guidance v05r02</u>: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2022-09-27	Original

2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247(c)	PASS	Xiaoxiao Li
5.2	AC Conducted Emission	15.207	PASS	Junman Wang
5.3	Peak Output Power	15.247(b)(3)	PASS	Xiaoxiao Li
5.4	Power Spectral Density	15.247(e)	PASS	Xiaoxiao Li
5.5	6dB Bandwidth	15.247(a)(2)	PASS	Xiaoxiao Li
5.6	99% Occupied Bandwidth	-	PASS ^{*1}	Xiaoxiao Li
5.7	Duty cycle	-	PASS ^{*1}	Xiaoxiao Li
5.8	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS	Xiaoxiao Li
5.9	Radiated Band Edge Emission	15.205/15.209	PASS	Xiaoxiao Li
5.10	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS	Dongyang Wu

Note:

The measurement uncertainty is not included in the test result.

*1: No requirement on standard, only report these test data.

3. SUMMARY

3.1. Client Information

Applicant:	Screeneo Innovation SA
Address:	Route de Lully 5C, 1131 Tolochenaz, Switzerland
Manufacturer:	Screeneo Innovation SA
Address:	Route de Lully 5C, 1131 Tolochenaz, Switzerland

3.2. Product Description

Main unit information:	
Product Name:	Digital Projector
Trade Mark:	PHILIPS
Model No.:	NeoPix 320
Listed Model(s):	NPX320
Power supply:	AC 100-240V from AC power
Hardware version:	1.0.0
Software version:	1.0.0

3.3. Radio Specification Description

Bluetooth version:	V5.0
Support function ^{*2} :	BLE1M,BLE2M
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	FPC Antenna
Antenna gain:	3dBi

Note:

*2: only show the RF function associated with this report.

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Phone: 86-755-26715499 E-mail: <u>cs@szhtw.com.cn</u> <u>http://www.szhtw.com.cn</u>	
Qualificationa	Туре	Accreditation Number
Qualifications	FCC	762235

4. TEST CONFIGURATION

4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

Channel	Frequency (MHz)
00	2402
01	2404
19	2440
38	2478
39	2480

4.2. Descriptions of Test mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit.

For Radiated spurious emissions:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report.

4.3. Test sample information

Test item	HTW sample no.
RF Conducted test items	Please refer to the description in the appendix report
RF Radiated test items	YPHT22081934003
EMI test items	YPHT22081934001

Note:

RF Conducted test items: Peak Output Power, Power Spectral Density, 6dB Bandwidth, 99% Occupied Bandwidth, Duty cycle, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission EMI test items: AC Conducted Emission

4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?			
🗸 No			
Item	Equipment	Trade Name	Model No.
1			
2			

4.5. Testing environmental condition

Туре	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

4.6. Statement of the measurement uncertainty

Test Item	Measurement Uncertainty
AC Conducted Emission (150kHz~30MHz)	3.00 dB
Radiated Emission (30MHz~1000MHz	4.36 dB
Radiated Emissions (1GHz~25GHz)	5.10 dB
Peak Output Power	0.77dB
Power Spectral Density	0.77dB
Conducted Spurious Emission	0.77dB
6dB Bandwidth	70Hz for <1GHz 130Hz for >1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

•	Conducted E	mission					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
•	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2022/08/30	2023/08/29
•	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2022/08/29	2023/08/28
•	Pulse Limiter	R&S	HTWE0193	ESH3-Z2	101447	2022/08/29	2023/08/28
•	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLE X_142	EF-NM- BNCM-2M	2022/09/17	2023/09/16
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

4.7. Equipment Used during the Test

•	Radiated emi	ssion-6th test sit	te				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2023/09/29
•	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2022/08/30	2023/08/29
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2024/04/05
•	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2024/04/05
•	Pre-Amplifer	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2021/11/05	2022/11/04
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2022/02/25	2023/02/24
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

•	Radiated em	ission-7th test s	ite				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2018/09/27	2023/09/26
•	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2022/08/25	2023/08/24
•	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
•	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/04/27	2023/04/26
•	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/05	2022/11/04
•	Broadband Pre- amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2022/02/28	2023/02/27
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
•	Test Software	Audix	N/A	E3	N/A	N/A	N/A

•	RF Conducted Method					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Signal and spectrum Analyzer	R&S	FSV40	100048	2022/08/25	2023/08/24
•	Spectrum Analyzer	Agilent	N9020A	MY50510187	2022/08/25	2023/08/24
•	Power Meter	Anritsu	ML249A	N/A	2022/08/25	2023/08/24
0	Radio communication tester	R&S	CMW500	137688-Lv	2022/08/25	2023/08/24

5.1. Antenna Requirement

REQUIREMENT

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responseble party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

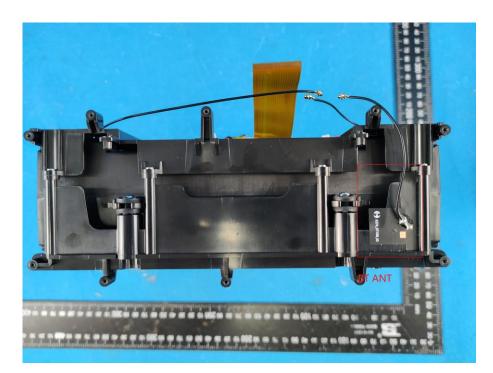
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULT

☑ Passed □ Not Applicable

The antenna type is a FPC antenna, the directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. AC Conducted Emission

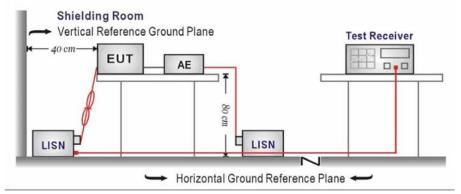
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)					
Frequency range (IVIHZ)	Quasi-peak	Average				
0.15-0.5	66 to 56*	56 to 46*				
0.5-5	56	46				
5-30	60	50				

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup according to ANSI C63.10 requirements.
- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
- 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE

Please refer to the clause 4.2

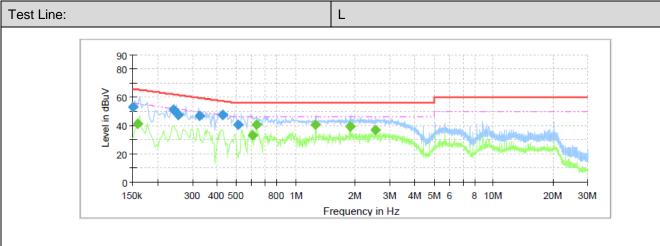
TEST RESULT

☑ Passed □ Not Applicable

Shenzhen Huatongwei International Inspection Co., Ltd.

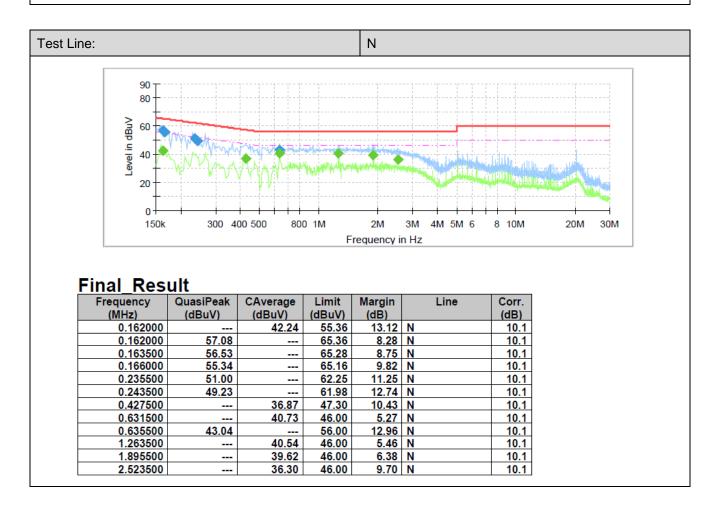
Page:

BLE 1M



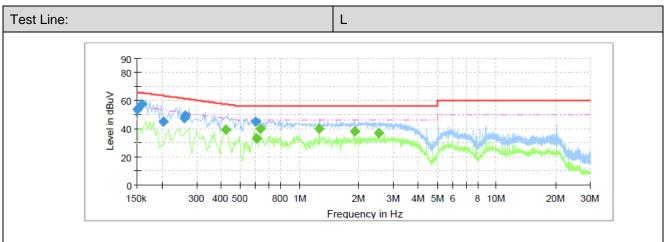
Final_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)		(dB)
0.150000	52.87		66.00	13.13	L1	10.1
0.158000		41.21	55.57	14.35	L1	10.1
0.239500	51.01		62.11	11.11	L1	10.1
0.255500	47.45		61.58	14.13	L1	10.1
0.327500	46.76		59.51	12.75	L1	10.1
0.427500	47.52		57.30	9.78	L1	10.1
0.511500	40.69		56.00	15.31	L1	10.1
0.603500		33.30	46.00	12.70	L1	10.1
0.631500		40.60	46.00	5.40	L1	10.1
1.263500		40.47	46.00	5.53	L1	10.1
1.895500		39.67	46.00	6.33	L1	10.1
2.527500		37.00	46.00	9.00	L1	10.2



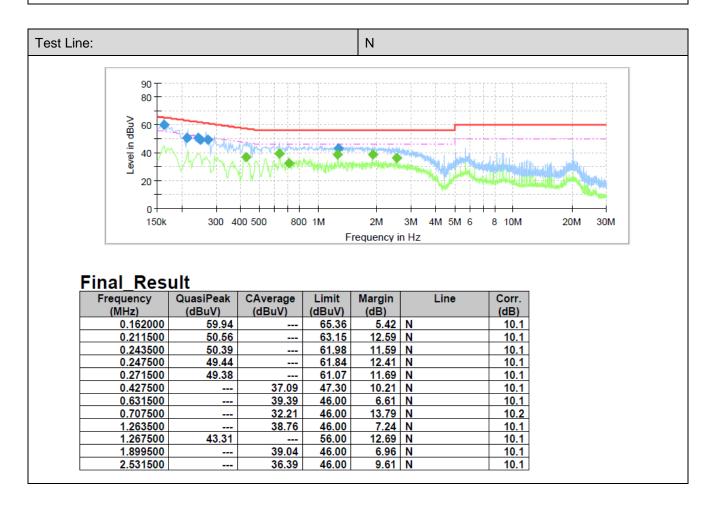
Page:

BLE 2M



Final_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)		(dB)
0.150000	53.85		66.00	12.15	L1	10.1
0.159500	57.55		65.49	7.94	L1	10.1
0.203500	45.27		63.47	18.20	L1	10.1
0.259500	47.70		61.45	13.75	L1	10.1
0.263500	49.40		61.32	11.92	L1	10.1
0.423500		39.11	47.38	8.27	L1	10.1
0.595500	45.13		56.00	10.87	L1	10.1
0.603500		33.34	46.00	12.66	L1	10.1
0.631500		39.97	46.00	6.03	L1	10.1
1.263500		39.81	46.00	6.19	L1	10.1
1.899500		38.19	46.00	7.81	L1	10.1
2.527500		37.10	46.00	8.90	L1	10.2

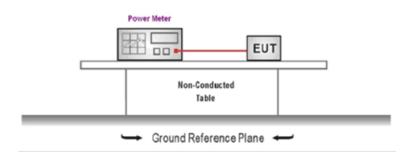


5.3. Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was tested according to ANSI C63.10 and KDB 558074 D01 requirements.
- 2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
- 3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
- 4. Record the measurement data.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix A on the appendix report

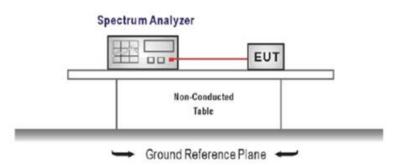
5.4. Power Spectral Density

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):

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

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input,
- Configure the spectrum analyzer as shown below: Center frequency=DTS channel center frequency Span =1.5 times the DTS bandwidth RBW = 3 kHz ≤ RBW ≤ 100 kHz, VBW ≥ 3 × RBW Sweep time = auto couple Detector = peak Trace mode = max hold
 Place the radio in continuous transmit mode, allow the second s
- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
- 4. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

Please refer to appendix B on the appendix report

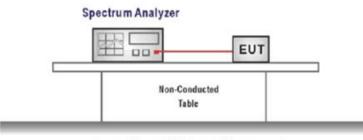
5.5. 6dB bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



Ground Reference Plane

TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =DTS channel center frequency

Span=2 x DTS bandwidth

RBW = 100 kHz, VBW \ge 3 × RBW

Sweep time= auto couple

Detector = Peak

Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

TEST DATA

Please refer to appendix C on the appendix report

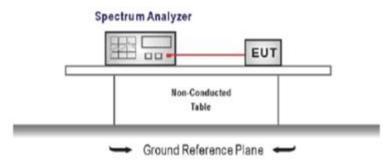
2022-09-27

5.6. 99% Occupied Bandwidth

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =channel center frequency Span≥1.5 x OBW RBW = 1%~5%OBW VBW ≥ 3 × RBW Sweep time= auto couple Detector = Peak Trace mode = max hold

3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

☑ Passed □ Not Applicable

TEST DATA

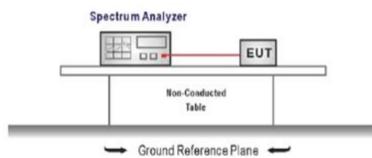
Please refer to appendix D on the appendix report

2022-09-27

5.7. Duty Cycle

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:

Span=zero span, Frequency=centered channel, RBW= 1 MHz, VBW ≥ RBW Sweep=as necessary to capture the entire dwell time,

Detector function = peak, Trigger mode

4. Measure and record the duty cycle data

TEST MODE

Please refer to the clause 4.2

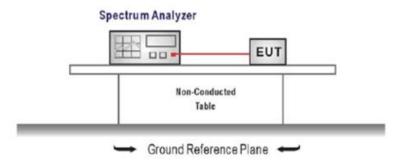
TEST DATA

Please refer to appendix E on the appendix report

5.8. Conducted Band edge and Spurious Emission LIMIT

FCC CFR Title 47 Part 15 Subpart C Section15.247 (d):In any 100 kHz bandwidth outside the frequency band 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 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Emission level measurement

Set the center frequency and span to encompass frequency range to be measured

RBW = 100 kHz, VBW \ge 3 x RBW

Detector = peak, Sweep time = auto couple, Trace mode = max hold

Allow trace to fully stabilize

Use the peak marker function to determine the maximum amplitude level.

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

☑ Passed □ Not Applicable

<u>TEST DATA</u>

Please refer to appendix F on the appendix report

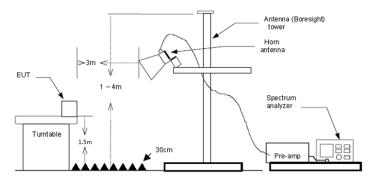
5.9. Radiated Band edge Emission

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10 .
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
- 5. Use the following spectrum analyzer settings:
 - a) Span shall wide enough to fully capture the emission being measured
 - b) Set RBW=100kHz for <1GHz, VBW=3*RBW, Sweep time=auto, Detector=peak, Trace=max hold
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.6 duty cycle.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

☑ Passed □ Not Applicable

Note:

- 1) Level= Reading + Factor; Factor = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level– Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

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Test channel		CH00			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	47.22	27.96	3.89	37.56	41.51	74.00	-32.49	Peak	
2	2389.25	56.71	27.72	3.99	37.45	50.97	74.00	-23.03	Peak	
3	2390.01	54.66	27.72	3.99	37.45	48.92	74.00	-25.08	Peak	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	35.99	27.96	3.89	37.56	30.28	54.00	-23.72	Average	
2	2372.87	40.41	27.75	3.97	37.49	34.64	54.00	-19.36	Average	
3	2390.01	39.17	27.72	3.99	37.45	33.43	54.00	-20.57	Average	

est channel		CH00			Polarity	/		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	48.26	27.96	3.89	37.56	42.55	74.00	-31.45	Peak
2	2389.25	62.33	27.72	3.99	37.45	56.59	74.00	-17.41	Peak
3	2390.01	59.87	27.72	3.99	37.45	54.13	74.00	-19.87	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	36.65	27.96	3.89	37.56	30.94	54.00	-23.06	Average
2	2372.97	43.81	27.75	3.97	37.49	38.04	54.00	-15.96	Average
3	2390.01	40.42	27.72	3.99	37.45	34.68	54.00	-19.32	Average

Test channel		CH39			Polarit	y		Horizon	tal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	57.24	27.43	4.03	37.26	51.44	74.00	-22.56	Peak
2	2500.00	49.14	27.40	4.04	37.26	43.32	74.00	-30.68	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	45.03	27.43	4.03	37.26	39.23	54.00	-14.77	Average
2	2488.67	46.46	27.42	4.04	37.26	40.66	54.00	-13.34	Average
3	2500.00	37.94	27.40	4.04	37.26	32.12	54.00	-21.88	Average

Test channel		CH39			Polarity			Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	57.05	27.43	4.03	37.26	51.25	74.00	-22.75	Peak
2	2500.00	49.71	27.40	4.04	37.26	43.89	74.00	-30.11	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	44.22	27.43	4.03	37.26	38.42	54.00	-15.58	Average
2	2488.64	45.82	27.42	4.04	37.26	40.02	54.00	-13.98	Average
3	2500.00	37.67	27.40	4.04	37.26	31.85	54.00	-22.15	Average

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Fest channel		CH00			Polarity	/		Horizont	al
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	46.99	27.96	3.89	37.56	41.28	74.00	-32.72	Peak
2	2389.25	55.81	27.72	3.99	37.45	50.07	74.00	-23.93	Peak
3	2390.01	53.62	27.72	3.99	37.45	47.88	74.00	-26.12	Peak
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	2310.00	36.29	27.96	3.89	37.56	30.58	54.00	-23.42	Average
2	2372.87	40.28	27.75	3.97	37.49	34.51	54.00	-19.49	Average
3	2390.01	37.47	27.72	3.99	37.45	31.73	54.00	-22.27	Average

Test channel		CH00			Polarity	,		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	47.09	27.96	3.89	37.56	41.38	74.00	-32.62	Peak
2	2388.93	62.70	27.72	3.99	37.45	56.96	74.00	-17.04	Peak
3	2390.01	59.92	27.72	3.99	37.45	54.18	74.00	-19.82	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	36.12	27.96	3.89	37.56	30.41	54.00	-23.59	Average
2	2373.08	44.12	27.75	3.97	37.49	38.35	54.00	-15.65	Average
3	2390.01	40.37	27.72	3.99	37.45	34.63	54.00	-19.37	Average

Test channel		CH39			Polarity	/		Horizont	al
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	62.58	27.43	4.03	37.26	56.78	74.00	-17.22	Peak
2	2500.00	47.61	27.40	4.04	37.26	41.79	74.00	-32.21	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	52.25	27.43	4.03	37.26	46.45	54.00	-7.55	Average
2	2500.00	38.35	27.40	4.04	37.26	32.53	54.00	-21.47	Average

Test channel		CH39			Polarity			Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	63.91	27.43	4.03	37.26	58.11	74.00	-15.89	Peak
2	2500.00	51.65	27.40	4.04	37.26	45.83	74.00	-28.17	Peak
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over	Remark
1	2483.50	51.89	27.43	4.03	37.26	46.09	54.00	-7.91	Average
2	2500.00	38.00	27.40	4.04	37.26	32.18	54.00	-21.82	Average

5.10. Radiated Spurious Emission

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

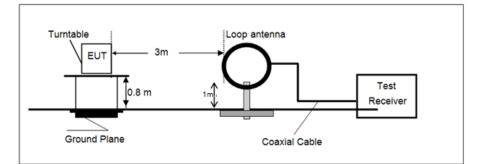
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

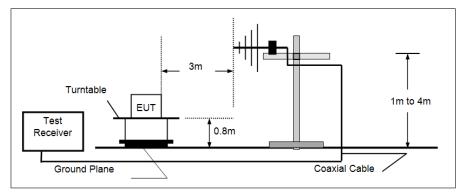
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

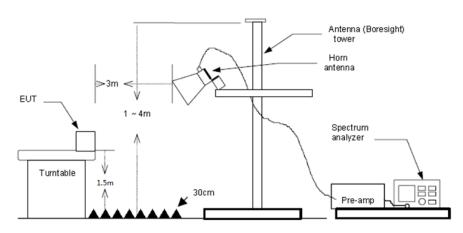
➢ 9 kHz ~ 30 MHz



> 30 MHz ~ 1 GHz



Above 1 GHz



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10.
- The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.6 duty cycle.

TEST MODE

Please refer to the clause 4.2

TEST RESULT

Passed

Not Applicable

Note:

- 1) Level= Reading + Factor/Transd; Factor/Transd = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level– Limit
- Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

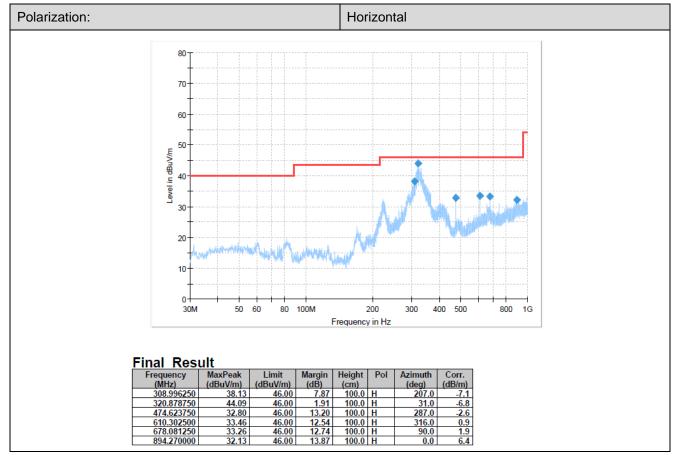
<u>For 9 kHz ~ 30 MHz</u>

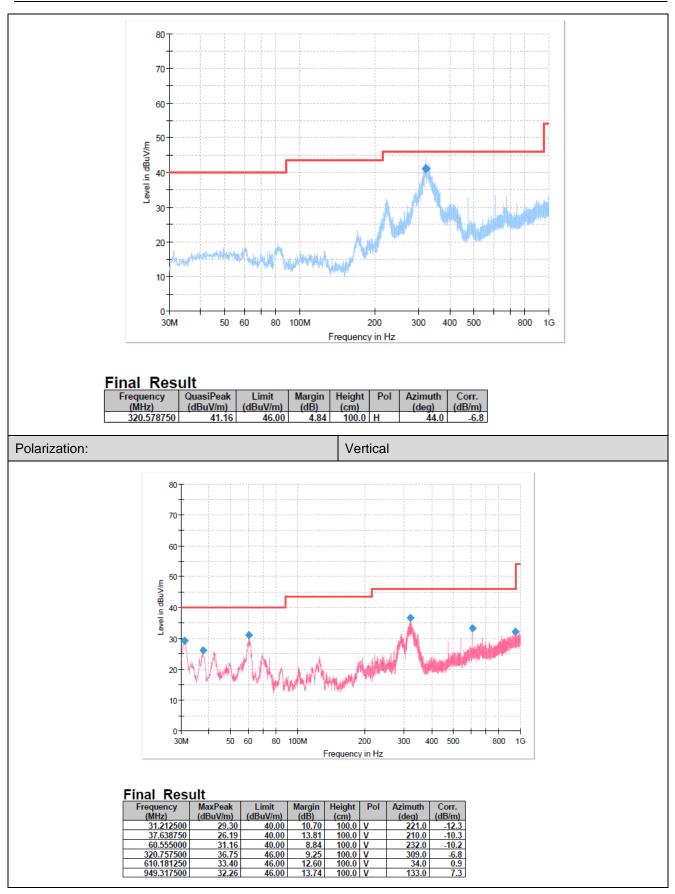
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

For 30 MHz ~ 1000 MHz

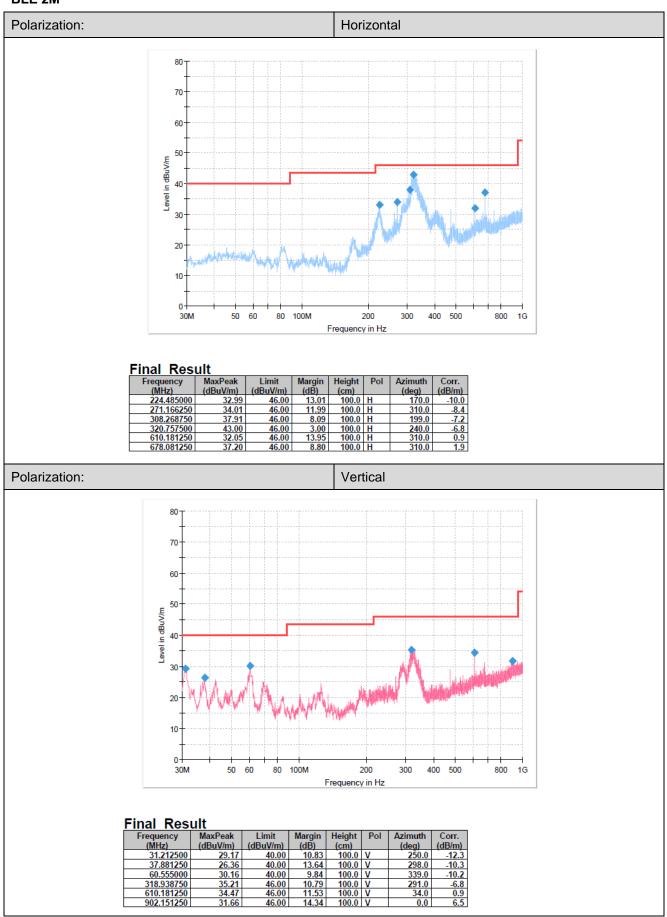
Have pre-scan all test channel, found CH39 which it was worst case, so only show the worst case's data on this report.

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Date of issue:

For 1 GHz ~ 25 GHz

BLE 1M

Test channel		CH00			Polarit	у		Horizont	al
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak
2	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak
3	3168.08	53.32	28.96	4.63	37.12	49.79	74.00	-24.21	Peak
4	5284.50	48.86	31.40	6.08	35.38	50.96	74.00	-23.04	Peak
Test channel		CH00			Polarit	у		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1799.95	57.29	25.40	3.44	37.08	49.05	74.00	-24.95	Peak
2	2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak
3	3168.08	53.58	28.96	4.63	37.12	50.05	74.00	-23.95	Peak
4	5271.06	48.66	31.40	6.07	35.36	50.77	74.00	-23.23	Peak

Test channel		CH19			Polari	ty		Horizon	tal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Pream dB	p Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak
2	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak
3	3168.08	53.36	28.96	4.63	37.12	49.83	74.00	-24.17	Peak
4	5271.06	47.76	31.40	6.07	35.36	49.87	74.00	-24.13	Peak
Test channel		CH19			Polari	y		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1799.95	57.29	25.40	3.44	37.08	49.05	74.00	-24.95	Peak
2	2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak
3	3168.08	53.09	28.96	4.63	37.12	49.56	74.00	-24.44	Peak
4	5284.50	47.77	31.40	6.08	35.38	49.87	74.00	-24.13	Peak

Test channel		CH39			Polarit	у		Horizon	tal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak
1 2 3	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak
	3168.08	53.16	28.96	4.63	37.12	49.63	74.00	-24.37	Peak
4	5284.50	48.71	31.40	6.08	35.38	50.81	74.00	-23.19	Peak
Test channel		CH39			Polarit	у		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1799.95	57.29	25.40	3.44	37.08	49.05	74.00	-24.95	Peak
2	2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak
3	5271.06	48.28	31.40	6.07	35.36	50.39	74.00	-23.61	Peak
4	6331.33	45.68	33.06	6.76	34.59	50.91	74.00	-23.09	Peak

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Test channel		CH00			Polarit	у		Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak	
2	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak	
3	4809.50	48.61	31.40	5.72	35.28	50.45	74.00	-23.55	Peak	
4	5284.50	48.76	31.40	6.08	35.38	50.86	74.00	-23.14	Peak	
Test channel		CH00			Polarit	у		Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
	4700.05	E7 30	25.40	3.44	37,08	49.05	74.00	-24.95	Peak	
1	1799.95	57.29	23.40	2.44						
1 2	1799.95 2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak	
_						49.00 50.19	74.00 74.00	-25.00 -23.81	Peak Peak	

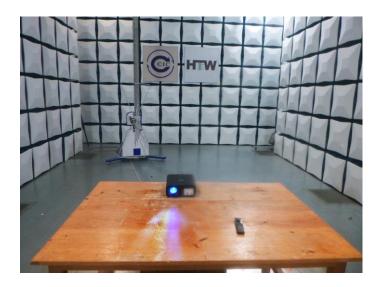
Test channel		CH19			Polarit	у		Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak	
2	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak	
3	3168.08	52.00	28.96	4.63	37.12	48.47	74.00	-25.53	Peak	
4	5271.06	47.80	31.40	6.07	35.36	49.91	74.00	-24.09	Peak	
Test channel		CH19			Polarit	у		Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	1799.95	57.29	25.40	3.44	37.08	49.05	74.00	-24.95	Peak	
2	2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak	
3	3168.08	54.29	28.96	4.63	37.12	50.76	74.00	-23.24	Peak	
4	5271.06	47.93	31.40	6.07	35.36	50.04	74.00	-23.96	Peak	

Test channel		CH39			Polarity			Horizontal	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1055.31	59.45	25.22	2.58	36.98	50.27	74.00	-23.73	Peak
1 2 3	2595.02	55.67	27.49	4.32	37.09	50.39	74.00	-23.61	Peak
	3168.08	52.14	28.96	4.63	37.12	48.61	74.00	-25.39	Peak
4	5284.50	48.52	31.40	6.08	35.38	50.62	74.00	-23.38	Peak
est channel		CH39			Polarity			Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1799.95	57.29	25.40	3.44	37.08	49.05	74.00	-24.95	Peak
2	2193.52	54.51	28.14	3.76	37.41	49.00	74.00	-25.00	Peak
3	5284.50	47.53	31.40	6.08	35.38	49.63	74.00	-24.37	Peak
4	6331.33	44.92	33.06	6.76	34.59	50.15	74.00	-23.85	Peak

6. TEST SETUP PHOTOS

Radiated Emission









AC Conducted Emission



7. EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No.: CHTEW22090121.

8. APPENDIX REPORT