

TEST REPORT

For WiFi-5GHz Band

Report No.	CHTEW23110051	Report Verification:	
Project No.	SHT2310045701EW		
FCC ID	2BCINEC2		
Applicant's name	SENTRY CS LTD		
Address	5 Derech Hashalom, Tel Aviv, Israel		
Product Name	Eclipse II (Drone tracking system)		
Trade Mark	-		
Model No.	CVX-EC2-BU (Antenna model: CVX-EC2-D-ANT)		
Listed Model(s)	-		
Standard	FCC CFR Title 47 Part 15 Subpart E § 15.407		
Date of receipt of test sample	Apr. 06, 2023		
Date of testing	Apr. 06, 2023 - May 28, 2024		
Date of issue	May 30, 2024		
Result	PASS		

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Testing Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.
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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:

- [FCC CFR Title 47 Part 15 Subpart E § 15.407](#): General technical requirements
- [ANSI C63.10:2020](#): American National Standard for Testing Unlicensed Wireless Devices
- [KDB789033 D02 v02r01](#): GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

1.2. **Report version**

Revision No.	Date of issue	Description
N/A	2024-05-30	Original

2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247(c)	PASS	Caspar Chen
5.2	AC Conducted Emission	15.207	PASS	Caspar Chen
5.3	Maximum Conducted Output Power	15.407(a)	PASS	Xiangyu Wei
5.4	Maximum Power Spectral Density	15.407(a)	PASS	Xiangyu Wei
5.5	99% Occupied Bandwidth	-	PASS ^{*1}	Caspar Chen
5.6	6dB Bandwidth	15.407(a)	PASS	Caspar Chen
5.7	Band edge	15.407(b)	PASS	Yifang Wang
5.8	Radiated Spurious Emissions	15.209	PASS	Yifang Wang
5.9	Frequency Stability	15.407(g)	PASS	Xiangyu Wei

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:	SENTRY CS LTD
Address:	5 Derech Hashalom, Tel Aviv, Israel
Manufacturer:	SENTRY CS LTD
Address:	5 Derech Hashalom, Tel Aviv, Israel

3.2. Product Description

Main unit information:	
Product Name:	Eclipse II (Drone tracking system)
Trade Mark:	-
Model No.:	CVX-EC2-BU (Antenna model: CVX-EC2-D-ANT)
Listed Model(s):	-
Power supply:	AC 100-240V 50Hz/60Hz
Test voltage:	AC 120V 60Hz
Hardware version:	Eclipse II
Software version:	Eclipse II

3.3. Radio Specification Description

Support function:	SDR
Modulation:	OFDM
Permissible frequency range:	5725MHz~5850MHz
Operation frequency:	5737MHz~5850MHz
Channel number:	227
Channel separation:	0.5MHz
Antenna type:	LG: Dual Band Omni-directional p/n MA-DBO2455-3 HG: FRP Antenna (Model No.: AOA-2458-79AF)
Antenna gain:	LG: 4.0dBi@5.8GHz HG: 8.5dBi@5.8GHz

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location (Old)	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Laboratory Location (New)	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China	
Contact information:	<p>Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn</p>	
Qualifications	Type	Accreditation Number
	FCC Registration Number	762235
	FCC Designation Number	CN1181

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.

Channel	Frequency (MHz)
CH _L	5737
...	...
CH _M	5800
...	...
CH _H	5845

4.2. Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit.
For AC power line conducted emissions:
The engineering test program was provided and enabled to make EUT continuous transmit.
For Radiated spurious emissions test item:
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	YPHT23040066001
EMI test items	YPHT23040066001

Note:

RF Conducted test items: Maximum Conducted Output Power, Maximum Power Spectral Density, 26dB Bandwidth and 99% Occupied bandwidth, 6dB Bandwidth, Frequency Stability

RF Radiated test items: Band edge, 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?			
<input checked="" type="checkbox"/> No			
Item	Equipment	Trade Name	Model No.
1			
2			

4.5. Testing environmental condition

Type	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

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Maximum Conducted Output Power	1.07
3	Maximum Power Spectral Density	1.07
4	26dB Bandwidth and 99% Occupied bandwidth	0.002%
5	6dB Bandwidth	0.002%
6	Radiated Band Edge Emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz
7	Radiated Spurious Emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz
8	Frequency Stability	0.05ppm

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

4.7. Equipment Used during the Test

● RF Conducted test item							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2023/08/22	2024/08/21
●	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2023/8/22	2024/8/21
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2023/8/18	2024/8/17
●	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2023/8/18	2024/8/17
●	ISN	FCC	HTWE0148	FCC-TLISN-T2-02	20371	2023/8/18	2024/8/17
●	ISN	FCC	HTWE0150	FCC-TLISN-T8-02	20375	2023/8/18	2024/8/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated Emission – 9kHz~30MHz							
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	2023/4/6	2026/4/5
●	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/4/6	2024/4/5
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2024/4/8	2027/4/7
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated Emission - 30MHz~1GHz							
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	2023/4/6	2026/4/5
●	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	546	2023/2/22	2026/2/21
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	/	2023/5/25	2024/5/24
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	/	2024/5/24	2025/5/23
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated emission-Above 1GHz							
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	2023/4/17	2026/4/16
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2023/8/22	2024/8/21
●	Horn Antenna	SCHWARZBECK	HTWE0126	BBHA 9120D	1011	2023/2/14	2026/2/13
●	Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2023/2/20	2026/2/19
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2023/5/25	2024/5/24
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

5. **TEST CONDITIONS AND RESULTS**

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 responsible 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.

TEST RESULT

Passed **Not Applicable**

The antenna type is Dual Band Omni-directional antenna, please refer to the report No.: CHTEW23110050.

5.2. AC Conducted Emission

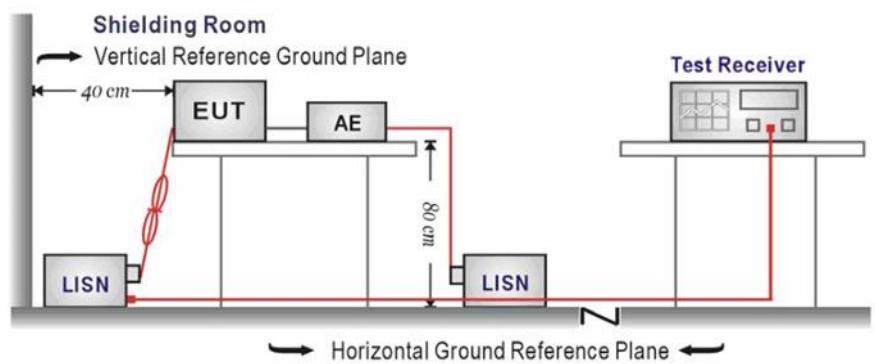
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	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.
2. 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.
3. 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.

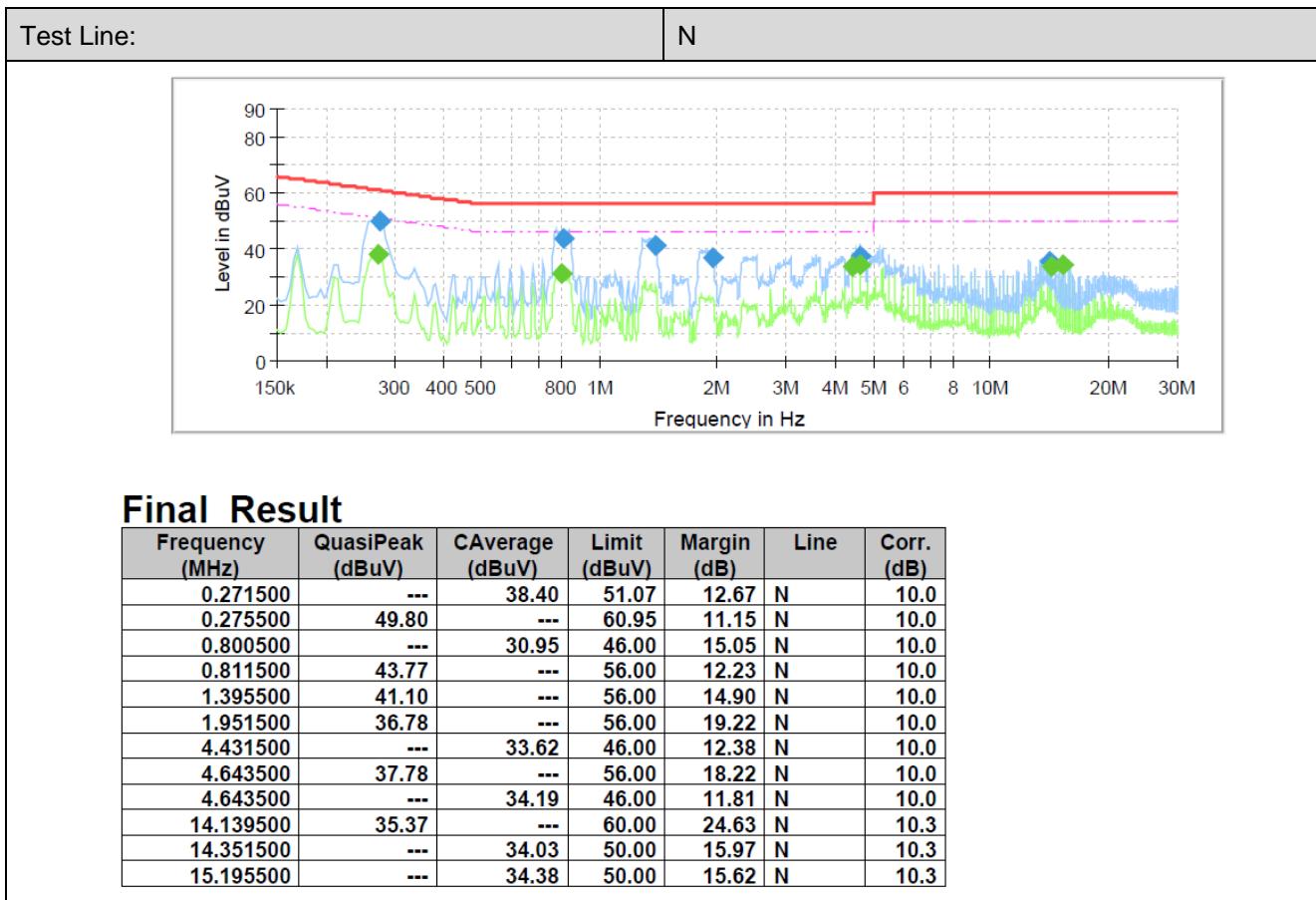
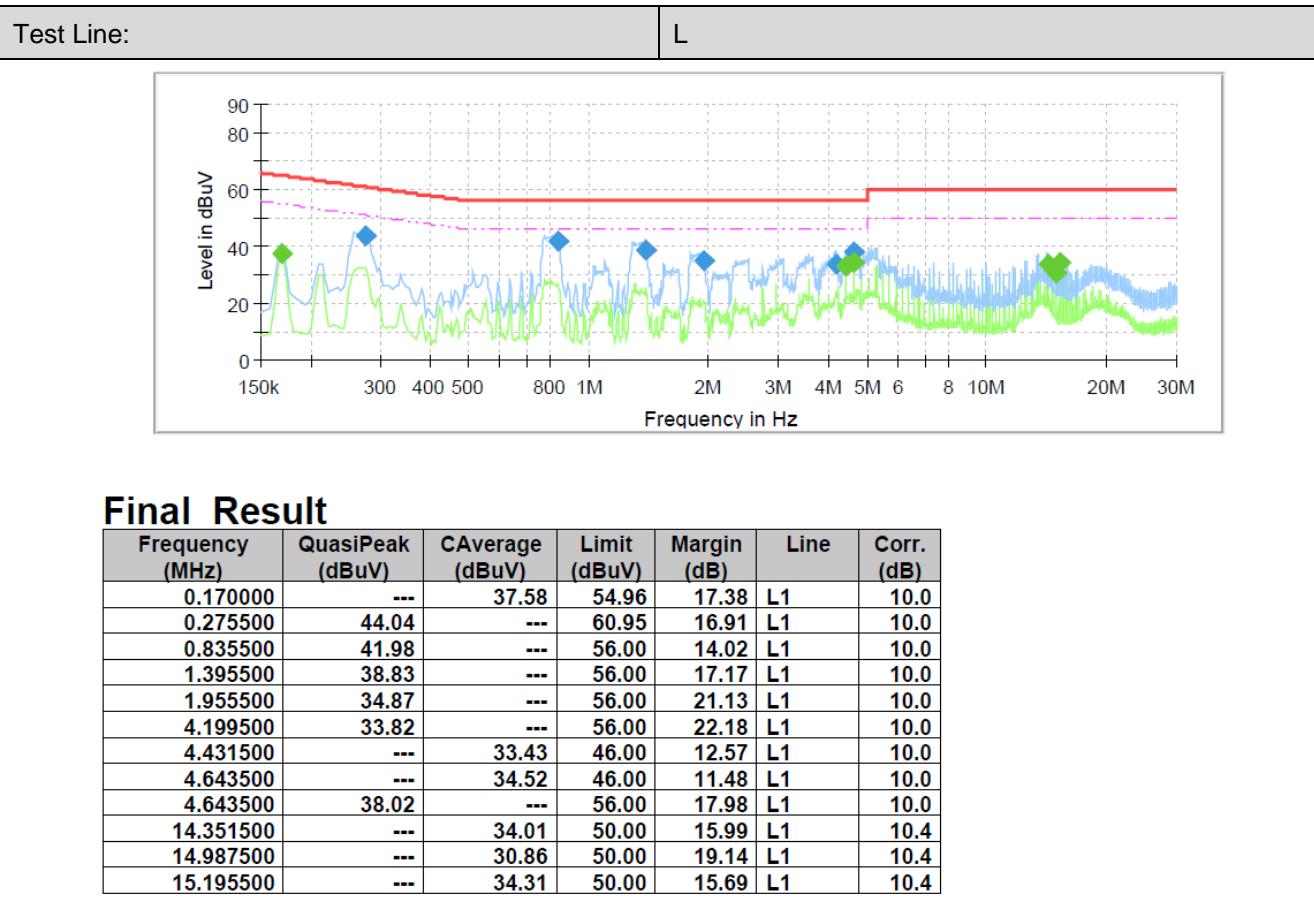
TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed

Not Applicable



5.3. Maximum Conducted Output Power

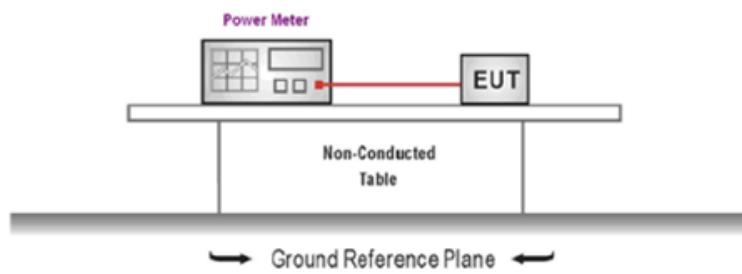
LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)
The maximum conducted output power (P_{out}) shall not exceed the lesser of 1W (30dBm).
if $G_{Tx} > 6\text{dBi}$, then $P_{out} = 30 - (G_{Tx} - 6)$.
- Point-to-point systems (P2P)
The maximum conducted output power (P_{out}) shall not exceed the lesser of 1W (30dBm).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was tested according to KDB789033 Section E-3-b)
2. The maximum conducted output power may be measured using a broadband AVG RF power meter.
3. Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
4. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
5. Record the measurement data.

6. TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

5.4. Power Spectral Density

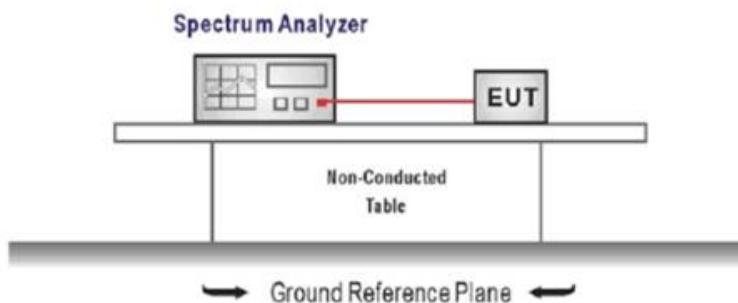
LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.
if $G_{Tx} > 6\text{dBi}$, then $\text{PSD} = 30 - (G_{Tx} - 6)$.
- Point-to-point systems (P2P)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. According KDB 789033 D02 – Section F
2. Analyzer was setting as follow:
Center frequency: test channel
Span was set to encompass the entire emission bandwidth of the signal
RBW=500kHz for devices operating in the band 5.725-5.85 GHz
 $VBW \geq 3 \text{ RBW}$
Number of sweep points $> 2 \times (\text{span}/\text{RBW})$
Sweep time = auto
Detector = Peak
Trigger was set to free run for all modes, trace was averaged over 100 sweeps
3. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

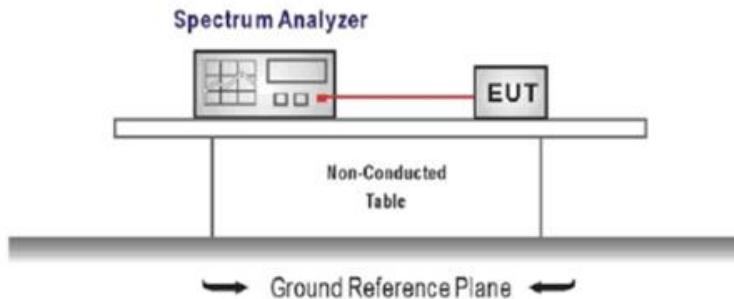
TEST DATA

Refer to the appendix report

5.5. 99% Occupy bandwidth

LIMIT

TEST CONFIGURATION



TEST PROCEDURE

1. According KDB 789033 D02 – Section C, 26dB bandwidth test as follow
 - a) Set RBW = approximately 1% of the emission bandwidth.
 - b) Set the VBW > RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. According KDB 789033 D02 – Section D, 99% bandwidth test as follow
 - a). Set center frequency to the nominal EUT channel center frequency.
 - b). Set span = 1.5 times to 5.0 times the OBW.
 - c). Set RBW = 1% to 5% of the OBW
 - d). Set VBW $\geq 3 \text{ RBW}$
 - e). Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
 - f). Use the 99% power bandwidth function of the instrument

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

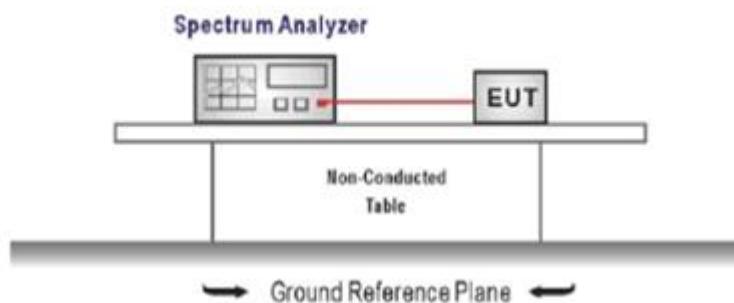
5.6. 6dB Bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

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 = test channel center frequency
Span=2 x emission bandwidth
RBW = 100 kHz, VBW $\geq 3 \times$ 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 wave form 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 4.3

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

5.7. Band edge

LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(b)

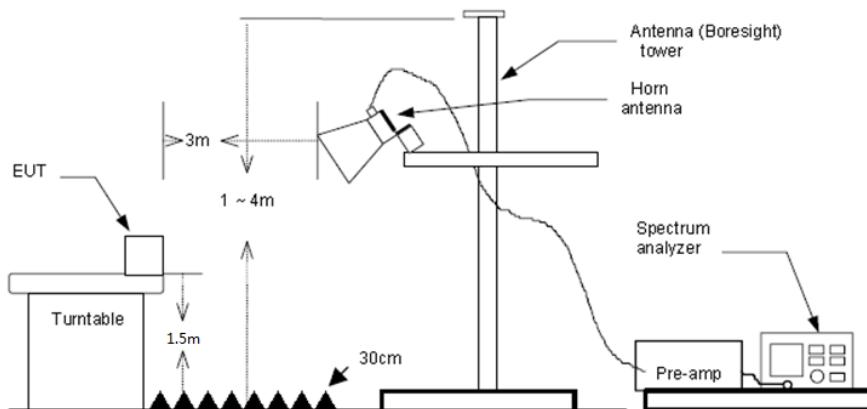
Un-restricted band emissions above 1GHz			
Operating Band	Frequency	EIRP Limit	Value
5725-5850 MHz	1GHz-5.65GHz	-27 dBm/MHz(68.2dB _u V/m)@3m	Peak
	5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dB _u V/m to 105.2dB _u V/m)	Peak
	5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.2*dB _u V/m to 110.8dB _u V/m)	Peak
	5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dB _u V/m to* 122.2dB _u V/m)	Peak
	5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dB _u V/m to110.8* dB _u V/m)	Peak
	5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dB _u V/m to 105.2* dB _u V/m)	Peak
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.2dB _u V/m to 68.2* dB _u V/m)	Peak
	Above 5.925GHz	-27 dBm/MHz(68.2dB _u V/m)@3m	Peak

* Increase/Decreases with the linearity of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit. $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$, for $d = 3$ meters.

TEST CONFIGURATION

Radiated:



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
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 was positioned 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 the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
RBW=1MHz, VBW=3MHz PEAK detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 4.3

TEST RESULTS

Passed Not Applicable

TEST DATA

SDR 5.8G LG					Test channel: CH _L					
Frequency (MHz)	Read Level (dBuV)	Antenn a Factor (dB/m)	Cable Loss (dB)	Pream p Factor (dB)	Aux Factor (dB)	Level (dBuV/ m)	Limit Line (dBuV/ m)	Over Limit (dB)	Test value	Polarization
5650	42.73	31.6	6.53	10	40.75	50.11	68.2	-18.09	Vertical	Peak
5699.956	42.93	31.8	6.61	10	40.73	50.61	105.2	-54.59	Vertical	Peak
5719.969	42.43	31.84	6.68	10	40.73	50.22	110.8	-60.58	Vertical	Peak
5724.96	42.23	31.85	6.7	10	40.72	50.06	122.2	-72.14	Vertical	Peak
5650	42.95	31.6	6.53	10	40.75	50.33	68.2	-17.87	Horizontal	Peak
5699.956	43.33	31.8	6.61	10	40.73	51.01	105.2	-54.19	Horizontal	Peak
5719.969	43.22	31.84	6.68	10	40.73	51.01	110.8	-59.79	Horizontal	Peak
5724.96	42.4	31.85	6.7	10	40.72	50.23	122.2	-71.97	Horizontal	Peak
SDR 5.8G LG					Test channel: CH _H					
Frequency (MHz)	Read Level (dBuV)	Antenn a Factor (dB/m)	Cable Loss (dB)	Pream p Factor (dB)	Aux Factor (dB)	Level (dBuV/ m)	Limit Line (dBuV/ m)	Over Limit (dB)	Test value	Polarization
5849.966	42.77	32.2	6.72	10	40.68	51.01	122.2	-71.19	Vertical	Peak
5855.041	41.92	32.21	6.72	10	40.68	50.17	110.8	-60.63	Vertical	Peak
5875.041	42.69	32.25	6.75	10	40.67	51.02	105.2	-54.18	Vertical	Peak
5925	41.83	32.3	6.82	10	40.65	50.3	68.2	-17.9	Vertical	Peak
5849.966	51.14	32.2	6.72	10	40.68	59.38	122.2	-62.82	Horizontal	Peak
5855.041	43.8	32.21	6.72	10	40.68	52.05	110.8	-58.75	Horizontal	Peak
5875.041	44.76	32.25	6.75	10	40.67	53.09	105.2	-52.11	Horizontal	Peak
5925	42.26	32.3	6.82	10	40.65	50.73	68.2	-17.47	Horizontal	Peak

SDR 5.8G HG					Test channel: CH _L						
Frequency (MHz)	Read Level (dBuV)	Antenn a Factor (dB/m)	Cable Loss (dB)	Pream p Factor (dB)	Aux Factor (dB)		Level (dBuV/ m)	Limit Line (dBuV/ m)	Over Limit (dB)	Test value	Polariz ation
5650	42.27	31.6	6.53	10	40.75		49.65	68.2	-18.55	Vertical	Peak
5699.956	42.67	31.8	6.61	10	40.73		50.35	105.2	-54.85	Vertical	Peak
5719.969	42.32	31.84	6.68	10	40.73		50.11	110.8	-60.69	Vertical	Peak
5724.96	43.35	31.85	6.7	10	40.72		51.18	122.2	-71.02	Vertical	Peak
5650	41.79	31.6	6.53	10	40.75		49.17	68.2	-19.03	Horizontal	Peak
5699.956	42.89	31.8	6.61	10	40.73		50.57	105.2	-54.63	Horizontal	Peak
5719.969	42.8	31.84	6.68	10	40.73		50.59	110.8	-60.21	Horizontal	Peak
5724.96	41.84	31.85	6.7	10	40.72		49.67	122.2	-72.53	Horizontal	Peak
SDR 5.8G HG					Test channel: CH _H						
Frequency (MHz)	Read Level (dBuV)	Antenn a Factor (dB/m)	Cable Loss (dB)	Pream p Factor (dB)	Aux Factor (dB)		Level (dBuV/ m)	Limit Line (dBuV/ m)	Over Limit (dB)	Test value	Polariz ation
5849.966	41.75	32.2	6.72	10	40.68		49.99	122.2	-72.21	Vertical	Peak
5855.041	42.49	32.21	6.72	10	40.68		50.74	110.8	-60.06	Vertical	Peak
5875.041	41.55	32.25	6.75	10	40.67		49.88	105.2	-55.32	Vertical	Peak
5925	41.26	32.3	6.82	10	40.65		49.73	68.2	-18.47	Vertical	Peak
5849.966	45.5	32.2	6.72	10	40.68		53.74	122.2	-68.46	Horizontal	Peak
5855.041	43.95	32.21	6.72	10	40.68		52.2	110.8	-58.6	Horizontal	Peak
5875.041	43.34	32.25	6.75	10	40.67		51.67	105.2	-53.53	Horizontal	Peak
5925	42.5	32.3	6.82	10	40.65		50.97	68.2	-17.23	Horizontal	Peak

Remark:

1. Final Level =Receiver Read level + Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

5.8. Radiated Spurious Emissions

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209 and Part 15 Subpart E Section 15.407

Frequency	Limit (dB _{UV} /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

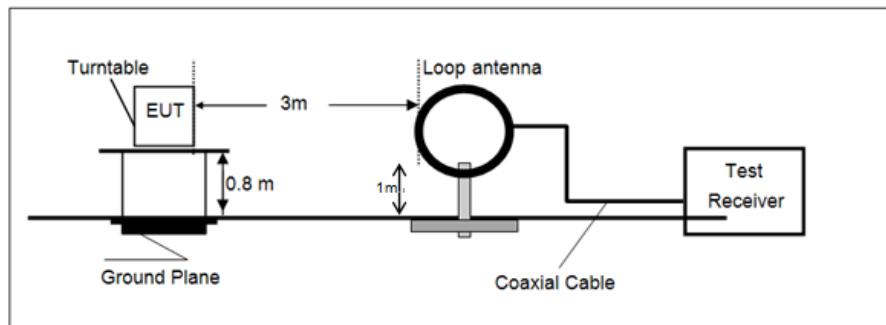
Note: Limit dB_{UV}/m @3m = Limit dB_{UV}/m @300m + 40*log(300/3)= Limit dB_{UV}/m @300m +80,

Limit dB_{UV}/m @3m = Limit dB_{UV}/m @30m +40*log(30/3)= Limit dB_{UV}/m @30m + 40.

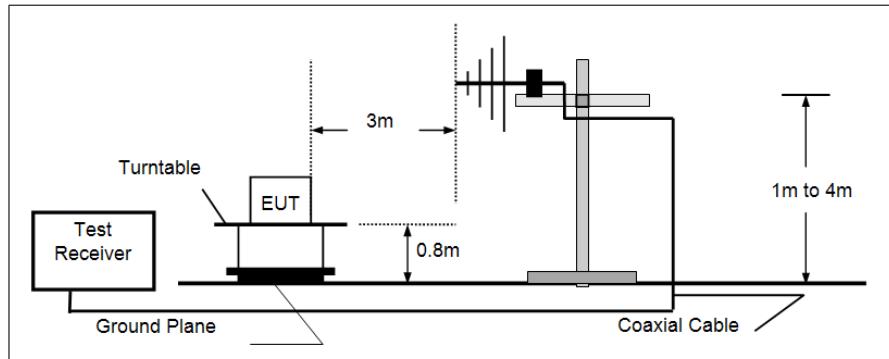
Unwanted emissions below 1GHz and Restricted band emissions above 1GHz		
Frequency	Limit (dB _{UV} /m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

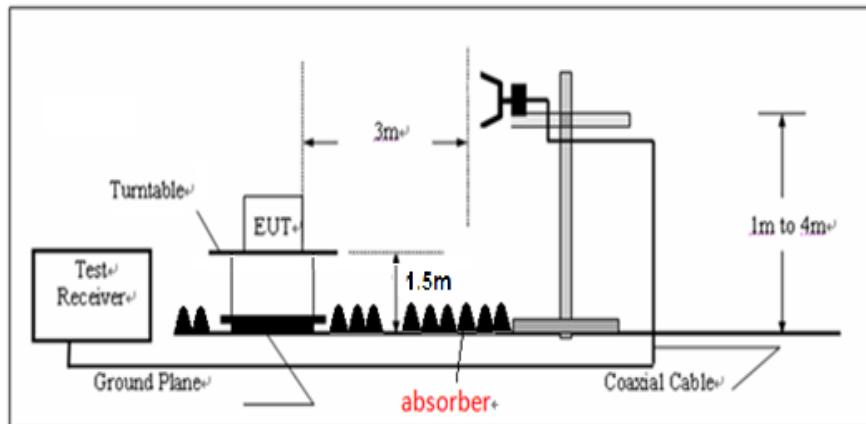
- 9KHz ~30MHz



- 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013
2. 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) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

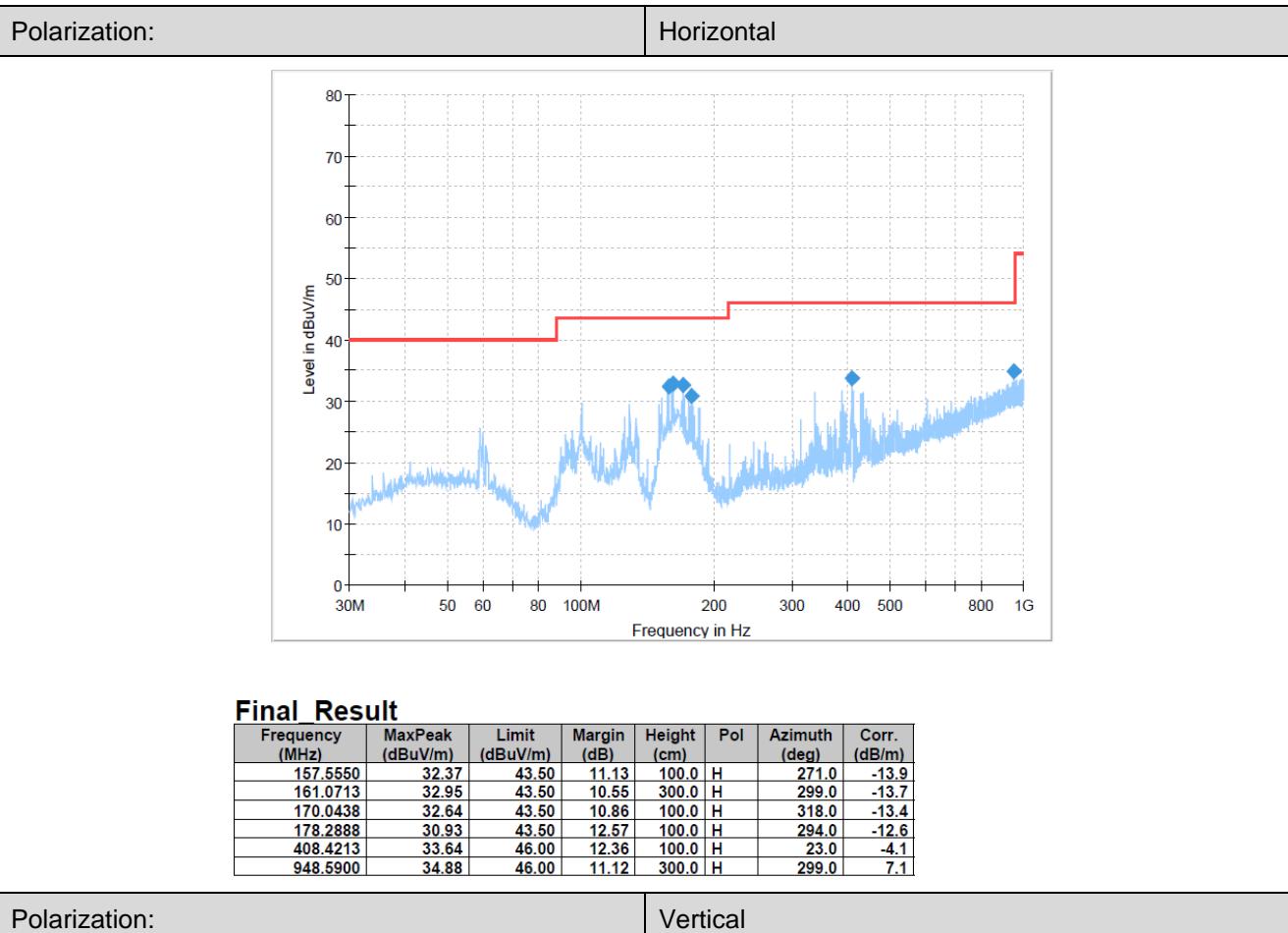
TEST DATA

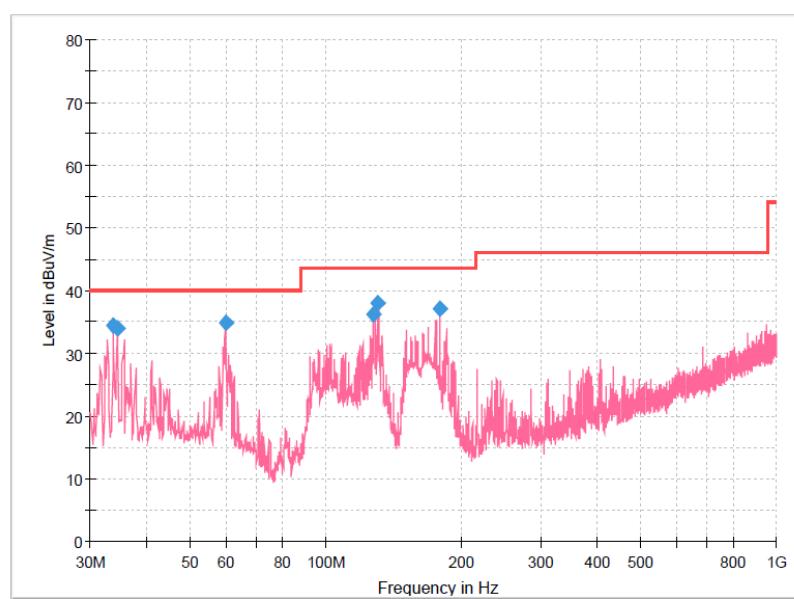
For 9 kHz ~ 30 MHz

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

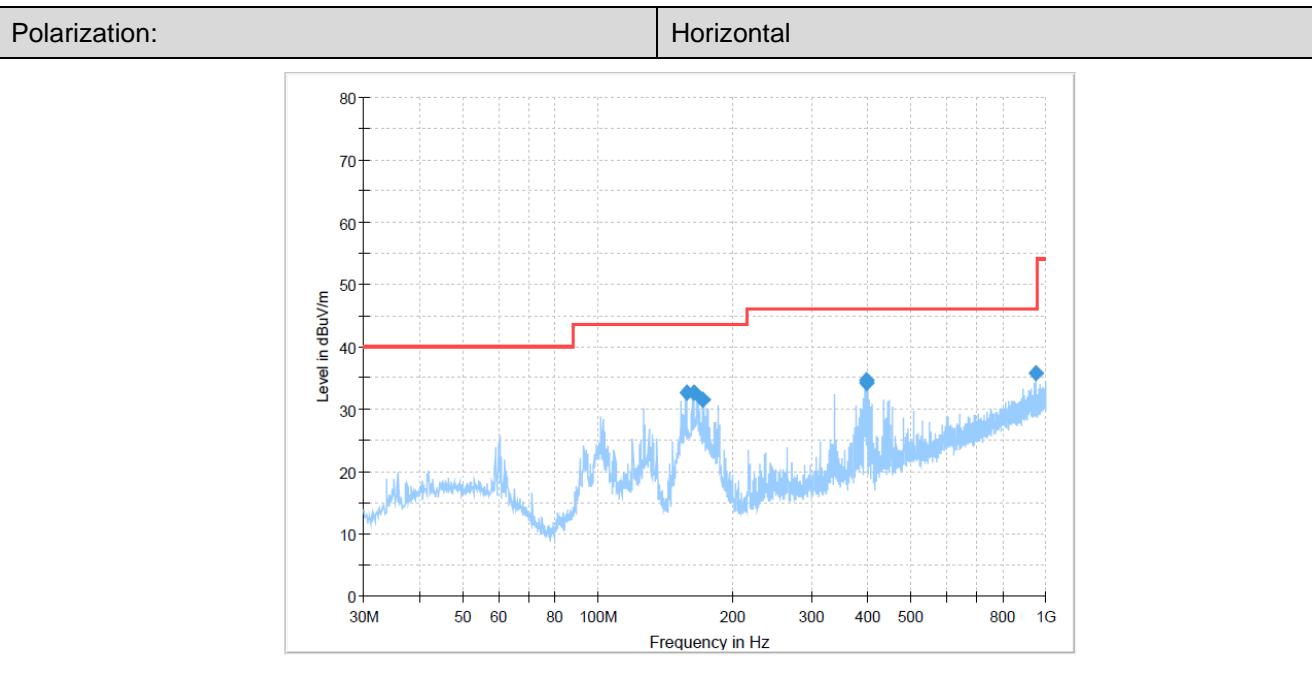
Have pre-scan all test channel, found CH_H which it was worst case, so only show the worst case's data on this report.

Antenna(LG) :

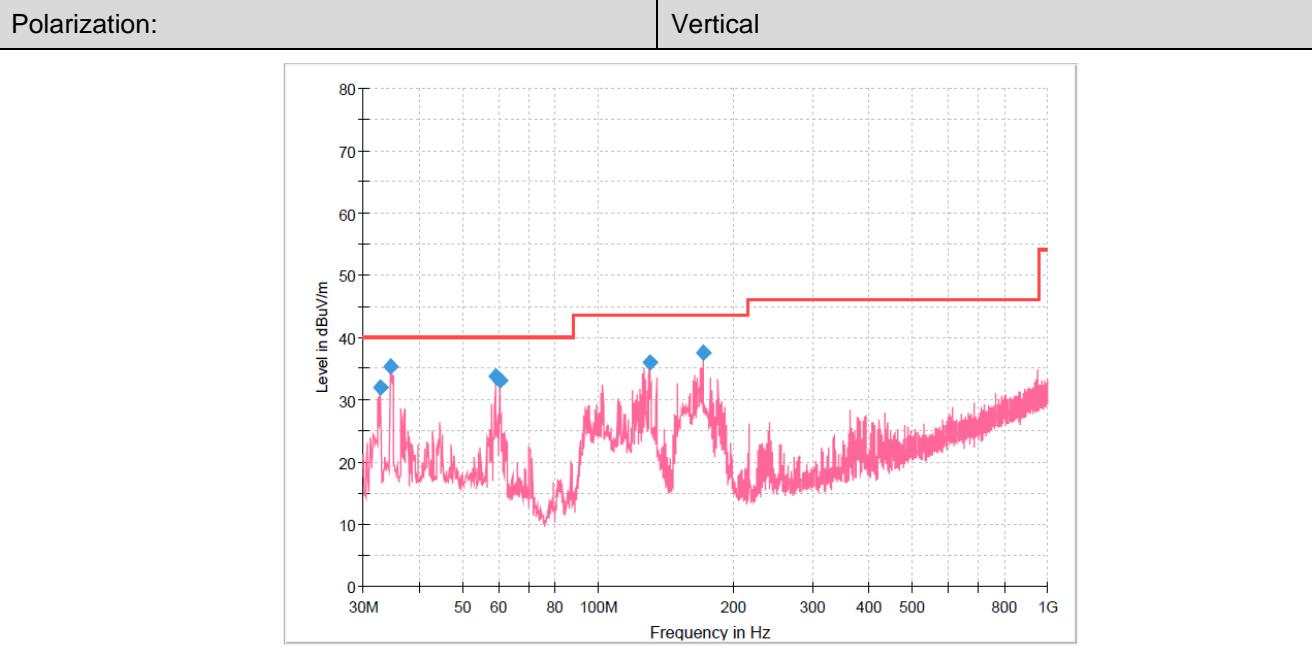


Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.7588	34.49	40.00	5.51	100.0	V	355.0	-12.3
34.4863	33.94	40.00	6.06	100.0	V	149.0	-12.0
59.8275	34.85	40.00	5.15	100.0	V	317.0	-9.9
127.7275	36.14	43.50	7.36	100.0	V	337.0	-13.7
130.5163	38.09	43.50	5.41	100.0	V	200.0	-14.0
178.8950	37.13	43.50	6.37	100.0	V	325.0	-12.6

Antenna(HG) :**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
157.4338	32.63	43.50	10.87	100.0	H	306.0	-13.9
163.4963	32.72	43.50	10.78	300.0	H	304.0	-13.6
171.2563	31.57	43.50	11.93	300.0	H	221.0	-13.3
396.0538	34.23	46.00	11.77	100.0	H	1.0	-4.7
398.3575	34.59	46.00	11.41	100.0	H	12.0	-4.5
948.3475	35.70	46.00	10.30	100.0	H	56.0	7.1

**Final Result**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.6675	31.94	40.00	8.06	100.0	V	0.0	-12.7
34.4863	35.28	40.00	4.72	100.0	V	238.0	-12.0
59.1000	33.69	40.00	6.31	100.0	V	305.0	-9.8
60.3125	33.09	40.00	6.91	100.0	V	317.0	-10.1
130.1525	35.96	43.50	7.54	100.0	V	272.0	-13.9
171.1350	37.60	43.50	5.90	100.0	V	337.0	-13.3

For Above 1GHz**Antenna(LG) :**

Test channel		CH _L		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1216.53	44.85	25.57	2.90	42.20	31.12	68.20	-37.08	Peak
2	2258.20	41.73	28.07	3.99	41.80	31.99	68.20	-36.21	Peak
3	7981.72	41.79	36.96	7.99	40.85	45.89	68.20	-22.31	Peak
4	11486.00	42.14	40.49	10.35	42.30	50.68	54.00	-3.32	Average
5	11486.41	50.90	40.49	10.35	42.30	59.44	68.20	-8.76	Peak

Test channel		CH _L		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1241.56	44.13	25.67	2.91	42.11	30.60	68.20	-37.60	Peak
2	2818.01	43.18	28.34	4.47	41.78	34.21	68.20	-33.99	Peak
3	7527.83	44.06	36.14	7.75	41.11	46.84	68.20	-21.36	Peak
4	11486.00	42.35	40.49	10.35	42.30	50.89	54.00	-3.11	Average
5	11486.41	46.05	40.49	10.35	42.30	54.59	68.20	-13.61	Peak

Test channel		CH _M		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1333.28	44.13	25.97	2.96	42.00	31.06	68.20	-37.14	Peak
2	2839.61	42.61	28.38	4.52	41.76	33.75	68.20	-34.45	Peak
3	7489.60	43.33	36.20	7.63	41.08	46.08	68.20	-22.12	Peak
4	11603.96	44.92	40.28	10.43	42.30	53.33	68.20	-14.87	Peak

Test channel		CH _M		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1472.44	43.58	25.81	3.18	42.19	30.38	68.20	-37.82	Peak
2	2839.61	42.78	28.38	4.52	41.76	33.92	68.20	-34.28	Peak
3	7981.72	40.72	36.96	7.99	40.85	44.82	68.20	-23.38	Peak
4	11545.04	40.54	40.41	10.39	42.30	49.04	68.20	-19.16	Peak

Test channel		CH _H		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1346.93	43.29	25.99	3.83	42.00	31.11	68.20	-37.09	Peak
2	2832.39	42.79	28.36	4.50	41.77	33.88	68.20	-34.32	Peak
3	7489.60	44.86	36.20	7.63	41.08	47.61	68.20	-20.59	Peak
4	11692.92	44.91	39.93	10.49	42.30	53.03	68.20	-15.17	Peak

Test channel		CH _H		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1364.18	43.39	25.97	3.51	42.00	30.87	68.20	-37.33	Peak
2	2920.25	42.73	28.50	4.59	41.70	34.12	68.20	-34.08	Peak
3	7489.60	45.64	36.20	7.63	41.08	48.39	68.20	-19.81	Peak
4	11692.92	41.34	39.93	10.49	42.30	49.46	68.20	-18.74	Peak

Antenna(HG) :

Test channel		CH _L		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2920.25	41.55	28.50	4.59	41.70	32.94	68.20	-35.26	Peak
2	5125.52	39.19	31.95	6.19	41.05	36.28	68.20	-31.92	Peak
3	7941.19	40.17	36.85	7.97	40.93	44.06	68.20	-24.14	Peak
4	11574.46	39.23	40.35	10.41	42.30	47.69	68.20	-20.51	Peak

Test channel		CH _L		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2818.01	42.16	28.34	4.47	41.78	33.19	68.20	-35.01	Peak
2	5086.52	39.20	31.92	6.28	41.07	36.33	68.20	-31.87	Peak
3	7432.62	39.97	36.20	7.84	41.03	42.98	68.20	-25.22	Peak
4	11341.14	39.12	40.22	10.25	42.30	47.29	68.20	-20.91	Peak

Test channel		CH _M		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2818.01	42.97	28.34	4.47	41.78	34.00	68.20	-34.20	Peak
2	5112.49	41.47	31.97	6.22	41.06	38.60	68.20	-29.60	Peak
3	7508.69	45.04	36.18	7.69	41.09	47.82	68.20	-20.38	Peak
4	11515.68	40.17	40.47	10.37	42.30	48.71	68.20	-19.49	Peak

Test channel		CH _M		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2920.25	42.46	28.50	4.59	41.70	33.85	68.20	-34.35	Peak
2	5112.49	39.90	31.97	6.22	41.06	37.03	68.20	-31.17	Peak
3	7470.56	42.06	36.20	7.72	41.06	44.92	68.20	-23.28	Peak
4	10374.42	39.65	39.82	9.69	40.65	48.51	68.20	-19.69	Peak

Test channel		CH _H		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1360.71	42.92	25.98	3.66	42.00	30.56	68.20	-37.64	Peak
2	4107.32	40.00	29.90	5.55	41.40	34.05	68.20	-34.15	Peak
3	7508.69	42.85	36.18	7.69	41.09	45.63	68.20	-22.57	Peak
4	11545.84	40.43	40.41	10.39	42.30	48.93	68.20	-19.27	Peak

Test channel		CH _H		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1216.53	44.44	25.57	2.90	42.20	30.71	68.20	-37.49	Peak
2	3033.91	42.04	28.57	4.66	41.63	33.64	68.20	-34.56	Peak
3	8002.06	40.80	37.00	8.00	40.81	44.99	68.20	-23.21	Peak
4	11574.46	40.04	40.35	10.41	42.30	48.50	68.20	-19.70	Peak

Remark:

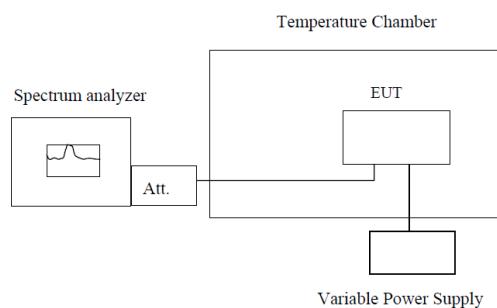
- Final level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Measuring frequencies from 1 GHz to 40GHz.

5.9. Frequency stability

LIMIT

Within Operation Band

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

1. The equipment under test was connected to an external power supply.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached..

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

Refer to the appendix report

6. TEST SETUP PHOTOS

Please refer to the report No.: CHTEW23110050

7. EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No.: CHTEW23110047

8. APPENDIX REPORT