

TEST REPORT

For Bluetooth-LE

Report No.: CHTW24040031 Report verification : 

Project No.: SHT2403069701W

Applicant's Name: Anker Innovations Limited

Address.....: Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong

Product Name: Anker SOLIX Smart Meter

Trade Mark: ANKER

Model No.: A17X7

Listed Model(s): -

Standard: ETSI EN 300 328 V2.2.2

Date of Receipt of Test Sample.....: Mar.25, 2024

Date of Testing.....: Mar.26, 2024- Apr.12, 2024

Date of Issue.....: Apr.15, 2024

Result.....: PASS

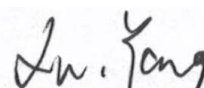
Compiled by
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Supervised by
(position+printedname+signature).....: Project Engineer Caspar Chen



Approved by
(position+printedname+signature).....: RF Manager Xu Yang



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

Address.....: Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China

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The test report merely correspond to the test sample.

Contents

<u>1.</u>	<u>TEST STANDARDS AND REPORT VERSION</u>	<u>3</u>
1.1.	Test Standards	3
1.2.	Report Version Information	3
<u>2.</u>	<u>TEST DESCRIPTION</u>	<u>4</u>
<u>3.</u>	<u>SUMMARY</u>	<u>5</u>
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	Radio Specification Description	6
3.4.	Testing Laboratory Information	8
<u>4.</u>	<u>TEST CONFIGURATION</u>	<u>9</u>
4.1.	Test frequency list	9
4.2.	Test mode	9
4.3.	Support unit used in test configuration and system	9
4.4.	Testing environmental condition	9
4.5.	Measurement uncertainty	10
4.6.	Equipments Used During the Test	11
<u>5.</u>	<u>TEST CONDITIONS AND RESULTS</u>	<u>12</u>
5.1.	RF Output Power	12
5.2.	Power Spectral Density	13
5.3.	Occupied Channel Bandwidth	14
5.4.	Transmitter Unwanted Emissions in the Out-of-band Domain	15
5.5.	Transmitter Unwanted Emissions in the Spurious Domain	16
5.5.1.	Conducted Measurements	16
5.5.2.	Radiated Measurements	17
5.6.	Receiver Spurious Emissions	22
5.6.1.	Conducted Measurements	22
5.6.2.	Radiated Measurements	23
5.7.	Receiver blocking	28
<u>6.</u>	<u>TEST SETUP PHOTOS OF THE EUT</u>	<u>30</u>
<u>7.</u>	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	<u>32</u>
<u>8.</u>	<u>APPENDIX REPORT</u>	<u>32</u>

1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[ETSI EN 300 328 V2.2.2](#)–Wideband transmission systems; data transmission equipment operating in the 2,4 GHz band; harmonised Standard for access to radio spectrum

1.2. Report Version Information

Revision No.	Date of Issue	Description
N/A	2024-04-15	Original

2. TEST DESCRIPTION

Standard clause	Report clause	Test item	Result ^{#1}	Test Engineer	Remark
4.3.2.2	5.1	RF Output Power	Pass	Xiangyu Wei	
4.3.2.3	5.2	Power Spectral Density	Pass	Xiangyu Wei	Only for non-FHSS
4.3.2.4	-	Duty cycle, Tx-Sequence, Tx-gap	N/R	-	Only for non-Adaptive equipment with RF output power >10dBm
4.3.2.5	-	Medium Utilization	N/R	-	Only for non-Adaptive equipment RF output power >10dBm
4.3.2.6	-	Adaptivity	N/R	-	Only for Adaptive Equipment RF output power >10dBm
4.3.2.7	5.3	Occupied Channel Bandwidth	Pass	Xiangyu Wei	
4.3.2.8	5.4	Transmitter unwanted emissions in the OOB domain	Pass	Xiangyu Wei	
4.3.2.9	5.5	Transmitter unwanted emissions in the spurious domain	Pass	Xiangyu Wei Yifan Wang	
4.3.2.10	5.6	Receiver spurious emissions	Pass	Xiangyu Wei Yifan Wang	
4.3.2.11	5.7	Receiver Blocking	Pass	Xiangyu Wei	
4.3.2.12	-	Geo-location capability	N/R	-	Not used

Note:

- 1) Pass: The EUT meet this standard requirement.
N/R: Not required by this standard for the EUT.
- 2) #1: The test result does not include measurement uncertainty value.

3. SUMMARY

3.1. Client Information

Applicant:	Anker Innovations Limited
Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
Manufacturer:	Anker Innovations Limited
Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong

3.2. Product Description

Main unit information:	
Product Name:	Anker SOLIX Smart Meter
Trade Mark:	ANKER
Model No.:	A17X7
Listed Model(s):	-
Power supply:	3PH 400Vac 50Hz
Hardware version:	24-P008-HW1.0
Software version:	V1.0.0.0

3.3. Radio Specification Description

Technical index for Bluetooth	
Bluetooth version:	V5.0
Modulation:	GFSK
Data Rate	☒ 1Mbps ☐ 2Mbps
Operation Frequency:	2402MHz~2480MHz
Channel Number:	40
Channel Separation:	2MHz
Modulation:	☐ FHSS ☒ Other forms of modulation GFSK
Type of Equipment:	☒ Stand-alone ☐ Combined Equipment ☐ Plug-in radio device ☐ Other
Adaptive / Non-adaptive Equipment:	☐ non-adaptive Equipment ☒ adaptive Equipment without the possibility to switch to a non-adaptive mode ☐ adaptive Equipment which can also operate in a non-adaptive mode
Receiver Categories:	☐ Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment. ☒ Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment. ☐ Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.
Operating Mode:	☒ Single Antenna Equipment ☒ Equipment with only 1 antenna ☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time ☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. ☐ Smart Antenna Systems - Multiple Antennas without beam forming ☐ Single spatial stream / Standard throughput ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1 ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2 ☐ Smart Antenna Systems - Multiple Antennas with beam forming ☐ Single spatial stream / Standard throughput ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1 ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
Antenna Type: #	☒ Bar Antenna ☒ Temporary RF connector provided ☐ No temporary RF connector provided Antenna Gain:0.67.... dBi Beamforming gain:0.....dB ☒ Suction cup Antenna ☒ Temporary RF connector provided ☐ No temporary RF connector provided Antenna Gain:3.05.... dBi Beamforming gain:0.....dB ☐ Dedicated Antennas (equipment with antenna connector)

	☐ Single power level with corresponding antenna(s) ☐ Multiple power settings and corresponding antenna(s) Number of different Power Levels: Power Level 1: dBm Power Level 2: dBm Power Level 3: dBm
Information is provided by the supplier	
☐ In Case of FHSS Modulation:	☐ In case of non-Adaptive Frequency Hopping equipment: The number of Hopping Frequencies: ☐ In case of Adaptive Frequency Hopping Equipment: The maximum number of Hopping Frequencies: The minimum number of Hopping Frequencies: The Dwell Time: The Minimum Channel Occupation Time:
☒ In Case of Adaptive Equipment:	The Channel Occupancy Time implemented by the equipment:../. ms ☒ The equipment has implemented an LBT based DAA mechanism In case of equipment using modulation different from FHSS: ☐ The equipment is Frame Based equipment ☒ The equipment is Load Based equipment ☐ The equipment can switch dynamically between Frame Based and Load Based equipment The CCA time implemented by the equipment: μs ☐ The equipment has implemented an non-LBT based DAA mechanism ☐ The equipment can operate in more than one adaptive mode
☐ In Case of Non-adaptive Equipment	The maximum RF Output Power (e.i.r.p.): dBm The maximum (corresponding) Duty Cycle: %
The worst case operational mode for each of the following tests:	
RF Output Power	Reference to section 5.1
Occupied Channel Bandwidth	Reference to section 5.3
Transmitter Unwanted Emissions in the OOB Domain	Reference to section 5.4
Transmitter Unwanted Emissions in the Spurious Domain	Reference to section 5.5
Receiver Spurious Emissions	Reference to section 5.6
☐ FHSS	
Dwell time:	
Minimum Frequency Occupation:	
Hopping Sequence:	
Hopping Frequency Separation	
☒ Other	
Power Spectral Density:	Reference to section 5.2
☒ Adaptive Equipment	
Adaptivity:	-
Receiver Blocking:	Reference to section 5.7
☐ Non-adaptive Equipment	
Duty cycle:	
Tx-Sequence:	
Tx-gap:	
Medium Utilisation:	

Note:

#: The antenna gain is provided by the applicant, and the applicant should be responsible for its authenticity, HTW lab has not verified the authenticity of its information

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China
Contact information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn

4. TEST CONFIGURATION

4.1. Test frequency list

The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test

Channel	Frequency (MHz)
CH-L	2402
CH-M	2440
CH-H	2480

4.2. Test mode

TX mode	Keep the EUT in continuously transmitting mode by test software.
RX mode	Keep the EUT in continuously receiving mode by test software.
Normal mode	Keep the EUT in continuously communication mode

4.3. 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	Equipement	Trade Name	Model No.	Other
1				
2				

4.4. Testing environmental condition

Normal Condition	Temperature	15 °C to +35 °C
	Relative humidity	20 % to 75 %.
	Voltage	the equipment shall be the nominal voltage for which the equipment was designed.
Extreme Condition	Temperature	Measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer
	Voltage	Measurements shall be made over the extremes of the operating voltage range as declared by the manufacturer

Normal Condition	T _N =Normal Temperature	25 °C
Extreme Condition	T _L =Lower Temperature	-25 °C
	T _H =Higher Temperature	55 °C

4.5. Measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	RF power, conducted	1.07dB
2	Power spectral density, conducted	1.07dB
3	Conducted spurious emission	1.68dB
4	Radiated spurious emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz
5	Occupied bandwidth	0.002%
6	Temperature	1°C
7	Humidity	5%

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

4.6. Equipments Used During the Test

● TS8997 Test system

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
●	Signal generator	R&S	HTWE0241	SMB100A	177956	2023/08/25	2024/08/24
●	Vector signal generator	R&S	HTWE0244	SMBV100A	260790	2023/05/23	2024/05/22
●	OSP	R&S	HTWE0243	OSP120	101317	2023/08/25	2024/08/24
●	10dB Attenuator	R&S	HTWE0250-01	10dB Attenuator-1	N/A	2023/05/15	2024/05/14
●	10dB Attenuator	R&S	HTWE0250-02	10dB Attenuator-2	N/A	2023/05/15	2024/05/14
●	10dB Attenuator	R&S	HTWE0250-03	10dB Attenuator-3	N/A	2023/05/15	2024/05/14
●	10dB Attenuator	R&S	HTWE0250-04	10dB Attenuator-4	N/A	2023/05/15	2024/05/14
●	Test software	R&S	N/A	EMC32	N/A	N/A	N/A

● Auxiliary Equipment

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Climate chamber	ESPEC	HTWS0715	GPL-2	N/A	2023/08/21	2024/08/20
●	DC Power Supply	Gwinstek	HTWE0274	SPS-2415	GER835793	N/A	N/A

● Radiated Spurious Emission

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	2023/08/22	2024/08/21
●	Spectrum Analyzer	R&S	HTWE0385	N9020A	MY54486658	2023/08/22	2024/08/21
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2024/04/08	2027/04/07
●	Horn Antenna	SCHWARZBECK	HTWE0126	BBHA 9120D	1011	2023/2/14	2026/2/13
●	Pre-Amplifier	CD	HTWE0071	PAP-0102	12004	2023/5/25	2024/5/24
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2023/5/25	2024/5/24
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

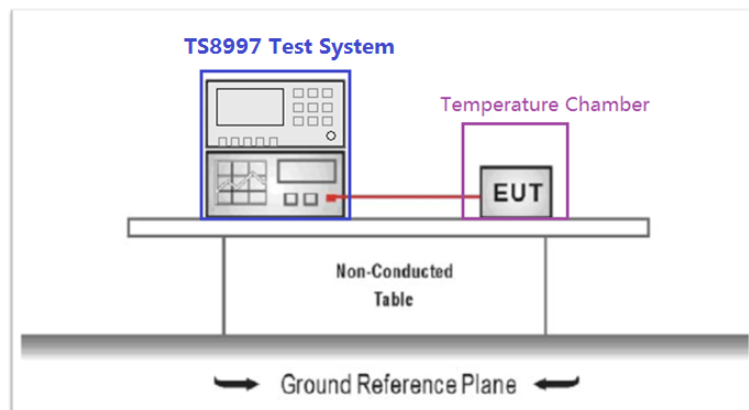
5.1. RF Output Power

LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.2.3

- For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm
- The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☒ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.2.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

Refer to the appendix report

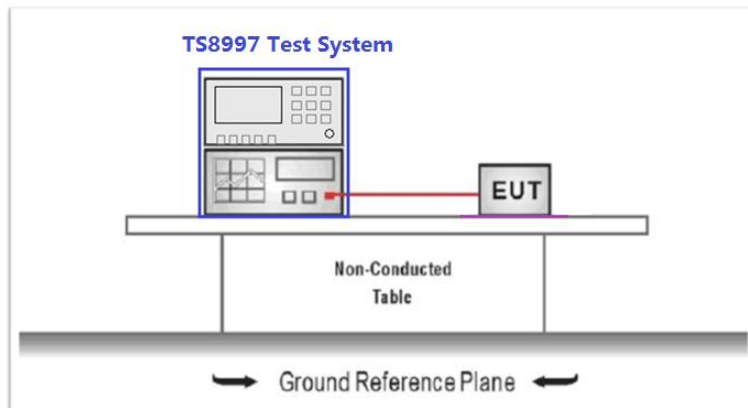
5.2. Power Spectral Density

LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.3

The maximum Power Spectral Density for non-FHSS equipment is 10 dBm per MHz.

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.3.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

Refer to the appendix report

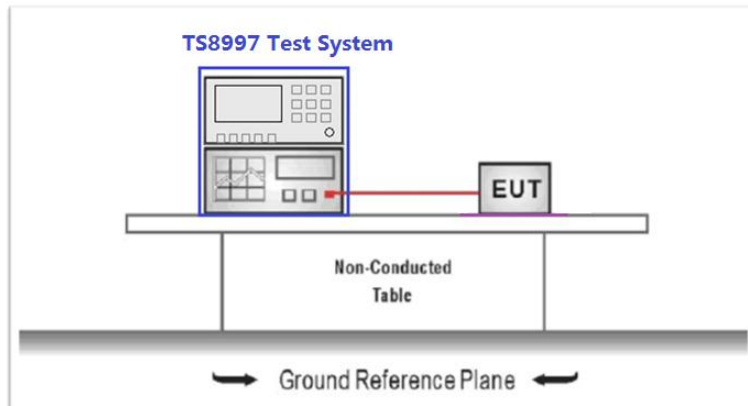
5.3. Occupied Channel Bandwidth

LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.7.3

- The Occupied Channel Bandwidth shall fall completely within the band given in the band 2,4 GHz to 2,4835 GHz.
- In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.
☒ Normal condition ☐ Extreme conditions
2. Refer to ETSI EN 300 328 Sub-clause 5.4.7.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

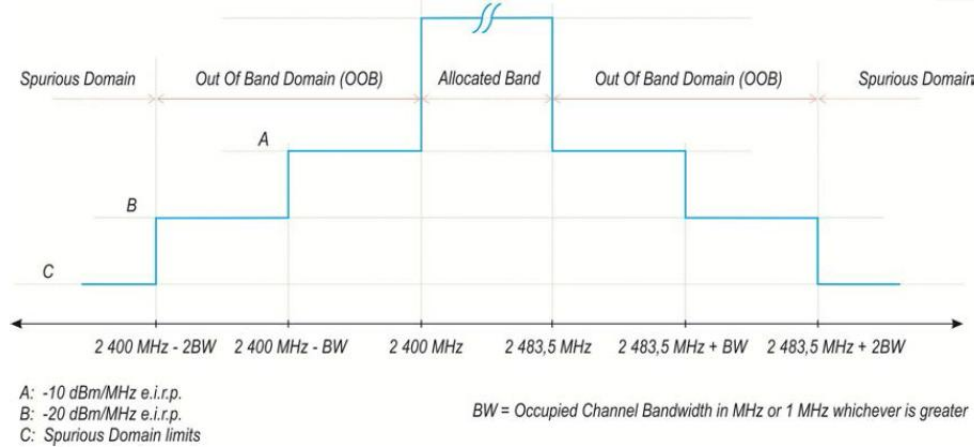
Refer to the appendix report

5.4. Transmitter Unwanted Emissions in the Out-of-band Domain

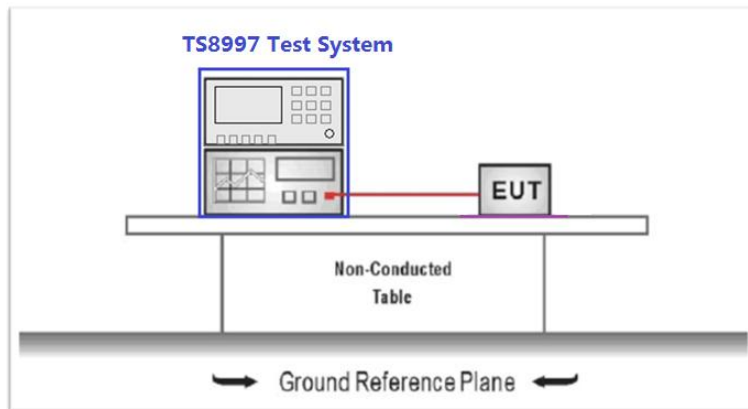
LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.8.3

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in the below figure.



TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.8.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

Refer to the appendix report

5.5. Transmitter Unwanted Emissions in the Spurious Domain

5.5.1. Conducted Measurements

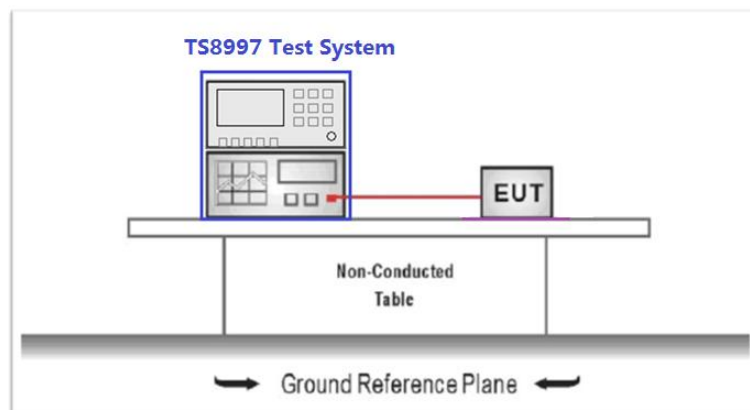
LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.9.3

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the below table

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.9.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

Refer to the appendix report

5.5.2. Radiated Measurements

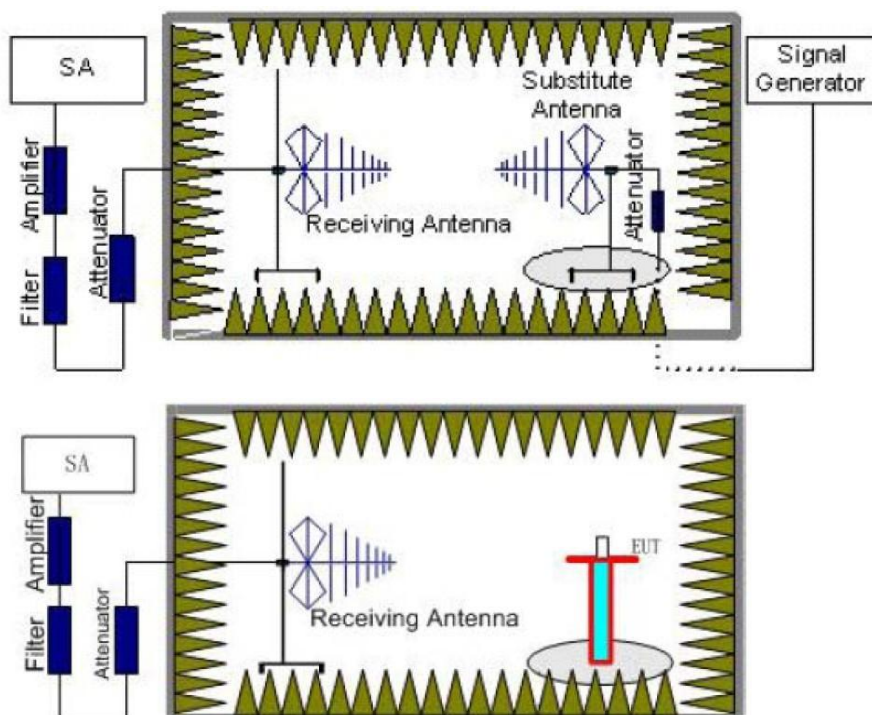
LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.9.3

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the below table

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.9.2.2 for the measurement method.

TEST MODE

Refer to the section 4.2

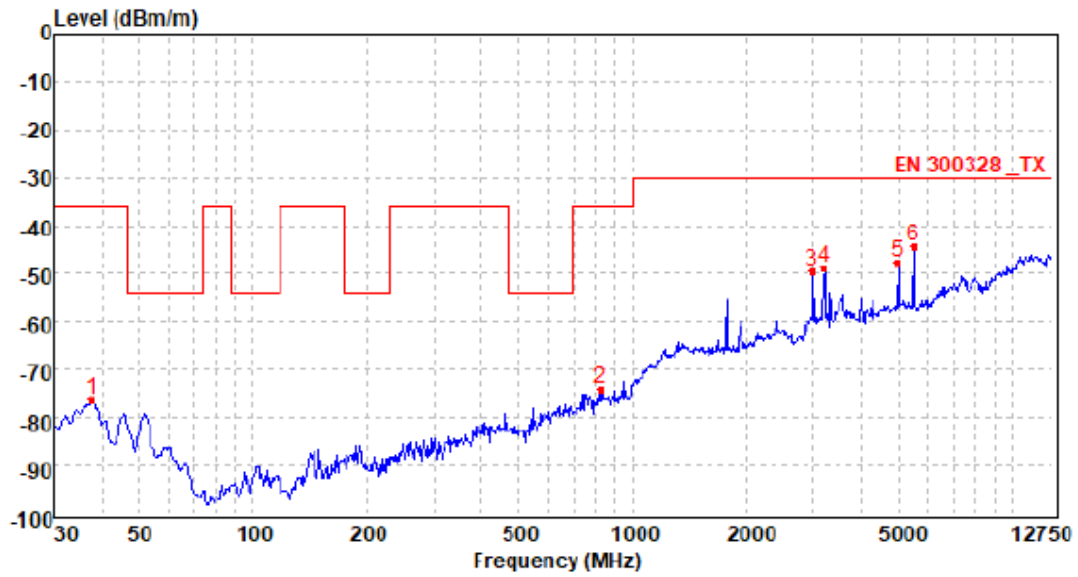
TX mode

TEST RESULT

☒ Passed ☐ Not Applicable

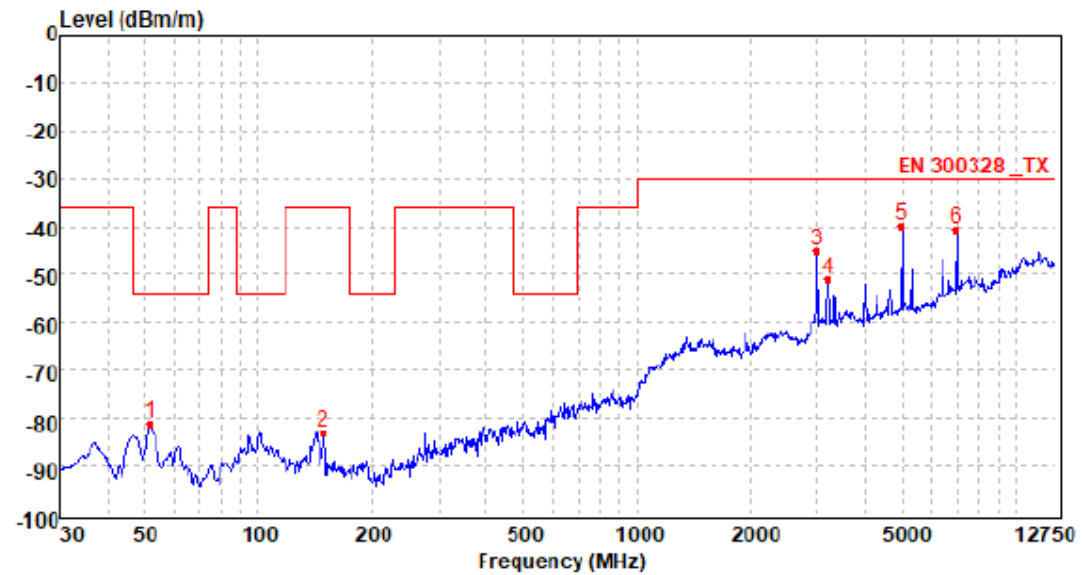
Bar Antenna:

Data rate	1Mbps		
Test Channel:	CH-L	Polarity:	Horizontal



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	37.04	-74.32	27.46	1.12	30.64	-76.38	-36.00	-40.38	Peak
2	823.65	-80.57	29.93	5.85	29.34	-74.13	-36.00	-38.13	Peak
3	2987.92	-53.41	41.02	4.77	41.66	-49.28	-30.00	-19.28	Peak
4	3200.50	-53.13	41.37	4.84	41.60	-48.52	-30.00	-18.52	Peak
5	4996.69	-56.87	44.35	6.09	41.11	-47.54	-30.00	-17.54	Peak
6	5532.26	-53.95	43.84	6.50	40.79	-44.40	-30.00	-14.40	Peak

Test Channel:	CH-L	Polarity:	Vertical
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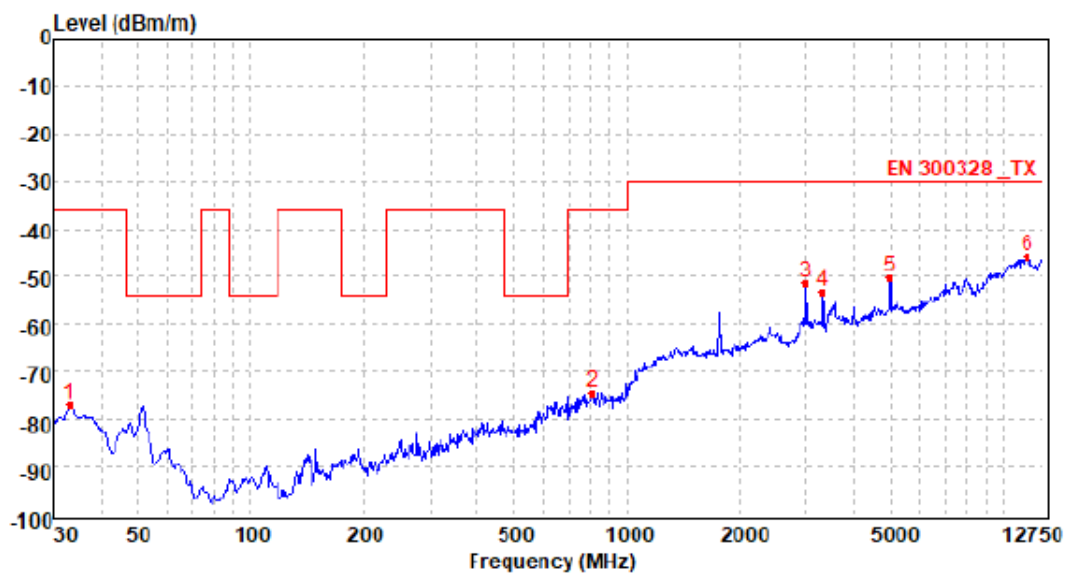
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	51.56	-74.18	22.36	1.32	30.67	-81.17	-54.00	-27.17	Peak
2	148.59	-75.15	20.58	2.31	30.46	-82.72	-36.00	-46.72	Peak
3	2995.54	-49.25	41.01	4.75	41.65	-45.14	-30.00	-15.14	Peak
4	3192.37	-55.77	41.46	4.80	41.60	-51.11	-30.00	-21.11	Peak
5	4996.69	-49.44	44.50	6.09	41.11	-39.96	-30.00	-9.96	Peak
6	6974.36	-54.41	47.36	7.34	40.88	-40.59	-30.00	-10.59	Peak

Test Channel:

CH-H

Polarity:

Horizontal

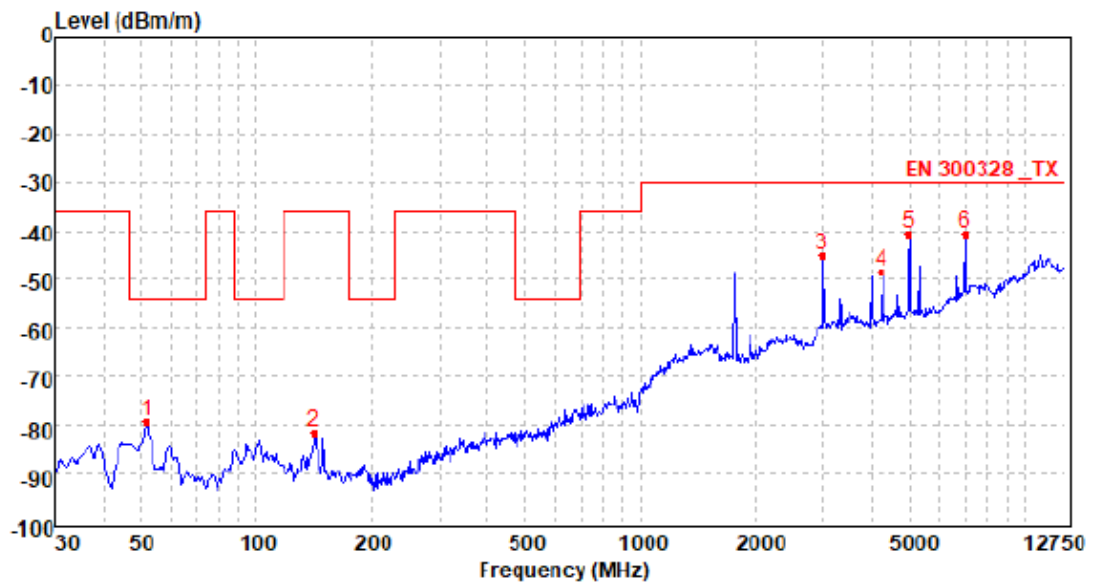


Test Channel:

CH-H

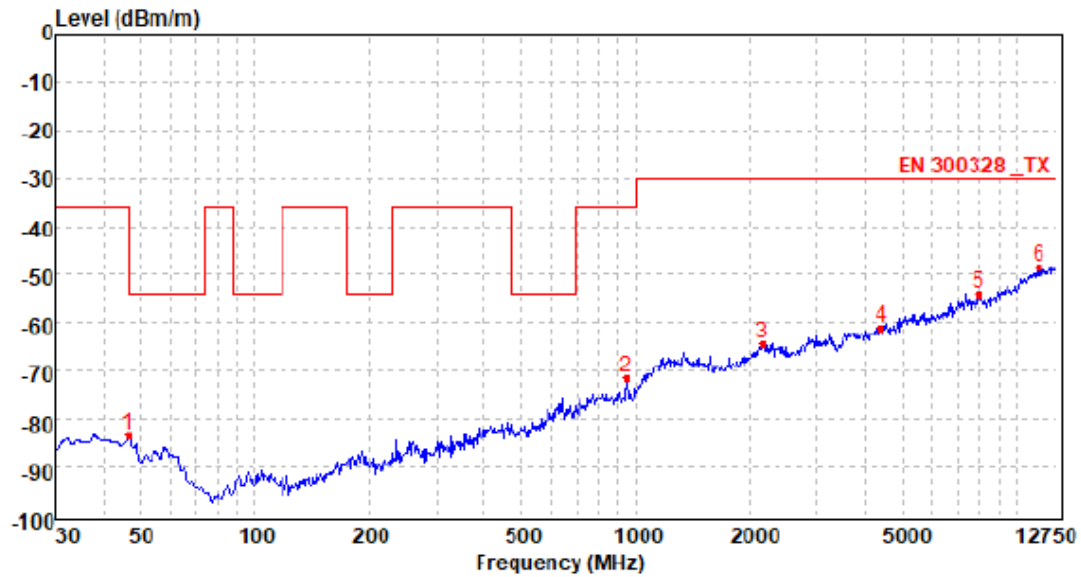
Polarity:

Vertical

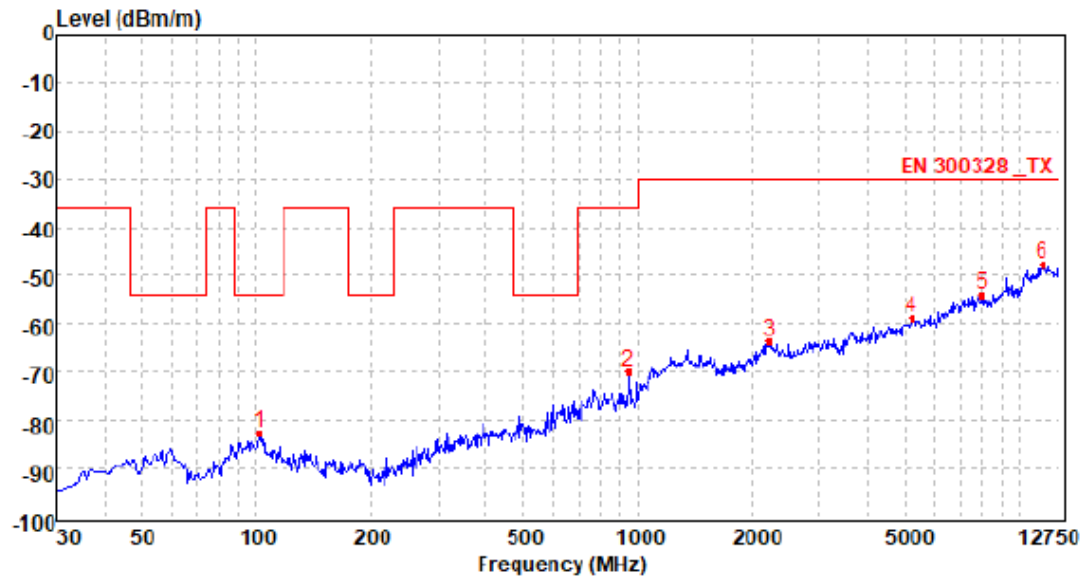


Suction cup Antenna:

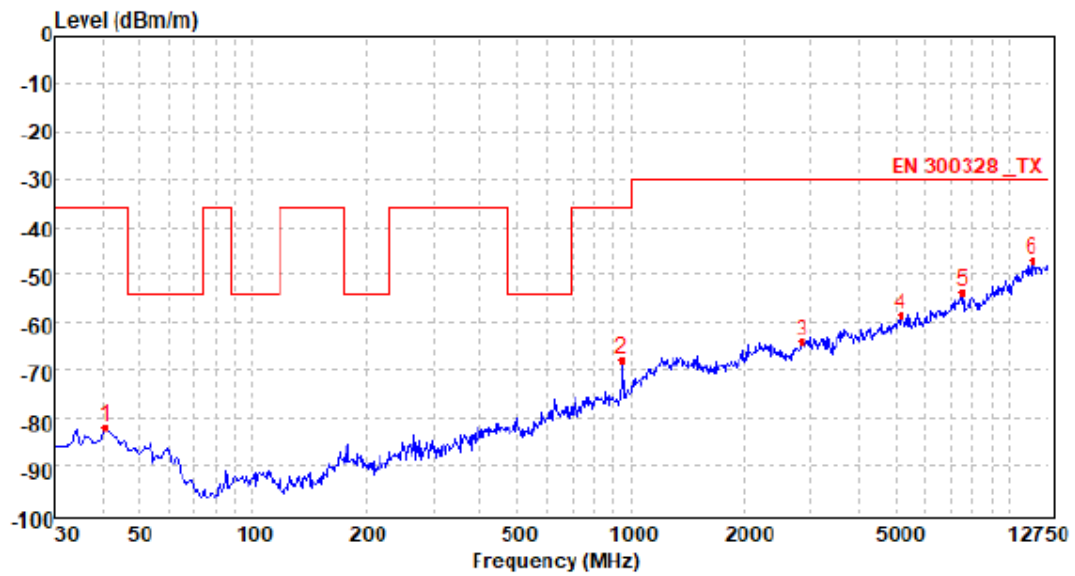
Data rate	1Mbps		
Test Channel:	CH-L	Polarity:	Horizontal



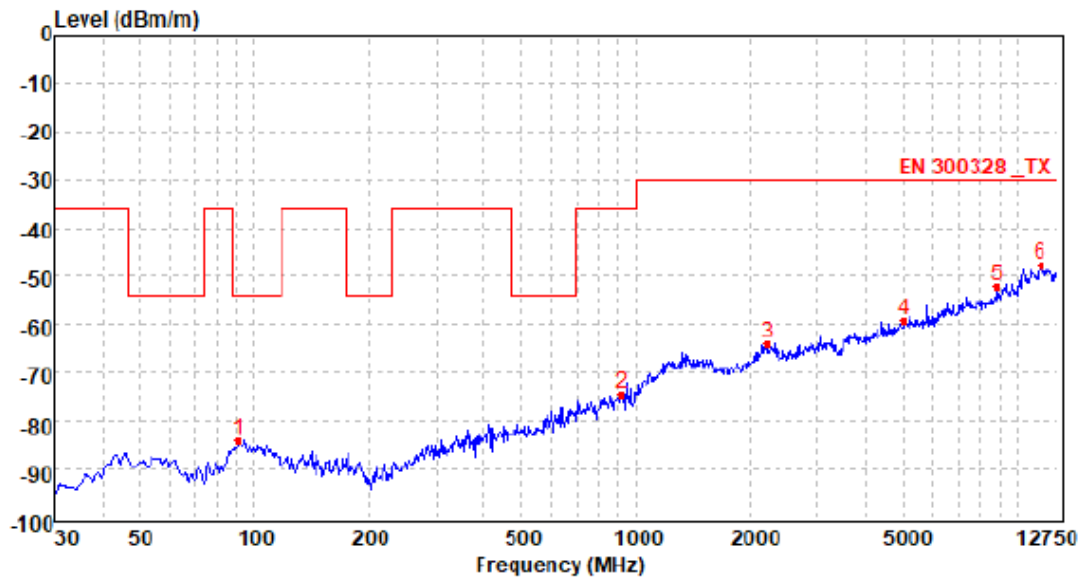
Test Channel:	CH-L	Polarity:	Vertical
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Test Channel:	CH-H	Polarity:	Horizontal
---------------	------	-----------	------------



Test Channel:	CH-H	Polarity:	Vertical
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5.6. Receiver Spurious Emissions

5.6.1. Conducted Measurements

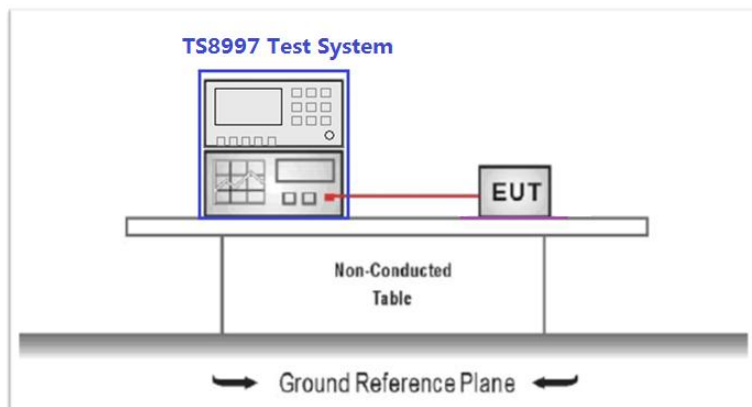
LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.10.3

The spurious emissions of the receiver shall not exceed the values given in the below table

Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.10.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

RX mode

TEST RESULT

☒ Passed ☐ Not Applicable

TEST DATA

Refer to the appendix report

5.6.2. Radiated Measurements

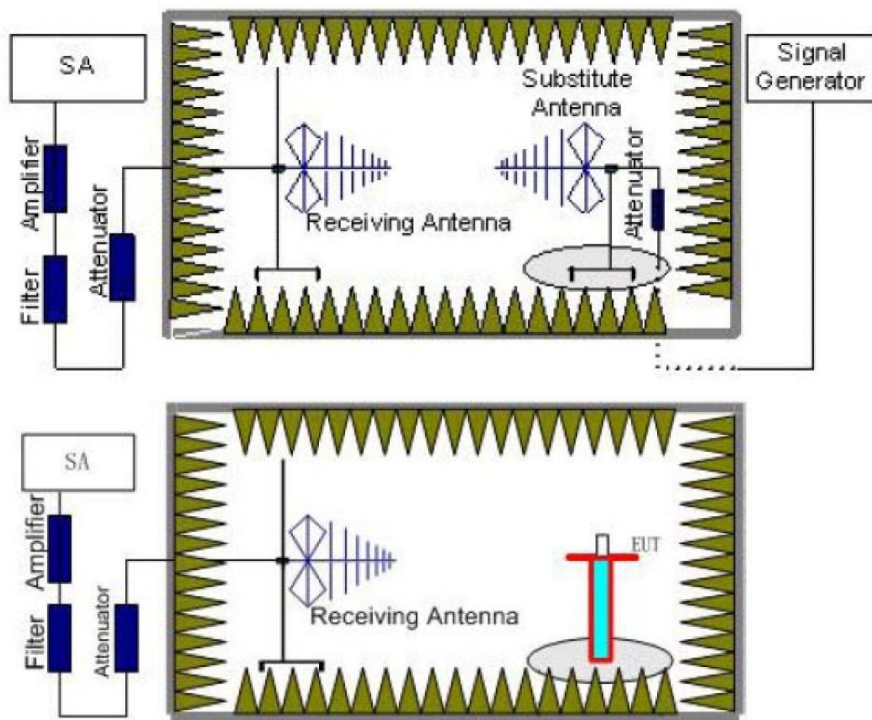
LIMIT

ETSI EN 300 328 Sub-clause 4.3.2.10.3

The spurious emissions of the receiver shall not exceed the values given in the below table

Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ Normal condition ☐ Extreme conditions

2. Refer to ETSI EN 300 328 Sub-clause 5.4.10.2.2 for the measurement method.

TEST MODE

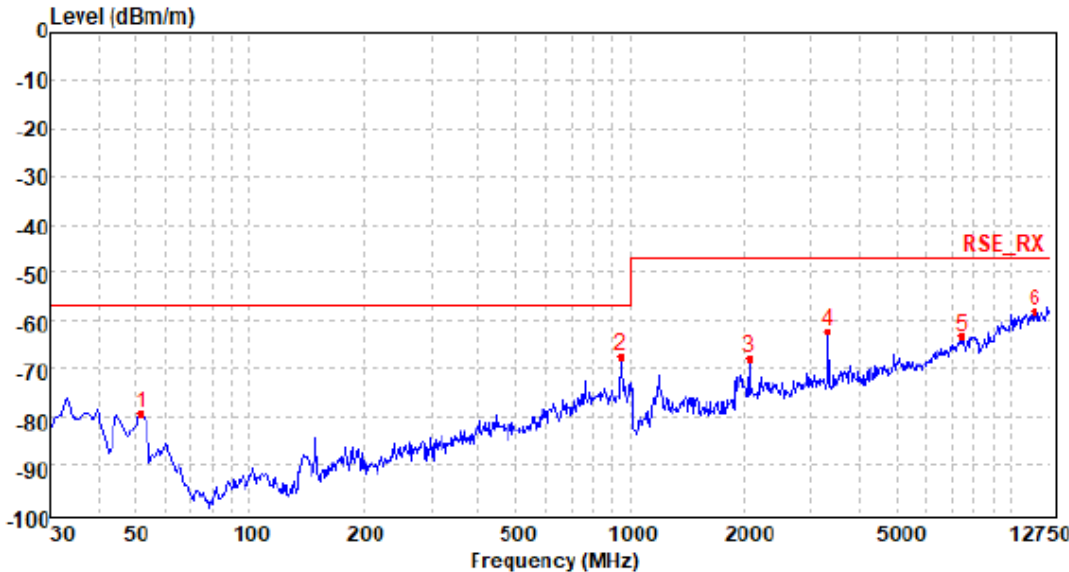
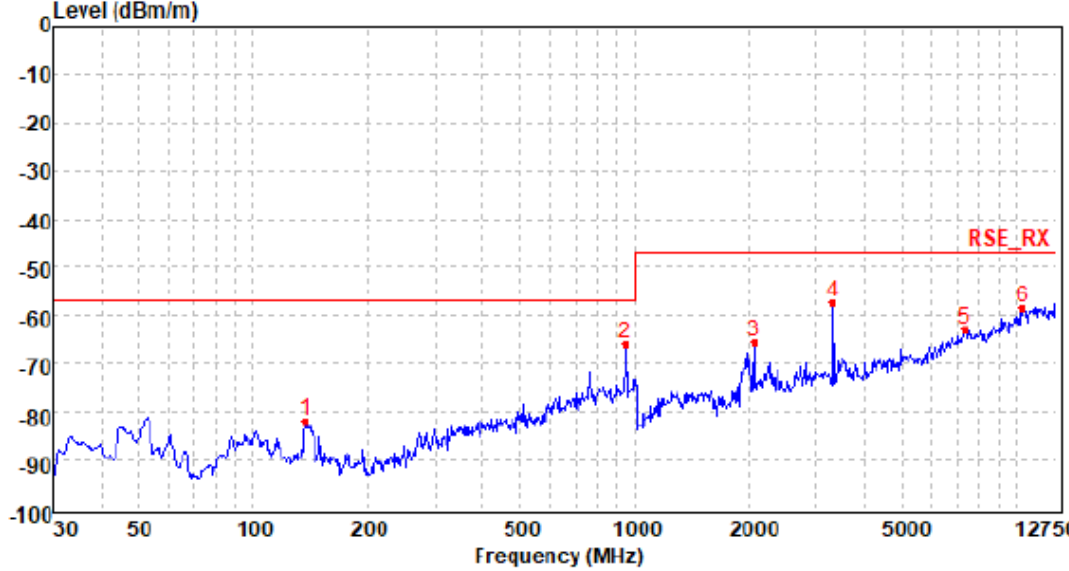
Refer to the section 4.2

RX mode

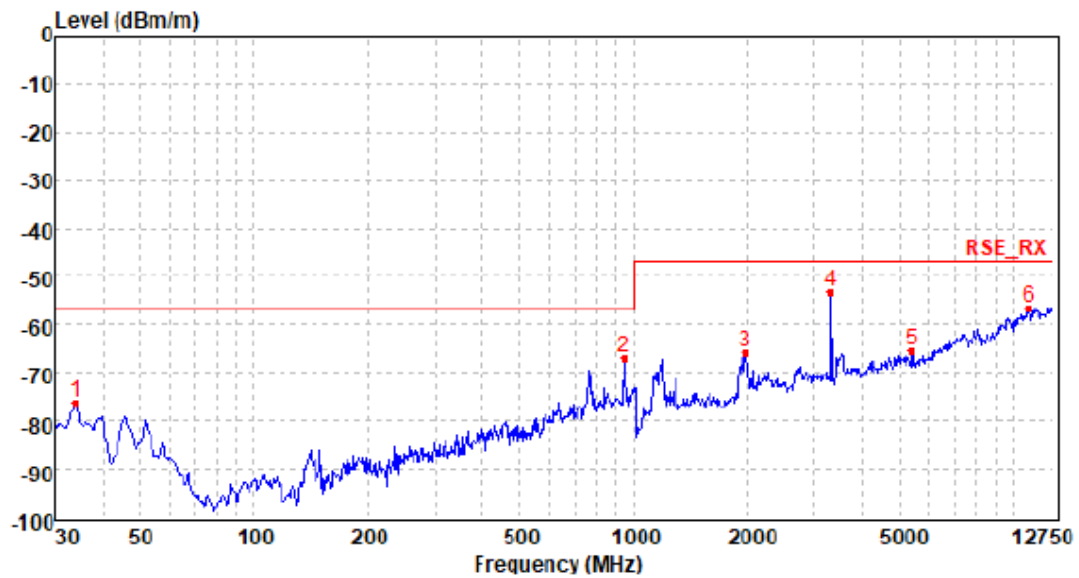
TEST RESULT

☒ Passed ☐ Not Applicable

Bar Antenna:

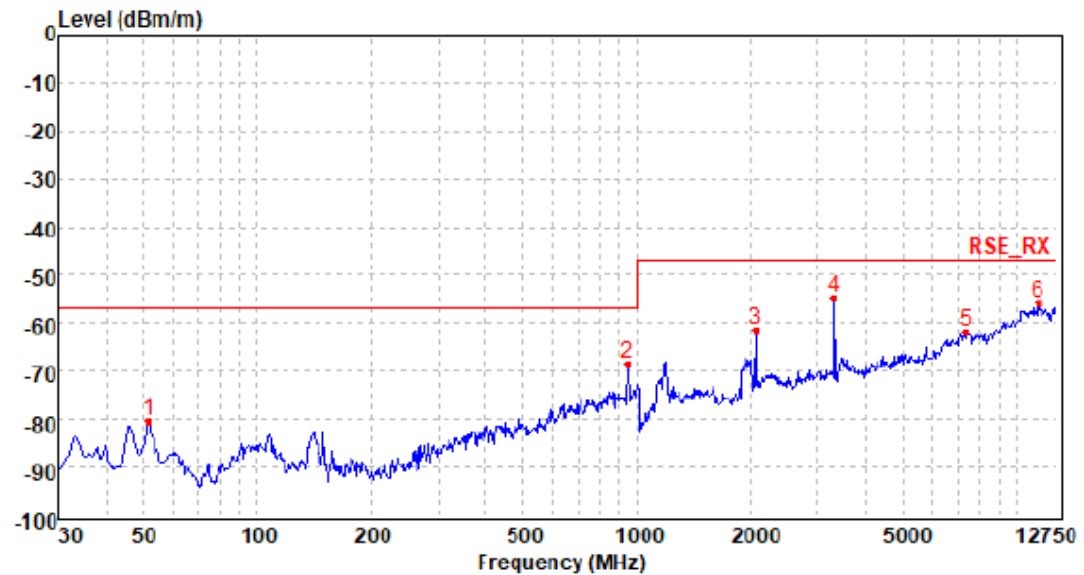
Data rate				1Mbps																																																																									
Test Channel:		CH-L		Polarity:		Horizontal																																																																							
Level (dBm/m)  Frequency (MHz) <table><tr><th>Mark</th><th>Frequency MHz</th><th>Reading dBm</th><th>Antenna dB</th><th>Cable dB</th><th>Preamp dB</th><th>Level dBm</th><th>Limit dBm</th><th>Over limit</th><th>Remark</th></tr><tr><td>1</td><td>51.56</td><td>-73.45</td><td>23.70</td><td>1.32</td><td>30.67</td><td>-79.10</td><td>-57.00</td><td>-22.10</td><td>Peak</td></tr><tr><td>2</td><td>944.72</td><td>-73.74</td><td>29.33</td><td>6.34</td><td>29.26</td><td>-67.33</td><td>-57.00</td><td>-10.33</td><td>Peak</td></tr><tr><td>3</td><td>2060.46</td><td>-69.38</td><td>39.69</td><td>3.79</td><td>41.90</td><td>-67.80</td><td>-47.00</td><td>-20.80</td><td>Peak</td></tr><tr><td>4</td><td>3308.19</td><td>-65.58</td><td>40.39</td><td>4.85</td><td>41.60</td><td>-61.94</td><td>-47.00</td><td>-14.94</td><td>Peak</td></tr><tr><td>5</td><td>7432.62</td><td>-78.48</td><td>48.40</td><td>7.84</td><td>41.03</td><td>-63.27</td><td>-47.00</td><td>-16.27</td><td>Peak</td></tr><tr><td>6</td><td>11603.96</td><td>-79.03</td><td>52.89</td><td>10.43</td><td>42.30</td><td>-58.01</td><td>-47.00</td><td>-11.01</td><td>Peak</td></tr></table>								Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark	1	51.56	-73.45	23.70	1.32	30.67	-79.10	-57.00	-22.10	Peak	2	944.72	-73.74	29.33	6.34	29.26	-67.33	-57.00	-10.33	Peak	3	2060.46	-69.38	39.69	3.79	41.90	-67.80	-47.00	-20.80	Peak	4	3308.19	-65.58	40.39	4.85	41.60	-61.94	-47.00	-14.94	Peak	5	7432.62	-78.48	48.40	7.84	41.03	-63.27	-47.00	-16.27	Peak	6	11603.96	-79.03	52.89	10.43	42.30	-58.01	-47.00	-11.01	Peak
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark																																																																				
1	51.56	-73.45	23.70	1.32	30.67	-79.10	-57.00	-22.10	Peak																																																																				
2	944.72	-73.74	29.33	6.34	29.26	-67.33	-57.00	-10.33	Peak																																																																				
3	2060.46	-69.38	39.69	3.79	41.90	-67.80	-47.00	-20.80	Peak																																																																				
4	3308.19	-65.58	40.39	4.85	41.60	-61.94	-47.00	-14.94	Peak																																																																				
5	7432.62	-78.48	48.40	7.84	41.03	-63.27	-47.00	-16.27	Peak																																																																				
6	11603.96	-79.03	52.89	10.43	42.30	-58.01	-47.00	-11.01	Peak																																																																				
Test Channel:		CH-L		Polarity:		Vertical																																																																							
Level (dBm/m)  Frequency (MHz) <table><tr><th>Mark</th><th>Frequency MHz</th><th>Reading dBm</th><th>Antenna dB</th><th>Cable dB</th><th>Preamp dB</th><th>Level dBm</th><th>Limit dBm</th><th>Over limit</th><th>Remark</th></tr><tr><td>1</td><td>137.05</td><td>-75.26</td><td>21.76</td><td>2.21</td><td>30.59</td><td>-81.00</td><td>-57.00</td><td>-24.00</td><td>Peak</td></tr><tr><td>2</td><td>948.05</td><td>-71.98</td><td>29.13</td><td>6.35</td><td>29.27</td><td>-65.77</td><td>-57.00</td><td>-8.77</td><td>Peak</td></tr><tr><td>3</td><td>2060.46</td><td>-66.86</td><td>39.38</td><td>3.79</td><td>41.90</td><td>-65.59</td><td>-47.00</td><td>-18.59</td><td>Peak</td></tr><tr><td>4</td><td>3308.19</td><td>-60.99</td><td>40.43</td><td>4.85</td><td>41.60</td><td>-57.31</td><td>-47.00</td><td>-10.31</td><td>Peak</td></tr><tr><td>5</td><td>7338.62</td><td>-78.23</td><td>48.61</td><td>7.73</td><td>40.98</td><td>-62.87</td><td>-47.00</td><td>-15.87</td><td>Peak</td></tr><tr><td>6</td><td>10400.86</td><td>-79.51</td><td>51.97</td><td>9.71</td><td>40.60</td><td>-58.43</td><td>-47.00</td><td>-11.43</td><td>Peak</td></tr></table>								Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark	1	137.05	-75.26	21.76	2.21	30.59	-81.00	-57.00	-24.00	Peak	2	948.05	-71.98	29.13	6.35	29.27	-65.77	-57.00	-8.77	Peak	3	2060.46	-66.86	39.38	3.79	41.90	-65.59	-47.00	-18.59	Peak	4	3308.19	-60.99	40.43	4.85	41.60	-57.31	-47.00	-10.31	Peak	5	7338.62	-78.23	48.61	7.73	40.98	-62.87	-47.00	-15.87	Peak	6	10400.86	-79.51	51.97	9.71	40.60	-58.43	-47.00	-11.43	Peak
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark																																																																				
1	137.05	-75.26	21.76	2.21	30.59	-81.00	-57.00	-24.00	Peak																																																																				
2	948.05	-71.98	29.13	6.35	29.27	-65.77	-57.00	-8.77	Peak																																																																				
3	2060.46	-66.86	39.38	3.79	41.90	-65.59	-47.00	-18.59	Peak																																																																				
4	3308.19	-60.99	40.43	4.85	41.60	-57.31	-47.00	-10.31	Peak																																																																				
5	7338.62	-78.23	48.61	7.73	40.98	-62.87	-47.00	-15.87	Peak																																																																				
6	10400.86	-79.51	51.97	9.71	40.60	-58.43	-47.00	-11.43	Peak																																																																				

Test Channel:	CH-H	Polarity:	Horizontal
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Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	33.93	-73.28	26.84	1.05	30.69	-76.08	-57.00	-19.08	Peak
2	944.72	-73.29	29.33	6.34	29.26	-66.88	-57.00	-9.88	Peak
3	1973.20	-66.23	38.80	3.67	41.91	-65.67	-47.00	-18.67	Peak
4	3308.19	-56.95	40.39	4.85	41.60	-53.31	-47.00	-6.31	Peak
5	5448.41	-75.24	43.99	6.59	40.85	-65.51	-47.00	-18.51	Peak
6	10971.98	-77.10	52.84	9.99	42.30	-56.57	-47.00	-9.57	Peak

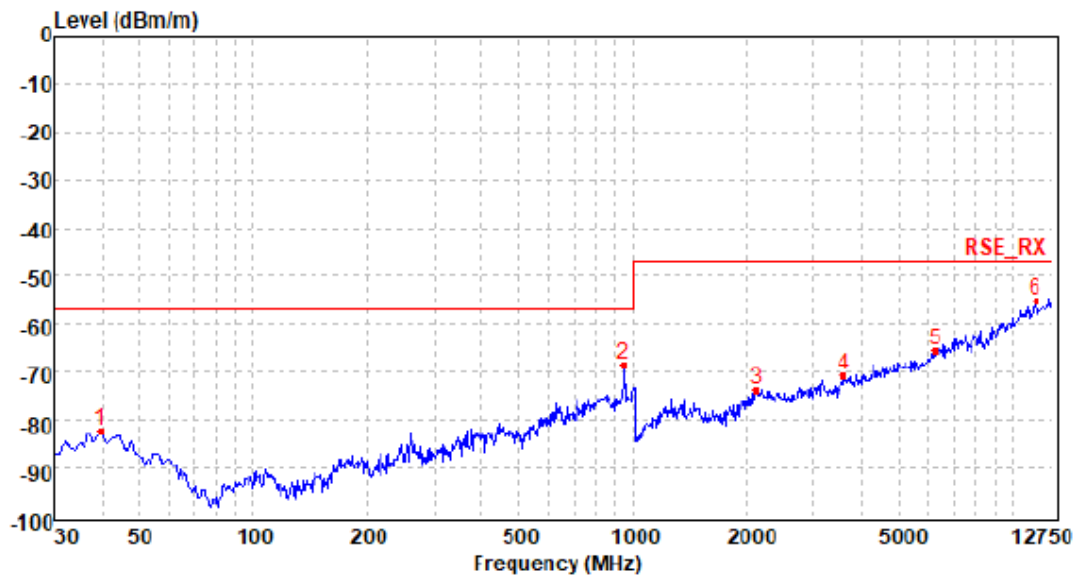
Test Channel:	CH-H	Polarity:	Vertical
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Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	51.56	-73.17	22.36	1.32	30.67	-80.16	-57.00	-23.16	Peak
2	944.72	-74.42	29.05	6.34	29.26	-68.29	-57.00	-11.29	Peak
3	2060.46	-62.79	39.38	3.79	41.90	-61.52	-47.00	-14.52	Peak
4	3308.19	-58.40	40.43	4.85	41.60	-54.72	-47.00	-7.72	Peak
5	7376.08	-77.16	48.60	7.71	41.00	-61.85	-47.00	-14.85	Peak
6	11399.03	-76.80	53.13	10.29	42.30	-55.68	-47.00	-8.68	Peak

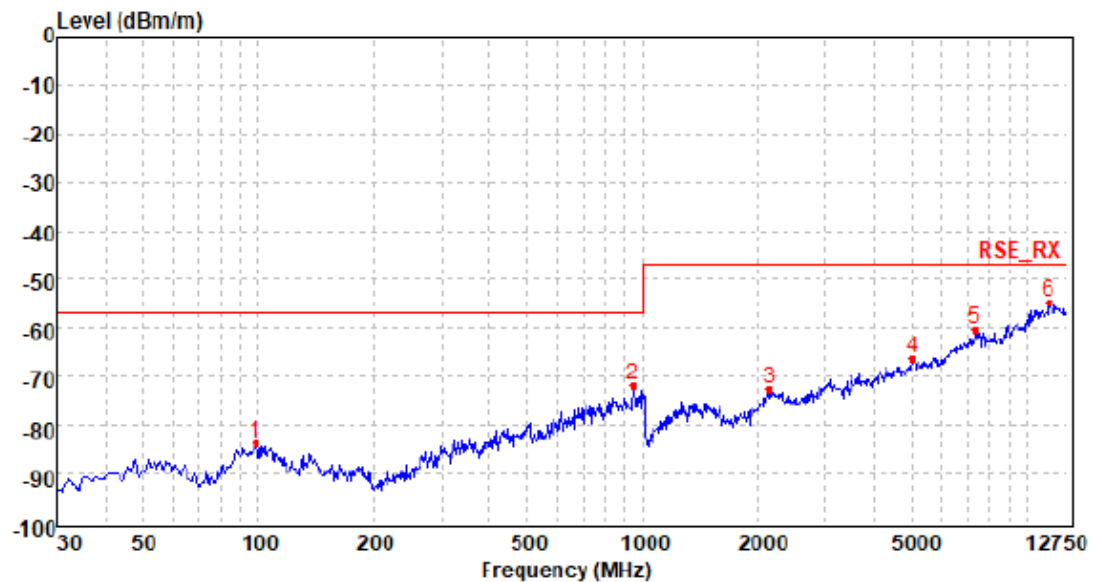
Suction cup Antenna:

Data rate	1Mbps		
Test Channel:	CH-L	Polarity:	Horizontal



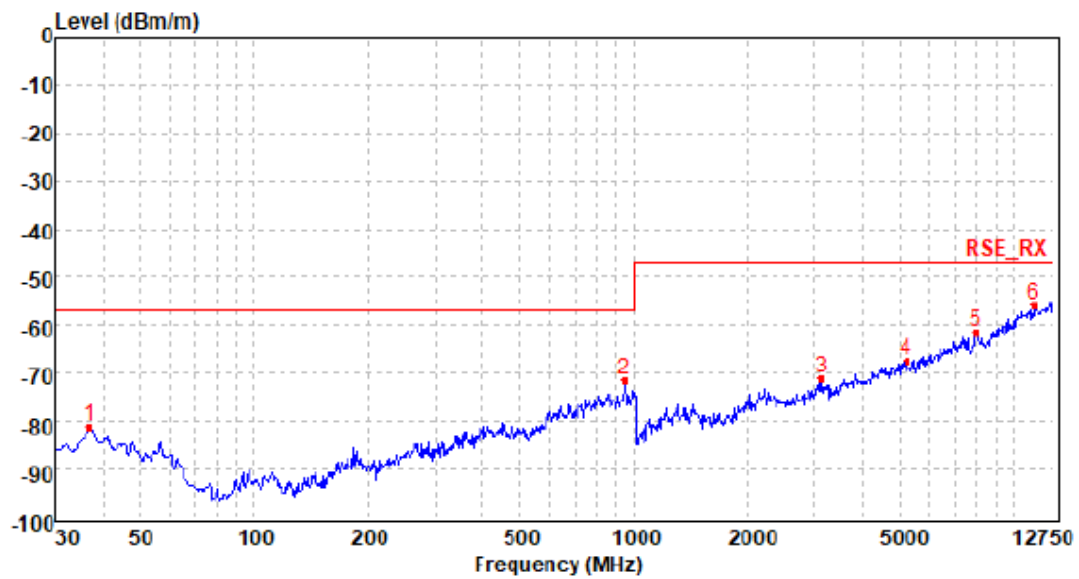
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	39.75	-80.31	27.74	1.15	30.61	-82.03	-57.00	-25.03	Peak
2	948.05	-74.99	29.40	6.35	29.27	-68.51	-57.00	-11.51	Peak
3	2113.59	-75.71	40.19	3.79	41.87	-73.60	-47.00	-26.60	Peak
4	3607.26	-76.40	42.38	5.07	41.60	-70.55	-47.00	-23.55	Peak
5	6251.26	-77.56	45.55	7.06	40.60	-65.55	-47.00	-18.55	Peak
6	11515.68	-76.21	52.97	10.37	42.30	-55.17	-47.00	-8.17	Peak

Test Channel:	CH-L	Polarity:	Vertical
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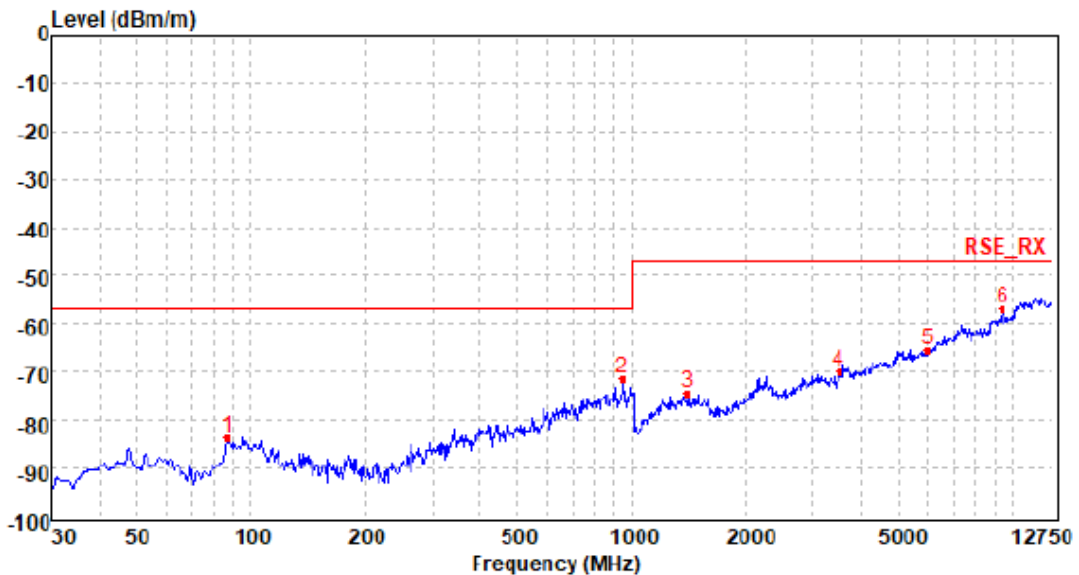
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	98.47	-80.62	25.77	1.05	30.65	-83.65	-57.00	-26.65	Peak
2	948.05	-77.93	29.13	6.35	29.27	-71.72	-57.00	-14.72	Peak
3	2140.66	-75.42	40.75	3.86	41.84	-72.65	-47.00	-25.65	Peak
4	5047.83	-75.38	44.37	6.09	41.08	-66.00	-47.00	-19.00	Peak
5	7338.62	-75.64	48.61	7.73	40.98	-60.28	-47.00	-13.28	Peak
6	11399.03	-75.85	53.13	10.29	42.30	-54.73	-47.00	-7.73	Peak

Test Channel:	CH-H	Polarity:	Horizontal
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Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	36.92	-78.73	27.32	1.10	30.65	-80.96	-57.00	-23.96	Peak
2	948.05	-77.91	29.40	6.35	29.27	-71.43	-57.00	-14.43	Peak
3	3128.01	-75.44	41.25	4.67	41.60	-71.12	-47.00	-24.12	Peak
4	5244.30	-76.64	43.98	6.34	41.00	-67.32	-47.00	-20.32	Peak
5	7981.72	-76.68	48.11	7.99	40.85	-61.43	-47.00	-14.43	Peak
6	11312.31	-76.69	52.95	10.23	42.30	-55.81	-47.00	-8.81	Peak

Test Channel:	CH-H	Polarity:	Vertical
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Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	86.76	-79.27	24.46	1.74	30.66	-83.73	-57.00	-26.73	Peak
2	948.05	-77.48	29.13	6.35	29.27	-71.27	-57.00	-14.27	Peak
3	1402.92	-73.24	37.76	3.08	42.00	-74.40	-47.00	-27.40	Peak
4	3498.74	-74.64	41.10	5.08	41.60	-70.06	-47.00	-23.06	Peak
5	5986.51	-76.13	44.71	6.80	40.63	-65.25	-47.00	-18.25	Peak
6	9465.98	-75.18	49.76	9.37	40.94	-56.99	-47.00	-9.99	Peak

5.7. Receiver blocking

LIMIT

Performance Criteria:

- For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.
- For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

Receiver Category 1: Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × log ₁₀ (OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × log ₁₀ (OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 20$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

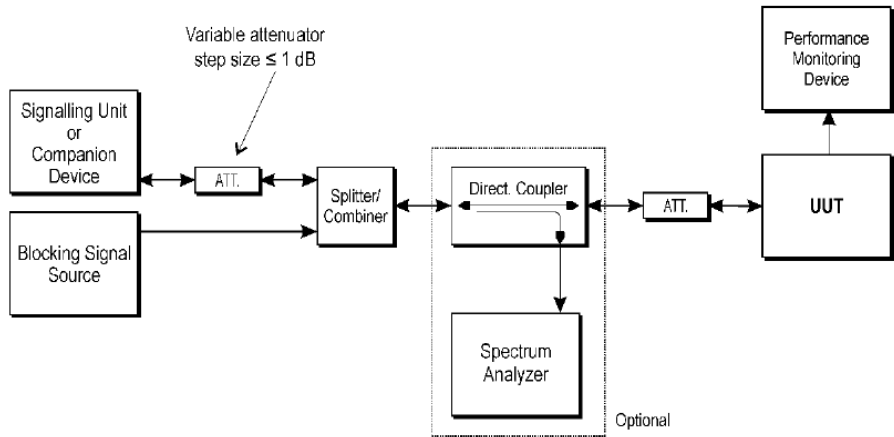
Receiver Category 2: Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 10$ dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Receiver Category 3: Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × log ₁₀ (OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to P _{min} + 30 dB where P _{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.
- ☒ Normal condition ☐ Extreme conditions
2. Refer to ETSI EN 300 328 Sub-clause 5.4.11.2.1 for the measurement method.

TEST MODE

Refer to the section 4.2

Normal mode

TEST RESULT

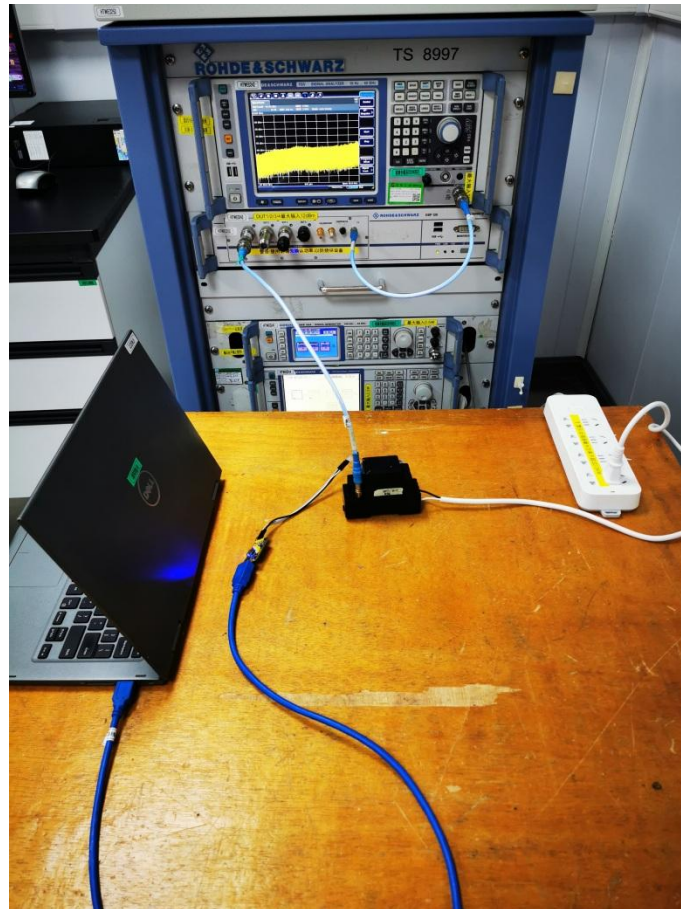
☒ Passed ☐ Not Applicable

TEST DATA

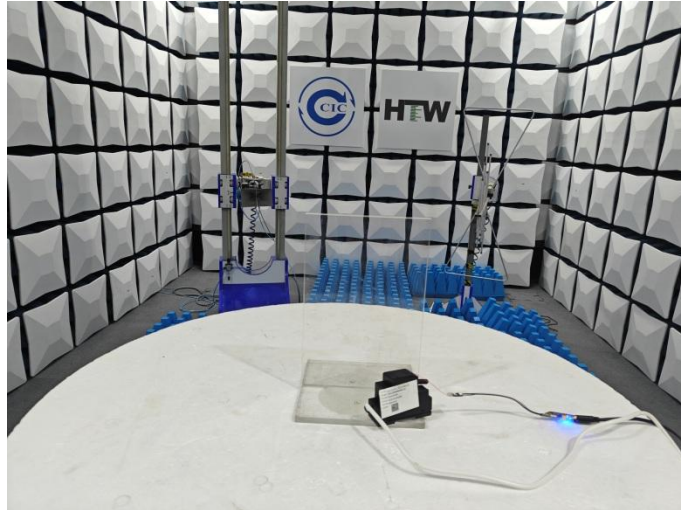
Refer to the appendix report

6. TEST SETUP PHOTOS OF THE EUT

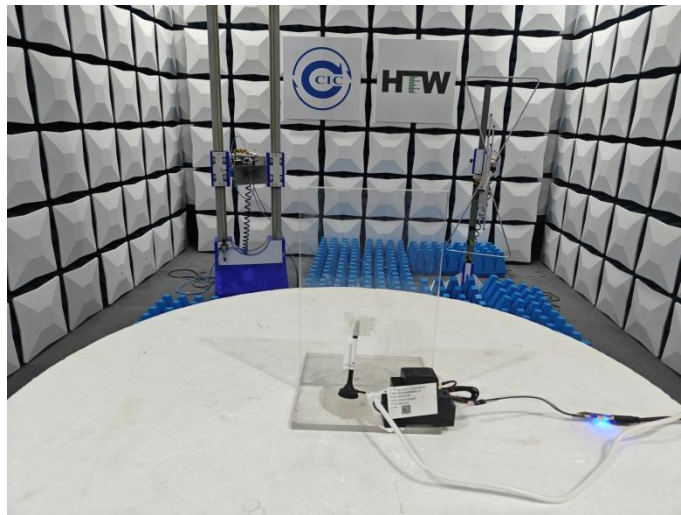
Conducted measurements



Radiated measurements(Bar Antenna)



Radiated measurements(Suction cup Antenna)



7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Refer to the test report No. CHTW24040030

8. APPENDIX REPORT

APPENDIX REPORT

Project No.	SHT2403069701W	Radio Specification	Bluetooth BLE
Test sample No.	YPHT24030697005 01	Model No.	A17X7
Start test date	2024-04-03	Finish date	2024-04-08
Temperature	25℃	Humidity	52%
Test Engineer	Xiangyu Wei	Auditor	Xiaodong Zhao

Appendix clause	Test item	Result
A	RF Output Power	PASS
B	Power Spectral Density	PASS
C	Occupied Channel Bandwidth	PASS
D	Transmitter Unwanted Emissions in the Out-of-band Domain	PASS
E	Transmitter Unwanted Emissions in the Spurious Domain	PASS
F	Receiver Spurious Emissions	PASS
G	Receiver blocking	PASS

Appendix A: RF Output Power

Test conditions	Channel	Conducted output power (dBm)	Antenna gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
Temperature (°C)						
T _N	CH-L	4.78	0.67	5.45	20.00	Pass
	CH-M	5.51	0.67	6.18		
	CH-H	5.17	0.67	5.84		
T _L	CH-L	4.71	0.67	5.38		
	CH-M	5.52	0.67	6.19		
	CH-H	5.13	0.67	5.80		
T _H	CH-L	4.73	0.67	5.40		
	CH-M	5.55	0.67	6.22		
	CH-H	5.17	0.67	5.84		

Test conditions	Channel	Conducted output power (dBm)	Antenna gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
Temperature (°C)						
T _N	CH-L	4.78	3.05	7.83	20.00	Pass
	CH-M	5.51	3.05	8.56		
	CH-H	5.17	3.05	8.22		
T _L	CH-L	4.71	3.05	7.76		
	CH-M	5.52	3.05	8.57		
	CH-H	5.13	3.05	8.18		
T _H	CH-L	4.73	3.05	7.78		
	CH-M	5.55	3.05	8.60		
	CH-H	5.17	3.05	8.22		

Note:

- 1) Burst quantity is great than 10.
- 2) EIRP (RF output power) =Conducted output power + Cable loss + Antenna gain

Appendix B: Power Spectral Density

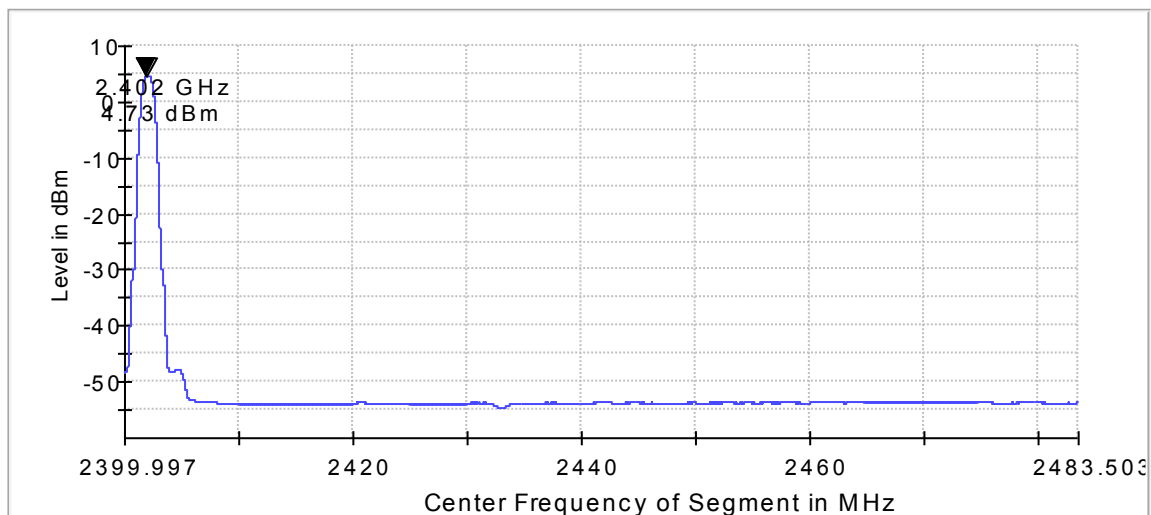
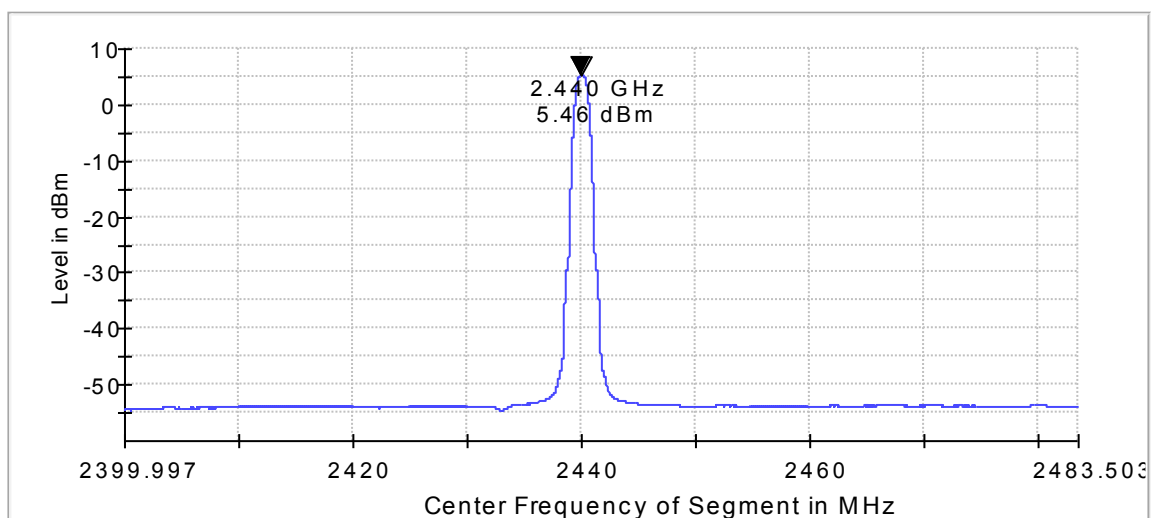
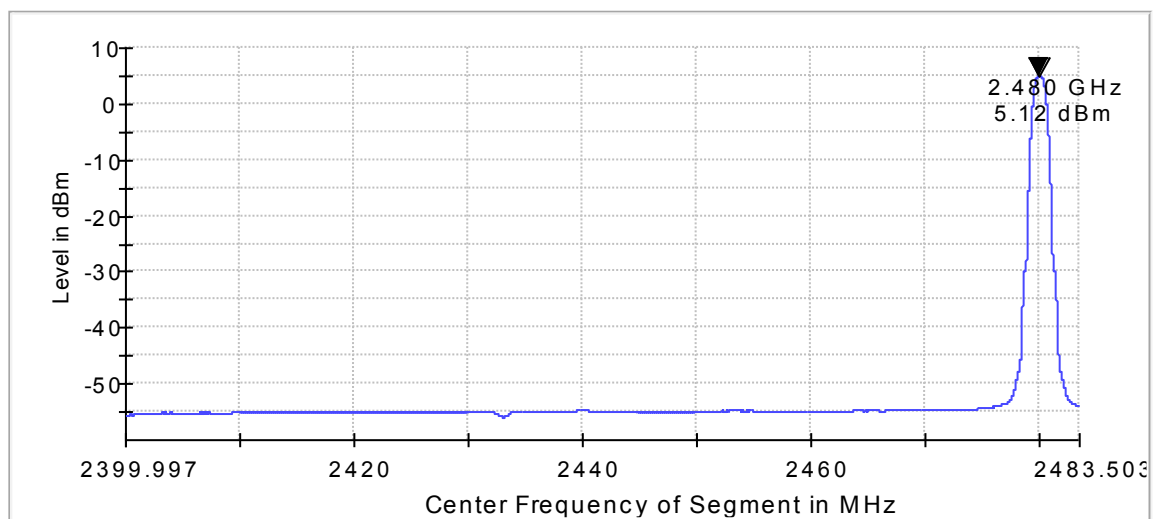
Channel	Conducted Power Spectral Density (dBm/MHz)	Antenna gain (dBi)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH-L	4.73	0.67	5.40	10.00	Pass
CH-M	5.46	0.67	6.13		
CH-H	5.12	0.67	5.79		

Channel	Conducted Power Spectral Density (dBm/MHz)	Antenna gain (dBi)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Result
CH-L	4.73	3.05	7.78	10.00	Pass
CH-M	5.46	3.05	8.51		
CH-H	5.12	3.05	8.17		

Note:

Power Spectral Density =Conducted power spectral density + Cable loss + Antenna gain

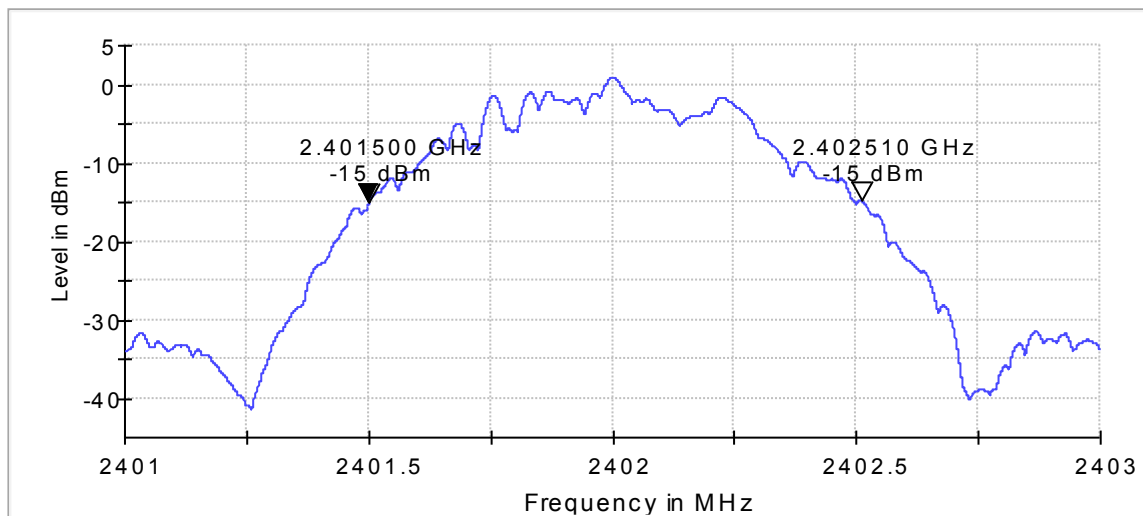
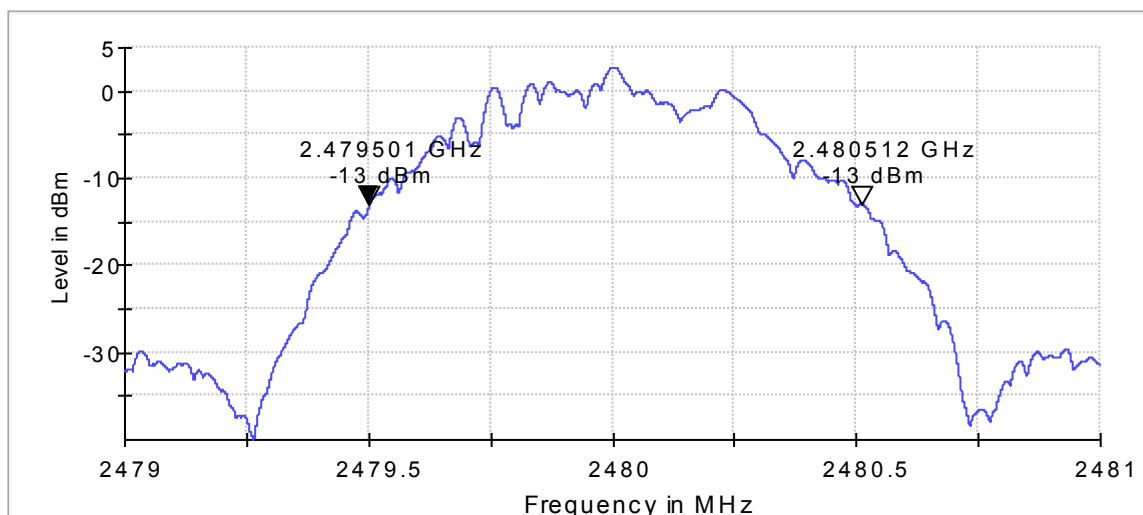
[Please refer to the test diagram](#)

CH-L**CH-M****CH-H**

Appendix C: Occupied Channel Bandwidth

Channel	Measured Frequency (MHz)		Limit (MHz)	Result
	F _{lower}	F _{higher}		
CH-L	2401.50	2402.51	2400.00~2483.50	Pass
CH-H	2479.50	2480.51		

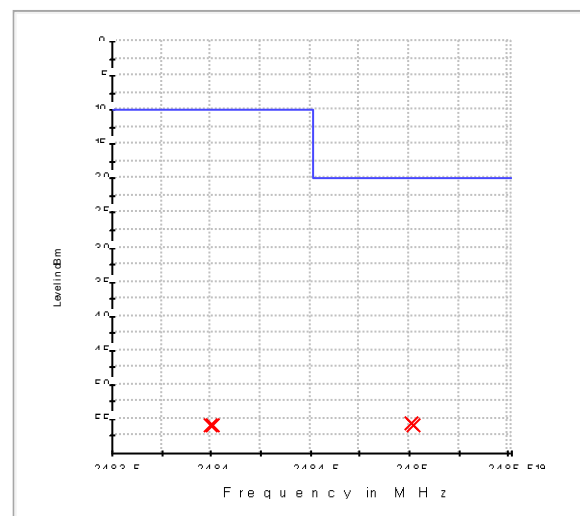
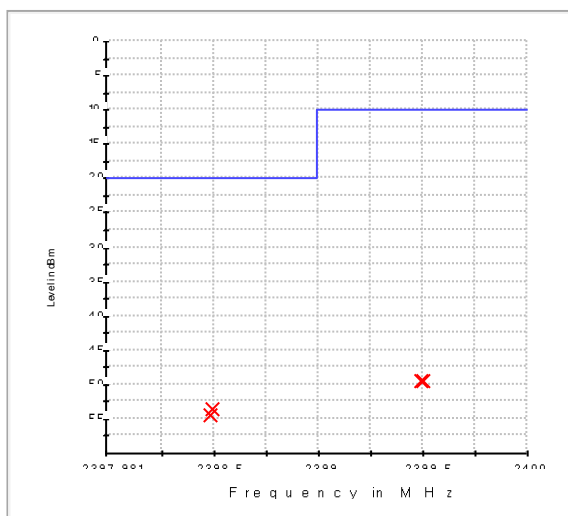
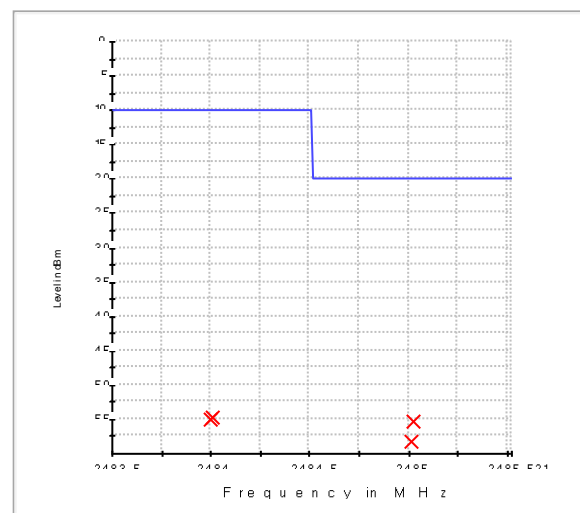
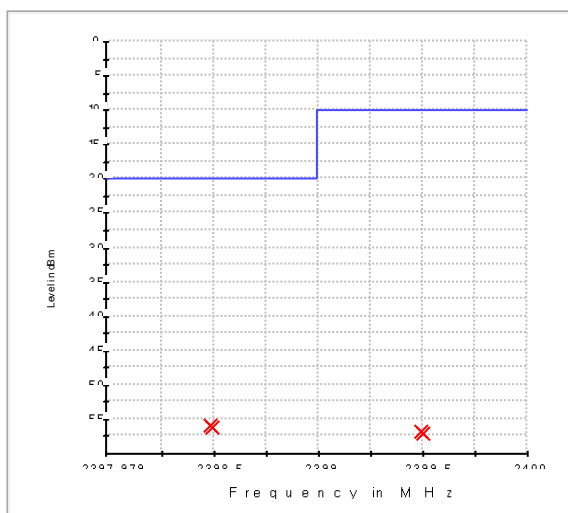
Please refer to the test diagram

CH-L**CH-H**

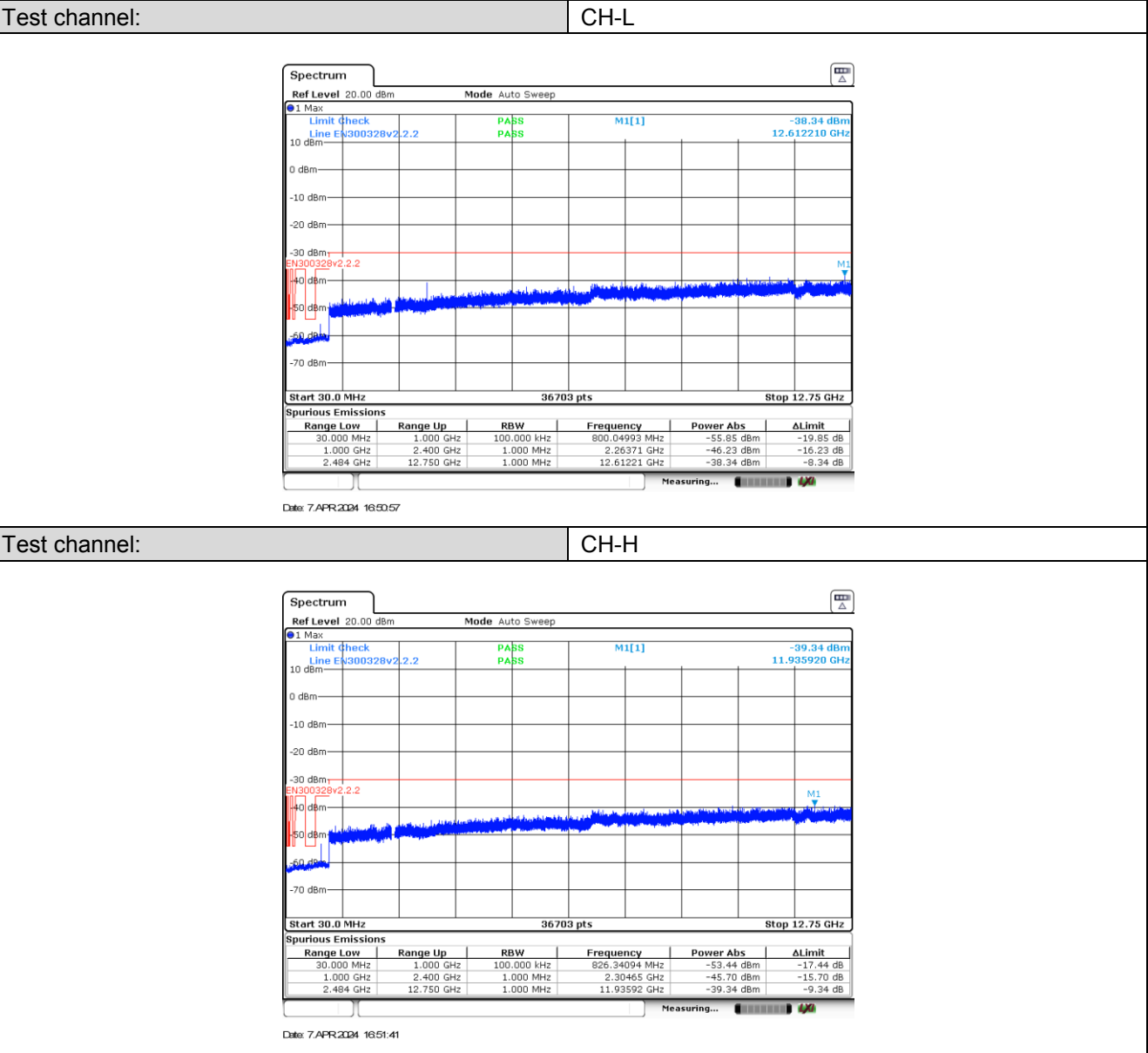
Appendix D: Transmitter Unwanted Emissions in the Out-of-band Domain

Frequency range (MHz)		Level (dBm)	Limit (dBm)	Result
Start	Stop			
2400-2OBW	2400-OBW	-53.67	<-20.00	Pass
2400-OBW	2400	-49.33	<-10.00	Pass
2483.5	2483.5+OBW	-54.70	<-10.00	Pass
2483.5+OBW	2483.5+2OBW	-55.21	<-20.00	Pass

Please refer to the test diagram

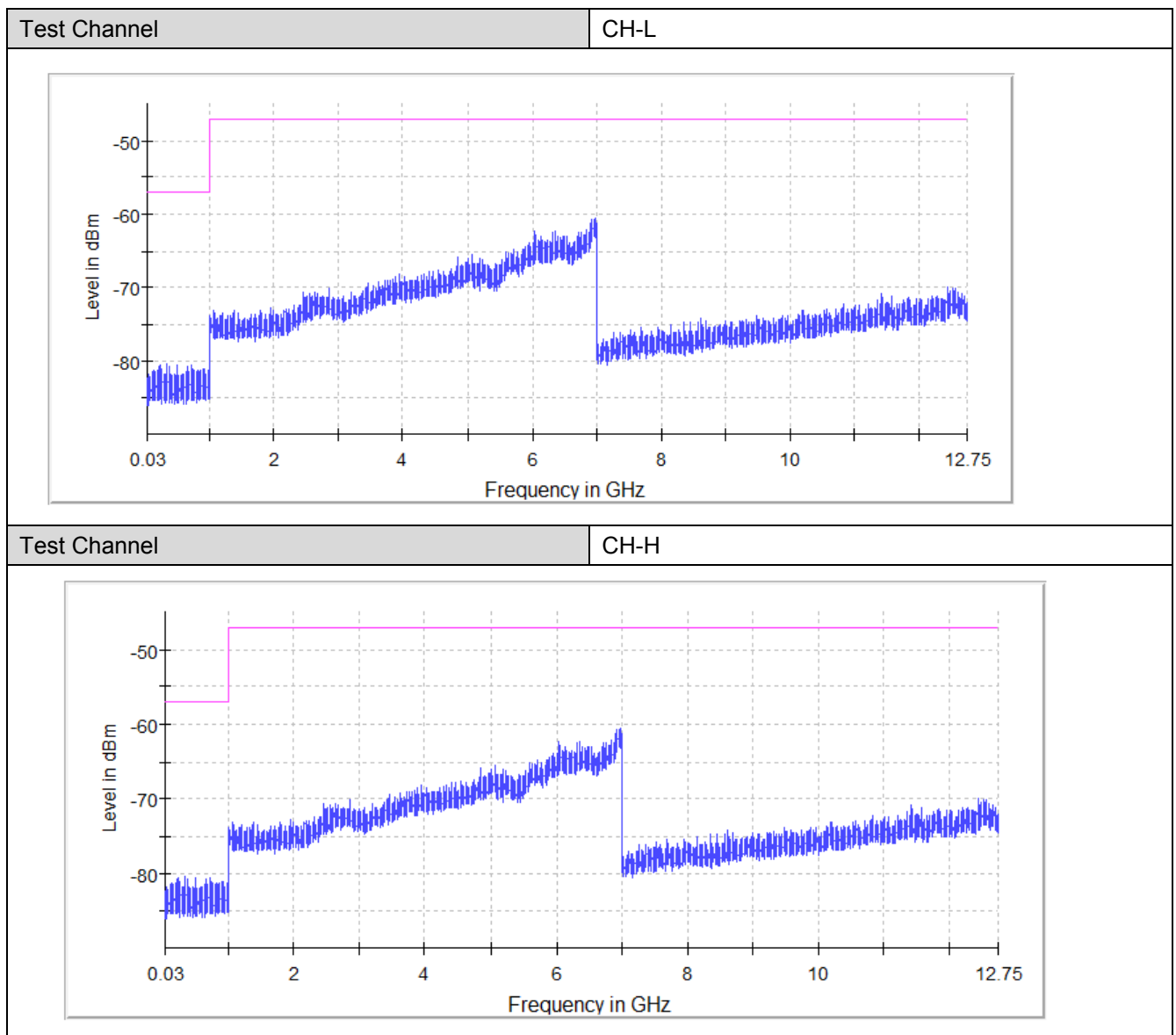
CH-L**CH-H**

Appendix E: Transmitter Unwanted Emissions in the Spurious Domain



Appendix F: Receiver Spurious Emissions

Have pretested all kind of modulation type, found the below modulation which it is worse case, so only show the test data of worse case on the test report.



Appendix G: Receiver blocking

Test channel	Wanted signal power [#] (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Test PER (%)	Limit (%)	Result
CH-L	-68.96	2300	-34.00	0.68	<10	Pass
		2380		0.76		
CH-H	-68.96	2504	-34.00	1.67	<10	Pass
		2584		1.25		

Note:

- The equipment belongs to Receiver Category 2
- #, wanted signal power level is as follow:

Receiver category	Wanted signal power level (dBm)	Blocking signal frequency (MHz)
1	$(-133 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -68 dBm whichever is less	2 380 2 504
	$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -74 dBm whichever is less	2 300, 2 330, 2 360 2 524, 2 584, 2 674
2	$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB})$ or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less	2 300, 2 380 2 504, 2 584
3	$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB})$ or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less	2 300, 2 380 2 504, 2 584

-----End of Report-----