



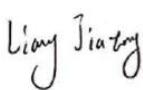
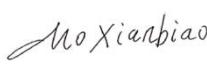
Test Report No.:
FCCSZ2024-0073-RF1

RF Test Report

FCC ID	:	VMIMR4KVDB
NAME OF SAMPLE	:	MaxRanger4K Video Doorbell
APPLICANT	:	Swann Communications U.S.A. Inc
CLASSIFICATION OF TEST	:	N/A

CVC Testing Technology (Shenzhen) Co., Ltd.



Applicant	Name : Swann Communications U.S.A. Inc Address : 12110 E. Slauson Avenue, Suite 4.Santa Fe Springs, CA, 90670,USA				
Manufacturer	Name : Shenzhen Infinova Limited Address : Infinova Building,Guan Lan High Tech Park,Huan Guan Road South. Longhua New District , Shenzhen Guangdong				
Equipment Under Test	Name :MaxRanger4K Video Doorbell Model/Type: NVW-MR4KVDB Additional Model: N/A Trade mark : swann Serial NO.:N/A Sample NO.: 4-1				
Date of Receipt.	2024.09.29	Date of Testing	2024.09.29~2025.04.17		
Test Specification		Test Result			
FCC Part 15, Subpart C (15.247)		PASS			
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied.				
	seal of CVC Issue Date: 2025.04.17				
Compiled by:  <u>Liang Jiatong</u> Name Signature	Reviewed by:  <u>Mo Xianbiao</u> Name Signature	Approved by:  <u>Dong Sanbi</u> Name Signature			
Other Aspects: NONE.					
Abbreviations:OK, Pass= passed		Fail = failed	N/A= not applicable		
EUT= equipment, sample(s) under tested					

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCCSZ2024-0073-RF1	Original release	2025.04.17



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	See section 3.1
15.247(d) 15.209	Radiated Emissions	PASS	See section 3.2
15.247(d)	Band Edge Measurement	PASS	Appendix E&F&G of FCCSZ2024-0073-RF1-A1
15.247(a)(2)	6dB bandwidth	PASS	Appendix A of FCCSZ2024-0073-RF1-A1
--	Occupied Bandwidth Measurement	Report only	Appendix B of FCCSZ2024-0073-RF1-A1
15.247(b)	Conducted Output power	PASS	Appendix C of FCCSZ2024-0073-RF1-A1
15.247(e)	Power Spectral Density	PASS	Appendix D of FCCSZ2024-0073-RF1-A1
15.203	Antenna Requirement	PASS	See section 3.7



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Antenna Port Conducted Test					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 30	104408	1 year	2025/4/28
#3Shielding room	MORI	443	N/A	3 year	2026/5/16
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168778	1 year	2025/5/24
Analog signal Generator (100kHz ~ 40GHz)	Rohde&Schwarz	SMB 100A	181934	1 year	2025/4/27
Vector signal Generator (9kHz ~ 6GHz)	Rohde&Schwarz	SGT 100A	111724	1 year	2025/4/27
RF control unit(BT/WiFi)	Tonscend	JS0806-2-8CH	20E8060261	1 year	2025/4/28
10db attenuator	JUNKE	SMA-10-18-N	250312743	1 year	2026/1/16
Temperature and humidity meter	/	C193561457	C193561457	1 year	2025/4/27
RSE Test - 3M Chamber					
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	1 year	2025/4/28
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2025/4/28
Antenna(30MHz~1001MHz)	SCHWARZBECK	VULB 9168	1133	1 year	2025/2/20
Loop antenna (8.3k~30MHz)	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2025/6/3
Horn antenna(1GHz-18GHz)	ETS	3117	227611	1 year	2025/2/4
Horn antenna(18GHz-40GHz)	QMS	QMS-00880	22051	1 year	2025/3/24
3m anechoic chamber	MORI	966	CS0300011	3 year	2026/5/18
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	1 year	2025/4/28
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	1 year	2025/4/28
Preamplifier(10kHz-1GHz)	Rohde&Schwarz	SCU-01F	100299	1 year	2025/4/28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2025/4/28
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100801	1 year	2025/4/28
Preamplifier(18Gz-40GHz)	Rohde&Schwarz	SCU-40A	101209	1 year	2025/4/28
Temperature and humidity meter	/	C193561517	C193561517	1 year	2025/4/27

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Measurement Uncertainty
1	Conducted emission test	+/-2.70 dB
2	Occupied Channel Bandwidth	$\pm 1.86 \%$
3	RF output power, conducted	$\pm 0.9 \text{ dB}$
4	Power Spectral Density, conducted	$\pm 0.8 \text{ dB}$
5	Unwanted Emissions, conducted	$\pm 2.7 \text{ dB}$
6	Radiated emission 9kHz-30MHz	+/-5.6 dB
	Radiated emission 30MHz-1GHz	+/-4.6 dB
	Radiated emissions 1GHz-18GHz	$\pm 4.8 \text{ dB}$

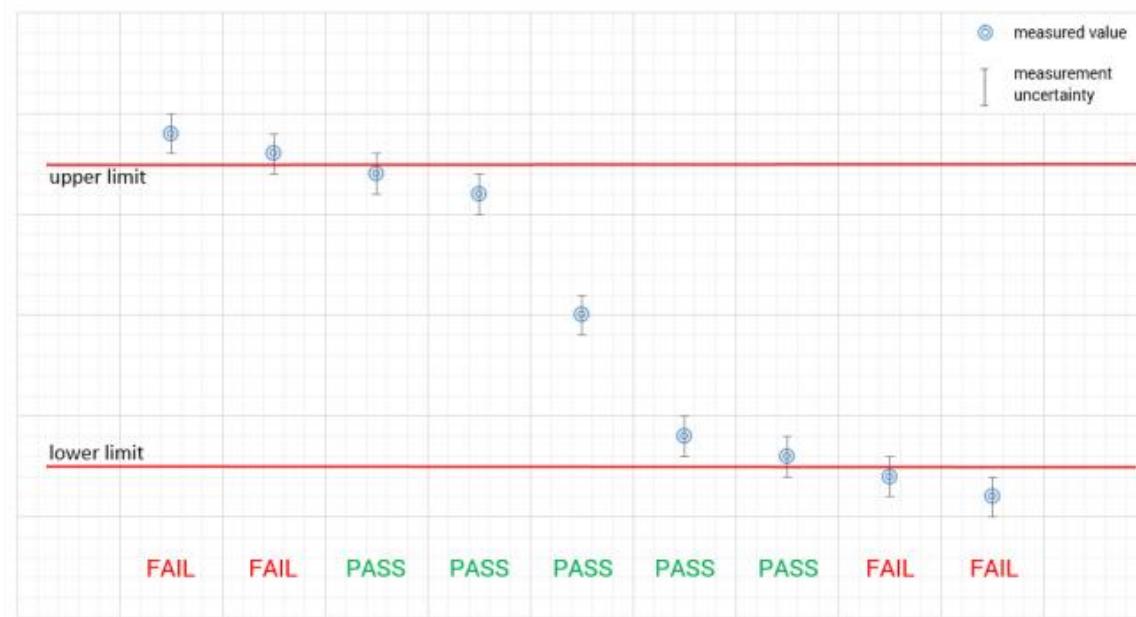
Remark: 95% Confidence Levels, k=2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed.

The measurement uncertainty is mentioned in this test report, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

measured value, measurement uncertainty, verdict





1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology (Shenzhen) Co., Ltd.

Address: No. 1301-14&16, Guanguang Road, Xinlan Community, Guanlan Subdistrict, Longhua District, Shenzhen, Guangdong, China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

FCC(Test firm designation number: CN1363)

IC(Test firm CAB identifier number: CN0137)

CNAS(Test firm designation number: L16091)



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	MaxRanger4K Video Doorbell
BRAND	swann
MODEL	NVW-MR4KVDB
ADDITIONAL MODEL	N/A
HVIN	NVW-MR4KVDB
POWER SUPPLY	DC 3.7V from Li-ion battery or DC 5V from USB host unit
MODULATION TYPE	OFDM
OPERATING FREQUENCY	903.5MHz~926.5MHz for 1Mbps; 905MHz~925MHz for 2Mbps; 906MHz~922MHz for 4Mbps; 908MHz~916MHz for 8Mbps;
NUMBER OF CHANNEL	See section 2.3
PEAK OUTPUT POWER	903.5MHz~926.5MHz for 21.90dBm (Maximum); 905MHz~925MHz for 20.46dBm (Maximum); 906MHz~922MHz for 20.46dBm (Maximum); 908MHz~916MHz for 21.48dBm (Maximum)
PEAK EIRP POWER	903.5MHz~926.5MHz for 22.98dBm (Maximum); 905MHz~925MHz for 21.54dBm (Maximum); 906MHz~922MHz for 21.54dBm (Maximum); 908MHz~916MHz for 22.56dBm (Maximum)
ANTENNA TYPE	FCP antenna, 1.08dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A
Remark:	<ol style="list-style-type: none">1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.3. EUT photo refer to the report (Report NO.: FCCSZ2023-0073-EUT).4. Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.5. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.

2.2 DESCRIPTION OF ACCESSORIES

N/A



2.3 OTHER INFORMATION

Operating frequency of each channel

WiFi HaLow 1Mbps					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	903.5	8	911.5	16	919.5
1	904.5	9	912.5	17	920.5
2	905.5	10	913.5	18	921.5
3	906.5	11	914.5	19	922.5
4	907.5	12	915.5	20	923.5
5	908.5	13	916.5	21	924.5
6	909.5	14	917.5	22	925.5
7	910.5	15	918.5	23	926.5

WiFi HaLow 2Mbps					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	905	4	913	6	921
1	907	5	915	7	923
2	909	6	917	8	925
3	911	7	919		

WiFi HaLow 4Mbps					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	906	2	914	4	922
1	910	3	918		

WiFi HaLow 8Mbps					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	908	1	916	/	/

1. The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.
2. By means of test software which provided by manufacture, the power levels during the tests were set

WiFi HaLow							
1Mbps		2Mbps		4Mbps		8Mbps	
FREQUENCY (MHz)	POWER SETTING						
903.5	default	905	default	906	default	908	default
915.5	default	917	default	918	default	916	default
926.5	default	925	default	922	default		



2.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	WiFi HaLow link

Where **RE<1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 23	0	OFDM	1Mbps

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 23	0,12,23	OFDM	1Mbps
A	0 to 8	0,6,8	OFDM	2Mbps
A	0 to 4	0,3,4	OFDM	4Mbps
A	0 to 1	0,1	OFDM	8Mbps



ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 23	0,12,23	OFDM	1Mbps
A	0 to 8	0,6,8	OFDM	2Mbps
A	0 to 4	0,3,4	OFDM	4Mbps
A	0 to 1	0,1	OFDM	8Mbps

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24deg. C, 54%RH	DC 3.7V From battery	Liu Yuan
RE≥1G	24deg. C, 54%RH	DC 3.7V From battery	Liu Yuan
PLC	24deg. C, 55%RH	DC 3.7V From battery	Liu Yuan
APCM	24deg. C, 55%RH	DC 3.7V From battery	Liu Yuan



2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, SUBPART C. SECTION 15.247
KDB 558074 D01 15.247 MEAS GUIDANCE V05R02
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment					
NO	Description	Brand	Model No.	Serial Number	Supplied by
1	Latop	Lenovo	V14	PFNXB1628023	Lab
2	10db attenuator	JUNKE	SMA-10-18-N	250312743	Lab
3	Network bridge	SWANN	900M-PNR	26347	Client
4	Adapter	HUAWEI	HW-200325CP0	N/A	Lab

Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

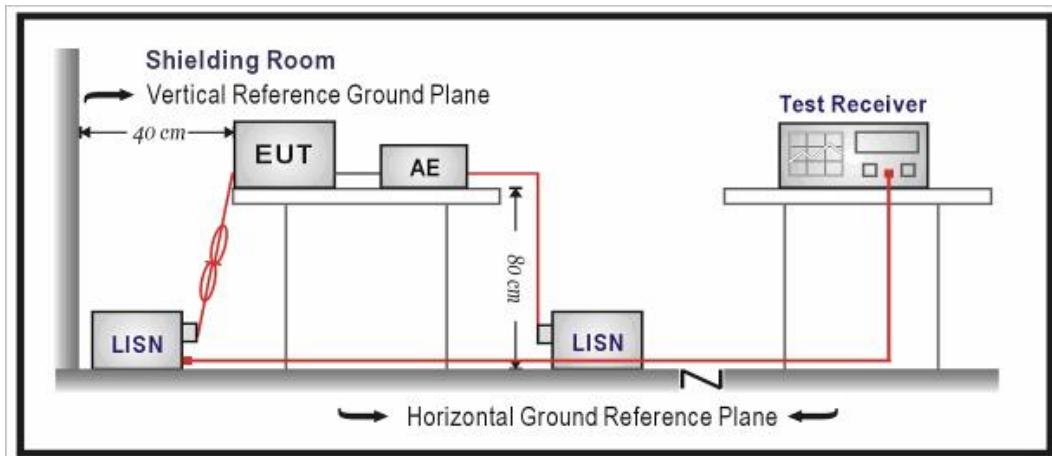
Frequency (MHz)	Conducted Limits(dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

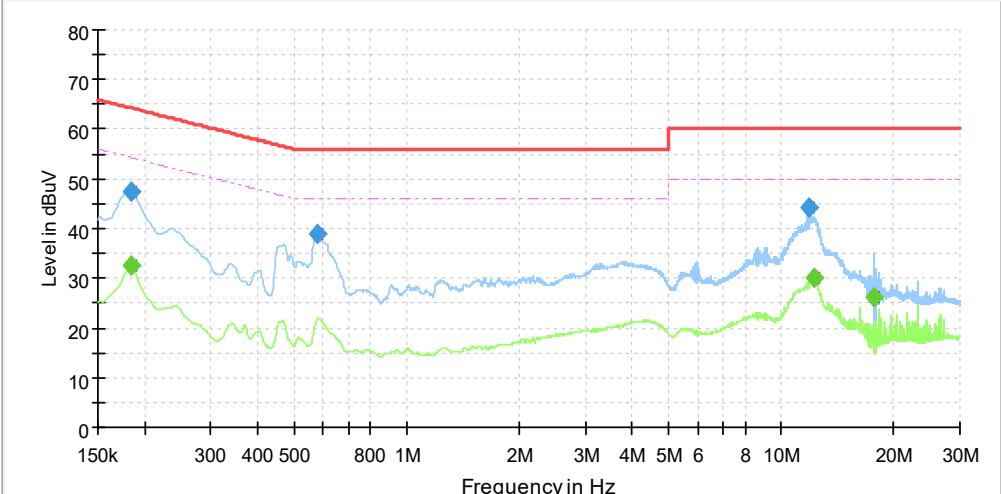
3.1.2 Measurement procedure

- a. 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 impedance stabilization network (LISN). The LISN provides a 50 ohm /50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) 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. The equipment under test shall be placed on a support of non-metallic material, the height of which shall be 1.5m above the ground,
- b. 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.
- c. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup

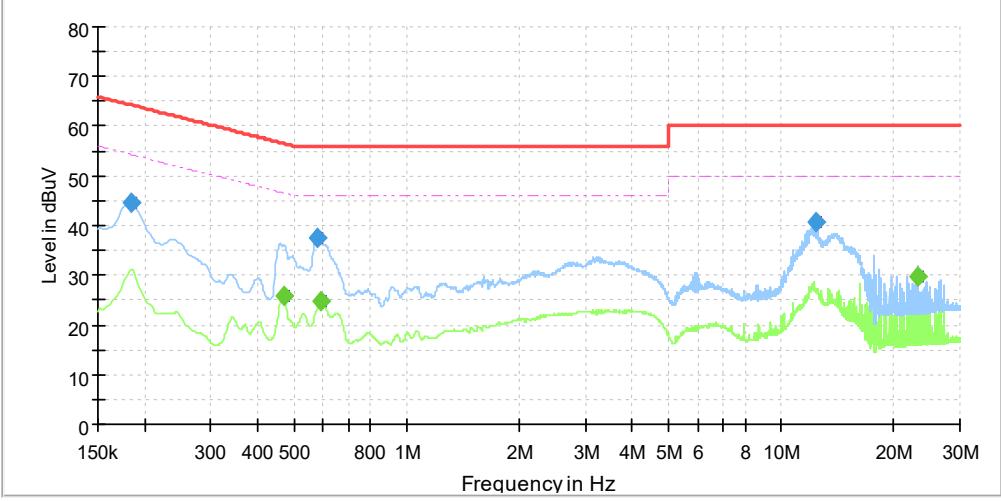


3.1.4 Test results

Test Mode	WiFi HaLow link	Frequency Range	150KHz ~ 30MHz																																																								
PHASE	Line (L)																																																										
																																																											
<table border="1"><thead><tr><th>NO</th><th>Frequency (MHz)</th><th>QuasiPeak (dBuV)</th><th>Average (dBuV)</th><th>Limit (dBuV)</th><th>Margin (dB)</th><th>Line</th><th>Corr.Factor (dB)</th></tr></thead><tbody><tr><td>1</td><td>0.184</td><td>47.3</td><td>---</td><td>64.3</td><td>17.1</td><td>L1</td><td>20.2</td></tr><tr><td>2</td><td>0.184</td><td>---</td><td>32.7</td><td>54.3</td><td>21.6</td><td>L1</td><td>20.2</td></tr><tr><td>3</td><td>0.575</td><td>38.8</td><td>---</td><td>56.0</td><td>17.2</td><td>L1</td><td>20.3</td></tr><tr><td>4</td><td>11.816</td><td>44.2</td><td>---</td><td>60.0</td><td>15.8</td><td>L1</td><td>23.2</td></tr><tr><td>5</td><td>12.199</td><td>---</td><td>30.1</td><td>50.0</td><td>19.9</td><td>L1</td><td>23.2</td></tr><tr><td>6</td><td>17.696</td><td>---</td><td>26.2</td><td>50.0</td><td>23.8</td><td>L1</td><td>23.3</td></tr></tbody></table>				NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)	1	0.184	47.3	---	64.3	17.1	L1	20.2	2	0.184	---	32.7	54.3	21.6	L1	20.2	3	0.575	38.8	---	56.0	17.2	L1	20.3	4	11.816	44.2	---	60.0	15.8	L1	23.2	5	12.199	---	30.1	50.0	19.9	L1	23.2	6	17.696	---	26.2	50.0	23.8	L1	23.3
NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)																																																				
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6	17.696	---	26.2	50.0	23.8	L1	23.3																																																				

Remark: The emission levels of other frequencies were very low against the limit.



Test Mode	WiFi HaLow link	Frequency Range	150KHz ~ 30MHz																																																								
PHASE	Line (N)																																																										
																																																											
<table border="1"><thead><tr><th>NO</th><th>Frequency (MHz)</th><th>QuasiPeak (dBuV)</th><th>Average (dBuV)</th><th>Limit (dBuV)</th><th>Margin (dB)</th><th>Line</th><th>Corr.Factor (dB)</th></tr></thead><tbody><tr><td>1</td><td>0.184</td><td>44.5</td><td>---</td><td>64.3</td><td>19.8</td><td>N</td><td>20.2</td></tr><tr><td>2</td><td>0.470</td><td>---</td><td>25.7</td><td>46.5</td><td>20.8</td><td>N</td><td>20.2</td></tr><tr><td>3</td><td>0.578</td><td>37.5</td><td>---</td><td>56.0</td><td>18.5</td><td>N</td><td>20.2</td></tr><tr><td>4</td><td>0.591</td><td>---</td><td>24.8</td><td>46.0</td><td>21.2</td><td>N</td><td>20.2</td></tr><tr><td>5</td><td>12.352</td><td>40.7</td><td>---</td><td>60.0</td><td>19.3</td><td>N</td><td>23.3</td></tr><tr><td>6</td><td>23.132</td><td>---</td><td>29.6</td><td>50.0</td><td>20.4</td><td>N</td><td>23.5</td></tr></tbody></table>				NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)	1	0.184	44.5	---	64.3	19.8	N	20.2	2	0.470	---	25.7	46.5	20.8	N	20.2	3	0.578	37.5	---	56.0	18.5	N	20.2	4	0.591	---	24.8	46.0	21.2	N	20.2	5	12.352	40.7	---	60.0	19.3	N	23.3	6	23.132	---	29.6	50.0	20.4	N	23.5
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6	23.132	---	29.6	50.0	20.4	N	23.5																																																				

Remark: The emission levels of other frequencies were very low against the limit.



3.2 RADIATED EMISSION AND BANEDGE MEASUREMENT

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/Meter)	MEASUREMENT DISTANCE (Meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Measurement procedure

- a Below 30MHz, If the EUT is a tabletop system, it is placed on a table with 0.8 m height. If the EUT is a floor standing device, it is placed directly on the turn table.
- b Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4. The AC power port of the EUT (if available) is connected to a power outlet below the turntable. Measurement distance is 3 m (see ANSI C 63.4)-see test details. EUT is set into operation. The turntable rotates from 0° to 315° using 45° steps. The antenna height is 1 m. At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions. Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- c Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT) The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4). Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.
- d The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- e The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- f For below 1GHz was used biolog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.



- g For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- h The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- i For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- j During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

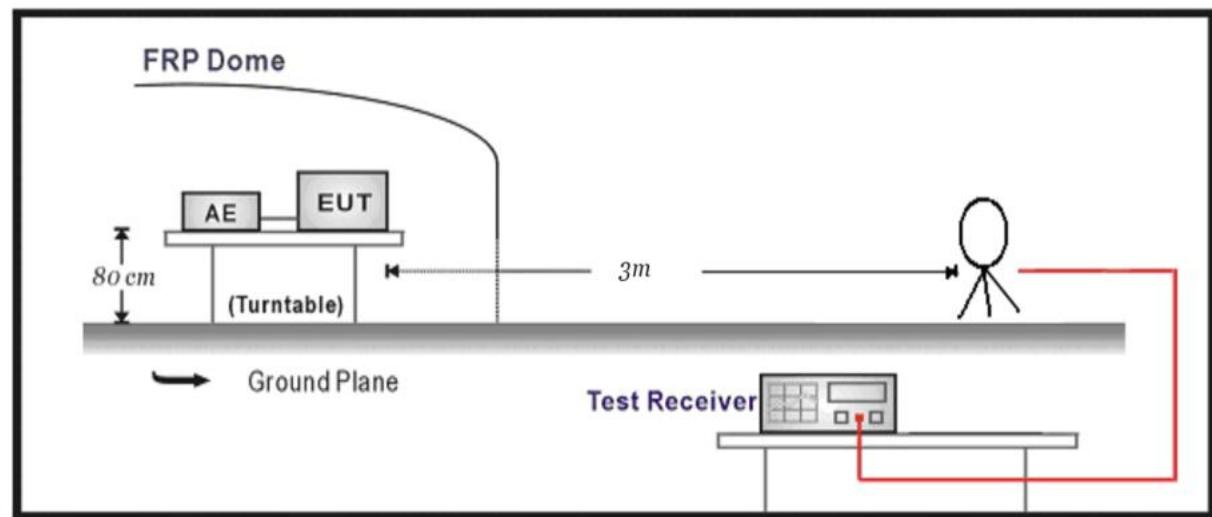
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3 x RBW
4. Detector = Peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize
8. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
9. All modes of operation were investigated and the worst-case emissions are reported.
10. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

Tabel 1-RBW

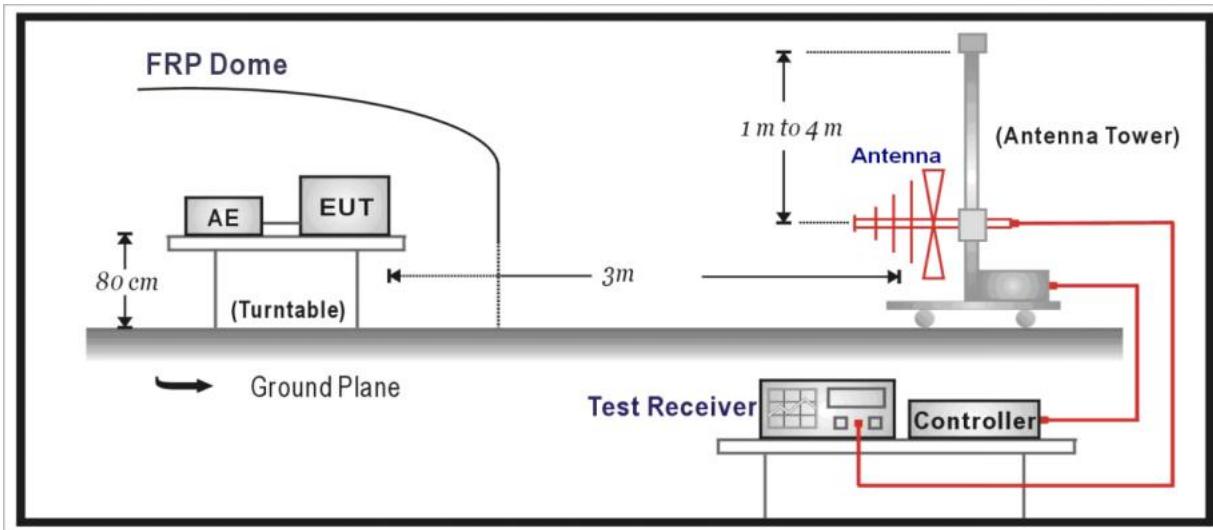
Frequency	RBW
9~90kHz	1MHz
90~110kHz	200Hz
110~490kHz	1MHz
0.49~30MHz	9kHz
30~1000MHz	120 kHz
>1000MHz	1MHz

3.2.3 Test setup

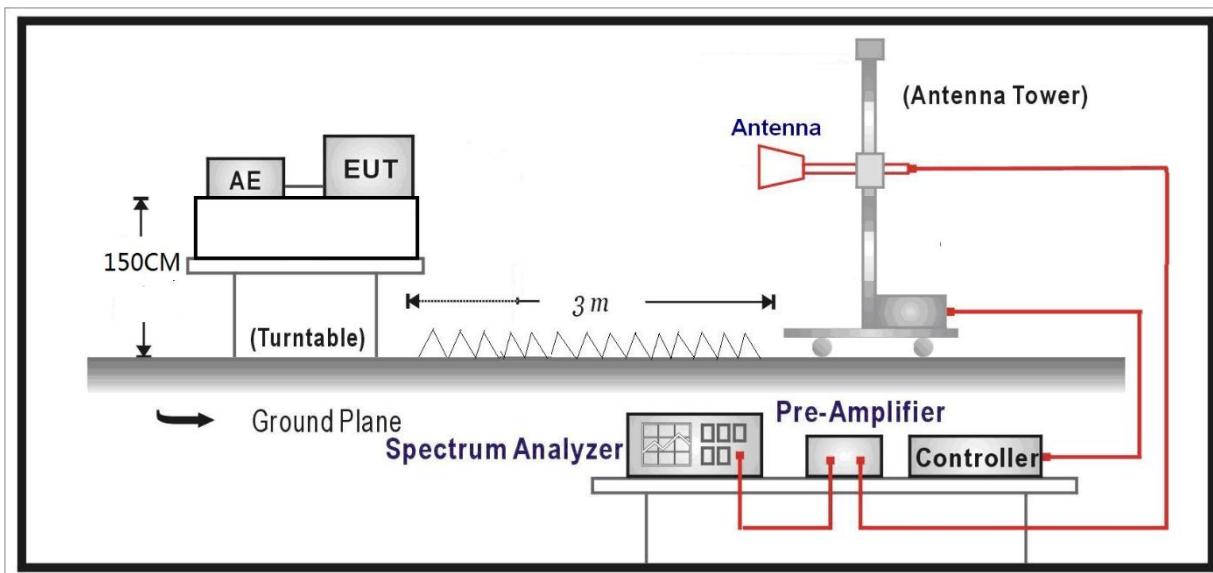
Below 30MHz Test Setup:



Below 1GHz Test Setup:

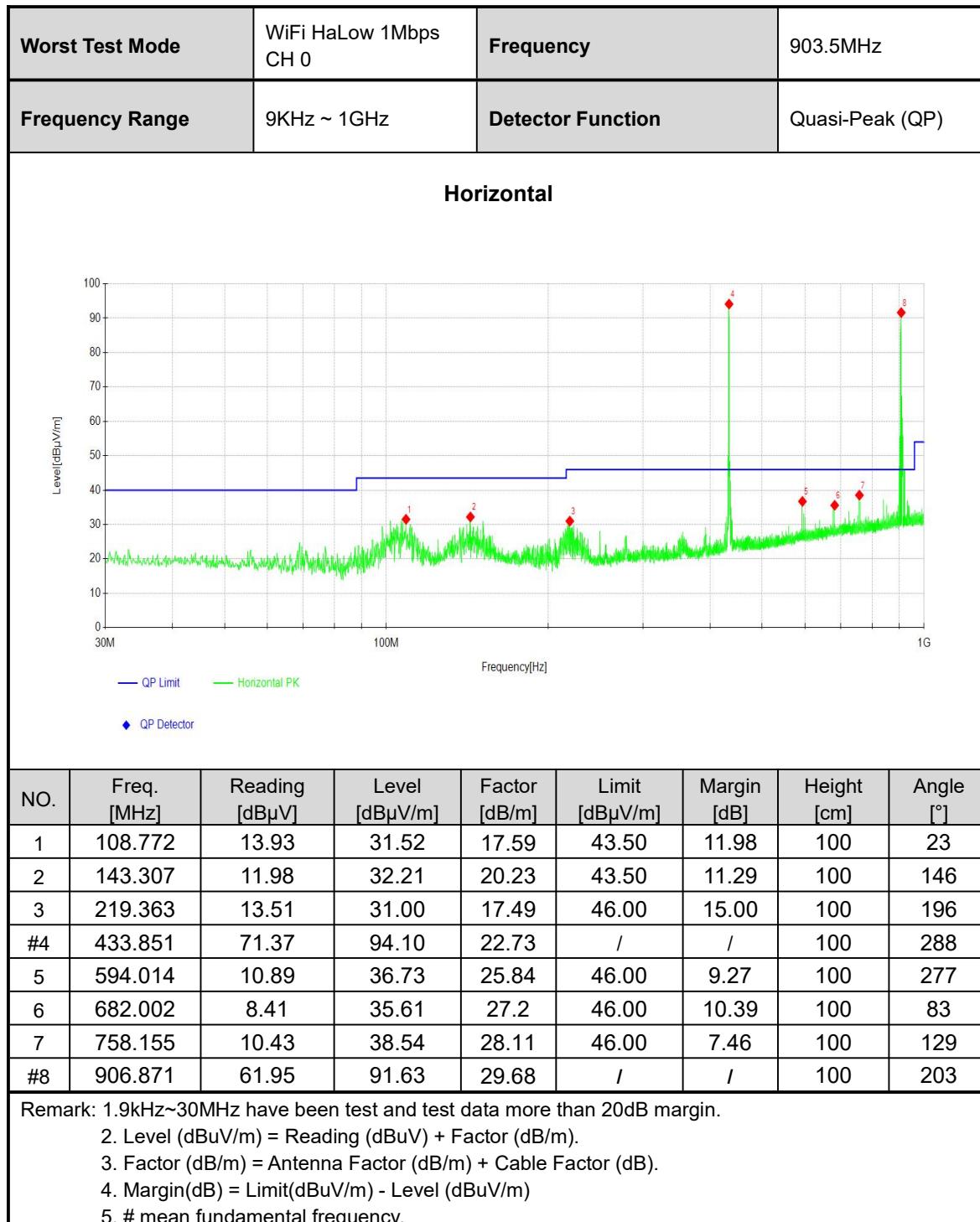


Above 1GHz Test Setup:

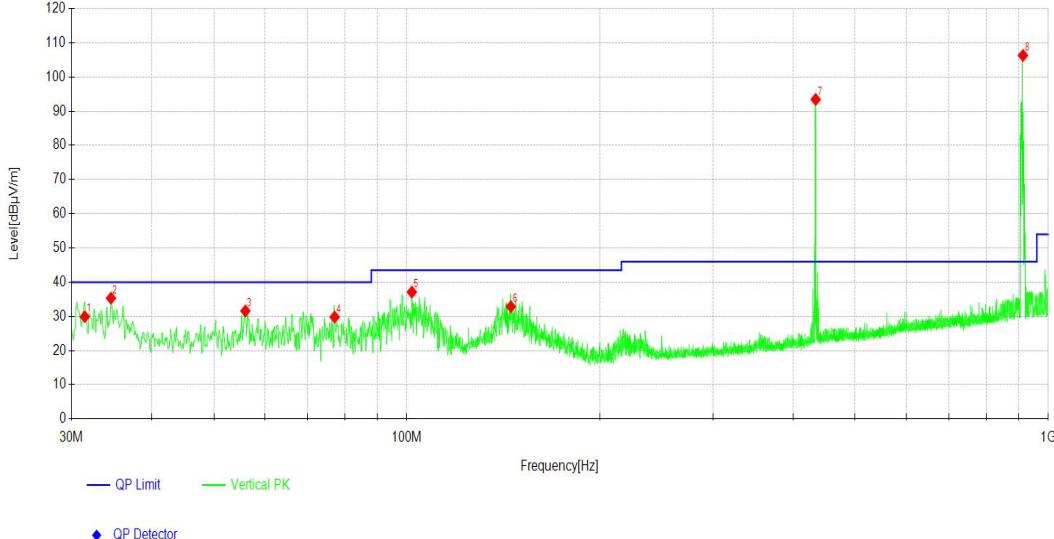


3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:





Worst Test Mode	WiFi HaLow 1Mbps CH 0	Frequency	903.5MHz					
Frequency Range	9KHz ~ 1GHz	Detector Function	Quasi-Peak (QP)					
Vertical								
								
NO.	Freq. [MHz]	Reading [dB μ V]	Level [dB μ V/m]	Factor [dB/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	31.455	10.50	29.9	19.40	40.00	5.75	100	152
2	34.559	15.69	35.32	19.63	40.00	4.68	100	159
3	55.999	12.58	31.59	19.01	40.00	8.41	100	354
4	77.147	13.87	29.82	15.95	40.00	6.81	100	254
5	101.787	20.17	37.11	16.94	43.50	6.39	100	141
6	145.248	12.54	32.86	20.32	43.50	6.99	100	42
#7	433.851	70.71	93.44	22.73	/	/	100	336
#8	913.273	76.52	106.31	29.79	/	/	100	251
Remark: 1.9kHz~30MHz have been test and test data more than 20dB margin. 2. Level (dB μ V/m) = Reading (dB μ V) + Factor (dB/m). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit(dB μ V/m) - Level (dB μ V/m) 5. # mean fundamental frequency.								



ABOVE 1GHz DATA

All modes have been tested, and the worst-case was recorded in this report.

Channel		WiFi HaLow 1Mbps CH 0		Frequency		903.5MHz			
Frequency Range		1GHz~9.3G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dB μ V]	Factor [dB/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1807.00	42.06	7.74	49.80	54.00	4.20	400	81	AV
2	1807.00	55.19	7.74	62.93	74.00	11.07	100	81	PK
3	2710.50	45.21	11.23	56.44	74.00	17.56	400	218	PK
4	2710.50	35.84	11.23	47.07	54.00	6.93	400	60	AV
5	3614.00	34.72	7.24	41.96	54.00	12.04	300	209	AV
6	3614.00	42.96	7.24	50.20	74.00	23.80	300	320	PK
Vertical									
NO	Freq. [MHz]	Reading [dB μ V]	Factor [dB/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	1807.00	39.68	7.74	47.42	54.00	6.58	300	196	AV
2	1807.00	48.89	7.74	56.63	74.00	17.37	200	262	PK
3	2710.50	44.15	11.23	55.38	74.00	18.62	400	39	PK
4	2710.50	35.87	11.23	47.10	54.00	6.90	300	39	AV
5	3614.00	34.78	7.24	42.02	54.00	11.98	400	171	AV
6	3614.00	43.78	7.24	51.02	74.00	22.98	100	238	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dB μ V/m) = Reading (dB μ V) + Factor (dB/m). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit(dB μ V/m) - Level (dB μ V/m)									

3.3 CONDUCTED OUTPUT POWER

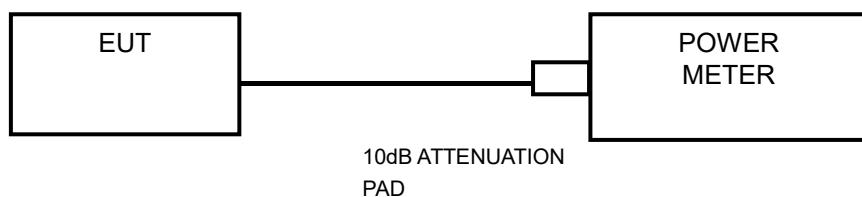
3.3.1 Limits

For DTSS employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W.

3.3.2 Measurement procedure

1. The EUT runs on battery power to allow it to function properly.
2. Connect the antenna port to the power meter port with an RF wire.
3. Let the EUT continuously transmit in a certain channel at a fixed frequency.
4. Use the power meter to measure a peak power, and then use the power meter to measure an AV power.
5. AV power=AV Reading+AV(Duty Cycle factor)

3.3.3 Test setup



3.4 POWER SPECTRAL DENSITY MEASUREMENT

3.4.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.4.2 Measurement procedure

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set RBW to: 3KHz
- d. Set VBW $\geq 3 \times$ RBW.
- e. Detector = peak
- f. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- g. Sweep time = auto couple.
- h. Use the peak marker function to determine the maximum amplitude level.

3.4.3 Test setup



3.5 OUT OF BAND EMISSION MEASUREMENT

3.5.1 Limits

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.5.2 Measurement procedure

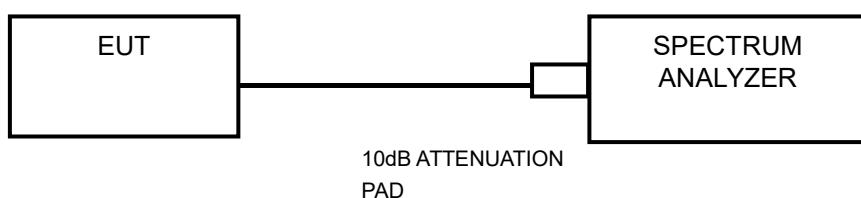
Measurement Procedure -Reference Level

- a. Set the RBW = 100 kHz.
- b. Set the VBW \geq 300 kHz.
- c. Detector = peak.
- d. Sweep time = auto couple.
- e. Trace mode = max hold.
- f. Allow trace to fully stabilize.
- g. Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

- a. Set RBW = 100 kHz.
- b. Set VBW \geq 300 kHz.
- c. Set span to encompass the spectrum to be examined
- d. Detector = peak.
- e. Trace Mode = max hold.
- f. Sweep = auto couple.

3.5.3 Test setup



3.6 OCCUPIED BANDWIDTH MEASUREMENT

3.6.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth. below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

3.6.2 TEST SETUP





3.7 ANTENNA REQUIREMENT

3.7.1 Limits of frequency stability

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

3.7.2 Antenna Anti-Replacement Construction

The antenna used for this product is FCP antenna and that no antenna other than that furnished by the responsible party shall be used with the device.

3.7.3 Antenna Gain

The maximum peak gain of the transmit antenna is 1.08 dBi.



4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).



5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

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



Important

- (1) The test report is invalid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

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