TEST REPORT

Test report
On Behalf of
Shenzhen SEI Robotics Co., Ltd.
For
4K HDMI dongle

FCC Model No.: IPA1104HDW-01-400-05T-TiVo, SN8BABX(X=A TO Z),IPA1104HDW 01 400 09T TIVO
ISED Model No./HVIN: IPA1104HDW-01-400-05T-TiVo, SN8BABB

FCC ID: 2AOVU-IPA1104HDW
IC: 25669-IPA1104HDW

Prepared for :	**Shenzhen SEI Robotics Co., Ltd.** 501, Block A, Productivity Building #5 Hi-tech Middle 2nd Road, Nanshan District, Shenzhen, China
Prepared By :	**Shenzhen Tongzhou Testing Co.,Ltd** **1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China**
Date of Test:	**Jun.16, 2020~ Jul.07, 2020**
Date of Report:	**Jul.09, 2020**
Report Number:	**TZ200701470-E2**

The test report apply only to the specific sample(s) tested under stated test conditions
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TEST RESULT CERTIFICATION

Applicant's name ..... :	**Shenzhen SEI Robotics Co., Ltd.**
Address..... :	501, Block A, Productivity Building #5 Hi-tech Middle 2nd Road, Nanshan District, Shenzhen, China
Manufacture's Name ..... :	**LIAN TECH Co., Ltd.**
Address..... :	Workshop CN-05-06, lot Cn-05,Van Trung Industrial Park, Viet Yen District, Bac Giang Province,Vietnam
Product description	
Trade Mark ..... :	eSTREAM4K
Product name..... :	4K HDMI dongle
ISED Model No./HVIN..... :	Refer to page 1
Standards ..... :	FCC Rules and Regulations Part 15 Subpart E Section 15.407 RSS 247 Issue 2, February 2017

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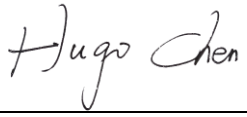
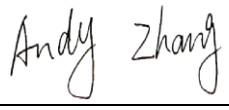
Date of Test ..... :	
Date (s) of performance of tests ..... :	**Jun.16, 2020~ Jul.07, 2020**
Date of Issue ..... :	**Jul.09, 2020**
Test Result ..... :	**Pass**

Testing Engineer : 

(Anna Hu)

Technical Manager : 

(Hugo Chen)

Authorized Signatory : 

(Andy Zhang)

Revision History

Revision	Issue Date	Revisions	Revised By
000	Jul.09, 2020	Initial Issue	Andy Zhang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	4K HDMI dongle
ISED Model No./HVIN	:	Refer to page 1
Model Declaration	:	All the same except for the shape and color of cover.
Test Model	:	SN8BABB
Power Supply	:	DC 5V by adapter
Hardware version	:	SMB.195.07
Software version	:	android9.0
Firmware/FVIN	:	V9.0-4.5.0
Bluetooth Version	:	V5.0+EDR
Channel Number	:	79 Channels for Bluetooth EDR(DSS) 40 Channels for Bluetooth BLE(DTS)
Modulation Technology	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth EDR(DSS) GFSK for Bluetooth BLE(DTS)
Data Rates	:	Bluetooth EDR(DSS): 1~3Mbps;Bluetooth BLE(DTS): 1Mbps
WLAN	:	Supported IEEE 802.11a/b/g/n/ac
WLAN FCC Operation Frequency	:	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz / 5180-5240MHz / 5260-5320MHz/5500 – 5720MHz/5745-5825MHz IEEE 802.11n HT40: 5190-5230MHz / 5270 – 5310 MHz/5510 – 5710MHz/5755-5795MHz IEEE 802.11a: 5180-5240MHz / 5260-5320MHz/5500 – 5720MHz/5745-5825MHz IEEE 802.11ac VHT20: 5180-5240MHz / 5260-5320MHz/5500 – 5720MHz/5745-5825MHz IEEE 802.11ac VHT40: 5190-5230MHz / 5270 – 5310 MHz/5510 – 5710MHz/5755-5795MHz IEEE 802.11ac VHT80: 5210MHz /5530MHz/5690MHz/5775MHz
WLAN Channel Number	:	11 Channels for 2412-2462MHz(IEEE 802.11b/g/n HT20) 4 Channels for 5180-5240MHz (IEEE 802.11a/ac VHT20/n HT20) 2 Channels for 5190-5230MHz (IEEE 802.11ac VHT40/n HT40) 1 Channels for 5210MHz (IEEE 802.11ac VHT80) 4 Channels for 5260-5320MHz (IEEE 802.11a/ac VHT20/n HT20) 2 Channels for 5270-5310MHz (IEEE 802.11ac VHT40/n HT40) 1 Channels for 5290MHz (IEEE 802.11ac VHT80) 12 Channels for 5500-5720MHz (IEEE 802.11a/ac VHT20/n HT20) 6 Channels for 5510-5710MHz (IEEE 802.11ac VHT40/n HT40) 3 Channels for 5530-5690MHz (IEEE 802.11ac VHT80) 5 Channels for 5745-5825MHz(IEEE 802.11a/ac VHT20/n HT20) 2 Channels for 5755-5795MHz(IEEE 802.11ac VHT40/n HT40) 1 Channels for 5775MHz(IEEE 802.11ac VHT80)
WLAN Modulation Technology	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)

		IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Type And Gain	:	Two Antennas: Internal Antenna 1: 2.5 dBi(Max.), for TX/RX (WLAN 2.4G Band/Bluetooth), 2.56 dBi(Max.), for TX/RX (WLAN 5.2G/UNII-2A Band) 3.02 dBi(Max.), for TX/RX (WLAN UNII-2C/5.8G Band) Internal Antenna 2: 3.99 dBi(Max.), for TX/RX (WLAN 2.4G Band), 2.73 dBi(Max.), for TX/RX (WLAN 5.2G/UNII-2A Band) 2.82 dBi(Max.), for TX/RX (WLAN UNII-2C/5.8G Band)
Directional Gain	:	6.32 dBi for MIMO(2.4G Band) 5.66 dBi for MIMO(5.2G Band/UNII-2A) 5.93 dBi for MIMO(UNII-2C/5.8G Band)

Note1: Antenna position refer to EUT Photos.
Note2: 5600-5650MHz is forbidden in Canada as this restriction is for the protection of Environment Canada's weather radars operating in this band.

1.2 EUT configuration

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

★supplied by the lab ☆supplied by the manufacturer

	Manufacturer	Description	Model	Serial Number	Certificate
☆	Aohai	Adapter	A18A-050100U-US2	N/A	N/A
★	DELL	Computer	Vostro	32ND5T2	N/A
★	AOC	Monitor	280LM00003	N/A	N/A

1.3. External I/O Cable

I/O Port Description	Quantity	Cable
USB Port	1	1m, unshielded
HDMI Port	1	N/A

1.4. Description of Test Facility

FCC
Designation Number: CN1275
Test Firm Registration Number: 167722
Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission
list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA
Certificate Number: 5463.01
Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC
ISED#: 22033
CAB identifier: CN0099
Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Shenzhen Tongzhou Testing Co.,Ltd quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.08dB	(1)
		30MHz~1000MHz	±4.42dB	(1)
		1GHz~40GHz	±4.06dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±2.23dB	(1)

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

1.7. Description of Test Modes

The EUT has been tested under operating condition.

EUT was set to widest bandwidth(80MHz) and connect to master device.

Antenna & Bandwidth

Antenna	Single (Port.1)			Two (Port.1 + Port.2)		
Bandwidth Mode	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
IEEE 802.11a	☐	☐	☐	☑	☐	☐
IEEE 802.11n	☐	☐	☐	☑	☑	☐
IEEE 802.11ac	☐	☐	☐	☑	☑	☑

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen Tongzhou Testing Co.,Ltd

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the normal mode to fix the that was for the purpose of the measurements of DFS function.

According to FCC's request,

KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

KDB 905462 D03 Client Without DFS New Rules v01r02

KDB 905462 D04 Operational Modes for DFS Testing New Rules v01

are required to be used for this kind of FCC 15.407 UII device.
According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E and IC RSS-247.

2.3. General Test Procedures

Detail in each test procedure

2.4. Test Sample

The application provides 1 sample to meet requirement;

Sample ID	Description
TZ200501367–2#	Normal Sample

2.5. Max E.I.R.P

TestMode	Antenna	Channel	Result[dBm]	Antenna Gain[dBi]	Max E.I.R.P
11A	Ant1	5260	11.29	2.56	13.85
	Ant2	5260	6.69	2.73	9.42
	Ant1	5280	10.84	2.56	13.4
	Ant2	5280	6.66	2.73	9.39
	Ant1	5320	10.14	2.56	12.7
	Ant2	5320	7.46	2.73	10.19
	Ant1	5500	6.33	3.02	9.35
	Ant2	5500	5.27	2.82	8.09
	Ant1	5580	4.21	3.02	7.23
	Ant2	5580	3.3	2.82	6.12
	Ant1	5700	5.36	3.02	8.38
	Ant2	5700	3.56	2.82	6.38
	Ant1	5720_UNII-2C	4.59	3.02	7.61
	Ant2	5720_UNII-2C	2.31	2.82	5.13
	Ant1	5720_UNII-3	-2.41	3.02	0.61
	Ant2	5720_UNII-3	-4.18	2.82	-1.36
11N20MIMO	Ant1	5260	11.76	2.56	14.32
	Ant2	5260	7.27	2.73	10
	total	5260	13.1	5.66	18.76
	Ant1	5280	11.43	2.56	13.99
	Ant2	5280	6.97	2.73	9.7
	total	5280	12.8	5.66	18.46
	Ant1	5320	10.67	2.56	13.23
	Ant2	5320	8.04	2.73	10.77
	total	5320	12.6	5.66	18.26
	Ant1	5500	6.71	3.02	9.73
	Ant2	5500	5.79	2.82	8.61
	total	5500	9.3	5.93	15.23
	Ant1	5580	4.63	3.02	7.65
	Ant2	5580	3.87	2.82	6.69
	total	5580	7.3	5.93	13.23
	Ant1	5700	6.02	3.02	9.04
	Ant2	5700	4.06	2.82	6.88
	total	5700	8.2	5.93	14.13
	Ant1	5720_UNII-2C	4.85	3.02	7.87
	Ant2	5720_UNII-2C	2.52	2.82	5.34
	total	5720_UNII-2C	6.8	5.93	12.73

TestMode	Antenna	Channel	Result[dBm]	Antenna Gain[dBi]	Max E.I.R.P
	Ant1	5720_UNII-3	-0.54	3.02	2.48
	Ant2	5720_UNII-3	-2.26	2.82	0.56
	total	5720_UNII-3	1.7	5.93	7.63
11N40MIMO	Ant1	5270	10.63	2.56	13.19
	Ant2	5270	6.2	2.73	8.93
	total	5270	12	5.66	17.66
	Ant1	5310	9.77	2.56	12.33
	Ant2	5310	6.5	2.73	9.23
	total	5310	11.4	5.66	17.06
	Ant1	5510	5.76	3.02	8.78
	Ant2	5510	4.38	2.82	7.2
	total	5510	8.1	5.93	14.03
	Ant1	5550	5.53	3.02	8.55
	Ant2	5550	3.29	2.82	6.11
	total	5550	7.6	5.93	13.53
	Ant1	5670	4.66	3.02	7.68
	Ant2	5670	2.45	2.82	5.27
	total	5670	6.7	5.93	12.63
	Ant1	5710_UNII-2C	4.82	3.02	7.84
	Ant2	5710_UNII-2C	2.54	2.82	5.36
	total	5710_UNII-2C	6.8	5.93	12.73
	Ant1	5710_UNII-3	-5.11	3.02	-2.09
	Ant2	5710_UNII-3	-6.6	2.82	-3.78
	total	5710_UNII-3	-2.8	5.93	3.13
11AC20MIMO	Ant1	5260	11.86	2.56	14.42
	Ant2	5260	7.35	2.73	10.08
	total	5260	13.2	5.66	18.86
	Ant1	5280	11.29	2.56	13.85
	Ant2	5280	7.14	2.73	9.87
	total	5280	12.7	5.66	18.36
	Ant1	5320	10.7	2.56	13.26
	Ant2	5320	8	2.73	10.73
	total	5320	12.6	5.66	18.26
	Ant1	5500	6.75	3.02	9.77
	Ant2	5500	5.84	2.82	8.66
	total	5500	9.3	5.93	15.23
	Ant1	5580	4.69	3.02	7.71
	Ant2	5580	3.95	2.82	6.77
	total	5580	7.3	5.93	13.23

TestMode	Antenna	Channel	Result[dBm]	Antenna Gain[dBi]	Max E.I.R.P
	Ant1	5700	5.95	3.02	8.97
	Ant2	5700	4.11	2.82	6.93
	total	5700	8.1	5.93	14.03
	Ant1	5720_UNII-2C	4.86	3.02	7.88
	Ant2	5720_UNII-2C	2.68	2.82	5.5
	total	5720_UNII-2C	6.9	5.93	12.83
	Ant1	5720_UNII-3	-0.52	3.02	2.5
	Ant2	5720_UNII-3	-2.1	2.82	0.72
	total	5720_UNII-3	1.8	5.93	7.73
11AC40MIMO	Ant1	5270	9.67	2.56	12.23
	Ant2	5270	5.31	2.73	8.04
	total	5270	11	5.66	16.66
	Ant1	5310	9.01	2.56	11.57
	Ant2	5310	5.69	2.73	8.42
	total	5310	10.7	5.66	16.36
	Ant1	5510	4.8	3.02	7.82
	Ant2	5510	3.26	2.82	6.08
	total	5510	7.1	5.93	13.03
	Ant1	5550	4.28	3.02	7.3
	Ant2	5550	2.2	2.82	5.02
	total	5550	6.4	5.93	12.33
	Ant1	5670	3.7	3.02	6.72
	Ant2	5670	1.52	2.82	4.34
	total	5670	5.8	5.93	11.73
	Ant1	5710_UNII-2C	3.92	3.02	6.94
	Ant2	5710_UNII-2C	1.6	2.82	4.42
	total	5710_UNII-2C	5.9	5.93	11.83
	Ant1	5710_UNII-3	-5.91	3.02	-2.89
	Ant2	5710_UNII-3	-7.33	2.82	-4.51
	total	5710_UNII-3	-3.6	5.93	2.33
11AC80MIMO	Ant1	5290	8.56	2.56	11.12
	Ant2	5290	4.53	2.73	7.26
	total	5290	10	5.66	15.66
	Ant1	5530	2.67	2.56	5.23
	Ant2	5530	2.07	2.82	4.89
	total	5530	5.4	5.93	11.33
	Ant1	5610	1.6	3.02	4.62

TestMode	Antenna	Channel	Result[dBm]	Antenna Gain[dBi]	Max E.I.R.P
	Ant2	5610	0.97	2.82	3.79
	total	5610	4.3	5.93	10.23
	Ant1	5690_UNII-2C	2.5	3.02	5.52
	Ant2	5690_UNII-2C	1.66	2.82	4.48
	total	5690_UNII-2C	5.1	5.93	11.03
	Ant1	5690_UNII-3	-10.38	3.02	-7.36
	Ant2	5690_UNII-3	-11.59	2.82	-8.77
	total	5690_UNII-3	-7.9	5.93	-1.97

Remark:
1. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW;

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. EUT Exercise Software

N/A.

3.3. Special Accessories

No.	Manufacturer	Description	Model	Serial Number	Certificate
1	NETGEAR	Router	R7800	4H777B53008A4	FCC ID: PY315100319

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen Tongzhou Testing Co.,Ltd has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart E				
FCC Rules	**ISED standards**	**Description of Test**	**Sample ID**	**Result**
§15.407(h)	RSS-247 6.3	Channel closing transmission time And channel moving time	TZ200501367–2#	Compliant
§15.407(h)	RSS-247 6.3	Non-Occupancy Period	TZ200501367–2#	Compliant

5. TEST RESULT

5.1 DYNAMIC FREQUENCY SELECTION

LIMIT

According to § 15.407 (h) and FCC 06-96 appendix “compliance measurement procedures for unlicensed-national information infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection”.

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client(with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	**Value (See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 4: DFS Response Requirement Values

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{PRI_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

DESCRIPTION OF EUT

Overview Of EUT With Respect To §15.407 (H) Requirements

The firmware installed in the EUT during testing was:

The EUT operates over the 5250-5350MHz and 5475-5725MHz range was a slave device associated with the master during these tests and it did not have radar detection + capability.

test was perform at antenna 1 for UNII-2A and at antenna 2 for UNII-2C as gain is lower than other antenna according to KDB 905462 D02.

The EUT uses one transmitter connected to 50-ohm coaxial antenna ports via a diversity switch. Only one antennas port is connected to the test system since the EUT has one antenna only.

The Slave device associated with the EUT during these tests does not have radar detection +capability.

WLAN traffic is generated by ping data from the Master to the Slave in full motion video mode using the TFGEN software with UDP protocol.

The EUT utilizes the 802.11ac architecture, with a nominal channel bandwidth of 80 MHz.

The Master Device is a access point support DFS.

The rated output power of the EUT is < 23dBm (EIRP). Therefore the required interference threshold level is -62 dBm.

Manufacturer’s Statement Regarding Uniform Channel Spreading

The end product implements an automatic channel selection feature at startup such that operation commences on channels distributed across the entire set of allowed 5GHz channels. This feature will ensure uniform spreading is achieved while avoiding non-allowed channels due to prior radar events.

TEST AND MEASUREMENT SYSTEM

System Overview

The measurement system is based on a conducted test method.

The short pulse and long pulse signal generating system utilizes the N7607B software. The Vector Signal Generator has been validated by the N7607B. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

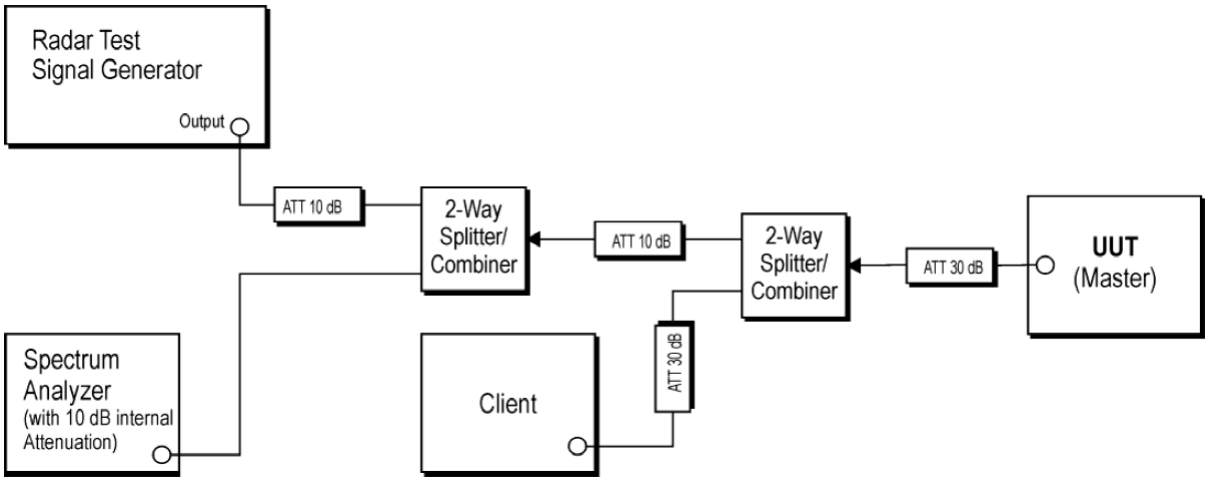
The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from FL to FH for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold. The time-domain resolution is 3 msec / bin with a 24 second sweep time, meeting the 22 second long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), 50 ohm termination would be removed from the splitter so that connection can be established between splitter and the Master and/or Slave devices.

Conducted Method System Block Diagram



System Calibration

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of –62 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyzer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from –62 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at –62 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at –62 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –62 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

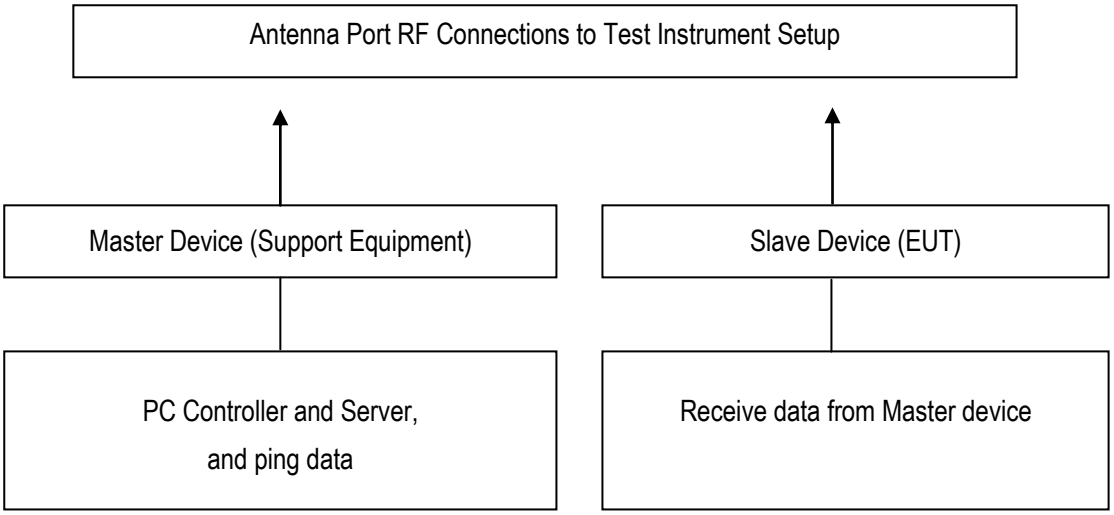
Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

Adjustment Of Displayed Traffic Level

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received level at the Master and Slave devices. Ping data to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Master Device. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic.

If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

Test Setup


Antenna Port RF Connections to Test Instrument Setup
Master Device (Support Equipment)
Slave Device (EUT)
PC Controller and Server,
and ping data
Receive data from Master device

TEST RESULTS

No non-compliance noted

Note: Please See Appendix A for test data

TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of test frequency utilizing a conducted test method.

CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

GENERAL REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =

(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated

Begins at (Reference Marker + 200 msec) and

Ends no earlier than (Reference Marker + 10 sec).

TEST RESULTS

Note: Please See Appendix B for channel loading test data and Appendix C for channel move time and channel closing transmission time.

NON-OCCUPANCY PERIOD

Type 0 Non-Occupancy Period Test Results

No non-compliance noted.

No EUT transmissions were observed on the test channel during the 30 minute observation time.

TEST RESULTS

Note: Please See Appendix A for test data

6. LIST OF MEASURING EQUIPMENTS

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2020/1/2	2021/1/1
2	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
3	Test Software	Tonscend	JS1120-3	V2.5.77.0418	N/A	N/A
4	Signal Generator	Keysight	N5182A	MY4620709	2020/1/2	2021/1/1

----------THE END OF REPORT----------