FCC PART 15.255

TEST REPORT

For

StarTech.com Ltd.

45 Artisans Crescent London, Ontario CANADA N5V 5E9

FCC ID: 2AA3IST121WHDS

Report Type: Original Report	**Product Type:** HDMI Over Wireless Extender – 1080p – 65 ft
Test Engineer:	*Lorin Bian*
Report Number:	RSZ161024005A
Test Period:	2016-12-08~2016-12-27
Report Date:	2016-12-28
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***StarTech.com Ltd.***'s product, model number: ***ST121WHDS (FCC ID: 2AA3IST121WHDS)*** (the "EUT") in this report was a HDMI Over Wireless Extender – 1080p – 65 ft, which was measured approximately: 90 mm (L) x 56 mm (W) x 17 mm (H),Rated input voltage: DC 5V from adapter.

Adapter Information:

Model: ZAU-B050100A-00

Input: AC 100-240V, 50/60Hz 0.2A

Output: DC 5.0V, 1000mA

**All measurement and test data in this report was gathered from final production sample, serial number: 161024005 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2016-12-08, and EUT conformed to test requirement.*

Objective

This test report is prepared on behalf of ***StarTech.com Ltd.*** in accordance with Part 2-Subpart J, and Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Rules Part 15, Subpart C Sections 15.203, 15.205, 15.207, 15.209, and 15.255

Related Submittal(s)/Grant(s)

Submitted with the Part of a system with FCC ID: 2AA3IST121WHDSR.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”.

All of the measurements detailed in this Test Report were performed by Bay Area Compliance Laboratories Corp. (Chengdu).

The Bay Area Compliance Laboratories Corp. Chengdu’s measurement Uncertainties (calculated for a k=2 Coverage Factor corresponding to approximately 95% Coverage) were as follows:

-For all of the AC Line Conducted Emissions Tests reported herein: ±3.17 dB.
-For of all of the Direct Antenna Conducted Emissions Tests reported herein: ±0.56 dB.

-For of all of the direct Radiated Emissions Tests reported herein are:
30 MHz to 200 MHz: ±4.7 dB;
200 MHz to 1 GHz: ±6.0 dB;
1 GHz to 6 GHz: ±5.13dB; and,
6 GHz to 25 GHz: ±5.47dB.

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (1-18GHz)	Unknown	NO.2	2016-11-10	2017-11-09
Unknown	RF Cable (18-40GHz)	Unknown	NO.6	2016-11-10	2017-11-09
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1312	2016-08-18	2017-08-18
Quinstar	Amplifier	QLW-18405536-JO	15964001032	2016-08-18	2017-08-18
Agilent	Spectrum Analyzer	8564E	5943A01752	2016-08-18	2017-08-18
Agilent	Harmonic Mixer	11970U	2332A00853	2016-12-06	2019-12-05
Flann Micowave	Horn Antenna	24245-AB	26	2016-12-06	2019-12-05
Agilent	Harmonic Mixer	11970V	2521A011767	2016-12-07	2019-12-06
Alpha Industries	Horn Antenna	861V/385	736	2016-12-07	2019-12-06
Agilent	Harmonic Mixer	11970W	2521A00597	2016-11-09	2019-11-08
Alpha Industries	Horn Antenna	861W/387	355	2016-11-09	2019-11-08
OML	Diplexer	DPL.26	EM-128	2016-10-11	2019-10-10
OML	Harmonic Mixer	M08HWD	F60313-1	2016-10-24	2019-10-23
OML	Horn Antenna	M08RH	EM-130	2016-10-24	2019-10-23
OML	Harmonic Mixer	M05HWD	G60106-1	2016-10-27	2019-10-26
OML	Horn Antenna	M05RH	EM-131	2016-10-27	2019-10-26
Agilent	Coaxial Cable	Unknown	1m	2016-05-06	-017-05-06
AgileInt	Coaxial Cable	Unknown	1m	2016-05-06	2017-05-06
Millitech	RF Detector	DET-15	67	2015-12-10	2017-12-09
Tektronix	DSO	TDS 3054	B015264	2016-11-23	2017-11-22
FLUKE	Multimeter	1587	27870099	2015-12-31	2016-12-30
HPC	AC Power Source	HPC-3145	F-08-EM002	N/A	N/A

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2016-10-16	2018-10-15
BACL	High Temperature Test Chamber[Note]	BTH-150	30024	2016-12-02	2017-12-01
Agilent	mm-Wave Source Modules	83557A	2735A00145	2015-08-16	2017-08-15
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2016-12-02	2017-12-01
SOLAR ELECTRONICS	L.I.S.N.	9252-50-24-BNC	984413	2016-12-02	2017-12-01
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	DE14781	2016-10-31	2017-10-30
Unknown	Conducted Cable	Unknown	NO.5	2016-11-10	2017-11-09
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

Note: the Temperature Chamber was calibrated includes both its controller and its temperature probe.

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

FAR Field Boundary Calculations

The far-field boundary is given in ANSI C63.10-2013:

$$R_m = 2D^2 / \lambda$$

Where:

D is the largest dimension of the antenna aperture in m and

λ is the free-space wavelength in m at the frequency of measurement.

The minimum test distance for the frequency range 40GHz-200GHz determine as below:

Manufacturer	Model	Frequency Range (GHz)	Largest Dimension of the Horn Antenna (mm)	Minimum Test Distance R_m (m)
Flann Micowave	24245-AB	40-60	40	0.64
Alpha Industries	861V/385	50-75	43.7	0.95
Alpha Industries	861W/387	75-90	30.7	0.57
OML	M08RH	90-140	19.7	0.36
OML	M05RH	140-220	12.5	0.23

Note: the maximum antenna dimension of the EUT was 12 mm. This length is smaller than the largest dimension of the smallest Horn Antenna used to measure up in the frequency range 40 GHz to 200 GHz. Given that the test distances used were 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz, it can be seen that the EUT was always in the Far-field of the Receive Antenna during all Radiated Emissions Tests.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The device supports LRP and MRP mode, the system operation channels list in the below table:

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	60163	6	62323
2	60321	7	62481
3	60480	8	62640
4	60639	9	62799
5	60797	10	62957

While in the LRP Mode, the device uses a total of 10 channels. During all tests while in the LRP Mode, Channels 1, 5, and 10 (i.e., Low, Middle, and High Channels for the LRP Mode) were used.

While in the MRP Mode, the device uses a total of 2 channels (i.e., Channels 3 and 8). During all tests while in the MRP Mode, Channels 3 and 8 (i.e., Low, and High Channels for the MRP Mode) were used.

EUT Exercise Software

The software “SWAM3” was used for testing, which was provided by manufacturer. The worst condition (maximum power) was configured by system default setting.

Equipment Modifications

No modifications were made to the EUT.

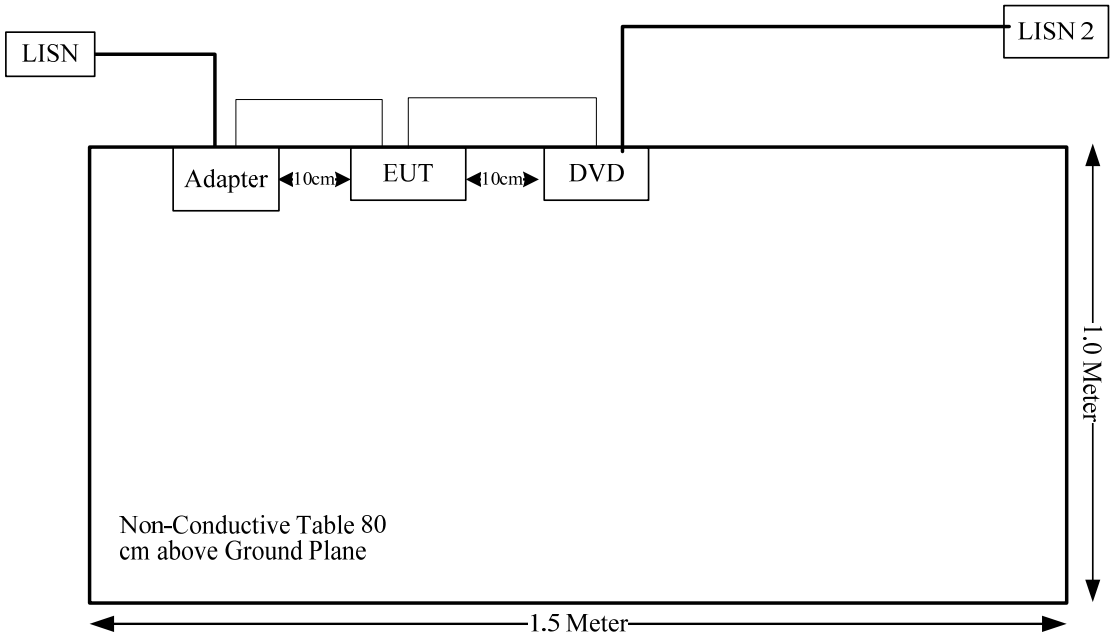
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SAST	DVD	SA003	Cf5869

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (cm)	From Port	To
USB cable	Yes	no	1	Adapter	EUT
HDMI cable	yes	yes	1	EUT	DVD

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310&§2.1091	Maximum Permissible Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§ 15.255 (d)	Occupied Bandwidth	Compliance
§15.255 (b)	EIRP Power	Compliance
§15.255 (d)	Peak Conducted Output Power	Compliance
§15.255 (c)	Spurious Emissions	Compliance
§15.255 (e)	Frequency Stability	Compliance
§15.255 (a)(g)	Operation Restriction And Group Installation	Compliance

FCC§1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation Formula:

Prediction of Power Density at the distance of the applicable MPE Limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Test Modes	**Frequency (GHz)**	**E.I.R.P**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
		(dBm)	**(mW)**			
LRP	60.163-62.957	32	1585	20.00	0.32	1.0
MRP	60.48-62.64	26	398	20.00	0.079	1.0

Note: The EIRP is the sum (in dB) of the power supplied to the antenna and the Gain of the antenna. The Gain of the antenna is 6 dBi in LRP Mode and 18 dBi in MRP Mode. The power supplied to the antenna is 26 dBm in LRP Mode and 8 dBm in MRP Mode.

Result: The device complied with the applicable MPE Limit at the 20 cm distance.

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has one non-removable integral “antenna on chip” which can be seen in the EUT internal Photos. Therefore, the EUT complied with the antenna requirements stated in FCC Rules Part 15 Subpart C Section 15.203.

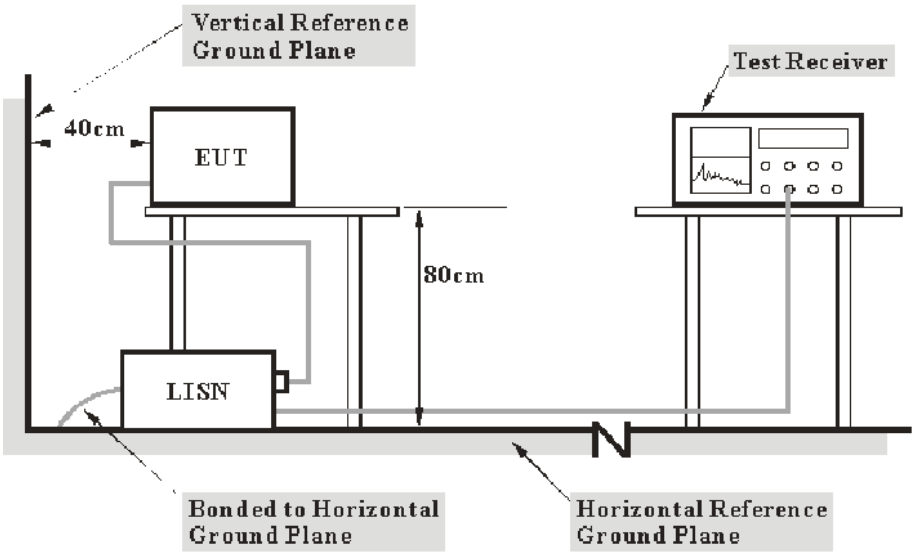
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The “Margin” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

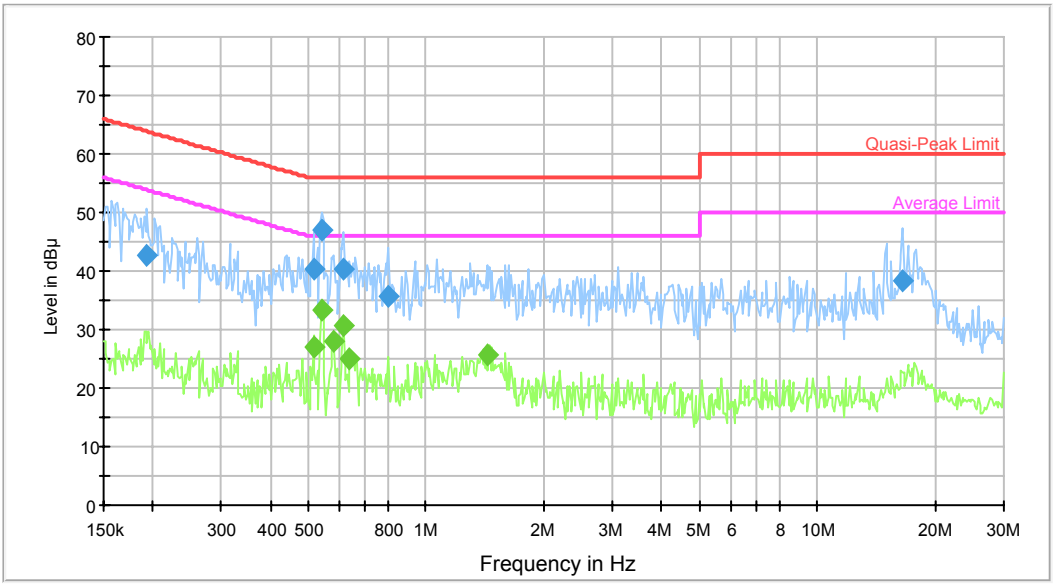
Environmental Conditions

Temperature:	25.9°C
Relative Humidity:	44 %
ATM Pressure:	101.2 kPa

The testing was performed by Lorin Bian on 2016-12-19.

Test Mode: Transmitting(pre-test MRP 60480MHz and LRP 60797MHz, LRP 60797MHz mode was the worst and be reported as below)

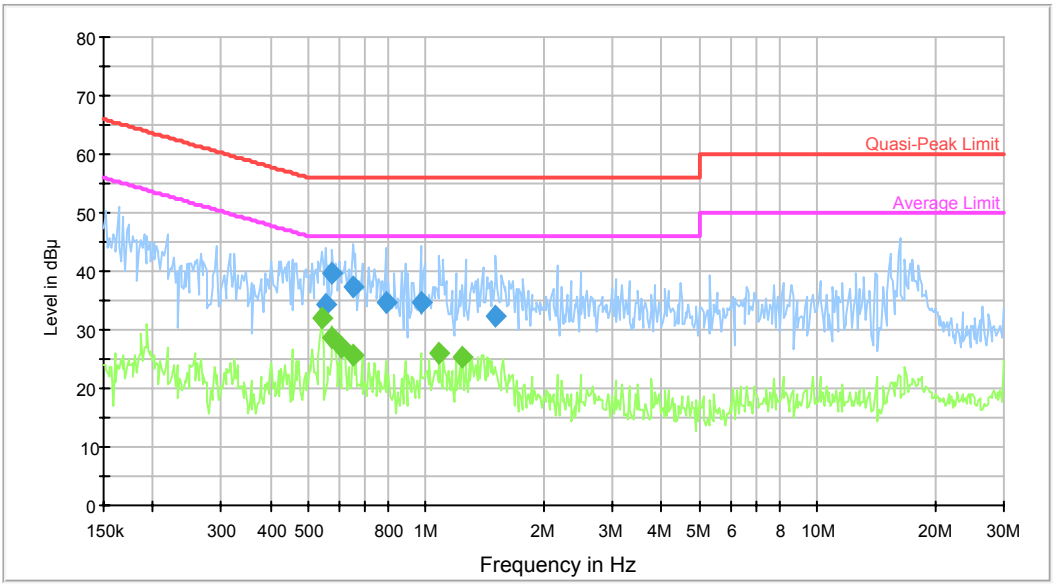
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.193566	42.8	9.000	L1	19.7	21.1	63.9	Compliance
0.515791	40.3	9.000	L1	19.7	15.7	56.0	Compliance
0.541050	47.0	9.000	L1	19.7	9.0	56.0	Compliance
0.614619	40.2	9.000	L1	19.7	15.8	56.0	Compliance
0.799472	35.5	9.000	L1	19.7	20.5	56.0	Compliance
16.512221	38.3	9.000	L1	20.1	21.7	60.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.515791	27.1	9.000	L1	19.7	18.9	46.0	Compliance
0.541050	33.4	9.000	L1	19.7	12.6	46.0	Compliance
0.581275	27.9	9.000	L1	19.8	18.1	46.0	Compliance
0.614619	30.5	9.000	L1	19.7	15.5	46.0	Compliance
0.639600	25.1	9.000	L1	19.7	20.9	46.0	Compliance
1.430284	25.8	9.000	L1	19.7	20.2	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.554139	34.4	9.000	N	19.6	21.6	56.0	Compliance
0.576662	39.8	9.000	N	19.6	16.2	56.0	Compliance
0.649874	37.2	9.000	N	19.6	18.8	56.0	Compliance
0.786832	34.5	9.000	N	19.6	21.5	56.0	Compliance
0.967957	34.5	9.000	N	19.7	21.5	56.0	Compliance
1.512328	32.3	9.000	N	19.7	23.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.541050	32.0	9.000	N	19.6	14.0	46.0	Compliance
0.576662	28.6	9.000	N	19.6	17.4	46.0	Compliance
0.609741	27.0	9.000	N	19.6	19.0	46.0	Compliance
0.649874	25.6	9.000	N	19.6	20.4	46.0	Compliance
1.082190	26.1	9.000	N	19.7	19.9	46.0	Compliance
1.239175	25.4	9.000	N	19.6	20.6	46.0	Compliance

FCC§15.255(b) - Equivalent Isotropically Radiated Power (EIRP)

Applicable Standard

(b) Within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

(1) Products other than fixed field disturbance sensors and short-range devices for interactive motion sensing shall comply with one of the following emission limits, as measured during the transmit interval:

(i) The average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm; or

(ii) For fixed point-to-point transmitters located outdoors, the average power of any emission shall not exceed 82 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi. The peak power of any emission shall not exceed 85 dBm, and shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi.

(A) The provisions in this paragraph for reducing transmit power based on antenna gain shall not require that the power levels be reduced below the limits specified in paragraph (b)(1)(i) of this section.

(B) The provisions of §15.204(c)(2) and (4) that permit the use of different antennas of the same type and of equal or less directional gain do not apply to intentional radiator systems operating under this provision. In lieu thereof, intentional radiator systems shall be certified using the specific antenna(s) with which the system will be marketed and operated. Compliance testing shall be performed using the highest gain and the lowest gain antennas for which certification is sought and with the intentional radiator operated at its maximum available output power level. The responsible party, as defined in §2.909 of this chapter, shall supply a list of acceptable antennas with the application for certification.

(2) For fixed field disturbance sensors that occupy 500 MHz or less of bandwidth and that are contained wholly within the frequency band 61.0-61.5 GHz, the average power of any emission, measured during the transmit interval, shall not exceed 40 dBm, and the peak power of any emission shall not exceed 43 dBm. In addition, the average power of any emission outside of the 61.0-61.5 GHz band, measured during the transmit interval, but still within the 57-71 GHz band, shall not exceed 10 dBm, and the peak power of any emission shall not exceed 13 dBm.

(3) For fixed field disturbance sensors other than those operating under the provisions of paragraph (b)(2) of this section, and short-range devices for interactive motion sensing, the peak transmitter conducted output power shall not exceed −10 dBm and the peak EIRP level shall not exceed 10 dBm.

(4) The peak power shall be measured with an RF detector that has a detection bandwidth that encompasses the 57-71 GHz band and has a video bandwidth of at least 10 MHz. The average emission levels shall be measured over the actual time period during which transmission occurs.

Test Procedure

Refer to ANSI C63.10-2013 Clause 9.11

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

At frequencies greater than or equal to 1 GHz, measurements were recorded using the Peak Detector and the CISPR Average Detector.

Environmental Conditions

Temperature:	23.9 °C
Relative Humidity:	52 %
ATM Pressure:	101.3 kPa

The testing was performed by Lorin Bian on 2016-12-22.

Test Data

Please refer to the following table:
Test Mode: Transmitting

Frequency	Detector	Polar	Substituted SG Level	Antenna Gain	EIPR Power	Limit	Margin
GHz	PK/QP/AV	H/V	(dBm)	(dBi)	dBm	dBm	dB
LRP							
60.163	PK	H	-14.66	24	29.48	43	13.52
60.163	AV	H	-21.76	24	22.38	40	17.62
60.797	PK	H	-13.04	24	31.20	43	11.80
60.797	AV	H	-24.84	24	19.40	40	20.60
62.957	PK	H	-13.93	24	30.61	43	12.39
62.957	AV	H	-25.73	24	18.81	40	21.19
MRP							
60.48	PK	H	-22.3	24	21.89	43	21.11
60.48	AV	H	-33.9	24	10.29	40	29.71
62.64	PK	H	-18.69	24	25.80	43	17.20
62.64	AV	H	-29.99	24	14.50	40	25.50

Note 1:The measurement distance is 1.0 m.
Note2: RF Detector and a DSO with a Bandwidth greater than 10 MHz were used to make the measurements
Note 3: the measurement performed with radiation method, according to ANSI C63.10-2013 Clause 9.11:

$$E = 126.8 - 20\log(\lambda) + P - G$$

$$\mathrm{EIRP} = E_{\mathrm{Meas}} + 20\log(d_{\mathrm{Meas}}) - 104.7$$

*=>EIRP=126.8-20*log(λ)+P-G+20log(1)-104.7*
*= 22.1-20*log(λ)+P-G*

λ the free-space wavelength in m at the frequency of measurement.
= 3 x 10^8/f

f is frequency in Hz.

Note 4: The Mixers and it`s RF cables is compose a system for calibration.
Note 5: the test data recorded was the maximum polarization.
Note 6: Substituted SG Level is the power recoded in Step e) 9) of §9.11 of ANSI C63.10-2013

FCC§15.255(d)(1)- Occupied Bandwidth

Applicable Standard

Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

Test Procedure

Refer to ANSI C63.10-2013 Clause 6.9 & 9.3

the Marker is to be placed on the highest amplitude peak of the “hash”, and then the Display Line should be moved to the -6dB than the highest amplitude peak, the Marker should be moved leftward off of the peak amplitude point to identify the -6 dB point, the Delta should be moved rightward off of the peak amplitude point to identify the -6 dB point. The Delta is the 6 dB Bandwidth.

Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Lorin Bian on 2016-12-22.

Test Data

Please refer to the following tables and plots:

Test Mode: Transmitting

LRP:

Channel	Frequency	6 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	60163	90.80	151.70
Middle	60797	89.20	155.00
High	62957	84.20	135.80

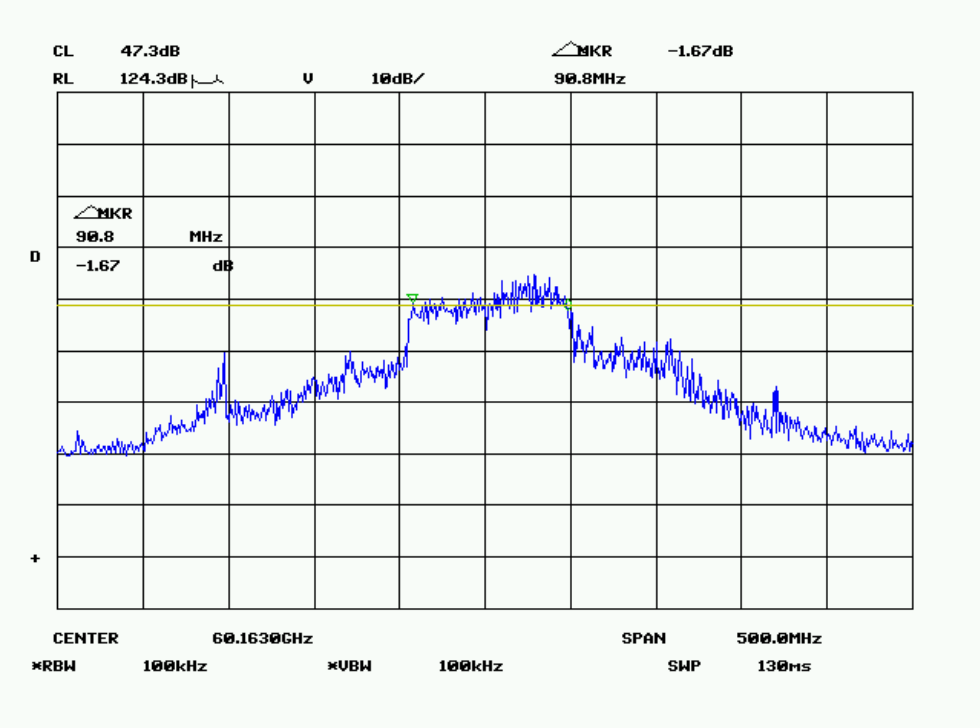
MRP:

Channel	Frequency	6 dB Bandwidth	99% Bandwidth
	(GHz)	(GHz)	(GHz)
Low	60.48	1.55	1.86
High	62.64	1.06	1.74

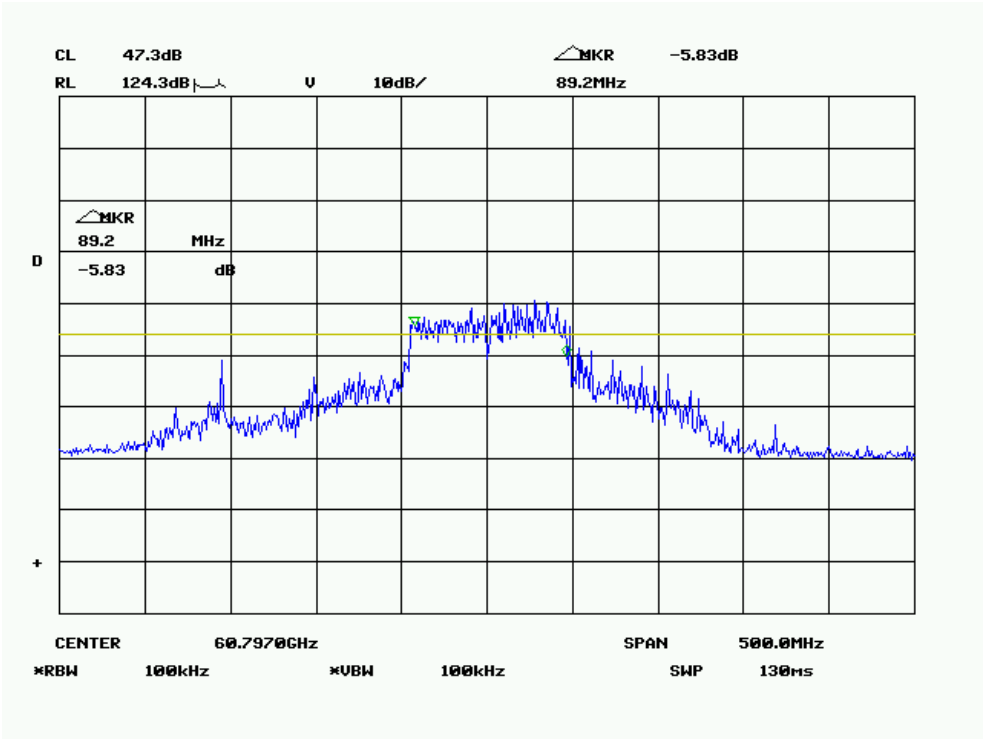
LRP:

6dB Bandwidth

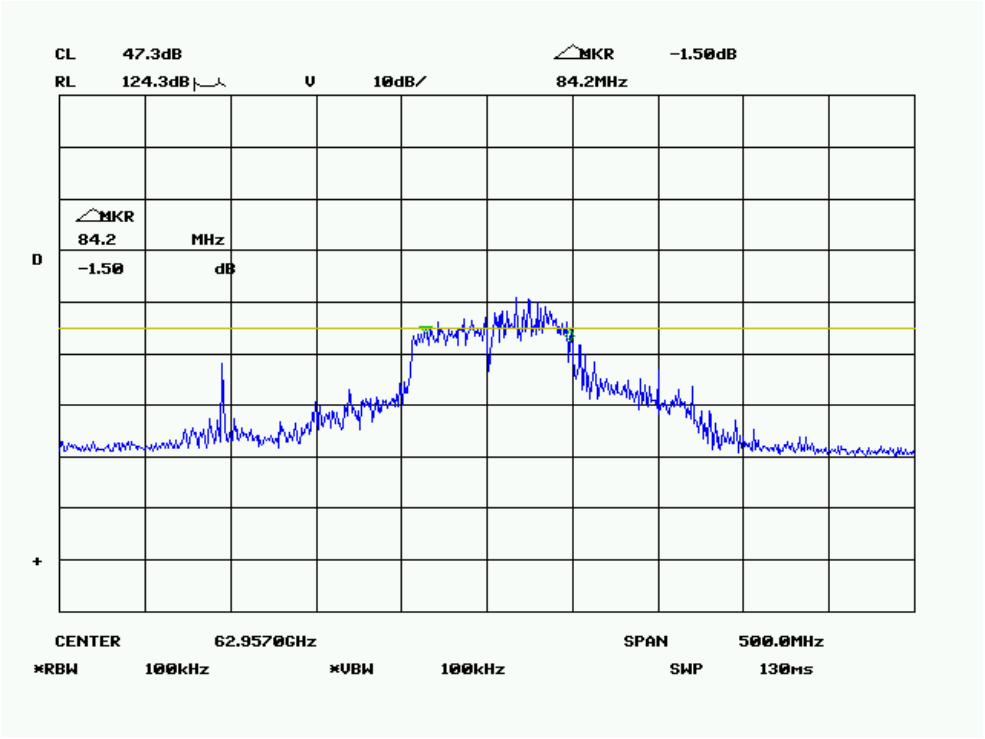
Low Channel



Middle Channel

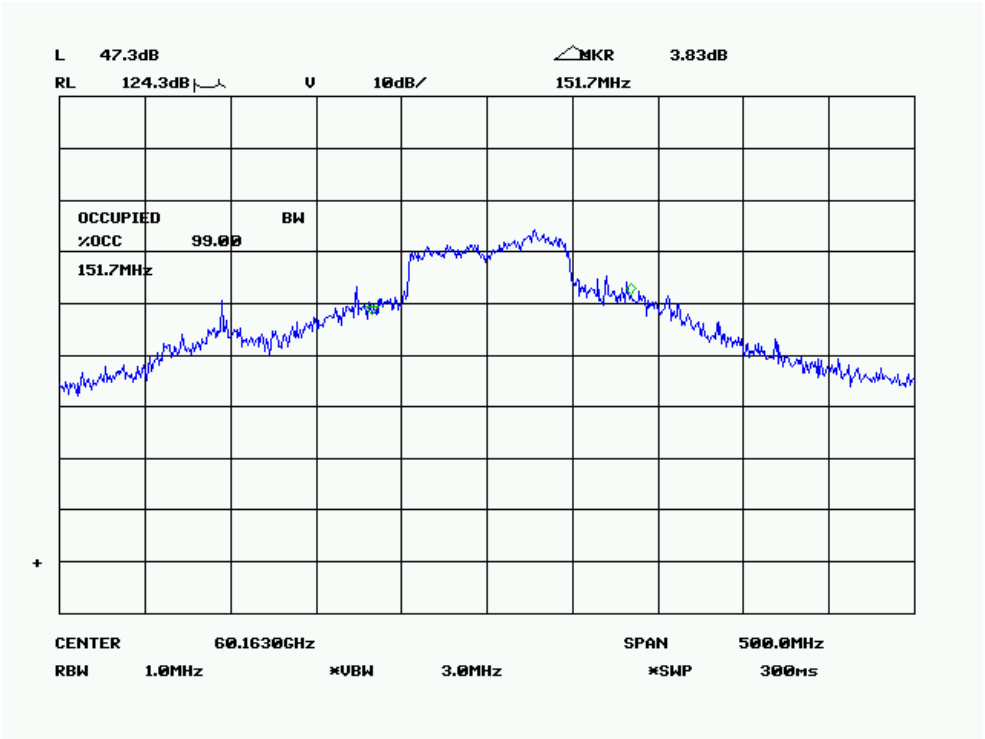


High Channel

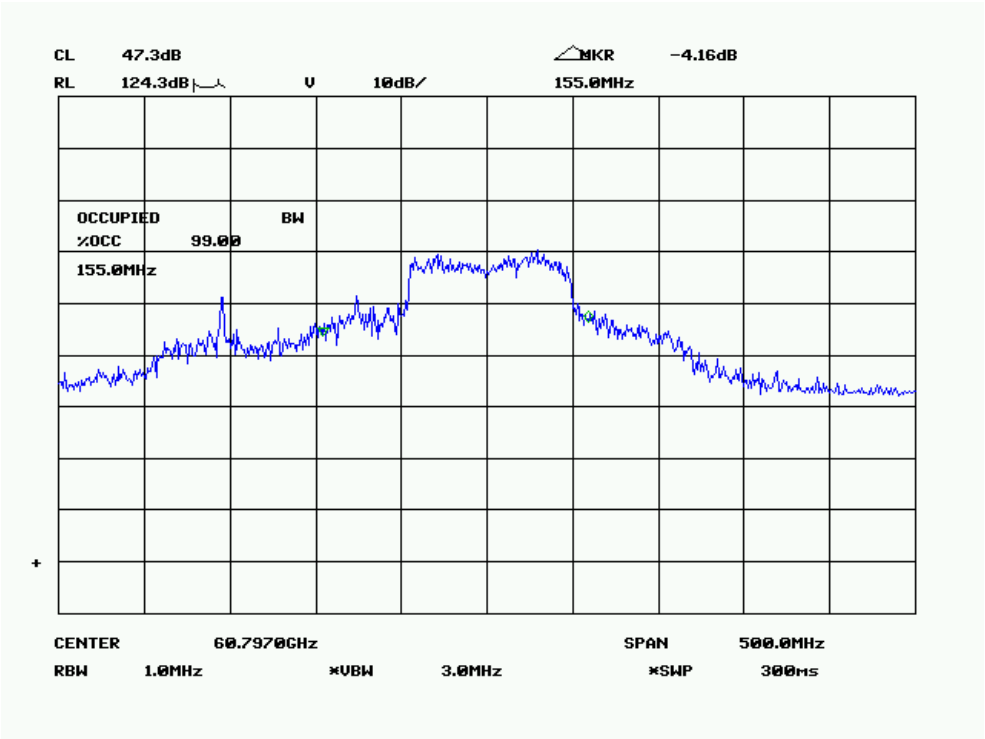


99% Bandwidth

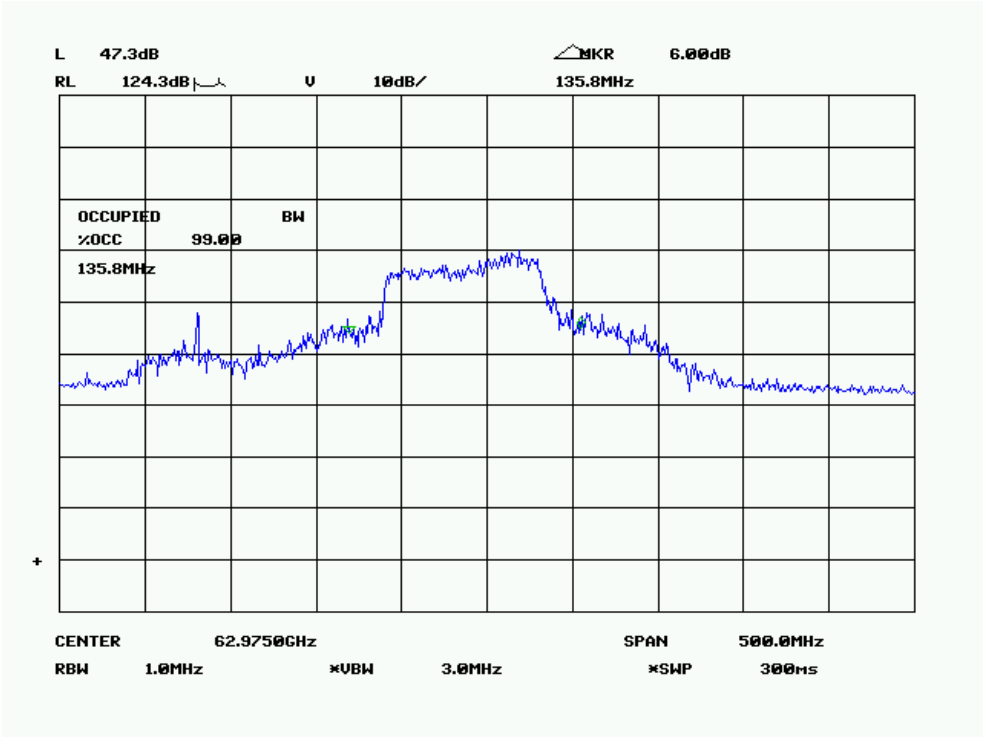
Low Channel



Middle Channel



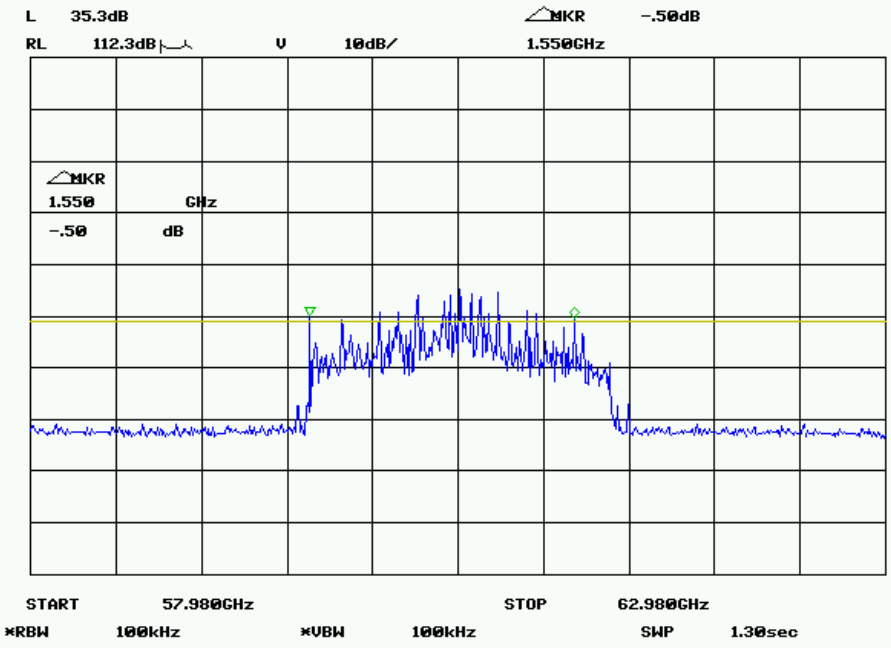
High Channel



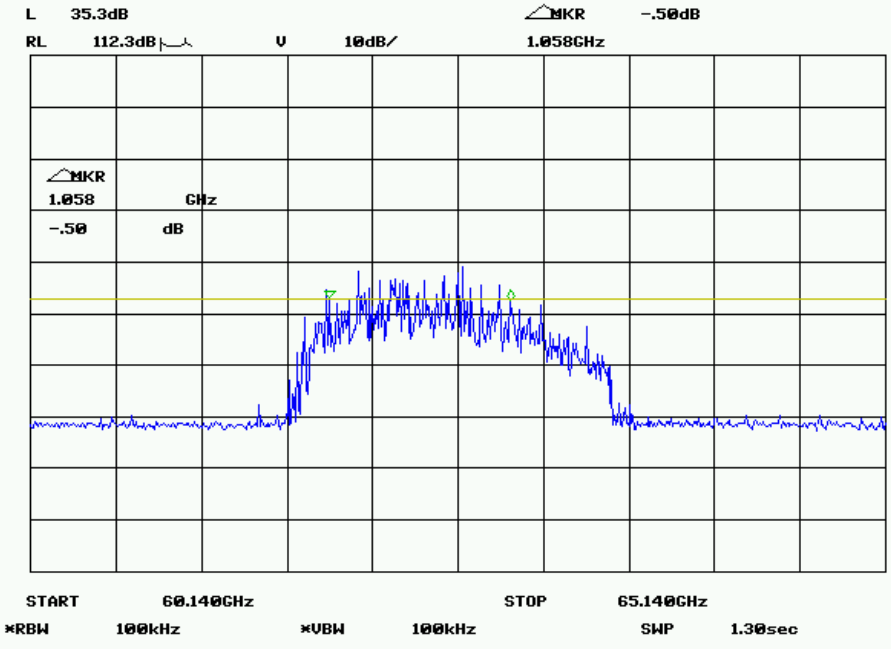
MRP:

6dB Bandwidth

Low Channel

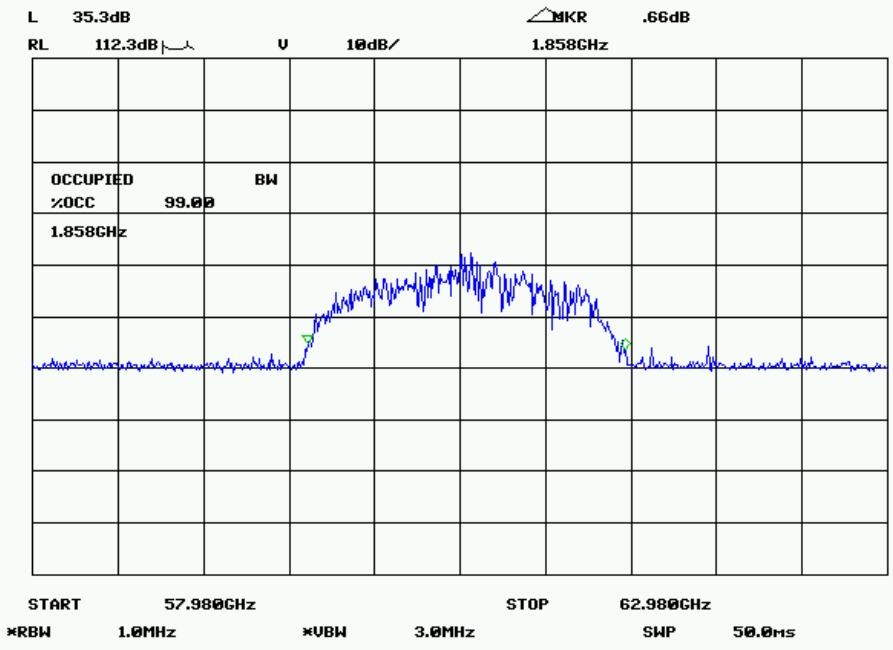


High Channel

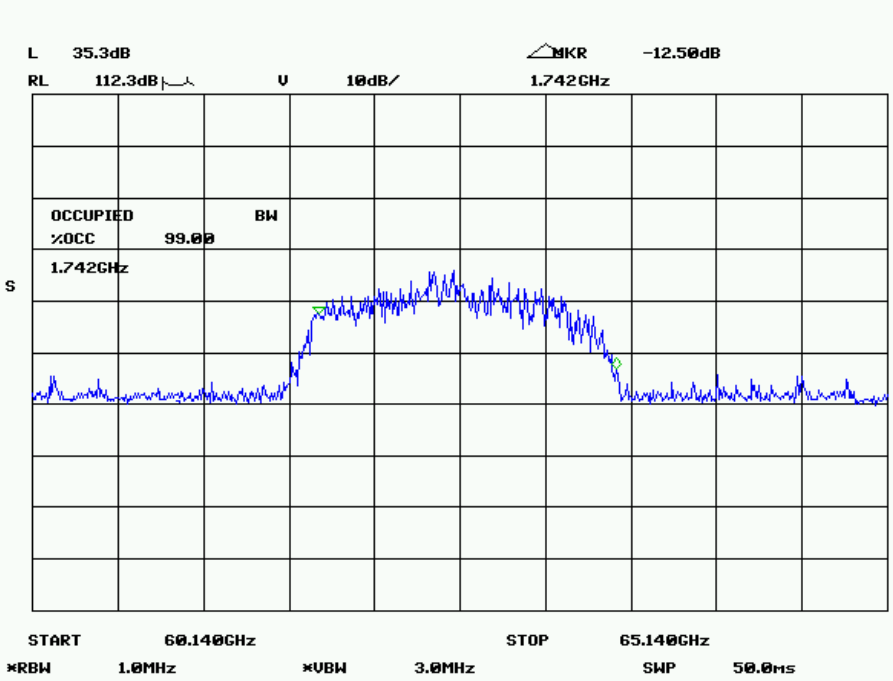


99% Bandwidth

Low Channel



High Channel



FCC§15.255(d) –PEAK CONDUCTED OUTPUT POWER

Applicable Standard

(d) Except as specified paragraph (e)(1) of this section, the peak transmitter conducted output power shall not exceed 500 mW. Depending on the gain of the antenna, it may be necessary to operate the intentional radiator using a lower peak transmitter output power in order to comply with the EIRP limits specified in paragraph (b) of this section.

(1) Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

(2) Peak transmitter conducted output power shall be measured with an RF detector that has a detection bandwidth that encompasses the 57-71 GHz band and that has a video bandwidth of at least 10 MHz.

(3) For purposes of demonstrating compliance with this paragraph, corrections to the transmitter conducted output power may be made due to the antenna and circuit loss.

Test Procedure

Refer to ANSI C63.10-2013 Clause 9.7 : equation to calculate power output.

Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Lorin Bian on 2016-12-22.

Test Data

Please refer to the following table:

Test Mode: Transmitting

Frequency	Peak EIPR Power	Antenna Gain	Peak conducted power	6dB Bandwidth	Limit	Margin
GHz	dBm	dBi	dBm	MHz	dBm	dB
LRP Mode						
60.163	29.48	6	23.48	90.8	26.57	3.09
60.797	31.2	6	25.2	89.2	26.49	1.29
62.957	30.61	6	24.61	84.2	26.24	1.63
MRP Mode						
60.48	21.89	18	3.89	1550	27	23.11
62.64	25.8	18	7.8	1058	27	19.2

Note 1: The EUT used for integral antenna without temporary RF connector provided, so Peak conducted power is equal to Peak EIRP Power substract the antenna gain.

Note 2: EIRP Power refer to §15.255 (b)

Note3: For radiated emissions measurements, calculated transmitter conducted output power P(con) P(con)=EIRP-Antenna gain(dBi)

*Note4: EUT operating in LRP mode with an emission bandwidth of less than 100 MHz , therefore the limit of its peak transmitter conducted output power is: 10*lg(500* (BW/100)) dBm*
Here, BW is 6 dB Bandwidth.

FCC§15.205, §15.209&§15.255(c)- TRANSMITTER SPURIOUS EMISSIONS

Applicable Standard

(c) Limits on spurious emissions:

(1) The power density of any emissions outside the 57-64 GHz band shall consist solely of spurious emissions.

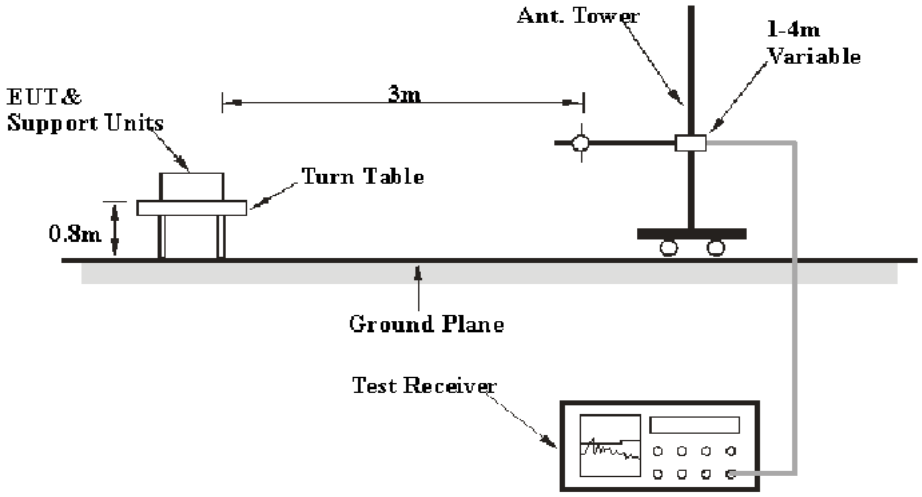
(2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.

(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.

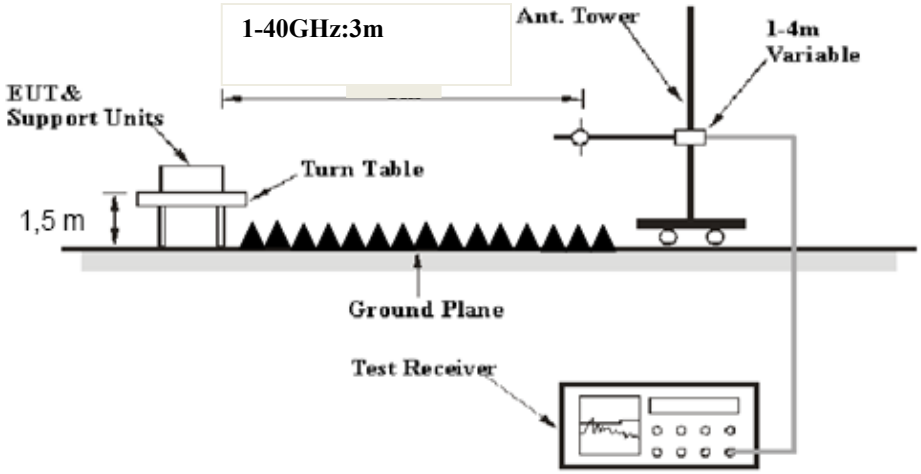
(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

EUT Setup

Below 1 GHz:



1-40 GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013 The specification used was the FCC 15.209/15.205 and FCC 15.255 limits.

Above 40GHz:

The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at the distance of 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz.

Test Equipment Setup

The system was investigated from 30 MHz to 200 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
1-40 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave
40 GHz – 200 GHz	1MHz	3 MHz	/	PK

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit –Corrected Amplitude

Test Procedure

Refer to ANSI C63.10-2013 Clauses 9.9, 9.12, and 9.13.

A Maximizing procedure was performed to ensure that the highest emissions from the EUT were actually measured in all of the Test Arrangements of the EUT and Local Support Equipment.

In accordance with FCC Rules Part 15 Subpart A Section 15.35, from 30 MHz to 1 GHz all radiated emissions measurements were made using a Quasi-peak Detector, and from 1 GHz to 40 GHz, all radiated emissions measurements were made using a Peak Detector and CISPR Average Detector. In accordance with FCC Rules Part 15 Subpart C Section 15.255, from 40 GHz to 200 GHz, all radiated emissions measurements were made using a Peak Detector.

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	58 %
ATM Pressure:	101.2 kPa

** The testing was performed by Lorin Bian on 2016-12-20.*

Test Mode: Transmitting

30MHz~40GHz:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB(1/m))					
LRP, Frequency: 60163 MHz									
5392	31.34	PK	V	32.11	5.41	26.67	42.19	74.00	31.81
5392	16.68	AV	V	32.11	5.41	26.67	27.53	54.00	26.47
7120	31.6	PK	V	34.54	6.13	26.31	45.96	74.00	28.04
7120	17.03	AV	V	34.54	6.13	26.31	31.39	54.00	22.61
2617	32.16	PK	V	23.43	3.09	26.78	31.90	74.00	42.10
2617	19.35	AV	V	23.43	3.09	26.78	19.09	54.00	34.91
6330	31.84	PK	V	33.23	6.07	26.57	44.57	74.00	29.43
6330	18.27	AV	V	33.23	6.07	26.57	31.00	54.00	23.00
390.84	46.24	QP	V	15.92	1.50	28.14	35.52	46.00	10.48
797.27	42.46	QP	V	21.88	2.31	28.44	38.21	46.00	7.79
LRP, Frequency: 60797MHz									
5392	31.29	PK	V	32.11	5.41	26.67	42.14	74.00	31.86
5392	16.73	AV	V	32.11	5.41	26.67	27.58	54.00	26.42
7120	31.55	PK	V	34.54	6.13	26.31	45.91	74.00	28.09
7120	17.05	AV	V	34.54	6.13	26.31	31.41	54.00	22.59
2617	32.06	PK	V	23.43	3.09	26.78	31.80	74.00	42.20
2617	19.42	AV	V	23.43	3.09	26.78	19.16	54.00	34.84
6330	31.77	PK	V	33.23	6.07	26.57	44.50	74.00	29.50
6330	18.29	AV	V	33.23	6.07	26.57	31.02	54.00	22.98
390.84	45.72	QP	V	15.92	1.50	28.14	35.00	46.00	11.00
797.27	43.75	QP	V	21.88	2.31	28.44	39.50	46.00	6.50
LRP, Frequency: 62957MHz									
5392	31.31	PK	V	32.11	5.41	26.67	42.16	74.00	31.84
5392	16.7	AV	V	32.11	5.41	26.67	27.55	54.00	26.45
7120	31.51	PK	V	34.54	6.13	26.31	45.87	74.00	28.13
7120	17.05	AV	V	34.54	6.13	26.31	31.41	54.00	22.59
2617	32.23	PK	V	23.43	3.09	26.78	31.97	74.00	42.03
2617	19.32	AV	V	23.43	3.09	26.78	19.06	54.00	34.94
6330	31.78	PK	V	33.23	6.07	26.57	44.51	74.00	29.49
6330	18.2	AV	V	33.23	6.07	26.57	30.93	54.00	23.07
390.84	45.27	QP	V	15.92	1.50	28.14	34.55	46.00	11.45
797.27	42.96	QP	V	21.88	2.31	28.44	38.71	46.00	7.29

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB(1/m))					
MRP, Frequency: 60797MHz									
3256	32.69	PK	V	25.63	3.81	26.50	35.63	74.00	38.37
3256	17.35	AV	V	25.63	3.81	26.50	20.29	54.00	33.71
6587	31.58	PK	V	33.56	6.12	26.48	44.78	74.00	29.22
6587	16.85	AV	V	33.56	6.12	26.48	30.05	54.00	23.95
2249	33.89	PK	V	24.05	3.02	26.85	34.11	74.00	39.89
2249	18.34	AV	V	24.05	3.02	26.85	18.56	54.00	35.44
5625	31.43	PK	V	32.45	5.63	26.62	42.89	74.00	31.11
5625	16.62	AV	V	32.45	5.63	26.62	28.08	54.00	25.92
390.84	45.87	QP	V	15.92	1.50	28.14	35.15	46.00	10.85
797.27	42.78	QP	V	21.88	2.31	28.44	38.53	46.00	7.47
MRP, Frequency: 62957MHz									
3256	32.75	PK	V	25.63	3.81	26.50	35.69	74.00	38.31
3256	17.29	AV	V	25.63	3.81	26.50	20.23	54.00	33.77
6587	31.51	PK	V	33.56	6.12	26.48	44.71	74.00	29.29
6587	16.9	AV	V	33.56	6.12	26.48	30.10	54.00	23.90
2249	33.93	PK	V	24.05	3.02	26.85	34.15	74.00	39.85
2249	18.29	AV	V	24.05	3.02	26.85	18.51	54.00	35.49
5625	31.34	PK	V	32.45	5.63	26.62	42.80	74.00	31.20
5625	16.57	AV	V	32.45	5.63	26.62	28.03	54.00	25.97
390.84	44.67	QP	V	15.92	1.50	28.14	33.95	46.00	12.05
797.27	43.08	QP	V	21.88	2.31	28.44	38.83	46.00	7.17

Note 1:The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss-Amplifier Gain

Note 2:The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit –Corrected Amplitude

40GHz~200GHz:

Frequency	Receiver		Rx Antenna		Corrected Amplitude	EIPR Power	Power Density	Limit
	Reading	Detector	Polar	Factor				
GHz	dBµV	PK/QP/AV	H/V	dB(1/m)	dBµV/m	dBm	pW/cm^2	pW/cm^2
LRP, Frequency: 60163 MHz								
50.71	35.19	PK	H	40.86	76.05	-28.65	1.21	90.00
50.71	36.26	PK	V	40.86	77.12	-27.58	1.54	90.00
88.67	43.17	PK	H	47.95	91.12	-13.58	38.79	90.00
88.67	43.81	PK	V	47.95	91.76	-12.94	44.95	90.00
123.45	44.01	PK	H	54.45	98.46	-12.26	52.55	90.00
123.45	44.51	PK	V	54.45	98.96	-11.76	58.96	90.00
LRP, Frequency: 60797MHz								
50.71	35.5	PK	H	40.86	76.36	-28.34	1.30	90.00
50.71	36.18	PK	V	40.86	77.04	-27.66	1.52	90.00
88.67	43.28	PK	H	47.95	91.23	-13.47	39.79	90.00
88.67	43.86	PK	V	47.95	91.81	-12.89	45.47	90.00
123.45	44.96	PK	H	54.45	99.41	-11.31	65.40	90.00
123.45	44.49	PK	V	54.45	98.94	-11.78	58.69	90.00
LRP, Frequency: 62957MHz								
50.71	35.95	PK	H	40.86	76.81	-27.89	1.44	90.00
50.71	36.18	PK	V	40.86	77.04	-27.66	1.52	90.00
88.67	43.27	PK	H	47.95	91.22	-13.48	39.70	90.00
88.67	43.81	PK	V	47.95	91.76	-12.94	44.95	90.00
123.45	44.12	PK	H	54.45	98.57	-12.15	53.90	90.00
123.45	44.56	PK	V	54.45	99.01	-11.71	59.64	90.00
MRP, Frequency: 60797MHz								
50.46	35.83	PK	H	40.81	76.64	-28.06	1.38	90.00
50.46	36.23	PK	V	40.81	77.04	-27.66	1.52	90.00
87.28	43.27	PK	H	47.69	90.96	-13.74	37.39	90.00
87.28	43.86	PK	V	47.69	91.55	-13.15	42.83	90.00
125.22	44.14	PK	H	54.78	98.92	-11.8	58.42	90.00
125.22	44.47	PK	V	54.78	99.25	-11.47	63.03	90.00

MRP, Frequency: 62957MHz								
50.46	35.93	PK	H	40.81	76.74	-27.96	1.42	90.00
50.46	36.16	PK	V	40.81	76.97	-27.73	1.49	90.00
87.28	43.27	PK	H	47.69	90.96	-13.74	37.39	90.00
87.28	43.81	PK	V	47.69	91.50	-13.2	42.34	90.00
125.22	44.1	PK	H	54.78	98.88	-11.84	57.88	90.00
125.22	44.54	PK	V	54.78	99.32	-11.4	64.06	90.00

Note 1:

EIRP = E-meas +20log(d-meas)-104.7

where:

EIRP : is the equivalent isotopically radiated power, in dBm

E-meas. : is the field strength of the emission at the measurement distance, in dBμV/m

d-meas. : is the measurement distance, in m

Note 2:The test distance is 1.0 m for 40-90GHz range, and 0.5m for 90-200GHz.

Note 3:Corrected Amplitude = Meter Reading + Antenna Factor

Note 4: The Mixers and it`s RF cables is compose a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

Note 5:

$$PD = \frac{EIRP_{Linear}}{4\pi d^2}$$

where

PD	is the power density at the distance specified by the limit, in W/m^2
$EIRP_{Linear}$	is the equivalent isotropically radiated power, in watts
d	is the distance at which the power density limit is specified, in m

The Specified distance is 3m.

FCC§15.255(e) - FREQUENCY STABILITY

Applicable Standard

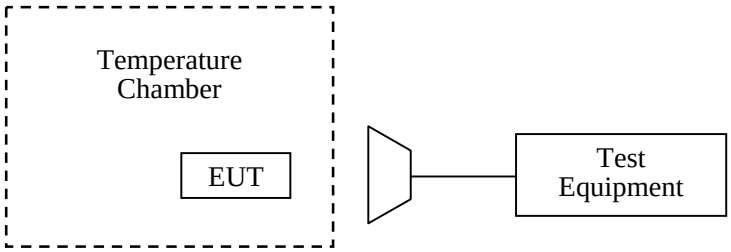
Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

Test Procedure

Frequency Stability vs. Temperature: The adapter of the equipment under test was connected to an AC power source. The EUT was placed inside the temperature chamber. Place the Horn antenna outside the temperature chamber. Place the EUT antenna toward the Horn antenna.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable AC power supply was connected to the equipment under test. The voltage was set from 85% to 115% of the nominal value. The output frequency was recorded for each voltage.



Environmental Conditions

Temperature:	28.8 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Lorin Bian on 2016-12-22.

Test Data

Please refer to the following table:

Temperature	Voltage	Frequency (MHz)			
℃	V_{AC}	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
-20	120	59480	63644	57000	71000
-10	120	59481	63642	57000	71000
0	120	59479	63647	57000	71000
10	120	59482	63646	57000	71000
20	120	59480	63640	57000	71000
30	120	59478	63643	57000	71000
40	120	59477	63638	57000	71000
50	120	59479	63639	57000	71000
25	102	59472	63642	57000	71000
25	138	59471	63646	57000	71000

Note: MRP mode was tested since the bandwidth covered LRP.

§15.255(a) (g)– OPERATION RESTRICTION AND GROUP INSTALLTION

Applicable Standard

§15.255 (a) Operation under the provisions of this section is not permitted for the following products:
(1) Equipment used on aircraft or satellites.
(2) Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. For the purposes of this section, the reference to fixed operation includes field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.

§15.255 (g) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

Result of Operation Restriction

EUT is a wireless HDMI Video Extender intended for indoor use only for the connection of consumer electronic (CE) audio and video devices. The Manufacturer declared that the EUT will not be advertised or sold for use on aircraft or satellites. The user manual includes a statement that cautions users that it is not permitted to use the product on aircraft or satellites.

Result of Group installation

The frequency, amplitude and phase of the transmit sign al are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array

******* END OF REPORT *******