FCC RADIO TEST REPORT

FCC ID	:	BKMAE-H931RX
Equipment	:	LCD Projector
Brand Name	:	EPSON
Model Name	:	H931A
Applicant	:	SEIKO EPSON CORPORATION 3-3-5 Owa Suwa-shi Nagano-Ken 392-8502, Japan
Manufacturer	:	SEIKO EPSON CORPORATION Toyoshina office 6925 Tazawa, Toyoshina Azumino-shi, Nagano 399-8285 Japan
Standard	:	47 CFR FCC Part 15.255

The product was received on Sep. 01, 2018, and testing was started from Sep. 01, 2018 and completed on Sep. 13, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013, 47 CFR FCC Part 15.255, Millimeter Wave Test Procedures and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR872105	01	Initial issue of report	Oct. 04, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	FCC 15.207	AC Power Conducted Emissions	PASS	-
3.2	FCC 15.255(e)	Occupied Bandwidth	PASS	-
3.3	FCC 15.255(c)	EIRP Power	PASS	-
3.4	FCC 15.255(c)	Peak Conducted Power	PASS	-
3.5	FCC 15.255(d)	Transmitter Spurious Emissions	PASS	-
3.6	FCC 15.255(f)	Frequency Stability	PASS	-
3.7	FCC 15.255(a), (h)	Operation Restriction and Group Installation	PASS	-

Reviewed by: Sam Chen

Report Producer: Cindy Peng

1 General Description

1.1 Information

1.1.1 The Channel Plan(s)

Frequency Range	57-71 GHz
The Channel Plan(s)	
Low-rate PHY (LRP) Band	Channel 2 LRP: 60.163-60.797 GHz Channel 3 LRP: 62.323-62.957 GHz
LRP Channel List	Channel 2 LRP: 60.163-60.797 GHz: LRP CH0: 60.163 LRP CH1: 60.321 LRP CH2: 60.480 LRP CH3: 60.639 LRP CH4: 60.797 Channel 3 LRP: 62.323-62.957 GHz: LRP CH0: 62.323 LRP CH1: 62.481 LRP CH2: 62.640 LRP CH3: 62.799 LRP CH4: 62.957

1.1.2 Antenna Information

Antenna Information	
☐ Equipment placed on the market without antennas	
☒ Integral antenna	
Integral antenna gain	6 dBi for LRP
	☐ Temporary RF connector provided
	☒ No temporary RF connector provided
☐ External antenna (dedicated antennas)	
	☐ Single power level with corresponding antenna(s)
	☐ Multiple power settings and corresponding antenna(s)

1.1.3 Power Levels

Worst Power Levels for LRP			
Applicable power levels	☐ Conducted ☒ EIRP		
Antenna gain	6 dBi		
Frequency (GHz)	Highest setting (P_{high}): (dBm)		
	Modulation	AV Power	Peak Power
60.163	BPSK	13.04	18.51

1.1.4 Extreme Operating

The Extreme Operating Temperature Range that Apply to the Equipment				
☒ -20 °C to +50 °C				
☐ Other:				
EUT Power Type	From Internal Power Supply			
Supply Voltage	☒ AC	State AC voltage	110	V
Supply Voltage	☐ DC	State DC voltage		V

1.1.5 Equipment Use Condition

Equipment Use Condition
☐ Fixed field disturbance sensors at 61-61.5GHz
☐ Except fixed field disturbance sensors at 61-61.5GHz
☒ Except fixed field disturbance sensors

1.1.6 User Condition

Intended Operation
☒ Indoor
☐ Outdoor (except outdoor fixed Point to Point)
☐ Outdoor fixed Point to Point

1.2 Additional Information Provided by the Submitter

1.2.1 Modulation

Modulation	
The LRP modulation is BPSK.	
Can the transmitter operate un-modulated:	☒ Yes ☐ No

1.2.2 Duty Cycle

Duty Cycle			Duty Cycle Factor
The transmitter is intended for	LRP	28.33 %	5.48

1.3 Accessories

Accessories		
No.	**Equipment Name**	**Description**
1	Remote controller*1	-
2	Power cable*1	Non-shielded, 3.0m
3	HDMI cable*1	Shielded, 3.0m

1.4 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	TX Device	EPSON	WIT4-G0	N/A
2	4K DVD player	SONY	BDP-S6500	N/A
3	NB	DELL	E6430	N/A
4	Earphone	SHYARO CHI	MIC-04	N/A
5	Mouse	Logitech	M-U0026	N/A
6	Flash disk3.0	ADATA	C103	N/A

For Test Site No: 03CH01-CB and TH01-CB

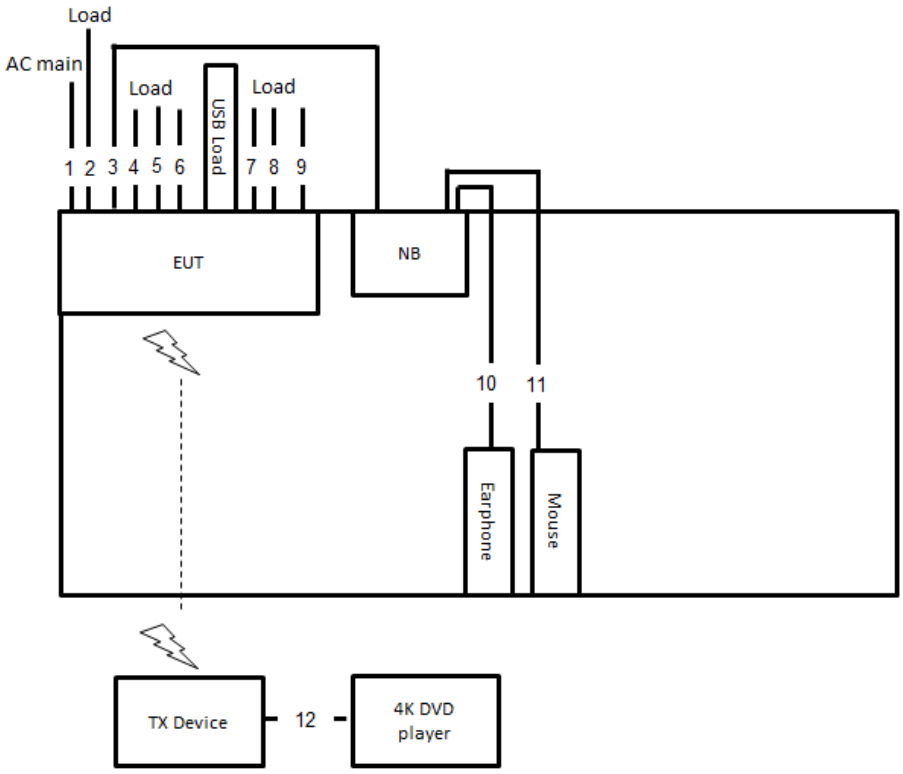
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	NB	DELL	E4300	N/A
2	TX Device	EPSON	WIT4-G0	N/A
3	4K DVD player	SONY	BDP-S6500	N/A

1.5 EUT Operation during Test

High Definition Audio / Video in the 4K format was sent from the transmitter device to the receiver device via the wireless link.

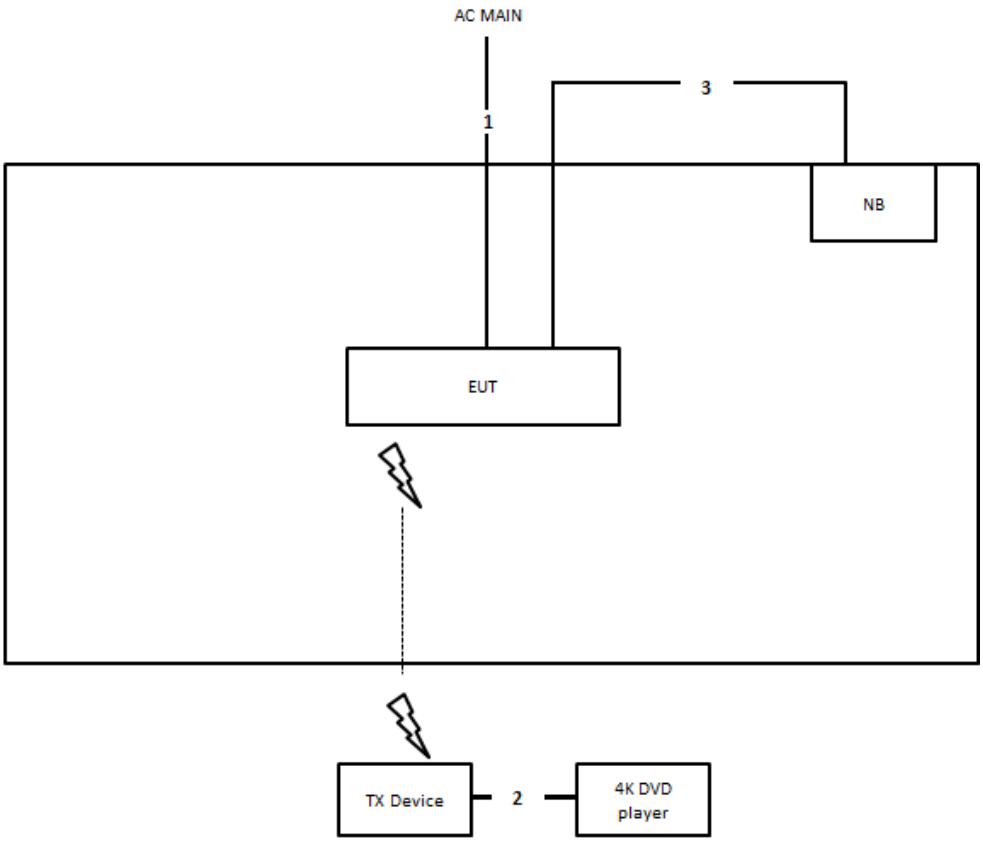
1.6 Test Setup Diagram

Test Setup Diagram - AC Power Conducted Emissions



Item	Connection	Shielded	Length
1	Power cable	No	3m
2	Audio cable	No	1.5m
3	RS232 cable	Yes	1.8m
4	VGA cable	Yes	1.8m
5	RJ-45 cable	No	1.5m
6	USB cable	Yes	1.5m
7	HDMI cable	Yes	1.5m
8	HDMI cable	Yes	3m
9	USB to HDMI cable	Yes	1.5m
10	Audio cable	No	1.1m
11	USB cable	Yes	1.5m
12	HDMI cable	Yes	1.5m

Test Setup Diagram - Transmitter Spurious Emissions



Item	Connection	Shielded	Length
1	Power cable	No	3m
2	HDMI cable	Yes	1.5m
3	RS232 cable	Yes	1.8m

1.7 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15.255
- ANSI C63.10-2013 Section 9. “Procedures for testing millimeter-wave systems”

1.8 Testing Location

Testing Location				
☐	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)		
		TEL : 886-3-327-3456	FAX : 886-3-327-0973	
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.		
		TEL : 886-3-656-9065	FAX : 886-3-656-9085	
Test Site No.				
CO01-CB		03CH01-CB		TH01-CB

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of Equipment under Test

2.1 Test Channel Frequencies

Nominal Channel Bandwidth			
Channel Plan (GHz)	Low Channel (GHz)	Middle Channel (GHz)	High Channel (GHz)
Channel 2 LRP: 60.163-60.797	60.163	60.480	60.797
Channel 3 LRP: 62.323-62.957	62.323	62.640	62.957

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz) Channel Plan 2&3
	LRP
AC Power Conducted Emissions	CTX
Occupied Bandwidth	60.163, 60.480, 60.797 & 62.323, 62.640, 62.957
EIRP Power	60.163, 60.480, 60.797 & 62.323, 62.640, 62.957
Peak Conducted Power	60.163, 60.480, 60.797 & 62.323, 62.640, 62.957
Transmitter Spurious Emissions (below 1 GHz)	CTX
Transmitter Spurious Emissions (1 GHz-40 GHz)	60.163, 60.480, 60.797 & 62.323, 62.640, 62.957
Transmitter Spurious Emissions (above 40 GHz)	60.163, 60.480, 60.797 & 62.323, 62.640, 62.957
Frequency Stability	Un-Modulation

2.3 Far Field Boundary Calculations

The far-field boundary is given as:

far field = (2 * L^2) / λ

where:

L = Largest Antenna Dimension, including the reflector, in meters

λ = wavelength in meters

Far Field (m)				
Frequency (GHz)	**L (m)**	**Lambda (m)**	**d(Far Field) (m)**	**d(Far Field) (cm)**
60.163	0.02	0.0049865	0.160	16.04
60.480	0.02	0.0049603	0.161	16.13
60.797	0.02	0.0049345	0.162	16.21
62.323	0.02	0.0049732	0.161	16.09
62.640	0.02	0.0047893	0.167	16.70
62.957	0.02	0.0047652	0.168	16.79

3 Transmitter Test Result

3.1 AC Power Conducted Emissions

3.1.1 Limit of AC Power Conducted Emissions

AC Power Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

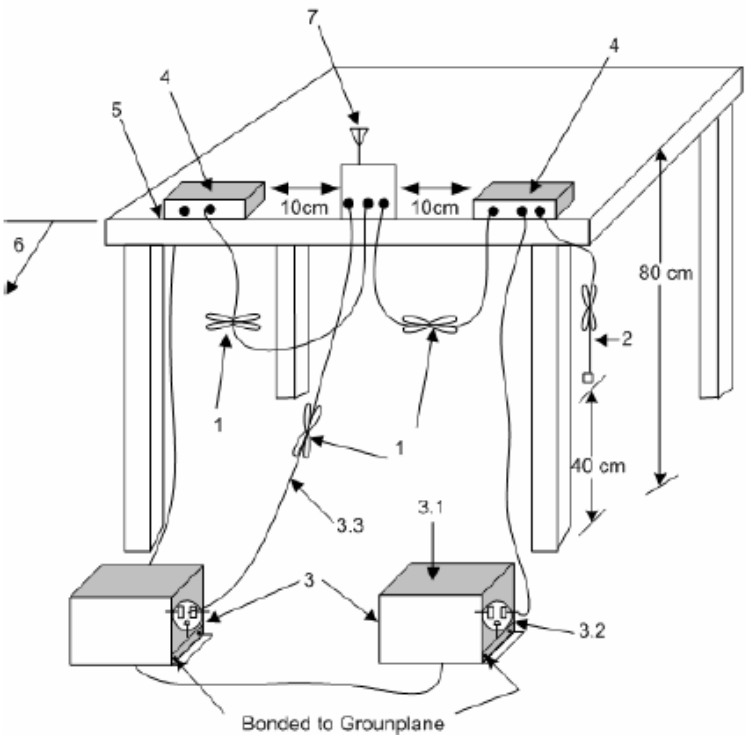
Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 6.2.

3.1.4 Test Setup

AC Power Conducted Emissions



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.

2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.

3.1—All other equipment powered from additional LISN(s).

3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.

3.3—LISN at least 80 cm from nearest part of EUT chassis.

4—Non-EUT components of EUT system being tested.

5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.

6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

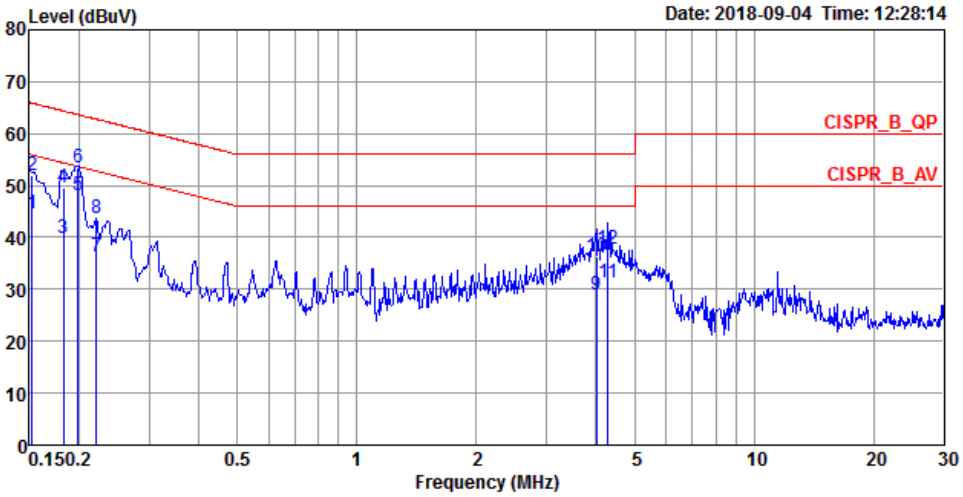
3.1.5 Test Result of AC Power Conducted Emissions

Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.2.3

NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.

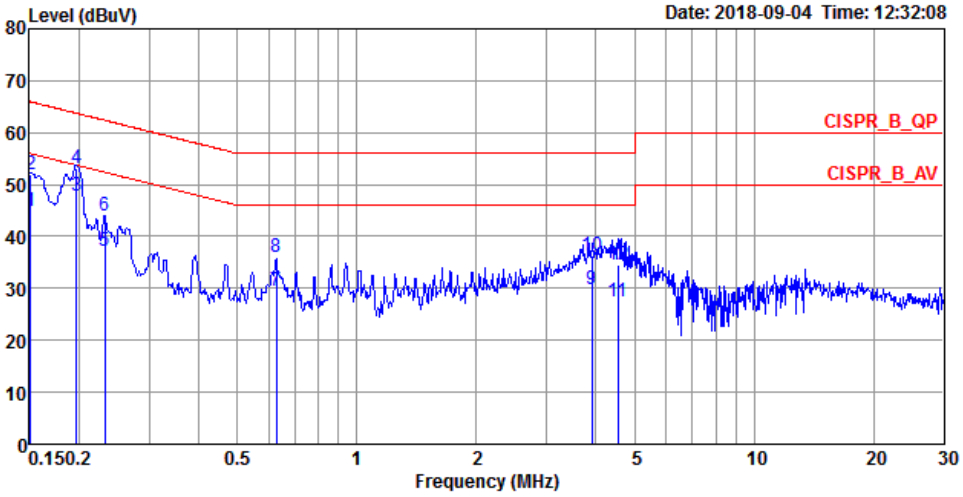
NOTE 2: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.

Temp	24°C	Humidity	59%
Test Engineer	Peter Wu	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1524	44.71	-11.16	55.87	34.64	9.91	0.16	Average	LINE
2	0.1524	51.83	-14.04	65.87	41.76	9.91	0.16	QP	LINE
3	0.1825	39.71	-14.66	54.37	29.65	9.91	0.15	Average	LINE
4	0.1825	49.51	-14.86	64.37	39.45	9.91	0.15	QP	LINE
5	0.1986	48.14	-5.53	53.67	38.09	9.91	0.14	Average	LINE
6	0.1986	53.58	-10.09	63.67	43.53	9.91	0.14	QP	LINE
7	0.2208	36.23	-16.56	52.79	26.18	9.91	0.14	Average	LINE
8	0.2208	43.78	-19.01	62.79	33.73	9.91	0.14	QP	LINE
9	4.0062	28.96	-17.04	46.00	18.85	9.98	0.13	Average	LINE
10	4.0062	36.26	-19.74	56.00	26.15	9.98	0.13	QP	LINE
11	4.2918	31.24	-14.76	46.00	21.12	9.99	0.13	Average	LINE
12	4.2918	37.74	-18.26	56.00	27.62	9.99	0.13	QP	LINE

Temp	24°C	Humidity	59%
Test Engineer	Peter Wu	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	44.86	-11.10	55.96	34.78	9.92	0.16	Average	NEUTRAL
2	0.1508	51.98	-13.98	65.96	41.90	9.92	0.16	QP	NEUTRAL
3	0.1965	47.70	-6.06	53.76	37.64	9.92	0.14	Average	NEUTRAL
4	0.1965	53.18	-10.58	63.76	43.12	9.92	0.14	QP	NEUTRAL
5	0.2316	37.21	-15.18	52.39	27.15	9.92	0.14	Average	NEUTRAL
6	0.2316	44.04	-18.35	62.39	33.98	9.92	0.14	QP	NEUTRAL
7	0.6271	29.62	-16.38	46.00	19.54	9.92	0.16	Average	NEUTRAL
8	0.6271	36.10	-19.90	56.00	26.02	9.92	0.16	QP	NEUTRAL
9	3.9014	29.77	-16.23	46.00	19.66	9.98	0.13	Average	NEUTRAL
10	3.9014	36.26	-19.74	56.00	26.15	9.98	0.13	QP	NEUTRAL
11	4.5494	27.42	-18.58	46.00	17.29	10.00	0.13	Average	NEUTRAL
12	4.5494	34.55	-21.45	56.00	24.42	10.00	0.13	QP	NEUTRAL

3.2 Occupied Bandwidth

3.2.1 Limit of Occupied Bandwidth

6dBc Bandwidth (see Note 1)	None
26dBc Bandwidth	None
99% Occupied Bandwidth (see Note 2)	None

NOTE 1: The 6dBc bandwidth is the frequency bandwidth of the signal power at the -6 dBc points when measured with a 100 kHz resolution bandwidth. These measurements shall also be performed at normal test conditions.

NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions.

3.2.2 Measuring Instruments

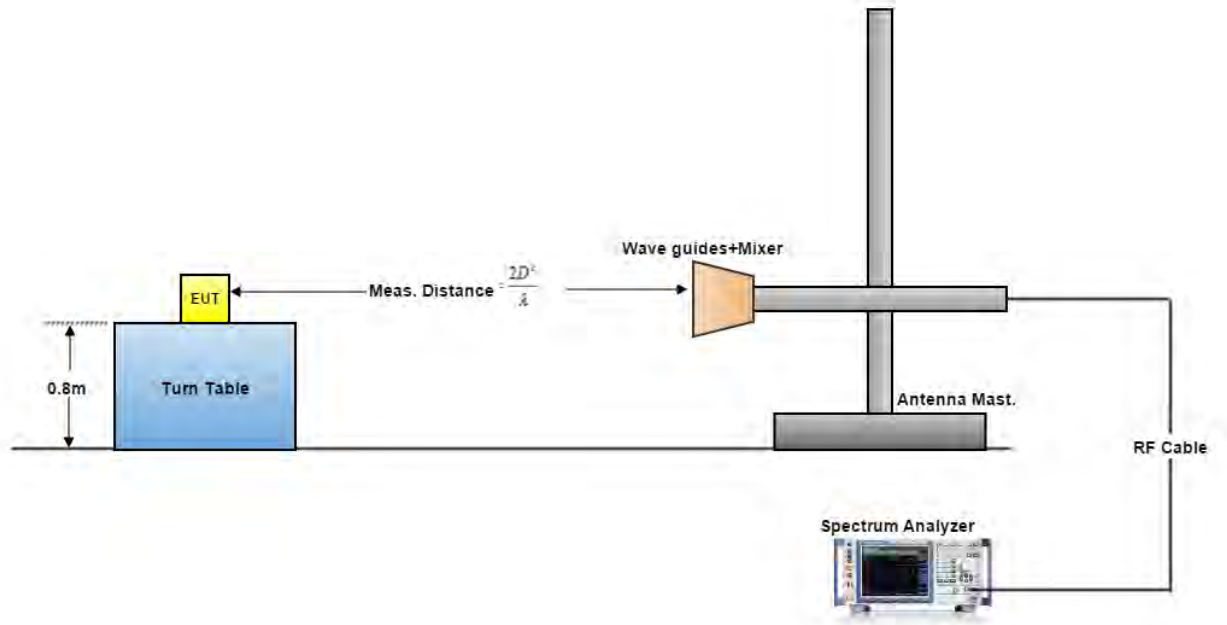
Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 6.9.2.

3.2.4 Test Setup

Occupied Channel Bandwidth

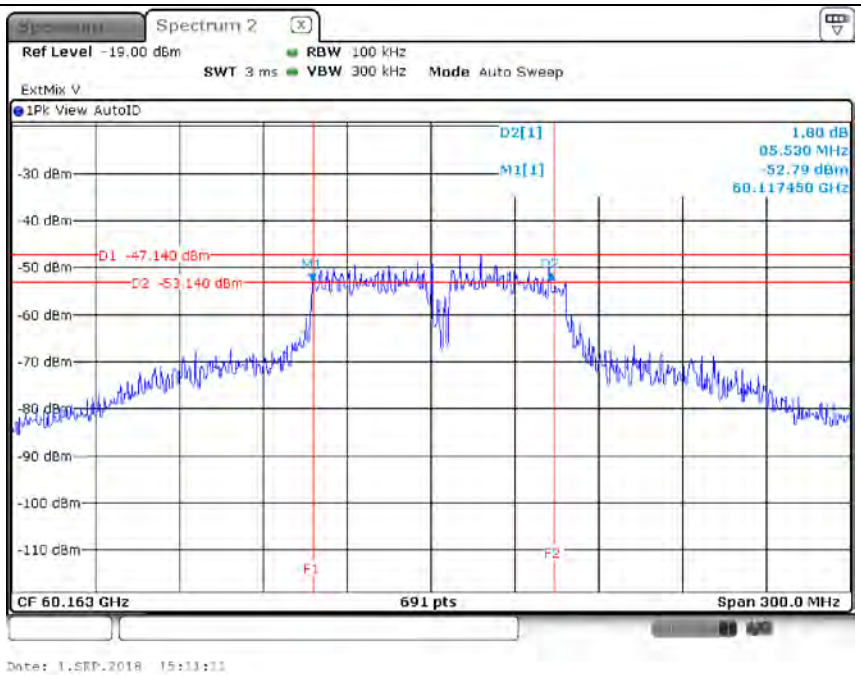


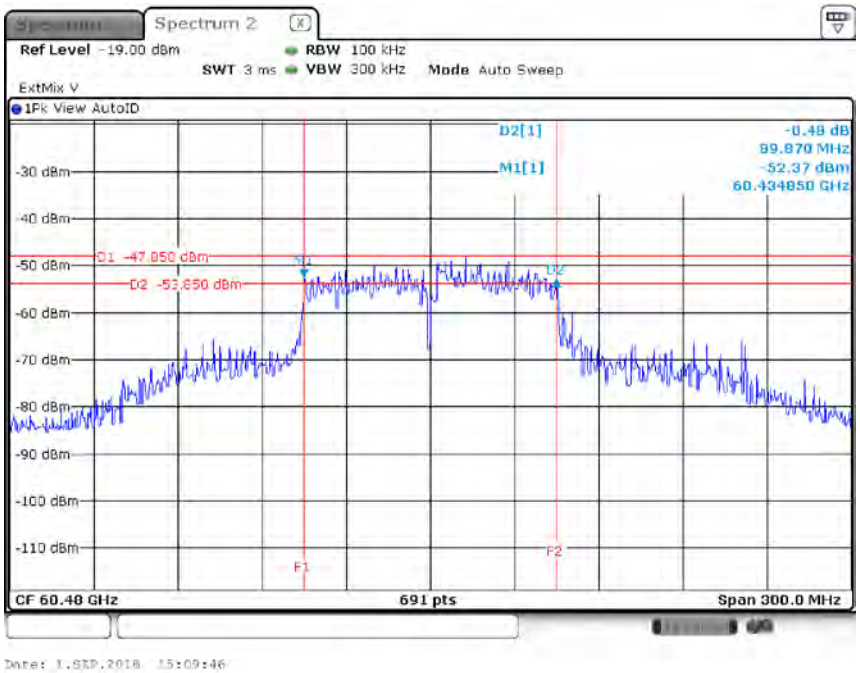
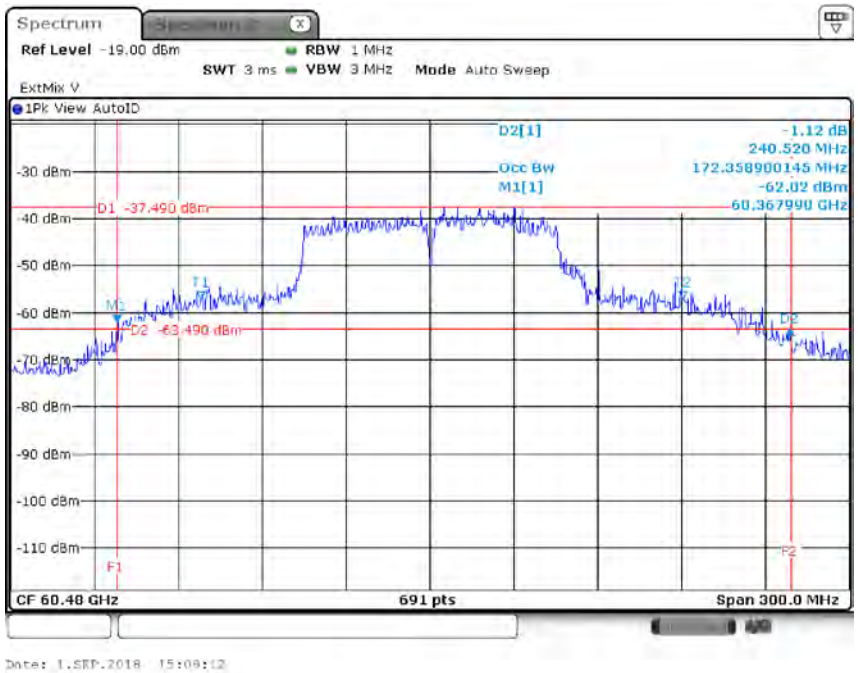
3.2.5 Test Result of Occupied Bandwidth

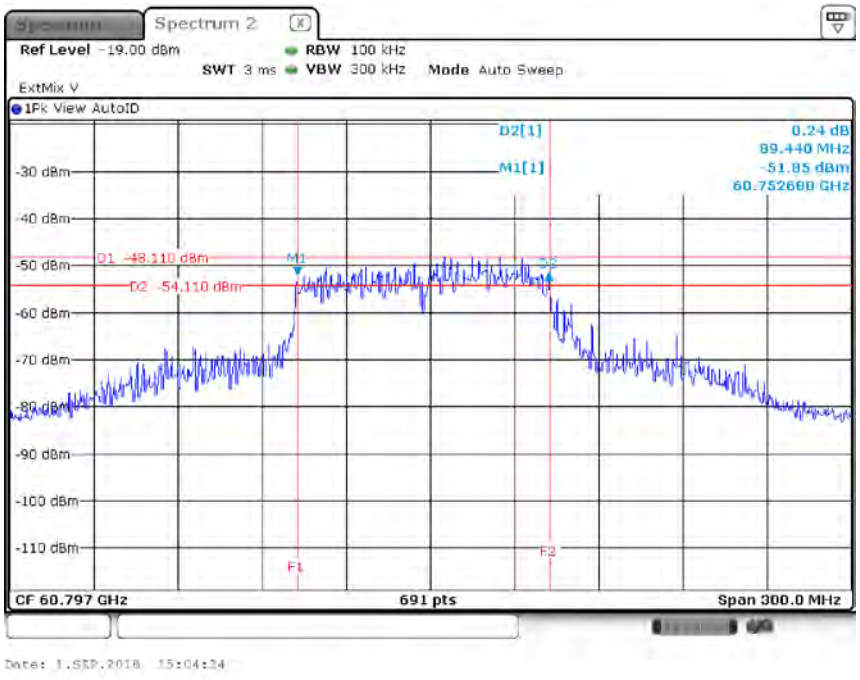
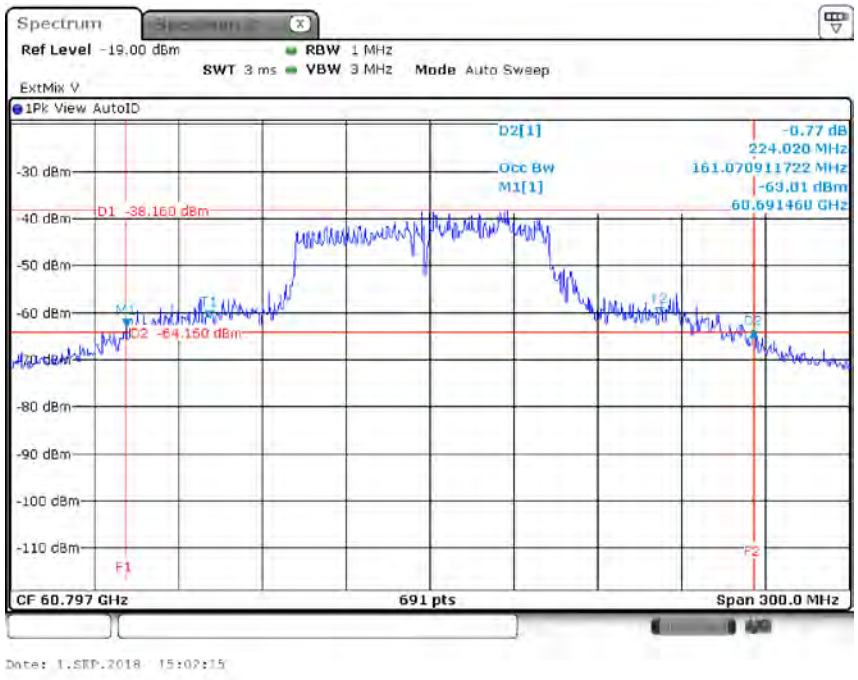
Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.9.2
NOTE: If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Refer as ANSI C63.10, clause 15, observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources.	

Temp	23.5℃	**Humidity**	65%		
Test Engineer	Lance Wu				
Test Results					
Channel Plan (GHz)	**Test Freq. (GHz)**	**6 dBc Bandwidth (MHz)**	**Occupied Bandwidth (MHz)**	**26 dBc Bandwidth (MHz)**	**Limit (MHz)**
Channel 2 LRP: 60.163-60.797	60.163	85.53	158.03	228.36	N/A
	60.480	89.87	172.36	240.52	N/A
	60.797	89.44	161.07	224.02	N/A
Channel 3 LRP: 62.323-62.957	62.323	74.67	157.60	230.54	N/A
	62.640	90.3	152.82	226.63	N/A
	62.957	92.91	151.09	217.95	N/A

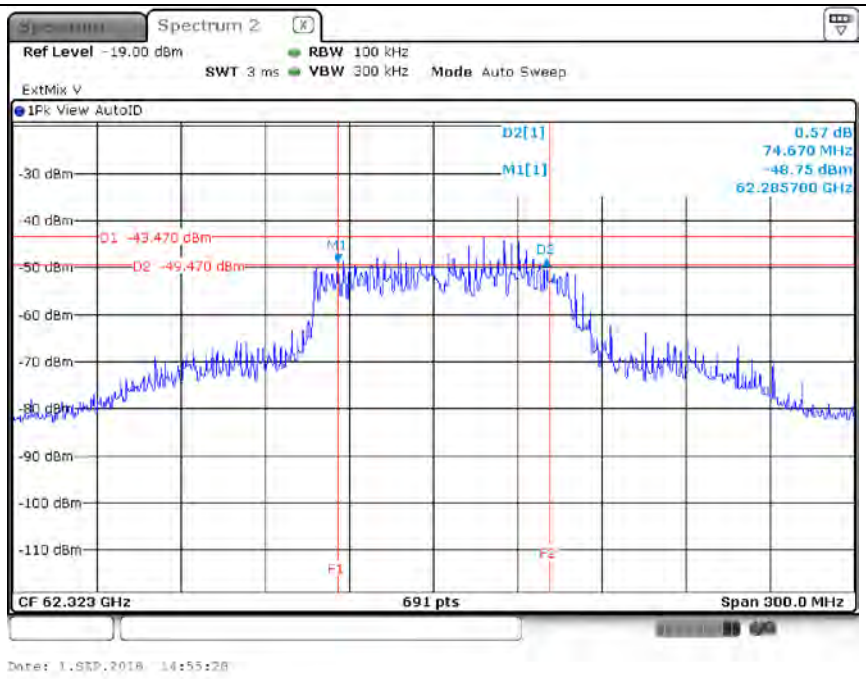
3.2.5.1 Bandwidth Plots

Channel Plan: Channel 2 LRP: 60.163-60.797 GHz
Test Frequency: 60.163 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth

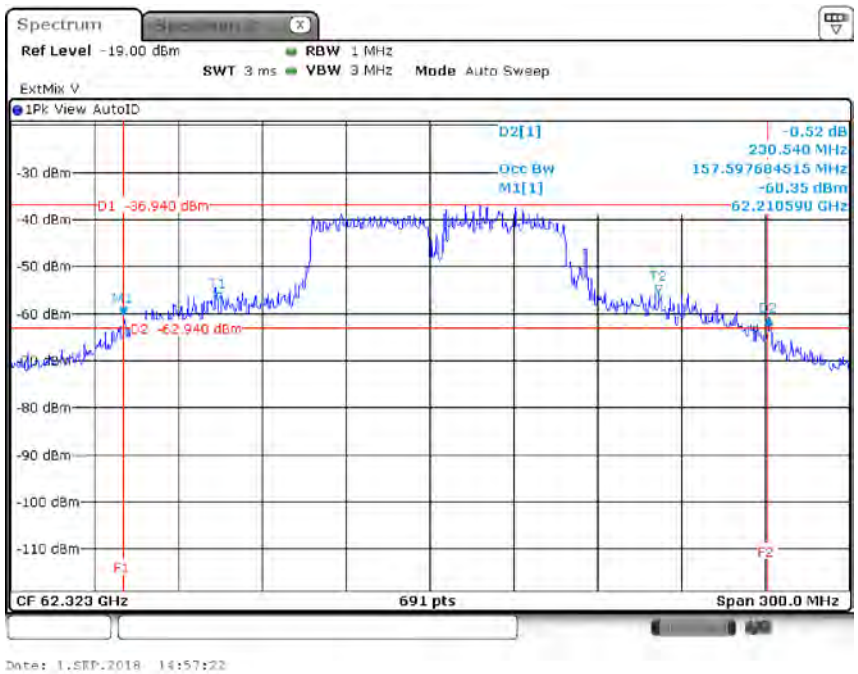

Test Frequency: 60.480 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth


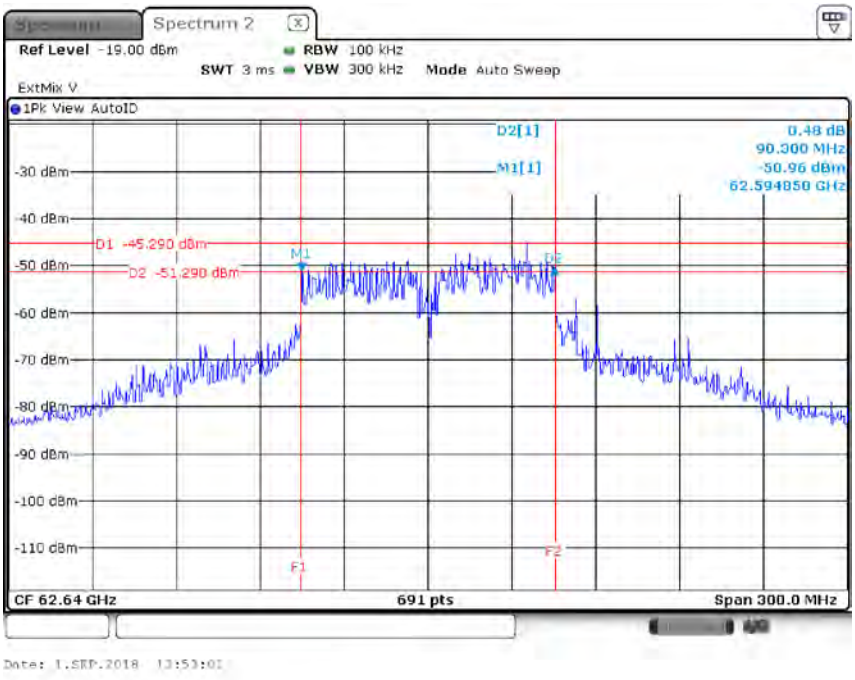
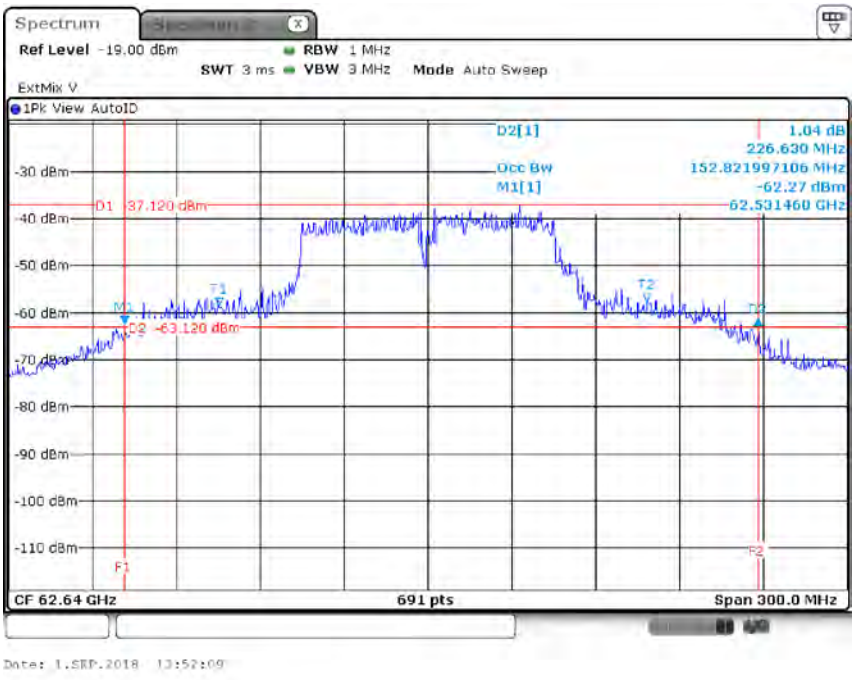
Test Frequency: 60.797 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth


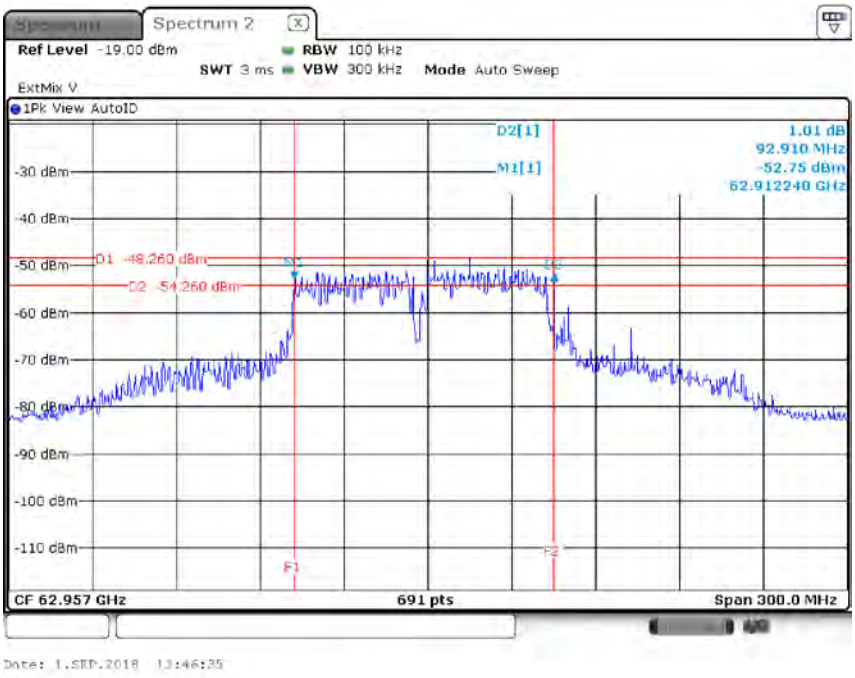
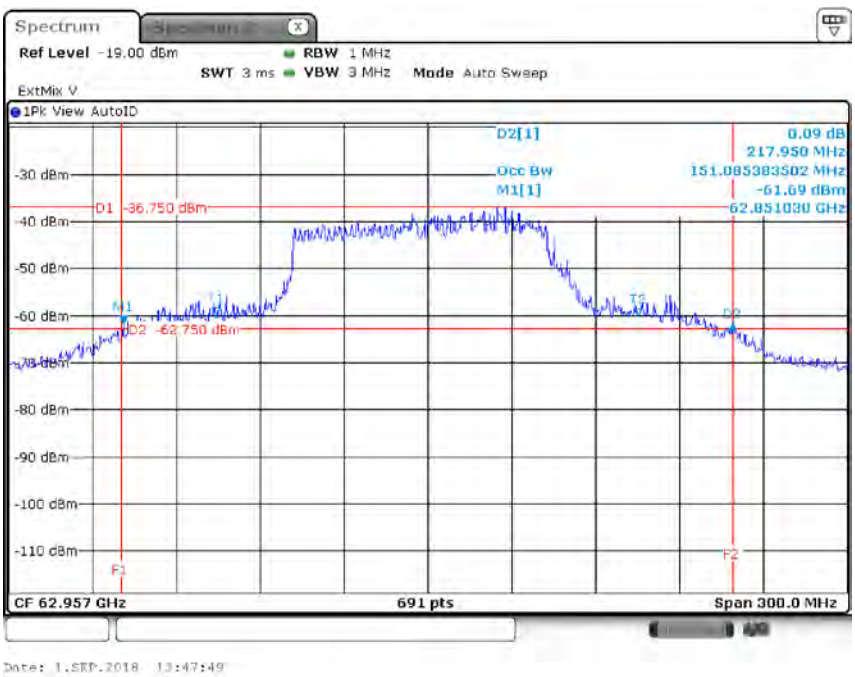
Channel Plan: Channel 3 LRP: 62.323-62.957 GHz
Test Frequency: 62.323 GHz
6 dBc Bandwidth



Occupied Bandwidth&26 dBc Bandwidth



Test Frequency: 62.640 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth


Test Frequency: 62.957 GHz
6 dBc Bandwidth

Occupied Bandwidth&26 dBc Bandwidth


3.3 EIRP Power

3.3.1 Limit of EIRP Power

EIRP Power Limit		
Use Condition	**EIRP Average Power**	**EIRP Peak Power**
Fixed field disturbance sensors at within the frequency band 61-61.5GHz	40 dBm	43 dBm
Fixed field disturbance sensors at outside of the band 61-61.5GHz	10 dBm	13 dBm
Except fixed field disturbance sensors at 61-61.5GHz	N/A	10 dBm
Except outdoor fixed Point to Point	40 dBm	43 dBm
Outdoor fixed Point to Point	82 dBm	85 dBm

NOTE: For the applicable limit, see FCC 15.255 (c)

3.3.2 Measuring Instruments

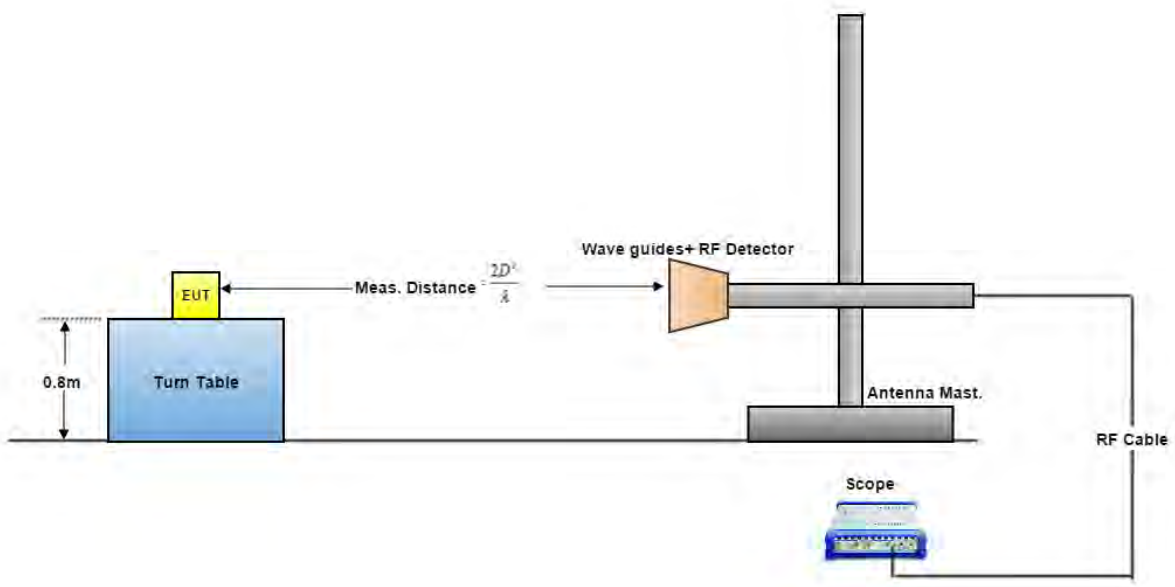
Refer a measuring instruments list in this test report.

3.3.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013 clause 9.3 & 9.5.

3.3.4 Test Setup

EIPR Power



3.3.5 Test Result of EIRP Power

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.11

NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing.

3.3.5.1 Test Result of EIRP Power

Temp	23.5℃						Humidity		65%			
Test Engineer	Lance Wu						Test Distance		0.5 m			
Test Date	Sep. 01, 2018~Sep. 13, 2018											
Test Results												
Channel Plan (GHz)	Test Freq. (GHz)	Rx Gain (dBi)	DSO (mV)		Power Measured (dBm)		E_{Meas} (dBuV/m)		EIRP (dBm)		EIRP Limit (dBm) (note 1)	
			Peak	AV	Peak	AV	Peak	AV	Peak	AV	Peak	AV
Channel 2 LRP: 60.163-60.797	60.163	23.60	15.03	4.51	-19.91	-25.39	129.33	123.86	18.51	13.04	43	40
	60.480	23.60	12.81	3.32	-20.73	-26.21	128.56	123.08	17.74	12.26	43	40
	60.797	23.60	12.63	3.91	-20.25	-25.73	129.09	123.61	18.26	12.79	43	40
Channel 3 LRP: 62.323-62.957	62.323	23.60	8.11	2.22	-22.58	-28.06	126.69	121.21	15.87	10.39	43	40
	62.640	23.60	13.01	3.21	-20.65	-26.13	128.94	123.47	18.12	12.65	43	40
	62.957	23.60	7.43	2.71	-22.26	-27.74	127.38	121.90	16.56	11.08	43	40

The measured power level is converted to EIRP using the Friis equation:

For radiated emissions, calculate the field strength (E) in dBμV/meter.

$E = 126.8 – 20\log(\lambda) + P - G$

where:

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

P : is the power measured at the output of the test antenna, in dBm

λ : is the wavelength of the emission under investigation [300/fMHz], in m

G : is the gain of the test antenna, in dBi For radiated emissions, calculate the EIRP (dBm). If the measurement was performed in the far field, calculate the EIRP.

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 1: For the applicable limit, see FCC 15.255 (c)

NOTE 2: The comparison method which replaces EUT with a signal generator is used to find the correct conversion factor between “DSO(mV)” & “Power Measured(dBm)”.

3.4 Peak Conducted Power

3.4.1 Limit of Peak Conducted Power

Peak Conducted Power Limit	
6dBc Bandwidth	**Peak Conducted Power (note 1)**
> 100MHz	500mW
≤ 100MHz	500mW x (BW/100) (see note 2)
NOTE 1: For the applicable limit, see FCC 15.255(c) NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)	

3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.4.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.5

3.4.4 Test Result of Peak Conducted Power

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.11
NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing.	

3.4.4.1 Peak Conducted Power

Temp	23.5℃			Humidity	65%		
Test Engineer	Lance Wu						
Test Date	Sep. 01, 2018~Sep. 13, 2018						
Test Results							
Channel Plan (GHz)	**Test Freq. (GHz)**	**EIRP (dBm)**	**Max. Ant. Gain (dBi)**	**Peak Power (dBm)** (note1)	**Peak Power (mW)**	**6dBc BW (MHz)** (note2)	**Peak Power Limit (mW)** (note3)
Channel 2 LRP: 60.163-60.797	60.163	18.51	6	12.51	17.838	85.53	427.65
	60.480	18.26	6	12.26	16.845	89.87	449.35
	60.797	18.12	6	12.12	16.308	89.44	447.20
Channel 3 LRP: 62.323-62.957	62.323	15.87	6	9.87	9.698	74.67	373.35
	62.640	18.12	6	12.12	16.308	90.30	451.50
	62.957	16.56	6	10.56	11.371	92.91	464.55

NOTE 1: Because EUT used for the integral antenna without temporary RF connector provided. Therefore peak conducted power is equal to EIRP power subtract the antenna gain.

NOTE 2: For the 6dBc bandwidth, see test report clause 3.2.5.

NOTE 3: For the applicable limit, see FCC 15.255(c)

NOTE 4: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm)

P(cond) = EIRP - G(dBi)

where:

G(dBi) is gain of EUT antenna.

3.5 Transmitter Spurious Emissions

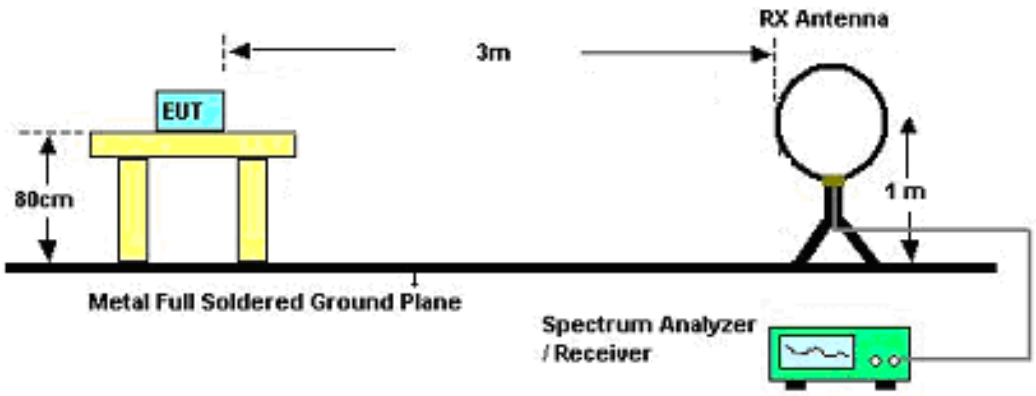
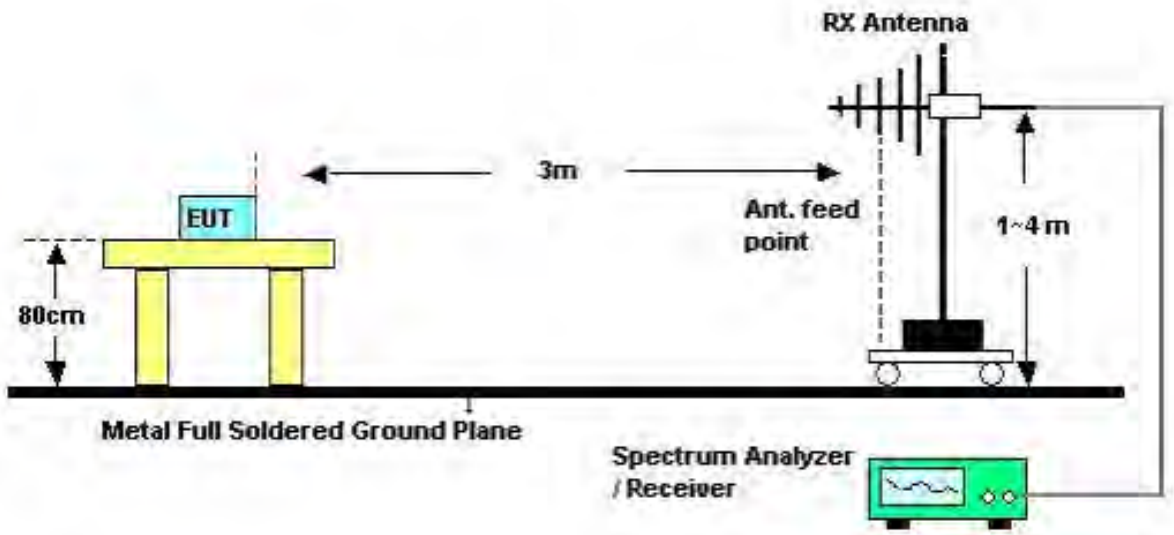
3.5.1 Limit of Transmitter Spurious Emissions

Frequency Range	Limit
Radiated emissions below 40 GHz	FCC 15.209
Radiated emissions above 40 GHz – 200GHz	90 pW/cm^2 @ 3 m (Equivalent EIRP 102 μW, -9.91dBm)
NOTE 1: For the applicable limit, see FCC 15.255(d)	
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

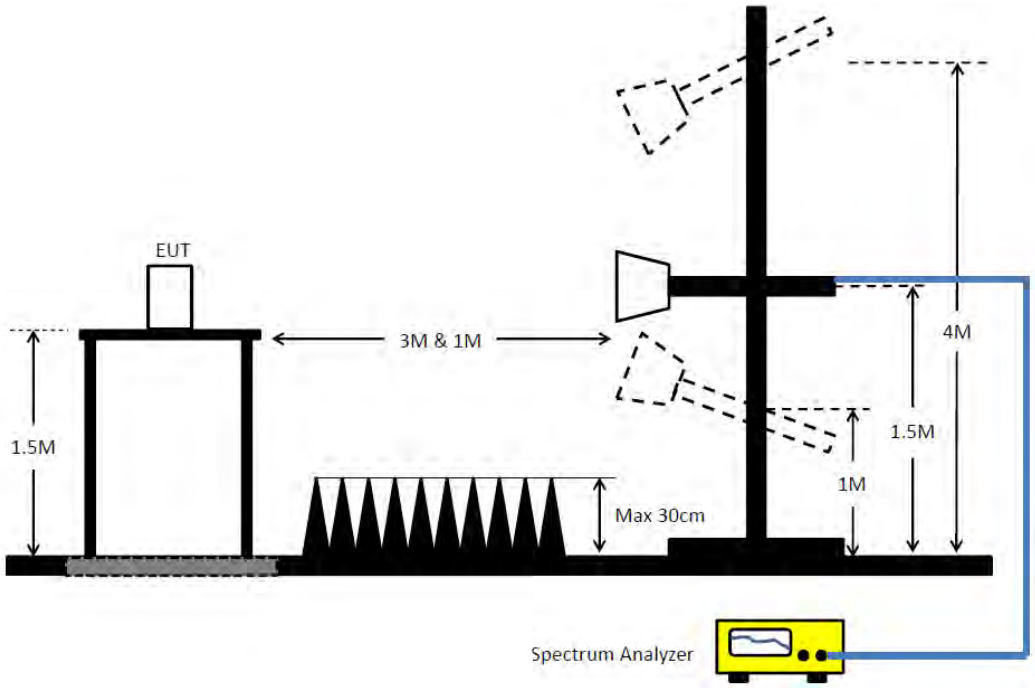
3.5.2 Test Procedures

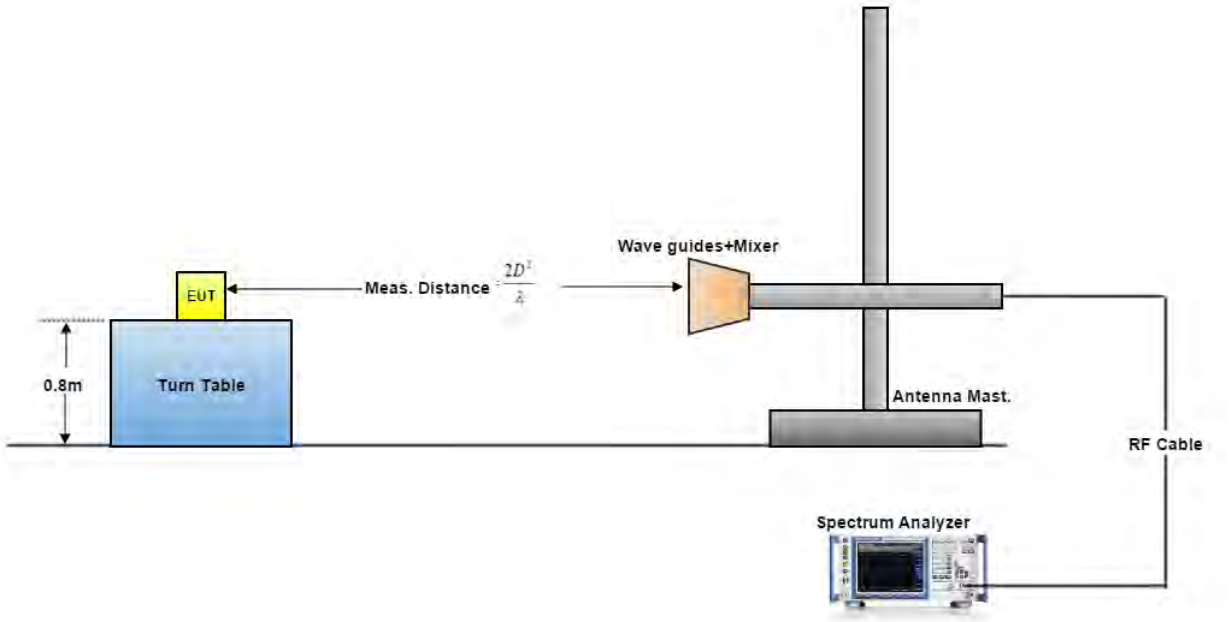
Method of measurement: Refer as ANSI C63.10-2013, clause 9.12

3.5.3 Test Setup

Transmitter Spurious Emissions
9kHz ~30MHz

30MHz~1GHz


1GHz ~40GHz



Above 40GHz


A measuring distance of at 3 m shall be used for measurements at frequencies up to 15 GHz. For frequencies above 15 GHz, any suitable measuring distance may be used. The measurement distance is chosen up to far field distance, depending on the test system noise floor for detecting spurious emission signals. Then above 15 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from spec. distance (3 m) to measurement distance. Distance extrapolation factor = 20 log (spec. distance [3 m] / measurement distance [N m]) (dB) .The measurements described in ANSI C63.10, clause 7.8.6. If the emission cannot be detected at 1 m, reduce the RBW to increase system sensitivity. Note the value. If the emission still cannot be detected, move the horn closer to the EUT, noting the distance at which a measurement is made.

3.5.4 Test Result of Transmitter Spurious Emissions

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.12 、9.13
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	

3.5.4.1 Test Result of Transmitter Spurious Emissions (Below 30MHz)

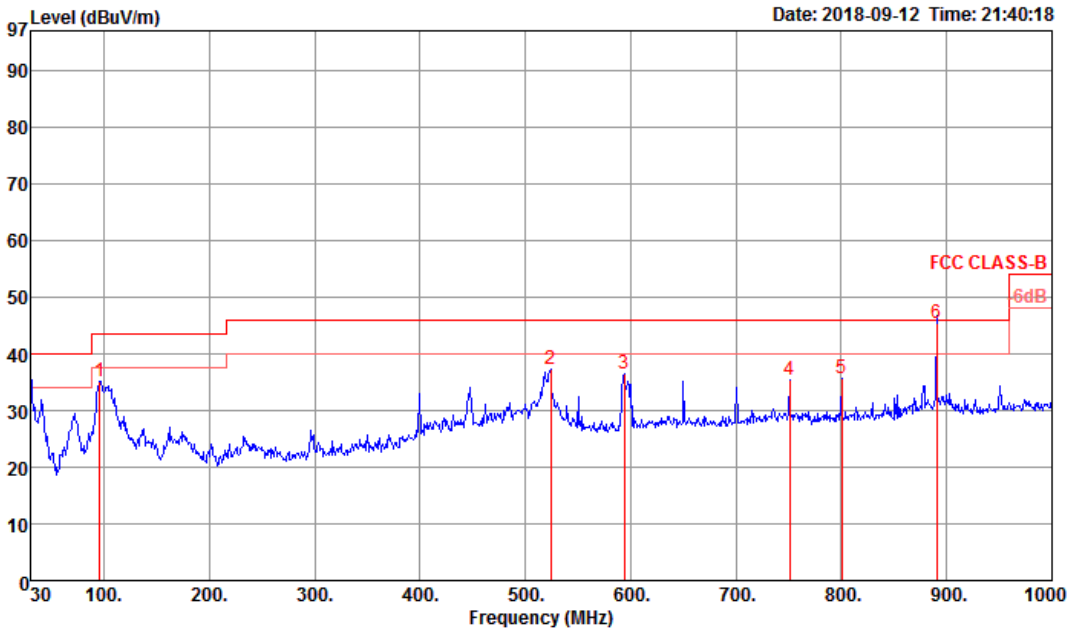
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.5.4.2 Test Result of Transmitter Spurious Emissions

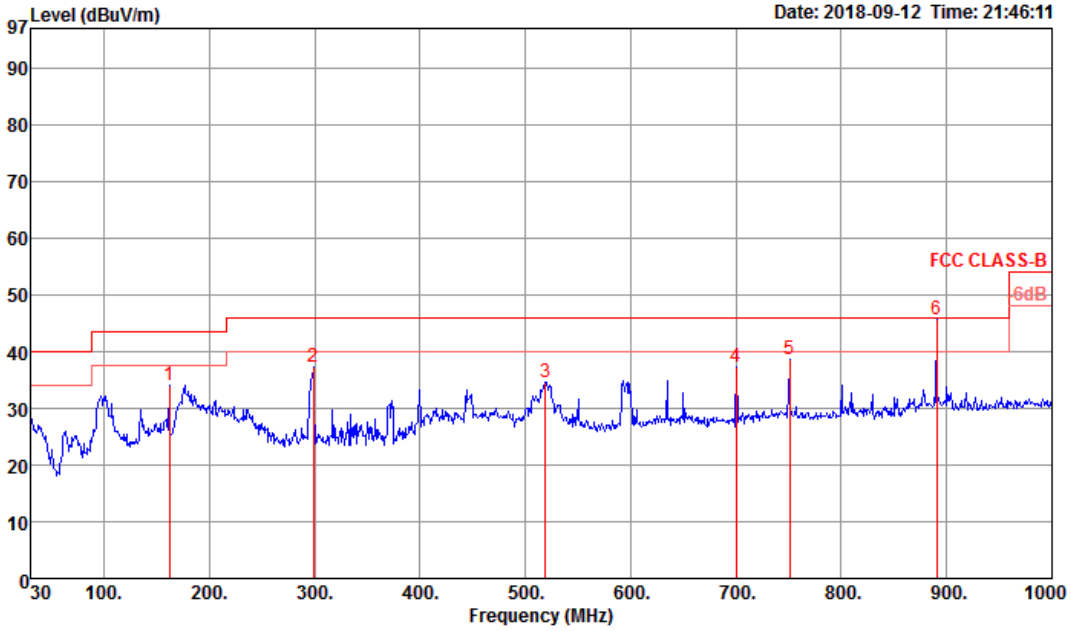
Temp	23.5℃	**Humidity**	65%
Test Engineer	Lance Wu	**Test Distance**	3 m
Test Range	30 MHz – 1000 MHz	**Test Configuration**	CTX

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	95.96	35.08	43.50	-8.42	49.44	0.85	16.50	31.71	300	360	Peak	VERTICAL
2	523.73	37.27	46.00	-8.73	42.55	2.84	24.00	32.12	300	360	Peak	VERTICAL
3	593.57	36.35	46.00	-9.65	41.64	1.96	24.95	32.20	300	360	Peak	VERTICAL
4	750.71	35.28	46.00	-10.72	37.61	3.78	26.10	32.21	300	360	Peak	VERTICAL
5	800.18	35.70	46.00	-10.30	38.03	3.51	26.40	32.24	300	360	Peak	VERTICAL
6	890.39	45.28	46.00	-0.72	46.00	4.33	27.10	32.15	119	183	QP	VERTICAL

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	161.92	33.98	43.50	-9.52	48.28	1.06	16.40	31.76	100	0	Peak	HORIZONTAL
2	298.69	37.34	46.00	-8.66	47.01	2.62	19.56	31.85	100	0	Peak	HORIZONTAL
3	518.88	34.58	46.00	-11.42	40.06	2.86	23.77	32.11	100	0	Peak	HORIZONTAL
4	700.27	37.17	46.00	-8.83	40.59	3.28	25.60	32.30	100	0	Peak	HORIZONTAL
5	750.71	38.67	46.00	-7.33	41.00	3.78	26.10	32.21	100	0	Peak	HORIZONTAL
6	890.39	45.58	46.00	-0.42	46.30	4.33	27.10	32.15	100	326	QP	HORIZONTAL

Test Plan: Channel 2 LRP: 60.163-60.797

Temp	23.5℃	**Humidity**	65%
Test Engineer	Lance Wu	**Test Distance**	3 m
Test Range	1 GHz – 18 GHz	**Test Freq. (GHz)**	60.163
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.01	54.82	74.00	-19.18	59.00	4.05	28.52	36.75	154	91	Peak	VERTICAL
2	2967.02	42.11	54.00	-11.89	46.29	4.05	28.52	36.75	154	91	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.01	45.71	54.00	-8.29	49.89	4.05	28.52	36.75	162	11	Average	HORIZONTAL
2	2967.03	58.04	74.00	-15.96	62.22	4.05	28.52	36.75	162	11	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	60.163
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18001.22	56.71	63.54	-6.83	43.02	10.76	37.40	34.47	150	55	Average	VERTICAL
2	18001.33	67.35	83.54	-16.19	53.66	10.76	37.40	34.47	150	55	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.50	57.22	63.54	-6.32	43.53	10.76	37.40	34.47	150	92	Average	HORIZONTAL
2	18001.43	68.09	83.54	-15.45	54.40	10.76	37.40	34.47	150	92	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	3 m
Test Range	1 GHz – 18 GHz	Test Freq. (GHz)	60.480
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.00	43.75	54.00	-10.25	47.93	4.05	28.52	36.75	141	184	Average	VERTICAL
2	2967.05	56.66	74.00	-17.34	60.84	4.05	28.52	36.75	141	184	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.03	41.60	54.00	-12.40	45.78	4.05	28.52	36.75	174	160	Average	HORIZONTAL
2	2967.05	53.96	74.00	-20.04	58.14	4.05	28.52	36.75	174	160	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	60.480
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18001.05	56.15	63.54	-7.39	42.46	10.76	37.40	34.47	150	48	Average	VERTICAL
2	18001.27	67.24	83.54	-16.30	53.55	10.76	37.40	34.47	150	48	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.72	57.12	63.54	-6.42	43.43	10.76	37.40	34.47	150	76	Average	HORIZONTAL
2	18001.05	68.10	83.54	-15.44	54.41	10.76	37.40	34.47	150	76	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	3 m
Test Range	1 GHz – 18 GHz	Test Freq. (GHz)	60.797
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2966.68	56.51	74.00	-17.49	60.69	4.05	28.52	36.75	134	185	Peak	VERTICAL
2	2967.03	43.82	54.00	-10.18	48.00	4.05	28.52	36.75	134	185	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2966.99	43.20	54.00	-10.80	47.38	4.05	28.52	36.75	153	92	Average	HORIZONTAL
2	2966.99	54.74	74.00	-19.26	58.92	4.05	28.52	36.75	153	92	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	60.797
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.82	56.06	63.54	-7.48	42.37	10.76	37.40	34.47	150	24	Average	VERTICAL
2	18000.82	67.55	83.54	-15.99	53.86	10.76	37.40	34.47	150	24	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.89	57.11	63.54	-6.43	43.42	10.76	37.40	34.47	150	84	Average	HORIZONTAL
2	18001.01	68.00	83.54	-15.54	54.31	10.76	37.40	34.47	150	84	Peak	HORIZONTAL

Test Plan: Channel 3 LRP: 62.323-62.957

Temp	23.5℃	**Humidity**	65%
Test Engineer	Lance Wu	**Test Distance**	3 m
Test Range	1 GHz – 18 GHz	**Test Freq. (GHz)**	62.323
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2966.00	54.87	74.00	-19.13	59.05	4.05	28.52	36.75	161	84	Peak	VERTICAL
2	2967.14	42.12	54.00	-11.88	46.30	4.05	28.52	36.75	161	84	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.09	58.16	74.00	-15.84	62.34	4.05	28.52	36.75	154	9	Peak	HORIZONTAL
2	2967.11	45.68	54.00	-8.32	49.86	4.05	28.52	36.75	154	9	Average	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	62.323
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18001.10	67.62	83.54	-15.92	53.93	10.76	37.40	34.47	150	56	Peak	VERTICAL
2	18001.22	56.57	63.54	-6.97	42.88	10.76	37.40	34.47	150	56	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.89	56.76	63.54	-6.78	43.07	10.76	37.40	34.47	150	127	Average	HORIZONTAL
2	18001.14	67.88	83.54	-15.66	54.19	10.76	37.40	34.47	150	127	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	3 m
Test Range	1 GHz – 18 GHz	Test Freq. (GHz)	62.640
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.09	57.02	74.00	-16.98	61.20	4.05	28.52	36.75	139	175	Peak	VERTICAL
2	2967.12	43.59	54.00	-10.41	47.77	4.05	28.52	36.75	139	175	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2967.03	53.81	74.00	-20.19	57.99	4.05	28.52	36.75	170	169	Peak	HORIZONTAL
2	2967.11	41.43	54.00	-12.57	45.61	4.05	28.52	36.75	170	169	Average	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	62.640
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.98	56.43	63.54	-7.11	42.74	10.76	37.40	34.47	150	27	Average	VERTICAL
2	18001.07	67.54	83.54	-16.00	53.85	10.76	37.40	34.47	150	27	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18001.23	56.52	63.54	-7.02	42.83	10.76	37.40	34.47	150	113	Average	HORIZONTAL
2	18001.23	67.94	83.54	-15.60	54.25	10.76	37.40	34.47	150	113	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	3 m
Test Range	1 GHz – 18 GHz	Test Freq. (GHz)	62.957
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2966.78	56.48	74.00	-17.52	60.66	4.05	28.52	36.75	141	174	Peak	VERTICAL
2	2967.12	43.47	54.00	-10.53	47.65	4.05	28.52	36.75	141	174	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	2966.84	43.24	54.00	-10.76	47.42	4.05	28.52	36.75	155	89	Average	HORIZONTAL
2	2967.01	54.99	74.00	-19.01	59.17	4.05	28.52	36.75	155	89	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Distance	1 m
Test Range	18 GHz – 40 GHz	Test Freq. (GHz)	62.957
Test Date	Sep. 13, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.82	56.06	63.54	-7.48	42.37	10.76	37.40	34.47	150	24	Average	VERTICAL
2	18000.82	67.55	83.54	-15.99	53.86	10.76	37.40	34.47	150	24	Peak	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	18000.99	56.07	63.54	-7.47	42.38	10.76	37.40	34.47	150	101	Average	HORIZONTAL
2	18001.01	67.87	83.54	-15.67	54.18	10.76	37.40	34.47	150	101	Peak	HORIZONTAL

Temp	23.5℃	Humidity	65%
Test Engineer	Lance Wu	Test Date	Sep. 01, 2018~Sep. 13, 2018
Test Range	40GHz – 200GHz		

Test Plan: Channel 2 LRP: 60.163-60.797

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
60.163	23.60	0.50	50.11	-79.12
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.30	3	0.0521	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
60.480	23.60	0.50	50.12	-79.09
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.27	3	0.0524	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
60.797	23.60	0.50	50.09	-79.21
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.39	3	0.0510	90.00	PASS

Test Plan: Channel 3 LRP: 62.323-62.957

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.323	23.60	0.50	50.08	-79.12
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.31	3	0.0520	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.640	23.60	0.50	50.13	-79.22
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.40	3	0.0509	90.00	PASS

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
62.957	23.60	0.50	50.44	-79.31
EIRP (dBm)	**Specification Distance (m)**	**Power Density (pW/cm^2)**	**Limit (pW/cm^2)**	**Test Result**
-42.43	3	0.0505	90.00	PASS

Note:
EIRP = Prx – Grx + Free Space Path Loss = Prx – Grx + 20Log(4πd/ λ)2
Which
Prx = Read Level.
Grx = Rx Antenna Gain.
A distance factor is offset and the formula is 20LOG(D1/D2)
Which
D1 = Specification Distance
D2 = Measurement Distance

3.6 Frequency Stability

3.6.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 15.255(f) and ANSI C63.10-2013, clause 9.14	within the frequency bands
Note: These measurements shall also be performed at normal and extreme test conditions.	

3.6.2 Measuring Instruments

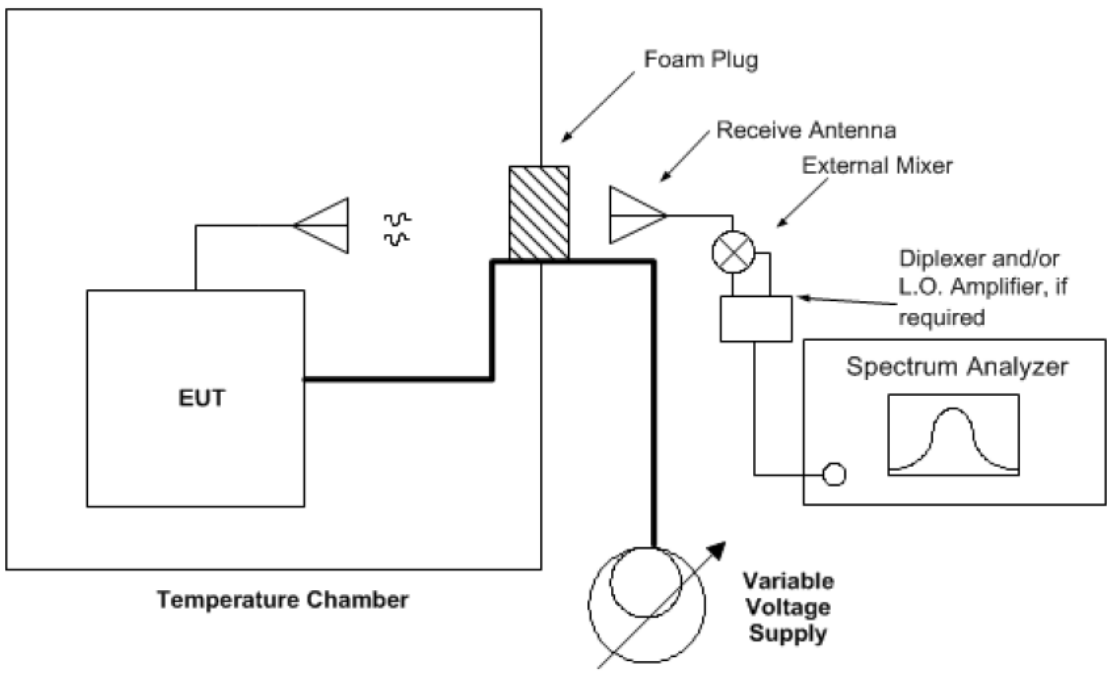
Refer a measuring instruments list in this test report.

3.6.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 9.14.

3.6.4 Test Setup

Frequency Stability



3.6.5 Test Result of Frequency Stability

Test Conditions	see ANSI C63.10, clause 5.11 & clause 9
Test Setup	see ANSI C63.10, clause 9.14
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	

3.6.5.1 Frequency Stability with Respect to Ambient Temperature

Frequency Stability with Respect to Ambient Temperature			
Temp	23.5℃	**Humidity**	65%
Test Engineer	Gino Huang	**Test Date**	Sep. 01, 2018~Sep. 13, 2018

Test Results			
Test Temperature (°C)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
-20	60480.1211	-1.20	Within band
-10	60480.1217	-0.60	Within band
0	60480.1199	-2.40	Within band
5	60480.1222	-0.10	Within band
10	60480.1211	-1.20	Within band
20	60480.1223	Reference	Within band
30	60480.1233	1.00	Within band
35	60480.1233	1.00	Within band
40	60480.1217	-0.60	Within band
50	60480.1237	1.40	Within band
NOTE: The manufacturer's specified temperature range of -20 to 50°C.			

3.6.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage			
Temp	23.5℃	**Humidity**	65%
Test Engineer	Gino Huang	**Test Date**	Sep. 01, 2018~Sep. 13, 2018

Test Results			
Test Voltage: (Vac)	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**Limit (±kHz)**
93.5	60480.1223	0	Within band
110	60480.1223	Reference	Within band
126.5	60480.1224	0.10	Within band

3.7 Operation Restriction and Group Installation

3.7.1 Limit of Operation Restriction and Group Installation

Item	Limit
Operation Restriction	Operation is not permitted for the following products: ♦ Equipment used on aircraft or satellites. (Refer as FCC 15.255 (a)) ♦ Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as FCC 15.255 (a))
Group Installation	Operation is not permitted for the following products: ♦ External phase-locking (Refer as FCC 15.255 (h))

3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not been used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for used on aircraft or satellites. EUT is a wireless video area network (WVAN) for the connection of consumer electronic (CE) audio and video devices.

3.7.3 Result of Group Installation

The frequency, amplitude and phase of the transmit signal 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.

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 31, 2018	Jan. 30, 2019	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50 -16-2	04083	150kHz ~ 100MHz	Dec. 20, 2017	Dec. 19, 2018	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 29, 2017	Dec. 28, 2018	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	150kHz ~ 30MHz	May 22, 2018	May 21, 2019	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 27, 2018	Aug. 26, 2019	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 28, 2018	Jun. 27, 2019	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 04, 2018	Jul. 03, 2019	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100354	9kHz ~ 2.75GHz	Dec. 08, 2017	Dec. 07, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Jul. 27, 2018	Jul. 26, 2019	Radiation (03CH01-CB)
Mixer	OML	M19HW/A	U91113-1	40 ~ 60 GHz	Oct. 12, 2017*	Oct. 11, 2018*	Radiation (03CH01-CB)
Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Oct. 12, 2017*	Oct. 11, 2018*	Radiation (03CH01-CB)
Mixer	OML	M12HW/A	E91113-1	60 ~ 90 GHz	Oct. 12, 2017*	Oct. 11, 2018*	Radiation (03CH01-CB)
Mixer	OML	M08HW/A	F91113-1	90 ~ 140 GHz	Oct. 12, 2017*	Oct. 11, 2018*	Radiation (03CH01-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Oct. 12, 2017*	Oct. 11, 2018*	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	M19RH	U91113-A	40 ~ 60 GHz	N.C.R	N.C.R	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	M15RH	V91113-A	50 ~ 75 GHz	N.C.R	N.C.R	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	M12RH	E91113-A	60 ~ 90 GHz	N.C.R	N.C.R	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	M08RH	F91113-A	90 ~ 140 GHz	N.C.R	N.C.R	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	M05RH	G91113-A	140 ~ 220 GHz	N.C.R	N.C.R	Radiation (03CH01-CB)
Detector	Millitech	DET-15-RPF W0	#A18185(074)	50 ~ 75 GHz	Jan. 29, 2018*	Jan. 29, 2020*	Radiation (03CH01-CB)
Pico Scope	Pico	Pico Scope 6402C	CX372/002	N/A	Jul. 13, 2018	Jul. 12, 2019	Radiation (03CH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 01, 2018	May 31, 2019	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

"*" Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Radiated Emission (40GHz ~ 220GHz)	4.7 dB	Confidence levels of 95%
Temperature	0.7°C	Confidence levels of 95%