



FCC RADIO TEST REPORT

FCC ID : 2AJASU3WG360
Equipment : WiGig USB Adapter
Brand Name : Millitronic
Model Name : MG360
Applicant : Millitronic
7F.-6, No.237, Sec.1,Datong Rd. Xizhi Dist.,New
Taipei City 22161 Taiwan
Manufacturer : Millitronic
7F.-6, No.237, Sec.1,Datong Rd. Xizhi Dist.,New
Taipei City 22161 Taiwan
Standard : 47 CFR FCC Part 15.255

The product was received on Jul. 18, 2018, and testing was started from Jul. 18, 2018 and completed on Nov. 01, 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: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Appendix A. Test Photos

Photographs of EUT v02



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(d)	Occupied Bandwidth	PASS	-
3.3	FCC 15.255(b)(1)	EIRP Power	PASS	-
3.4	FCC 15.255(d)	Peak Conducted Power	PASS	-
3.5	FCC 15.255(c)	Transmitter Spurious Emissions	PASS	-
3.6	FCC 15.255(e)	Frequency Stability	PASS	-
3.7	FCC 15.255(a),(g)	Operation Restriction and Group Installation	PASS	-

Reviewed by: Sam Chen

Report Producer: Viola Huang



1 General Description

1.1 Information

1.1.1 The Channel Plan(s)

Frequency Range	57-71 GHz
The Channel Plan(s)	Channel 2: 60.48 GHz

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	Printed Antenna	N/A	11.5

1.1.3 Power Levels

Applicable power levels	<input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP	
Antenna gain	11.5 dBi	
Frequency (GHz)	setting:(dBm)	
	AV Power	Peak Power
60.48	19.52	29.46



1.1.4 Extreme Operating

The Extreme Operating Temperature Range that Apply to the Equipment	
<input type="checkbox"/> -20 °C to +50 °C	
<input type="checkbox"/> 0 °C to +40 °C	
<input checked="" type="checkbox"/> Other: -40 °C to +85 °C	
EUT Power Type	From Host System
Supply Voltage	<input type="checkbox"/> AC State AC voltage - V
Supply Voltage	<input checked="" type="checkbox"/> DC State DC voltage 5 V

1.1.5 Equipment Use Condition

Equipment Use Condition
<input type="checkbox"/> Fixed field disturbance sensors at 61-61.5GHz
<input type="checkbox"/> Except fixed field disturbance sensors at 61-61.5GHz
<input checked="" type="checkbox"/> Except fixed field disturbance sensors

1.1.6 User Condition

Intended Operation
<input checked="" type="checkbox"/> Indoor
<input type="checkbox"/> Outdoor



1.2 Additional Information Provided by the Submitter

1.2.1 Modulation

IEEE 802.11ad Modulation Scheme

MCS Index	Modulation	Code rate	Data rate (Mbit/s)
0	π /-2BPSK	1/2	27.5
1	π /-2BPSK	1/2	385
2	π /-2BPSK	1/2	770
3	π /-2BPSK	5/8	962.5
4	π /-2BPSK	3/4	1155
5	π /-2BPSK	13/16	1251.25
6	π /-2QPSK	1/2	1540
7	π /-2QPSK	5/8	1925
8	π /-2QPSK	3/4	2310
9	π /-2QPSK	13/16	2502.5
10	π /2-16QAM	1/2	3080
11	π /2-16QAM	5/8	3850
12	π /2-16QAM	3/4	4620

Channel Bandwidth is 2.16GHz

Can the transmitter operate un-modulated: Yes No

1.2.2 Duty Cycle

Duty Cycle	Duty Cycle Factor
99.52 %	0.02



1.3 Accessories

N/A

1.4 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E6430	N/A
2	Mouse	HP	FM100	N/A
3	Earphone	e-Power	S90W	N/A

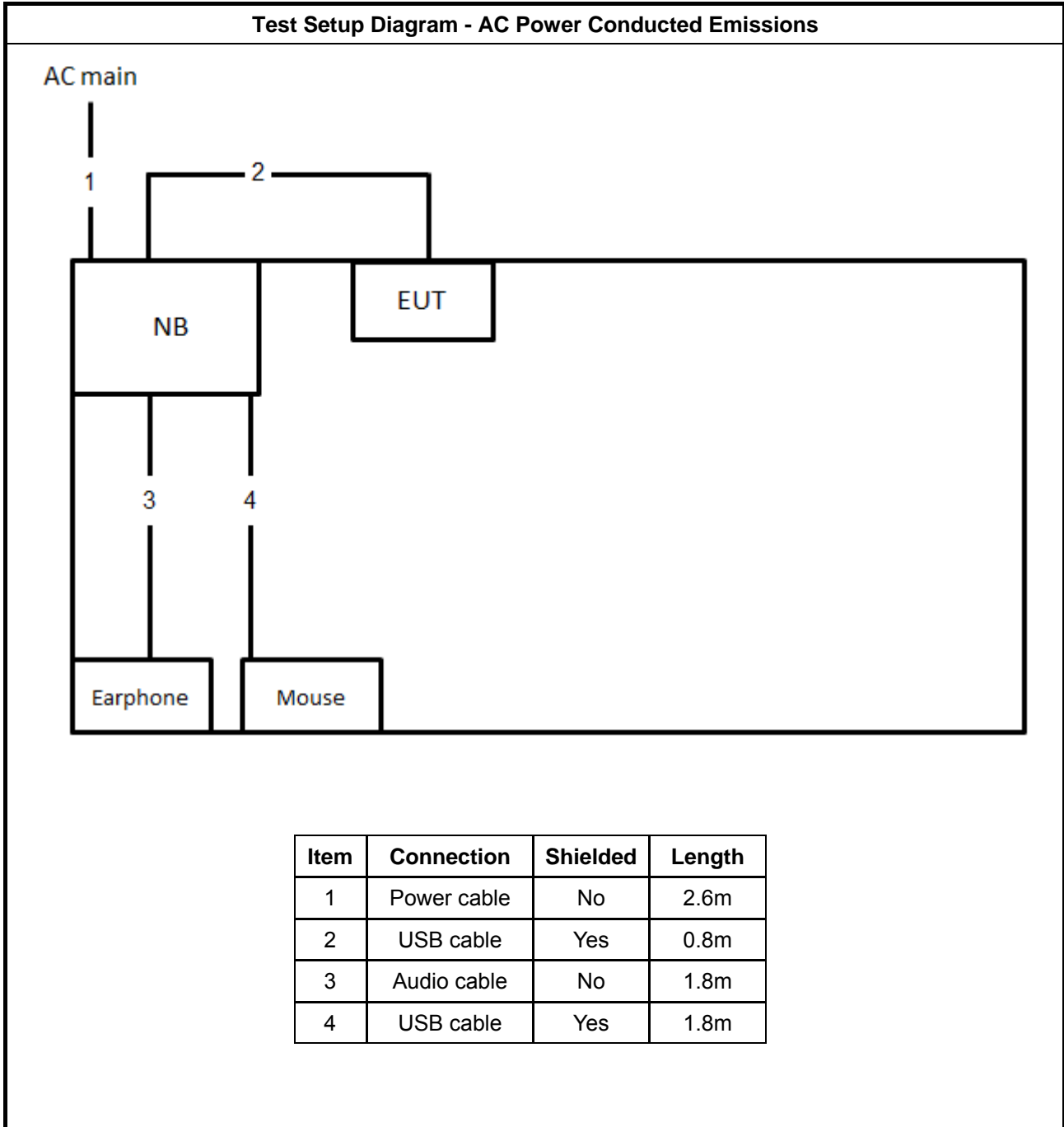
For Test Site No: 03CH01-CB and TH01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	N/A

1.5 EUT Operation during Test

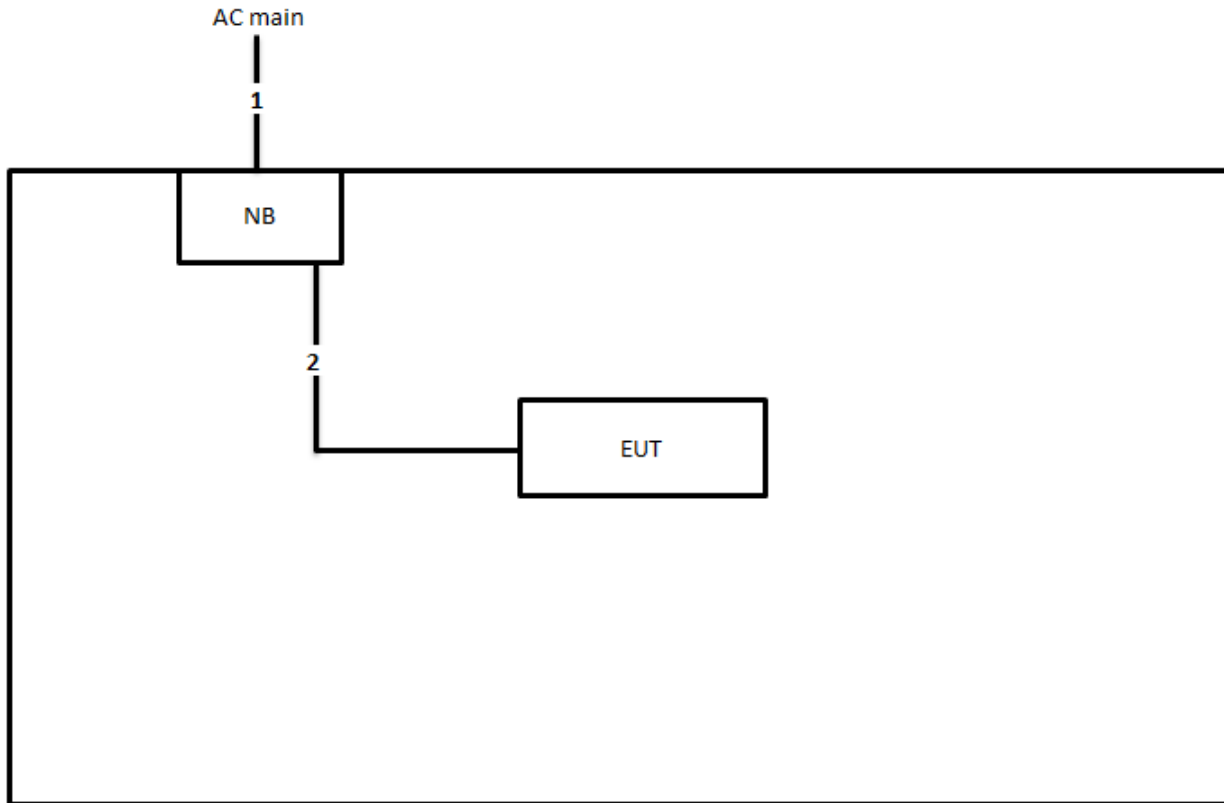
During the test, executed the test program to control the EUT continuously transmit RF signal.

1.6 Test Setup Diagram





Test Setup Diagram - Transmitter Spurious Emissions



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	USB cable	Yes	1m



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		
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	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

Test Channel Frequencies Configuration	
Channel 2	60.48 GHz

2.2 Conformance Tests and Related Test Frequencies

Test Item	Test Frequencies (GHz)
AC Power Conducted Emissions	CTX
Occupied Bandwidth	60.48
EIRP Power	60.48
Peak Conducted Power	60.48
Transmitter Spurious Emissions (below 1 GHz)	CTX
Transmitter Spurious Emissions (1 GHz-40 GHz)	60.48
Transmitter Spurious Emissions (above 40 GHz)	60.48
Frequency Stability	60.48

For Radiated Emission below 1GHz test:

The EUT was performed at X axis, Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

Mode 1. EUT in Z axis.

For Radiated Emission Above 1GHz test:

The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

Mode 1. EUT in Z axis.

2.3 Far Field Boundary Calculations

The far-field boundary is given as:

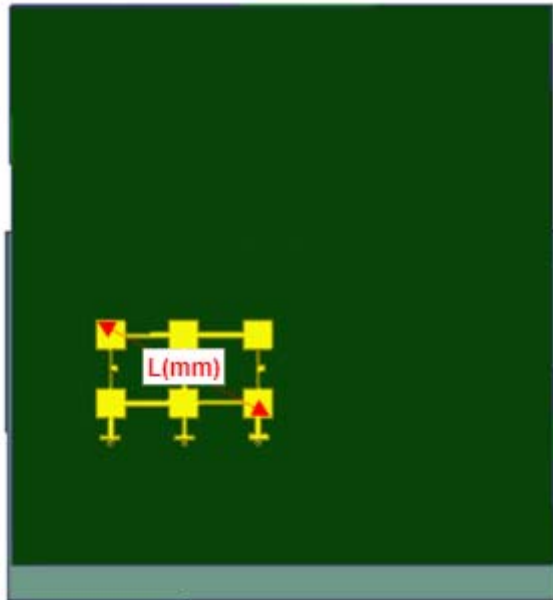
$$\text{far field} = (2 * L^2) / \lambda$$

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)
60.48	0.0082	0.0049603	0.027	2.7





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.

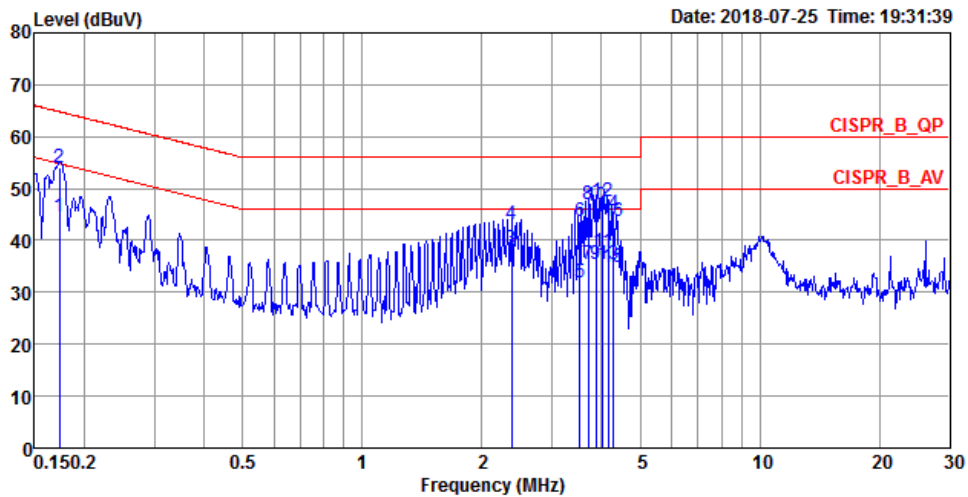


3.1.5 Test Result of AC Power Conducted Emissions

Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.2.3
<p>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.</p> <p>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.</p>	



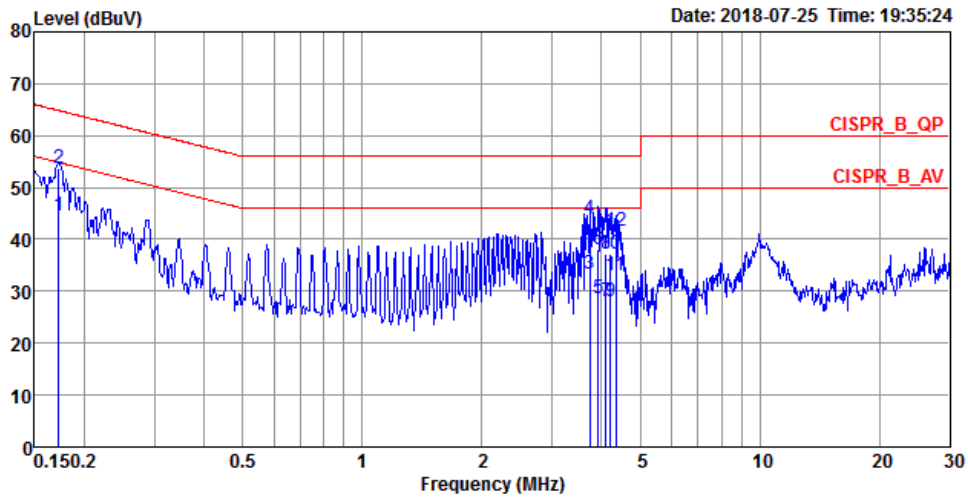
Temp	24°C	Humidity	52%
Test Engineer	Rick Yeh	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1735	44.52	-10.27	54.79	34.46	9.91	0.15	Average	LINE
2	0.1735	54.17	-10.62	64.79	44.11	9.91	0.15	QP	LINE
3	2.3710	38.48	-7.52	46.00	28.31	9.96	0.21	Average	LINE
4	2.3710	43.05	-12.95	56.00	32.88	9.96	0.21	QP	LINE
5	3.5220	31.84	-14.16	46.00	21.71	9.98	0.15	Average	LINE
6	3.5220	43.81	-12.19	56.00	33.68	9.98	0.15	QP	LINE
7	3.6948	35.34	-10.66	46.00	25.22	9.98	0.14	Average	LINE
8	3.6948	46.83	-9.17	56.00	36.71	9.98	0.14	QP	LINE
9	3.8656	35.30	-10.70	46.00	25.18	9.98	0.14	Average	LINE
10	3.8656	46.78	-9.22	56.00	36.66	9.98	0.14	QP	LINE
11	4.0353	37.75	-8.25	46.00	27.64	9.98	0.13	Average	LINE
12	4.0353	47.56	-8.44	56.00	37.45	9.98	0.13	QP	LINE
13	4.1503	35.31	-10.69	46.00	25.19	9.99	0.13	Average	LINE
14	4.1503	45.24	-10.76	56.00	35.12	9.99	0.13	QP	LINE
15	4.2603	34.96	-11.04	46.00	24.84	9.99	0.13	Average	LINE
16	4.2603	43.70	-12.30	56.00	33.58	9.99	0.13	QP	LINE



Temp	24°C	Humidity	52%
Test Engineer	Rick Yeh	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.1725	44.64	-10.20	54.84	34.57	9.92	0.15	Average	NEUTRAL
2	0.1725	53.64	-11.20	64.84	43.57	9.92	0.15	QP	NEUTRAL
3	3.7327	33.28	-12.72	46.00	23.16	9.98	0.14	Average	NEUTRAL
4	3.7327	43.91	-12.09	56.00	33.79	9.98	0.14	QP	NEUTRAL
5	3.9169	28.75	-17.25	46.00	18.64	9.98	0.13	Average	NEUTRAL
6	3.9169	38.14	-17.86	56.00	28.03	9.98	0.13	QP	NEUTRAL
7	4.0952	28.02	-17.98	46.00	17.91	9.98	0.13	Average	NEUTRAL
8	4.0952	37.17	-18.83	56.00	27.06	9.98	0.13	QP	NEUTRAL
9	4.2049	28.08	-17.92	46.00	17.96	9.99	0.13	Average	NEUTRAL
10	4.2049	37.16	-18.84	56.00	27.04	9.99	0.13	QP	NEUTRAL
11	4.3539	33.00	-13.00	46.00	22.88	9.99	0.13	Average	NEUTRAL
12	4.3539	41.75	-14.25	56.00	31.63	9.99	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.

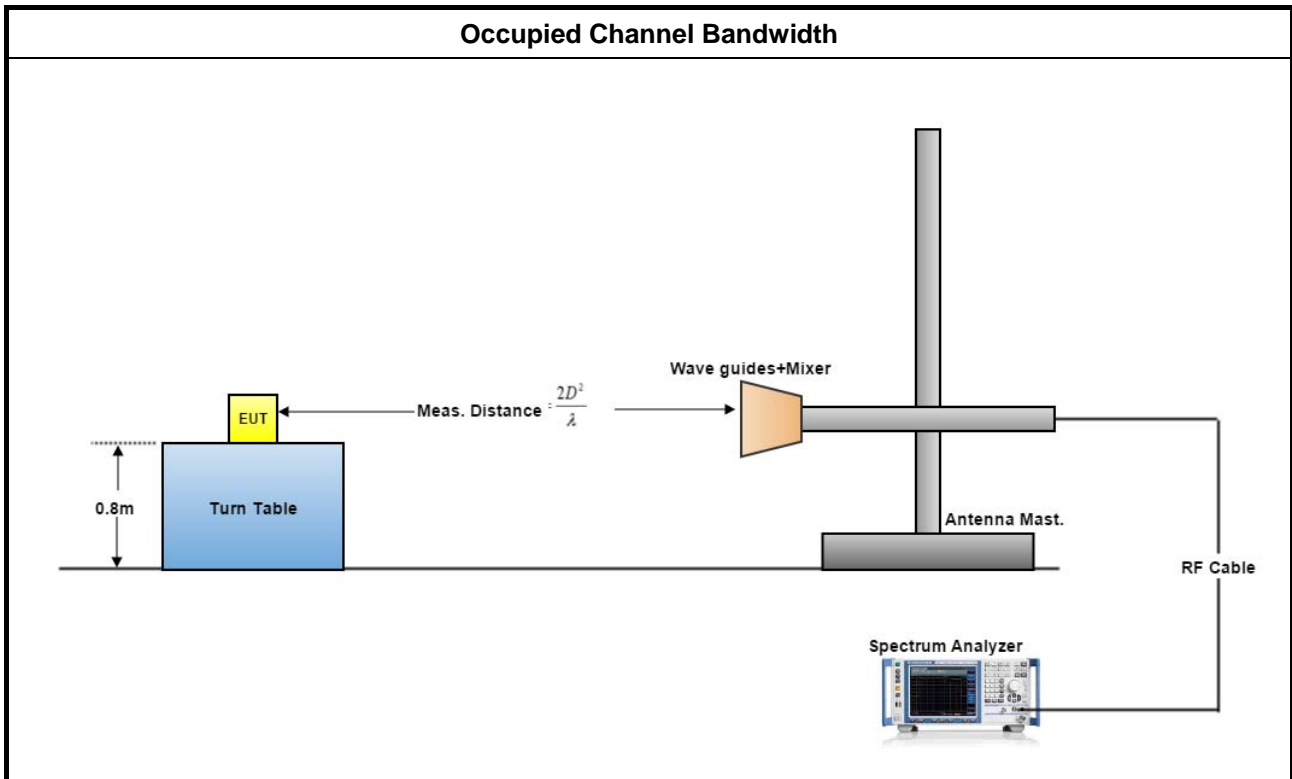
3.2.2 Measuring Instruments

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





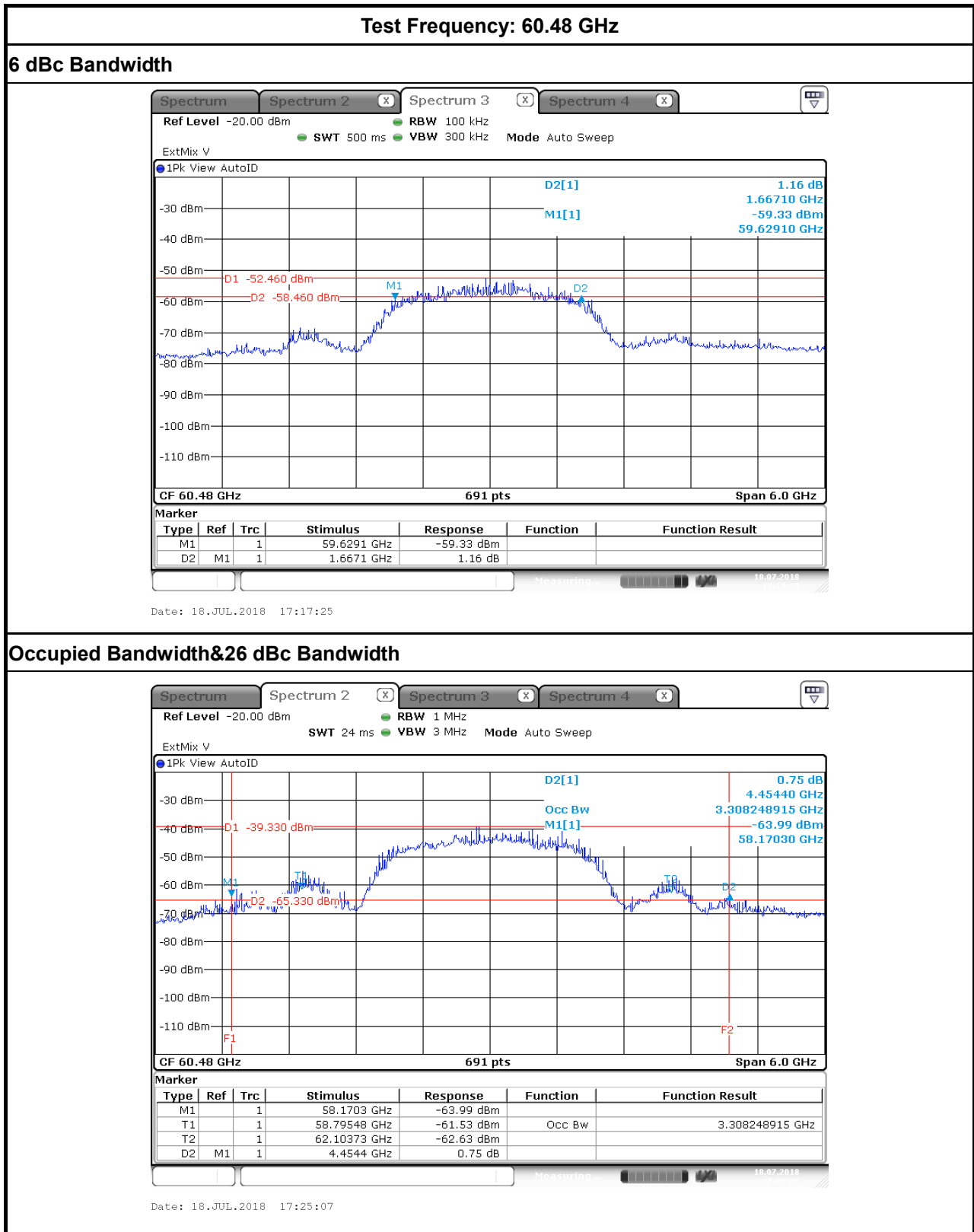
3.2.5 Test Result of Occupied Bandwidth

Test Conditions	see ANSI C63.10, clause 5.11
Test Setup	see ANSI C63.10, clause 6.9.2
<p>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.</p>	

Temp	27°C	Humidity	66%	
Test Engineer	Cola Fan			
Test Results				
Test Freq. (GHz)	6 dBc Bandwidth (MHz)	Occupied Bandwidth (MHz)	26 dBc Bandwidth (MHz)	Limit (MHz)
60.48	1667.10	3308.25	4454.40	N/A



3.2.5.1 Bandwidth Plots





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 fixed field disturbance sensors(indoor)	40 dBm	43 dBm
Except fixed field disturbance sensors(outdoor)	82 dBm	85 dBm

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

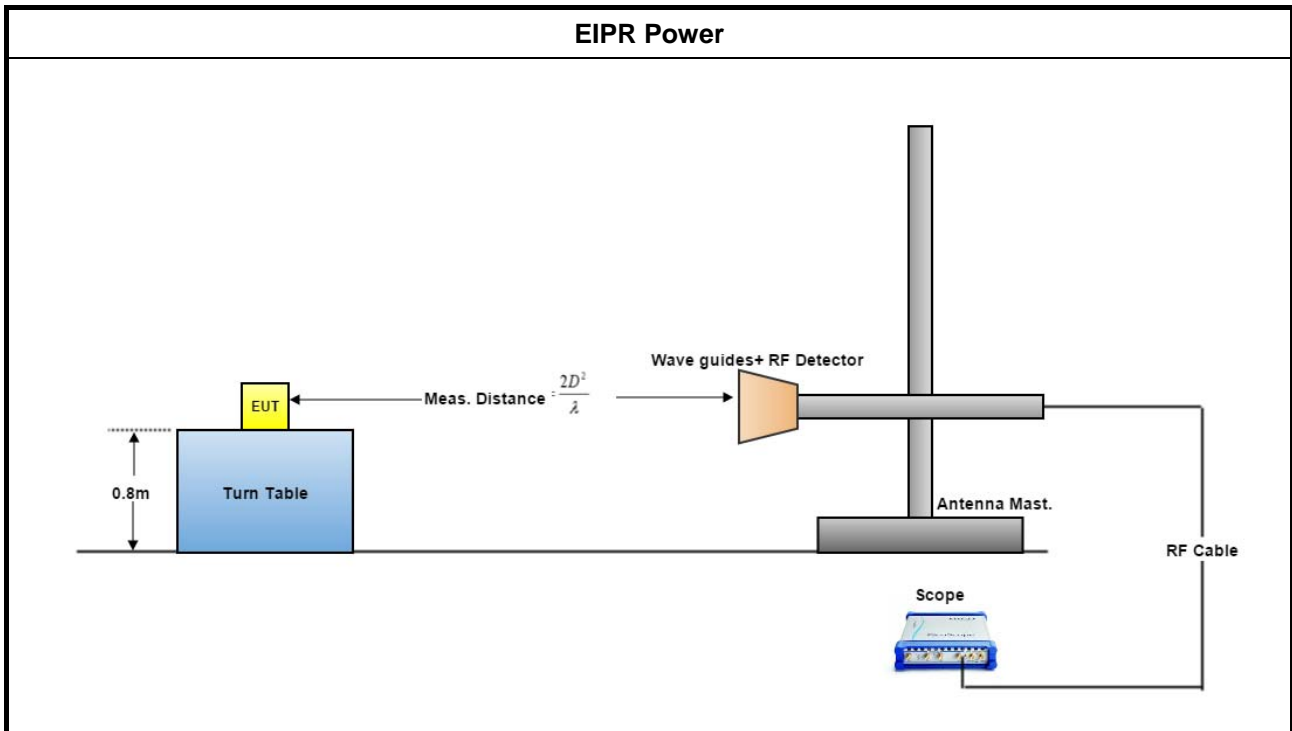
3.3.2 Measuring Instruments

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



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
<p>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.</p>	



3.3.5.1 Test Result of EIRP Power

Temp	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Distance	1 m
Test Date	Jul. 18, 2018 ~ Nov. 01, 2018		

Test Results

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
60.48	23	36.0	4.5	-15.63	-25.57	134.26	124.32	29.46	19.52	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.

$$EIRP = E\text{-meas} + 20\log(d\text{-meas}) - 104.7$$

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 (b)

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(d)	
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	27°C	Humidity	66%			
Test Engineer	Cola Fan					
Test Date	Jul. 18, 2018 ~ Nov. 01, 2018					
Test Results						
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)
60.48	29.46	11.5	17.96	62.515	1667.10	500.00
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(d)						
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

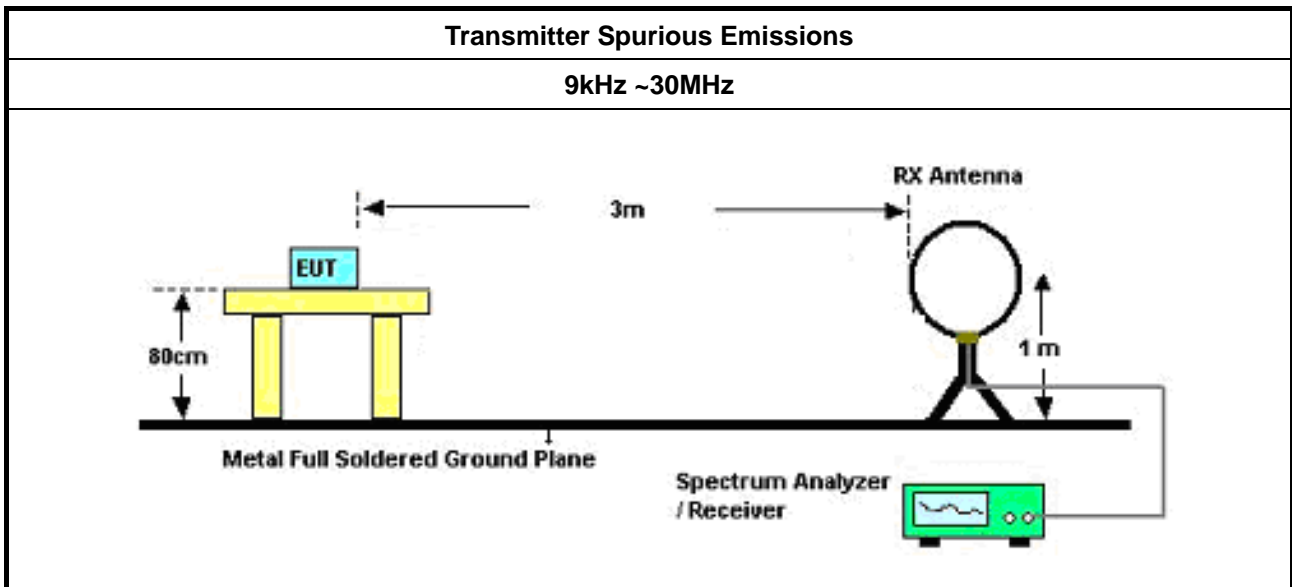
3.5.1 Limit of Transmitter Spurious Emissions

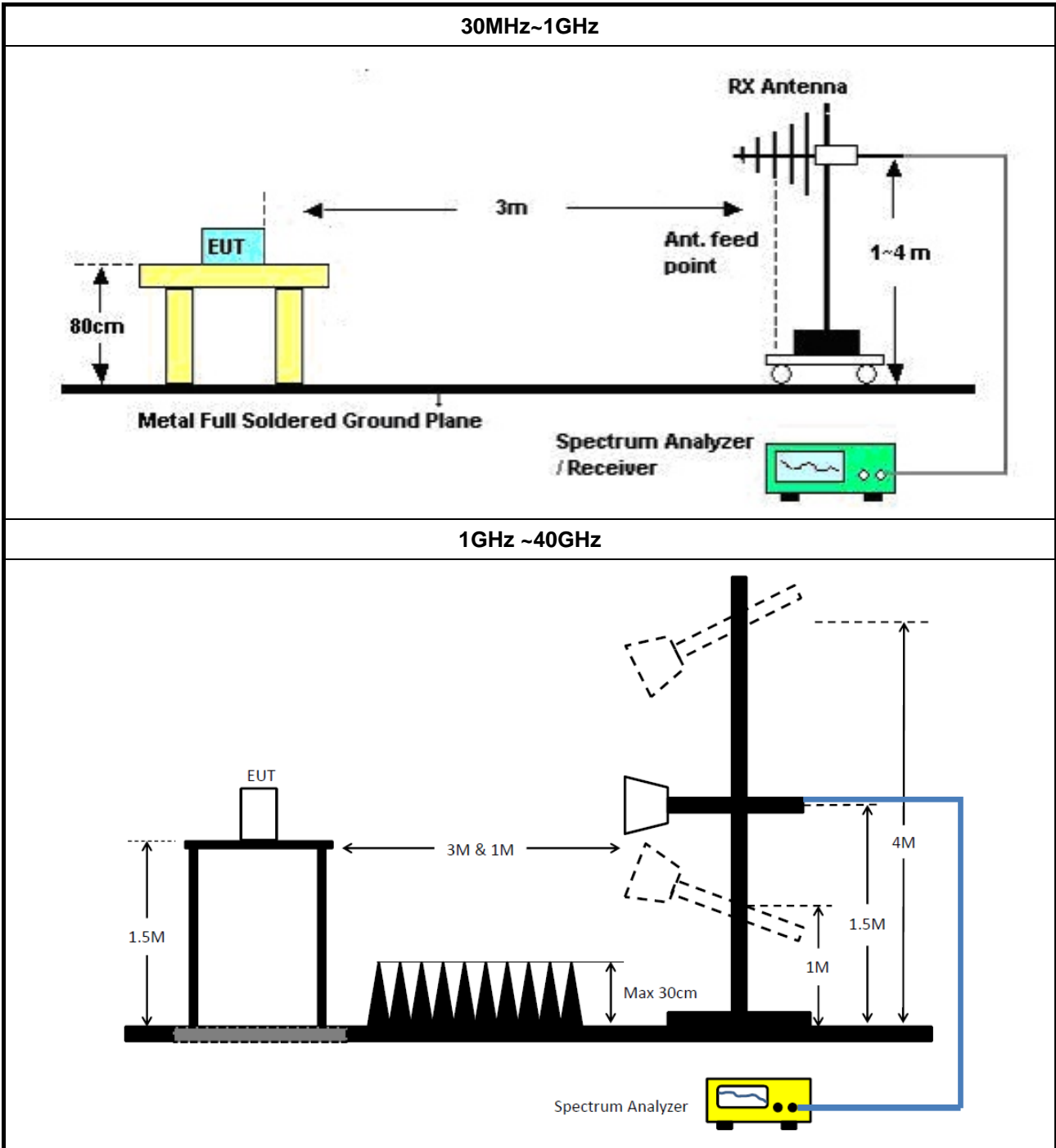
Frequency Range	Limit
Radiated emissions below 40 GHz	FCC 15.209
Radiated emissions above 40 GHz – 200GHz	90 pW/cm ² @ 3 m (Equivalent EIRP 102 μW, -9.91dBm)
NOTE 1: For the applicable limit, see FCC 15.255(c)	
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.	

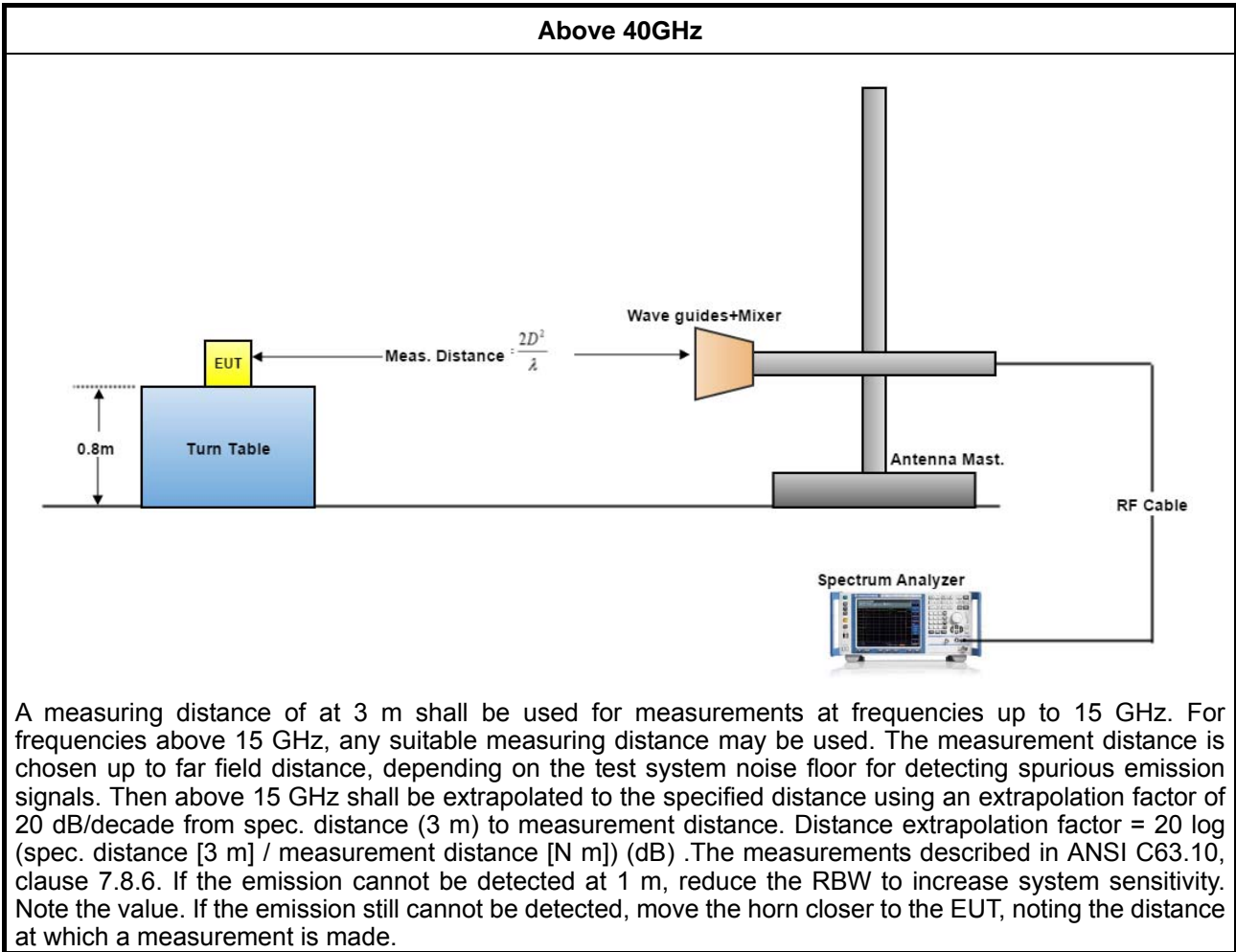
3.5.2 Test Procedures

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

3.5.3 Test Setup







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.

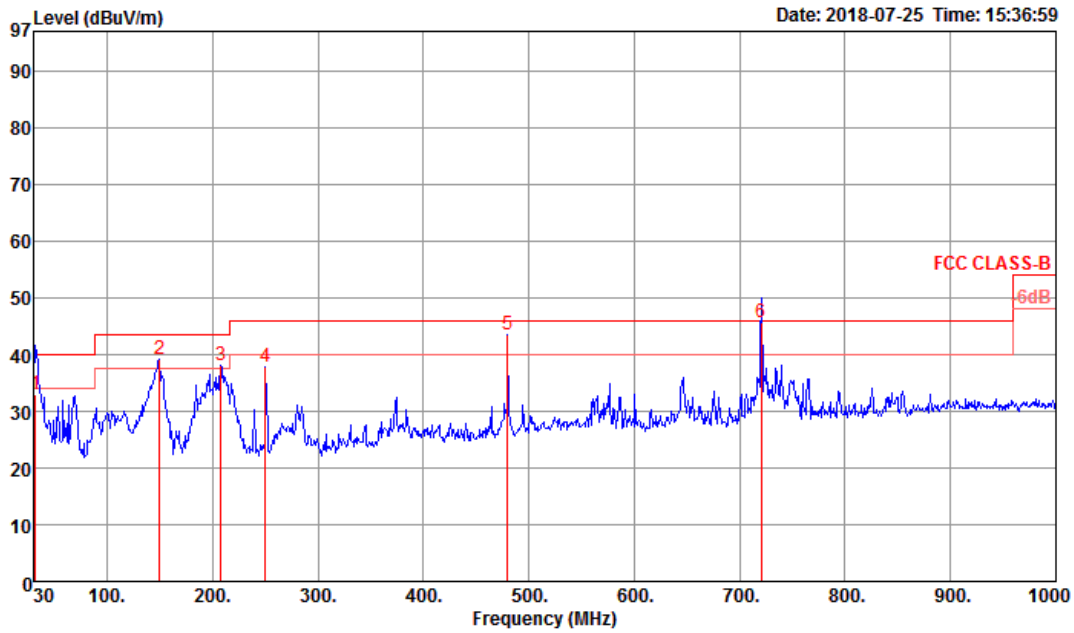
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.



3.5.4.2 Test Result of Transmitter Spurious Emissions

Temp	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Distance	3 m
Test Range	30 MHz – 1000 MHz	Test Configuration	CTX

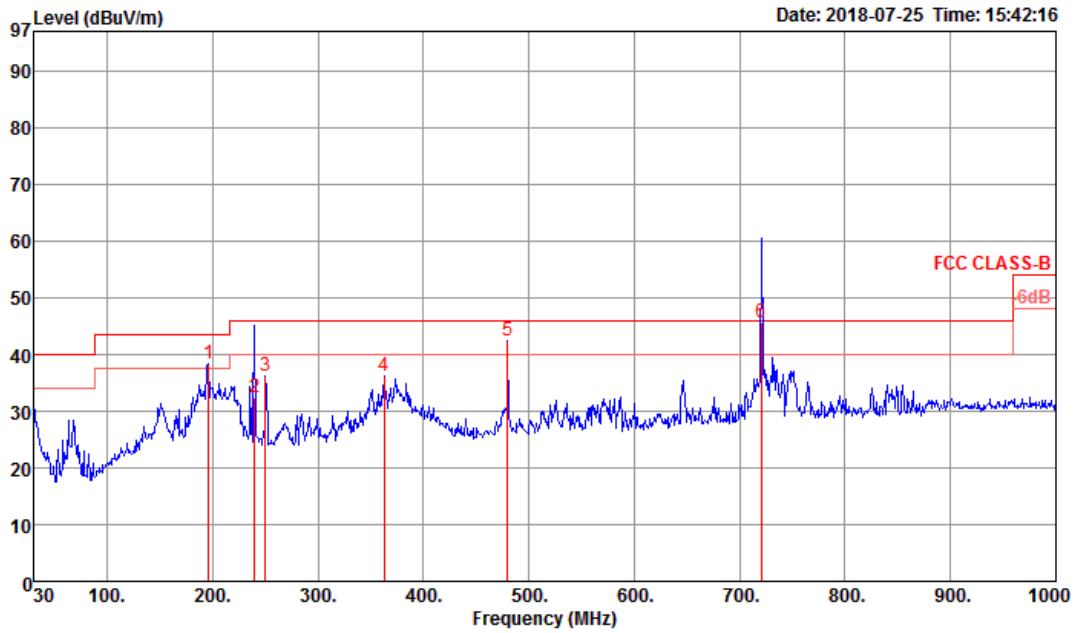
Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	31.94	32.89	40.00	-7.11	38.80	0.99	24.46	31.36	100	182 QP	VERTICAL
2	149.31	39.30	43.50	-4.20	52.83	1.09	17.14	31.76	300	360 Peak	VERTICAL
3	207.51	38.20	43.50	-5.30	51.65	2.02	16.31	31.78	300	360 Peak	VERTICAL
4	250.19	37.75	46.00	-8.25	48.29	2.38	18.90	31.82	300	360 Peak	VERTICAL
5	480.08	43.57	46.00	-2.43	49.27	2.87	23.47	32.04	300	360 QP	VERTICAL
6	720.64	45.76	46.00	-0.24	48.51	3.50	26.01	32.26	123	132 QP	VERTICAL



Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	195.87	38.26	43.50	-5.24	52.40	1.86	15.76	31.76	100	0 Peak	HORIZONTAL
2	239.52	32.50	46.00	-13.50	44.00	2.29	18.02	31.81	105	186 QP	HORIZONTAL
3	250.19	36.23	46.00	-9.77	46.77	2.38	18.90	31.82	100	0 Peak	HORIZONTAL
4	362.71	36.24	46.00	-9.76	44.80	1.79	21.54	31.89	100	0 Peak	HORIZONTAL
5	480.08	42.37	46.00	-3.63	48.07	2.87	23.47	32.04	100	0 Peak	HORIZONTAL
6	720.64	45.76	46.00	-0.24	48.51	3.50	26.01	32.26	100	54 QP	HORIZONTAL



Temp	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Distance	3 m
Test Range	1 GHz – 40 GHz	Test Freq. (GHz)	60.48
Test Date	Jul. 25, 2018		

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	10319.20	54.61	74.00	-19.39	41.85	9.49	38.29	35.02	150	40	Peak	VERTICAL
2	10319.92	42.21	54.00	-11.79	29.45	9.49	38.29	35.02	150	40	Average	VERTICAL

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	10319.20	43.33	54.00	-10.67	30.57	9.49	38.29	35.02	150	27	Average	HORIZONTAL
2	10319.50	56.74	74.00	-17.26	43.98	9.49	38.29	35.02	150	27	Peak	HORIZONTAL



Temp	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Date	Jul. 18, 2018 ~ Nov. 01, 2018
Test Range	40GHz – 200GHz		

Test Frequency (GHz)	Rx Antenna Gain (dBi)	Measurement Distance (m)	Read Worse Frequency (GHz)	Read Level (dBm)
60.48	23	1	56.63	-77.61
EIRP (dBm)	Specification Distance (m)	Power Density (pW/cm ²)	Limit (pW/cm ²)	Test Result
-33.11	3	0.4323	90.00	PASS

Note:
 $EIRP = Prx - Grx + \text{Free Space Path Loss} = Prx - Grx + 20\text{Log}(4\pi d / \lambda)^2$
 Which
 $Prx = \text{Read Level.}$
 $Grx = \text{Rx Antenna Gain.}$
 A distance factor is offset and the formula is $20\text{LOG}(D1/D2)$
 Which
 $D1 = \text{Specification Distance}$
 $D2 = \text{Measurement Distance}$

3.6 Frequency Stability

3.6.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 15.255(e) 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.	

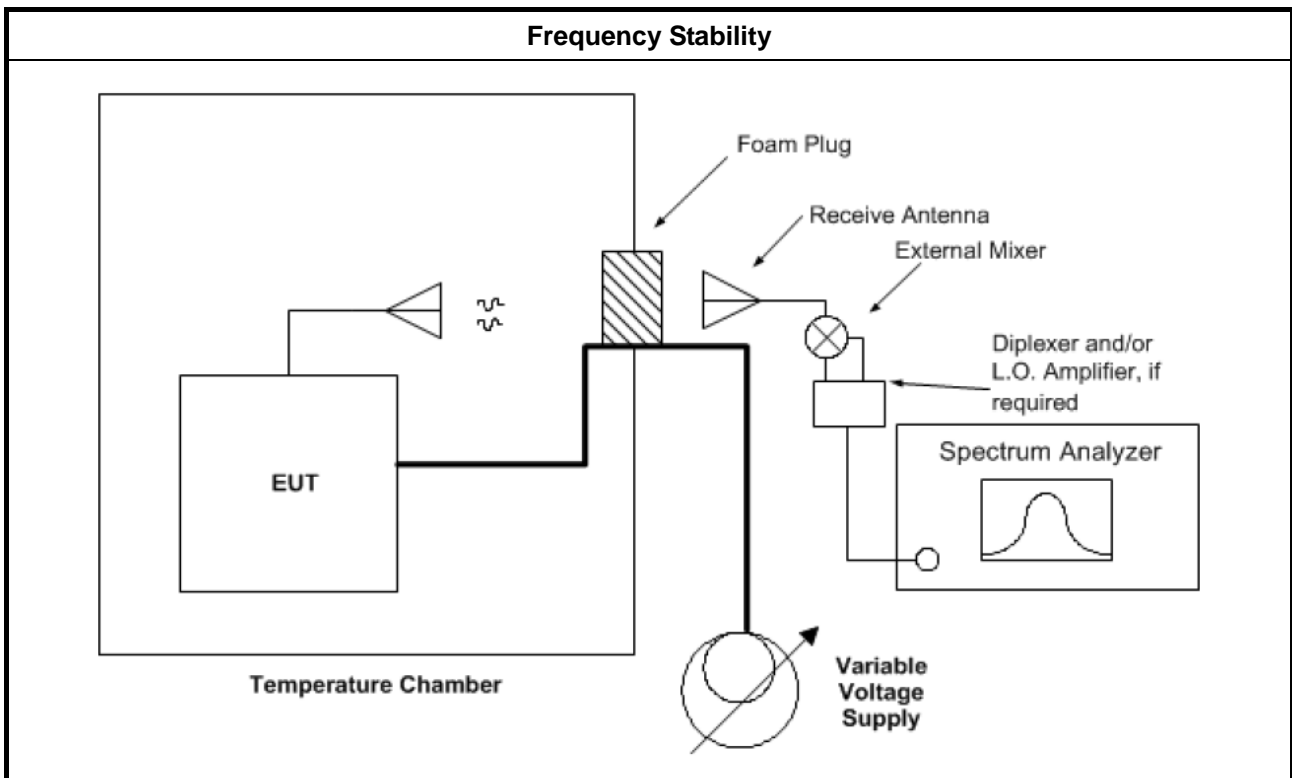
3.6.2 Measuring Instruments

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





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	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Date	Jul. 18, 2018 ~ Nov. 01, 2018
Test Results			
Test Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
-40	60480.0029	176.90	within band
-30	60480.0087	182.70	within band
-20	60480.0347	208.70	within band
-10	60480.0174	191.40	within band
0	60480.0029	176.90	within band
10	60480.0000	174.00	within band
20	60479.8260	Reference	within band
30	60479.6240	-202.00	within band
40	60479.6240	-202.00	within band
50	60479.6240	-202.00	within band
60	60479.8260	0.00	within band
70	60480.1740	348.00	within band
80	60480.7810	955.00	within band
85	60481.1290	1303.00	within band
NOTE: The manufacturer's specified temperature range of -40 to 85°C.			



3.6.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage			
Temp	27°C	Humidity	66%
Test Engineer	Cola Fan	Test Date	Jul. 18, 2018 ~ Nov. 01, 2018
Test Results			
Test Voltage: (Vdc)	Measured Frequency (MHz)	Delta Frequency (kHz)	Limit (±kHz)
4.25	60479.862	0	within band
5	60479.862	Reference	within band
5.75	60479.861	-1.00	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: <ul style="list-style-type: none">♦ 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: <ul style="list-style-type: none">♦ External phase-locking (Refer as FCC 15.255 (g))

3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not be used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for use 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-50-1 6-2	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)
Log Antenna	Schwarzbeck	VUSLP 9111	247	200MHz ~ 1GHz	May 22, 2018	May 21, 2019	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	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)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
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-16+17	N/A	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 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	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-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, 2019*	Radiation (03CH01-CB)
Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Oct. 12, 2017*	Oct. 11, 2019*	Radiation (03CH01-CB)
Mixer	OML	M12HW/A	E91113-1	60 ~ 90 GHz	Oct. 12, 2017*	Oct. 11, 2019*	Radiation (03CH01-CB)
Mixer	OML	M08HW/A	F91113-1	90 ~ 140 GHz	Oct. 12, 2017*	Oct. 11, 2019*	Radiation (03CH01-CB)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Oct. 12, 2017*	Oct. 11, 2019*	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-RPFW0	#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	Gaint Force	GTH-408-40-CP-AR	MAA1410-011	-40~100 degree	Sep. 15, 2017	Sep. 14, 2018	Conducted (TH01-CB)
Temp. and Humidity Chamber	Gaint Force	GTH-408-40-CP-AR	MAA1410-011	-40~100 degree	Sep. 14, 2018	Sep. 13, 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%