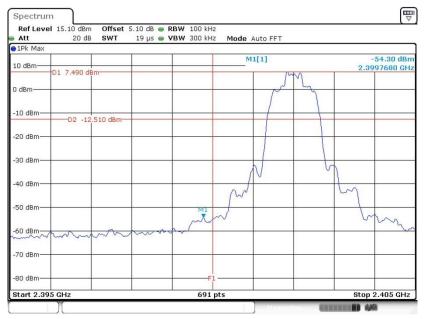


Test Mode :	3Mbps	Temperature :	21~25 ℃
Test Channel :	00 and 78	Relative Humidity :	51~54%
		Test Engineer :	Aly Cao

<3Mbps>

Low Band Edge Plot on Channel 00



Date: 16.MAR.2019 22:55:09

High Band Edge Plot on Channel 78



Date: 16.MAR.2019 23:04:39

Sporton International (Kunshan) Inc. TEL : +86-512-57900158 FAX : +86-512-57900958 FCC ID: 2AJOTTA-1179

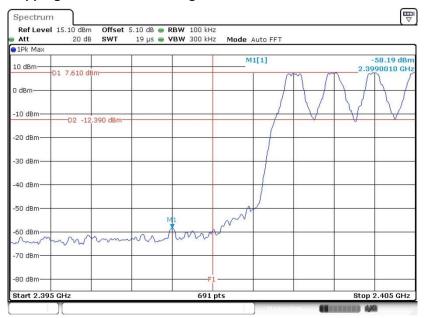


3.6.6 Test Result of Conducted Hopping Mode Band Edges

Test Mode :	1Mbps	Temperature :	21~25 ℃
Test Engineer :	Aly Cao	Relative Humidity :	51~54%

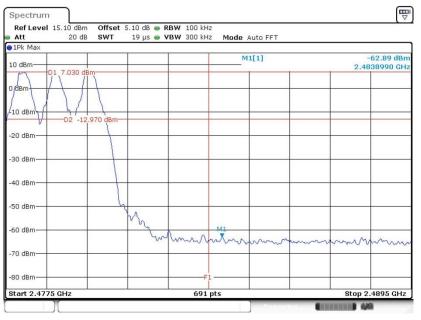
<1Mbps>

Hopping Mode Low Band Edge Plot



Date: 16.MAR.2019 22:23:52

Hopping Mode High Band Edge Plot



Date: 16.MAR.2019 22:38:03

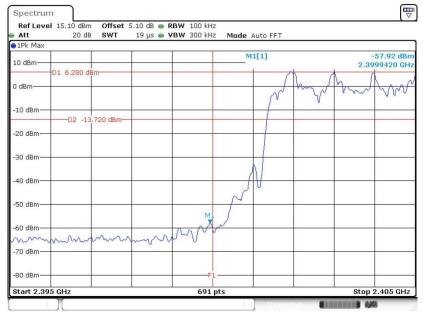
Sporton International (Kunshan) Inc. TEL : +86-512-57900158 FAX : +86-512-57900958 FCC ID: 2AJOTTA-1179



Test Mode :	2Mbps	Temperature :	21~25 ℃
Test Engineer :	Aly Cao	Relative Humidity :	51~54%

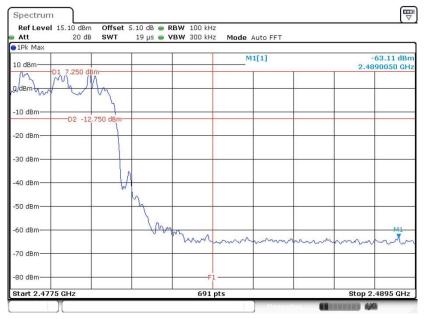
<2Mbps>

Hopping Mode Low Band Edge Plot



Date: 16.MAR.2019 22:43:17

Hopping Mode High Band Edge Plot



Date: 16.MAR.2019 22:50:21

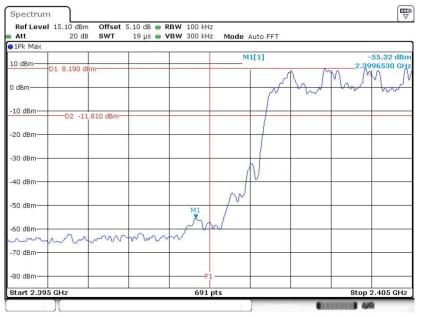
720510



Test Mode :	3Mbps	Temperature :	21~25℃
Test Engineer :	Aly Cao	Relative Humidity :	51~54%

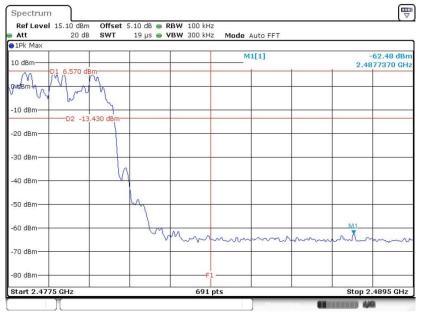
<3Mbps>

Hopping Mode Low Band Edge Plot



Date: 2.APR.2019 09:22:49

Hopping Mode High Band Edge Plot



Date: 16.MAR.2019 23:04:57



3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

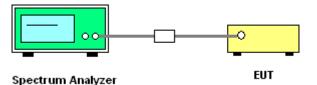
3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 7.8.8.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
- 5. Measure and record the results in the test report.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4 Test Setup



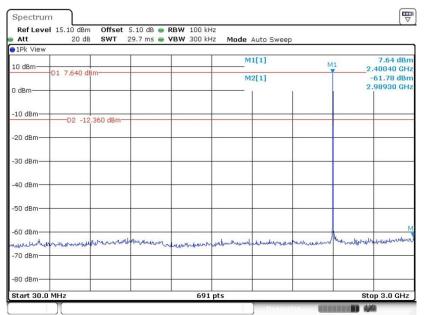
Sporton International (Kunshan) Inc. TEL : +86-512-57900158 FAX : +86-512-57900958 FCC ID: 2AJOTTA-1179

3.7.5 Test Result of Conducted Spurious Emission

Test Mode :	1Mbps	Temperature :	21~25 ℃
Test Channel :	00	Relative Humidity :	51~54%
		Test Engineer :	Aly Cao

<1Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 16.MAR.2019 22:30:56

1Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

Ref Level 15.10 dBm Off: Att 20 dB SW	set 5.10 dB 👄 RBV T 230 ms 👄 VBV		Auto Sweep	
1Pk View				
t <mark>id</mark> dBm			M2[1]	-56.85 dBn 23.6850 GH
D1 7.250 dBm			M1[1]	7.25 dBr
) dBm			1 1	2.4160 GH
10 dBm				
D2 -12.750 dł 20 dBm	m			
30 dBm				
40 dBm				
50 dBm				M2
50 dBm	nouthmethold	-	or how we have the second s	they wanter and a strand
70 dBm				_
30 dBm				
Start 2.0 GHz		691 pts		Stop 25.0 GHz

Date: 16.MAR.2019 22:32:26

Sporton International (Kunshan) Inc. TEL : +86-512-57900158 FAX : +86-512-57900958 FCC ID: 2AJOTTA-1179



Att 1Pk View	20 dB	SWT	29.7 ms 🖷	VBW 300 kł	12 Mode	Auto Sweep	1		
1PK VIEW	1	Г	1			1[1]			7.99 dBm
10 dBm	D1 7.990 df		-		IMI	1[1]		M1 2	2.43910 GHz
	DI 7.990 di	300	-		M	2[1]			-61.92 dBn
0 dBm						I	i i	2	.58090 GH:
-10 dBm—	00.10	.010 dBm-							
	02 -12	.010 dBm-							
-20 dBm—									
-30 dBm	-				-		-		
-40 dBm	-			-		-			
-50 dBm									
-60 dBm	-	-	-					M2	-
anonathe	one had when have	controlition	ethnistouther	hallowedward	on the hole bole	Where Multurale	madelihan	a produced	mound
70 dBm-	-								-
					1	1		1	1

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 16.MAR.2019 22:35:31

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Ref Level 1 Att	20 dB SW1	et 5.10 dB 👄 🖡 230 ms 👄 🛚	/BW 300 kHz	Mode Auto Swee	p		
1Pk View							
dBm-				M1[1]		7.89	
D1	7.890 dBm			M2[1]		-56.65	
dBm					Ϊ Ĩ	16.5960	GH
10 dBm	-D2 -12.110 dB	m					
20 dBm					-		
30 dBm							
40 dBm							
50 dBm				M2			
60 dBm	www.hundhang	wuunder	unitalitation	www.ubcontinter	Annonenter a	www.www.www.	104
70 dBm							
B0 dBm							
Start 2.0 GHz	!		691 pt	s		Stop 25.0 C	Hz

Date: 16.MAR.2019 22:36:01



5.610 dŖm	_		M1[1]		6.61 dBm
5.610 dBm				M1	2.48210 GHz
			M2[1]	T	-61.70 dBm
	+ +		-	Ť	1.60100 GHz
·D2 -13.390 dBm·					
	_				
		M2			
unaryulunarded	untorburder unter any	iter would be a shall be	when the mounterestable	announder a par	when the houter down
		1			
		-D2 -13,390 dBm	M2		M2

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 16.MAR.2019 22:40:24

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

Att	20 dB	SWT	230 ms 👄 '	VBW 300 kH	z Mode	Auto Sweep			
1Pk View				~~~					
l0_dBm	D1 6.190 d	Bro				11[1]			6.19 dBr 2.4830 GH -56.65 dBr
dBm	01 0.150 0						1		0.1240 GH
10 dBm—	02 -13	3.810 dBm-							
20 dBm—	02 -13								
30 dBm—									
40 dBm—									
50 dBm—							M2		
EO dBm-	menundand	levereday	www.www.www.	www.	webuch	mountain	purphellenachily	www.unhou	mplan de
70 dBm—									
80 dBm—									
Start 2.0	GHz			691	pts			Sto	p 25.0 GHz

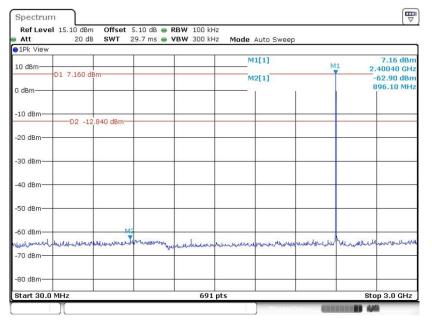
Date: 16.MAR.2019 22:40:52



Test Mode :	2Mbps	Temperature :	21~25 ℃
Test Channel :	00	Relative Humidity :	51~54%
		Test Engineer :	Aly Cao

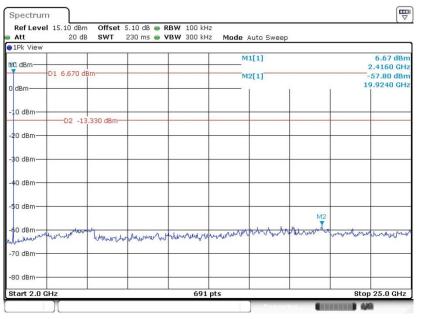
<2Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 23.MAR.2019 00:40:14

CSE Plot on Ch 00 between 2 GHz ~ 25 GHz



Date: 23.MAR.2019 00:40:43



Att 🛛	20 de	SWT	29.7 ms 👄	VBW 300 kH	z Mode	Auto Sweep)		
●1Pk View			~						
10 dBm			_		M	1[1]		M1	7.01 dBm 2.43910 GHz
	D1 7.010 d	Bm			M	2[1]			-63.11 dBm
0 dBm				-		I	1	í l	599.50 MHz
-10 dBm—	D2 -12	2.990 dBm-							
-20 dBm	De 10								
-20 aBm				C. C.					
-30 dBm	-		_						
-40 dBm				-					
-50 dBm									+
-60 dBm—	has								
	unsulut	manundula	mananeneral.	a such have been	u mon when the	Mummercala	anter burgeling when	Andrelline	menun
-70 dBm—				den de forder e con				a state a sec	
-80 dBm							-		
Start 30.0	MHz			691	nts			8	top 3.0 GHz

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 23.MAR.2019 00:41:31

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Att	el 15.10 dBm 20 dE		5.10 dB 👄 1 230 ms 👄 1	VBW 300 kH		Auto Swee	D		
1Pk View							F		
₩ dBm—	D1 7.010 d	Bm				1[1]			7.01 dBn 2.4490 GH
dBm					M	2[1]	1		-57.98 dBn 8.2930 GH
10 dBm—	D2 -12	2.990 dBm-							
20 dBm—						-	-		
30 dBm—							<u></u>		
40 dBm—	<u>,</u>								
50 dBm—							M2		
60 dBm-	mundumatur	human	utwork	Mutheman	mound	where		the weeks were	an when whe
-70 dBm—									
-80 dBm—									
Start 2.0	GHz			691	pts			Sto	25.0 GHz

Date: 23.MAR.2019 00:42:02



Att 🛛	20 de	SWT	29.7 ms 👄	VBW 300 kH	Iz Mode	Auto Sweep)		
∋1Pk View	1								
10 dBm	-	-			M	1[1]		M1	5.98 dBm 2.47780 GHz
	D1 5.980 d	Bm			M	2[1]		-	-63.04 dBm
0 dBm									1.14110 GH
-10 dBm—									
10 0011	D2 -14	1 1.020 dBm-							
-20 dBm									
20 0011									
-30 dBm									
-30 ubiii-									
10 -10									
-40 dBm									
-50 dBm—									
			542						
60 dBm—		1			-			1	
	where all the high high high high starting	marken	meranner	multimeterstan	without	calentriched	www.www.www.	www.belv	nonequilitystation
70 dBm—									
-80 dBm						2			

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 23.MAR.2019 00:43:00

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

Att	20 dB	SWT	230 ms 🥃 🖌	/BW 300 kH	z Mode	Auto Sweep)		
1Pk View									
LO dBm-					N	11[1]			3.59 dBr 2.4830 GH
11					N	12[1]			-58.28 dBr
dBm	D1 3.590 di	sm-				Ĩ	Ĩ.	1	8.3260 GH
10 dBm—									
20 dBm—	D2 -16	.410 dBm—					4		
0 dBm—							0		
0 dBm—				-			-		
0 dBm—									
0 dBm-	herenand	Municipal	manum	monthere	maproduted	to ward	M2	huduitytutu	Autoritestown
70 dBm—									
30 dBm—									-
tart 2.0	GHz			691	pts	1		Sto	p 25.0 GHz

Date: 23.MAR.2019 00:43:37



Test Mode :	3Mbps	Temperature :	21~25 ℃
Test Channel :	00	Relative Humidity :	51~54%
		Test Engineer :	Aly Cao

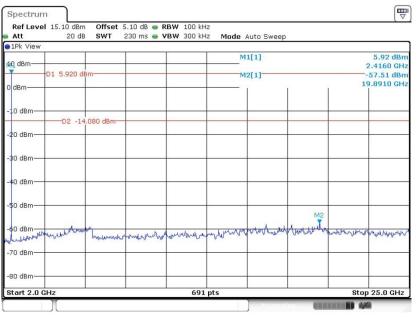
<3Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz

1Pk View	(
10 dBm					M	1[1]	м	1 2.	7.21 dBm 40040 GHz
D dBm	D1 7.210 dB	3m-			M	12[1]	1		61.82 dBm 926.20 MHz
-10 dBm—	D2 -12	.790 dBm-							
-20 dBm—									
-30 dBm—									
-40 dBm—									
-50 dBm—									
-60 dBm—	anonetter market ar		M2	n n ndka		in the survey	Nesternes & I	William a selection day	deres server with the
-70 dBm—				and particulations	- Alineral anal	- 00-0 000000			
-80 dBm									

Date: 23.MAR.2019 00:44:26

CSE Plot on Ch 00 between 2 GHz ~ 25 GHz



Date: 23.MAR.2019 00:44:59



Att	20 dE	SWT	2011 110	VBW 300 kH	Mode	Auto Sweep	,		
10 dBm					M	1[1]		M1 2	7.30 dBm .43910 GHz
0 dBm	D1 7.300 d	Bm			M	2[1]	1	-	-63.01 dBm 715.50 MHz
-10 dBm—	D2 -12	2.700 dBm-						 	
-20 dBm—									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm	Meth derwordth	M2 LANUMLAN	whenter	Lands - Number of		Julian Juddehr	and which the series are	Awaren	mul white
-70 dBm				and the second	and the second				
								í .	

CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 23.MAR.2019 00:45:48

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Att	20 dB	SWT	230 ms 👄 🖌	BW 300 KH	z Mode	Auto Sweep			
1Pk View	1 1	(i	<u> </u>						n on in
d dBm					M	1[1]			7.27 dBi 2.4490 GH
Ĭ	D1 7.270 dE	Im			M	2[1]			58.84 dB
dBm						I	i i	11	3.3260 GH
10 dBm—	00.10	.730 dBm-							
	02 -12	.730 asm—							
0 dBm—	+								
30 dBm—									
0 dBm									
U UBIII									
0 dBm—									
						13	M2		
0 dBm-	h ola	kin				0.4. A 1 1 A			
worker	Mullow Anda	herrenat	Junann	malinableth	hund sharry	1 Jan R. and Mar	a management	hulan and and	Huddhart
70 dBm-									
30 dBm	+	-	+			-			-
tart 2.0	CH2			601	pts			Stor	25.0 GH

Date: 23.MAR.2019 00:46:17



Att	l 15.10 dBm 20 dB		5.10 dB 👄 29.7 ms 👄			uto Sweep			
1Pk View			~		-				
10 dBm	D1 6.500 d	Dest				L[1]		M1	6.50 dBm 2.47780 GH
) dBm	DI 6.500 u	ып			M2	2[1]			-62.00 dBm 2.91190 GHz
-10 dBm—	D2 -13	3.500 dBm-							
-20 dBm									
-30 dBm									_
40 dBm									
50 dBm									
60 dBm—	Mallan	below sound	apple places.		and and all all all	her were where we	where a strate and	wer here where	M2
70 dBm—	ch a sar Marsaga		W	dana and					
80 dBm									

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

Date: 16.MAR.2019 23:08:45

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

Att	el 15.10 dBm 20 dB			RBW 100 kH VBW 300 kH		Auto Sweep			
1Pk View									
.pidBm—	D1 5.900 dl	3m				1[1] 2[1]			5.90 dBr 2.4830 GH -56.88 dBr
dBm							l		6.3630 GH
-10 dBm—	D2 -14	.100 dBm-							
20 dBm—	02 -14	.100 0811							
30 dBm—	-								
40 dBm—									
-50 dBm						M2			
60 dBm-	- word a work and	uy Walandaria	winning	hurnhourd	urman	materdutuchasy	husher in myrally	trattion which	- Marchael
70 dBm—		# 2000000 0000 00							
80 dBm—									
Start 2.0	GHz			691	pts			Sto	p 25.0 GHz

Date: 16.MAR.2019 23:09:13



3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.8.3 Test Procedures

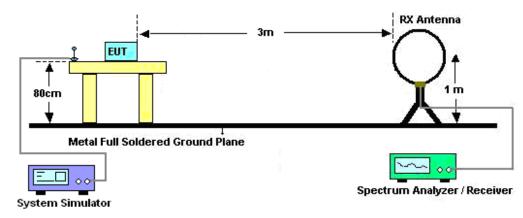
- 1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 4. Set to the maximum power setting and enable the EUT transmit continuously.
- 5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds On time = N₁*L₁+N₂*L₂+...+N_{n-1}*LN_{n-1}+N_n*L_n Where N₁ is number of type 1 pulses, L₁ is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
- 6. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
- 8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.82dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

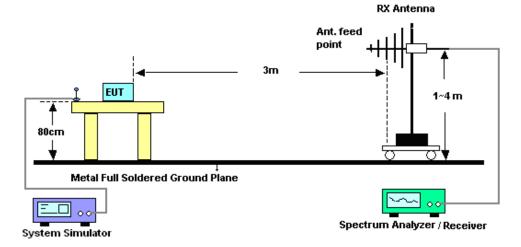


3.8.4 Test Setup

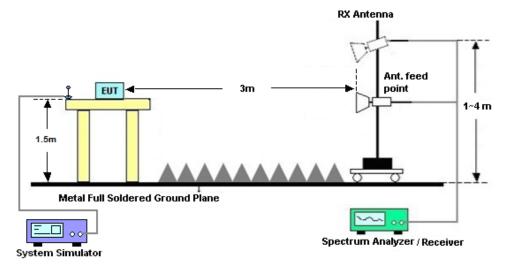
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.8.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.8.8 Duty cycle correction factor for average measurement

Please refer to Appendix C.



3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted	limit (dBµV)
Frequency of emission (MHZ)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.9.2 Measuring Instruments

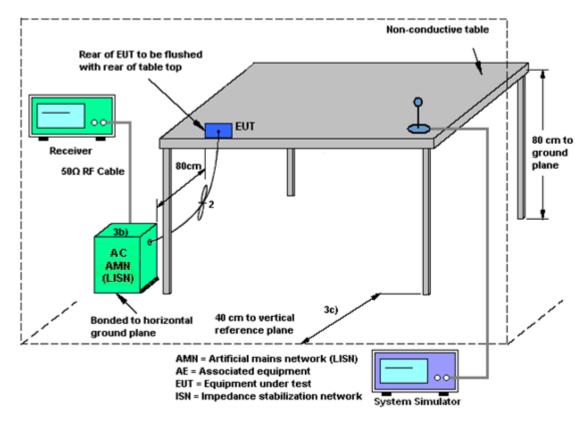
The measuring equipment is listed in the section 4 of this test report.

3.9.3 Test Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



3.10 Antenna Requirements

3.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	Mar.13, 2019~ Apr. 02, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GH z	Jan. 14, 2019	Mar.13, 2019~ Apr. 02, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Mar.13, 2019~ Apr. 02, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 23	3Hz~8.5GHz;M ax 30dBm	Oct. 12, 2018	Mar. 24, 2019	Oct. 11, 2019	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY574710 84	10Hz-44GHz	Jun. 25, 2018	Mar. 24, 2019	Jun. 24, 2019	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Mar. 24, 2019	Oct. 18, 2019	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Mar. 24, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 20, 2018	Mar. 24, 2019	Oct. 19, 2019	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Mar. 24, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2018	Mar. 24, 2019	Aug. 05, 2019	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35- HG	2014749	18~40GHz	Jan. 14, 2019	Mar. 24, 2019	Jan. 13, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2018	Mar. 24, 2019	Apr. 16, 2019	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY532702 03	500MHz~26.5G Hz	Apr. 18, 2018	Mar. 24, 2019	Apr. 17, 2019	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 24, 2019	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 19, 2018	Mar. 30, 2019	Apr. 18, 2019	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Mar. 30, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Mar. 30, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Mar. 30, 2019	Oct. 11, 2019	Conduction (CO01-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	2.9 dB
of 95% (U = 2Uc(y))	2:9 dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	5.0 dB
of 95% (U = 2Uc(y))	5.0 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence	5.0 dB
of 95% (U = 2Uc(y))	5.0 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

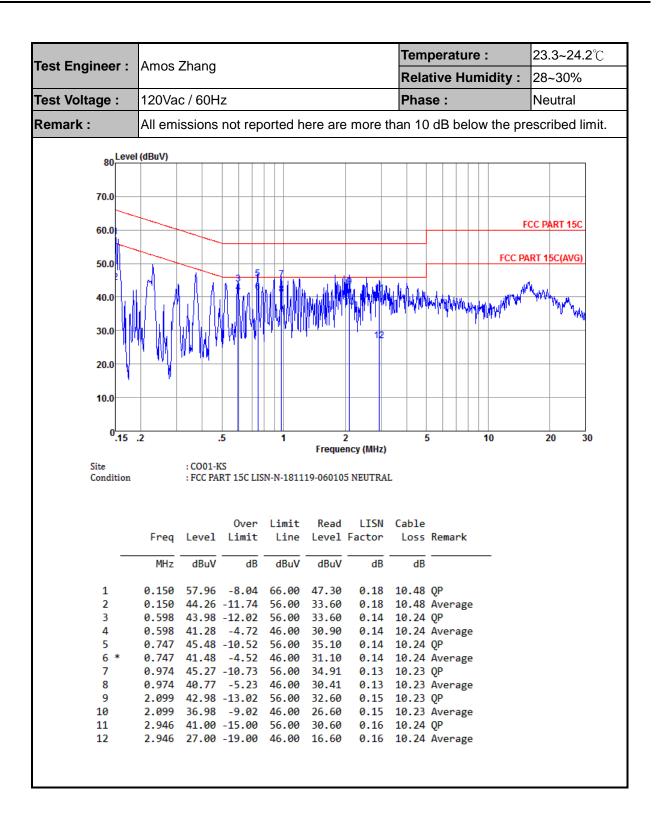
Measuring Uncertainty for a Level of Confidence	5.0 dB
of 95% (U = 2Uc(y))	5.0 dB



Appendix A. AC Conducted Emission Test Results

Fest Voltage :			orted h	ere are	e more tl	Phas	tive Humidity : se : dB below the p	Line
Remark : /	All emissions		orted h	ere are	e more ti			
80 Level (70.0 60.0 50.0		not rep	orted h	ere are	e more ti	han 10) dB below the p	rescribed limit.
80 Level (70.0 60.0 50.0							•	
80 70.0 60.0 50.0								
60.0 50.0								
60.0 50.0								
50.0								
M II								FCC PART 15C
M II								
40.0		5	T II		18.			PART 15C(AVG)
40.0	MAN MALINAL IN	h that we		h la ch 🖊	1. M.A.	Mut	1 month and the second	Nalthan
1 111	4 1 1 1 1 1 1 1	11/1/17	MINIM		21111		R. R. Malthank die 1.	The second
20.0	1 W 'W			YI N	14	1 ₈		- Mar
30.0			8 10	Щ.				
20.0				ľ				
20.0								
10.0								
0.15 .2	2	.5	1	;	2	5	<u> </u>	20 30
				-	ncy (MHz)	-		
Site Condition	: CO01-F	KS RT 15C LIS	N-L-18111	19-060105	LINE			
Condition				.,				
	Freg Level		Limit		LISN Factor	Cable	Remark	
	Freq Level		LINE	Level		LUSS		
	MHz dBuV	dB	dBuV	dBuV	dB	dB		
1 *	0.151 60.17	-5.79	65.96	49.60	0.09	10.48	OP	
2	0.151 47.17	-8.79	55.96	36.60	0.09	10.48	Äverage	
	0.224 51.08			40.60		10.35	•	
	0.224 35.78 0.510 46.01			25.30 35.60		10.35	Average QP	
6	0.510 28.21	-17.79	46.00	17.80	0.17	10.24	Average	
7	0.943 45.93			35.49		10.24	-	
	0.943 26.03 1.088 43.94			15.59 33.51		10.24	Average OP	
10		-20.26		15.31			Average	
	2.023 48.25			37.80		10.23		
12	2.023 36.55	-9.45		26.10	0.22	10.23	Average	
	2.554 45.96			35.49		10.24	-	
	2.554 32.06						Average	
	3.009 43.38					10.24	•	
16 17		-16.92					Average	
17	3.943 42.79	-13.21	56.00	32.30	0.24	10.25	QP	







Appendix B. Radiated Spurious Emission

2.4GHz	2400~2	2483.5MHz
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BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2322.48	45.32	-28.68	74	47.33	-2.01	32.94	5.55	351	81	Р	Н
	*	2322.48	20.50	-33.50	54	-	-	-	-	-	-	А	Н
		2402	96.54	-	-	98.34	-1.8	33.03	5.63	351	81	Р	Н
BT		2402	71.72	-	-	-	-	-	-	-	-	Α	Н
CH 00 2402MHz		2377.99	45.50	-28.50	74	47.34	-1.84	33	5.61	400	124	Р	V
2402111172	*	2377.99	20.68	-33.32	54	-	-	-	-	-	-	А	V
		2402	94.12	-	-	95.92	-1.8	33.03	5.63	400	124	Р	V
		2402	69.30	-	-	-	-	-	-	-	-	А	V
		2483.76	49.23	-24.77	74	49.47	-0.24	32.49	5.72	351	81	Р	н
	*	2483.76	24.41	-29.59	54	-	-	-	-	-	-	А	Н
DT		2480	101.65	-	-	101.89	-0.24	32.49	5.72	351	81	Р	Н
ВТ СН 78		2480	76.83	-	-	-	-	-	-	-	-	А	Н
2480MHz		2483.55	55.35	-18.65	74	55.59	-0.24	32.49	5.72	400	124	Р	V
240010112	*	2483.55	30.53	-23.47	54	-	-	-	-	-	-	А	V
		2480	97.18	-	-	97.42	-0.24	32.49	5.72	400	124	Р	V
		2480	72.36	-	-	-	-	-	-	-	-	Α	V
Remark		o other spurio I results are F		st Peak	and Averag	e limit lin	е.						



	BT (Harmonic @ 3m)												
ВТ	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT		4806	35.21	-38.79	74	59.66	-24.45	63.76	8.43	100	205	Ρ	Н
CH 00 2402MHz		4806	34.17	-39.83	74	58.62	-24.45	63.76	8.43	100	12	Р	V
		4884	36.63	-37.37	74	60.88	-24.25	63.73	8.43	100	360	Ρ	н
BT		7323	39.58	-34.42	74	58.31	-18.73	64.37	10.08	100	360	Р	Н
CH 39 2440MHz		4884	36.22	-37.78	74	60.47	-24.25	63.73	8.43	100	360	Ρ	V
244010102		7320	38.62	-35.38	74	57.35	-18.73	64.37	10.08	100	360	Ρ	V
		4962	36.81	-37.19	74	60.79	-23.98	63.69	8.44	100	360	Р	Н
BT		7440	40.47	-33.53	74	58.87	-18.4	64.38	10.18	100	360	Р	Н
CH 78		4962	36.54	-37.46	74	60.52	-23.98	63.69	8.44	100	307	Ρ	V
2480MHz		7440	40.7	-33.3	74	59.1	-18.4	64.38	10.18	100	307	Р	V
Remark		o other spurio I results are F		st Peak	and Averag	e limit lin	е.						,

2.4GHz 2400~2483.5MHz



Emission below 1GHz

2.4GHz BT (LF)	
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ВТ	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		30.97	16.24	-23.76	40	25.1	-8.86	32.97	0.47	-	-	Р	н
		292.87	15.83	-30.17	46	27.96	-12.13	33.02	1.79	-	-	Р	Н
		555.74	21.67	-24.33	46	28.43	-6.76	33.31	2.49	-	-	Р	Н
		743.92	23.34	-22.66	46	28.06	-4.72	33.13	2.99	-	-	Р	н
0.4011-		886.51	24.07	-21.93	46	26.68	-2.61	32.39	3.33	-	-	Р	н
2.4GHz BT		952.47	24.83	-21.17	46	26.08	-1.25	31.68	3.46	100	0	Р	Н
LF		30	17.5	-22.5	40	25.82	-8.32	32.98	0.46	-	-	Р	V
		335.55	16.64	-29.36	46	27.73	-11.09	33.07	1.92	-	-	Р	V
		468.44	19.33	-26.67	46	27.46	-8.13	33.23	2.27	-	-	Р	V
		605.21	21.57	-24.43	46	27.7	-6.13	33.35	2.61	-	-	Р	V
		685.72	22.16	-23.84	46	27.76	-5.6	33.29	2.83	-	-	Р	V
		845.77	24.09	-21.91	46	27.17	-3.08	32.62	3.26	100	0	Р	V
	1. No	o other spurio	us found.										
Remark		l results are P		st limit li	ne.								



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any
	unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is not under limit 6dB .
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	Р	н
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	А	Н

1. Level(dBµV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBµV/m) – Limit Line(dBµV/m)

For Peak Limit @ 2390MHz:

1. Level(dBµV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

- = 32.22(dB/m) + 4.58(dB) + 54.51(dBµV) 35.86 (dB)
- = 55.45 (dBµV/m)
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

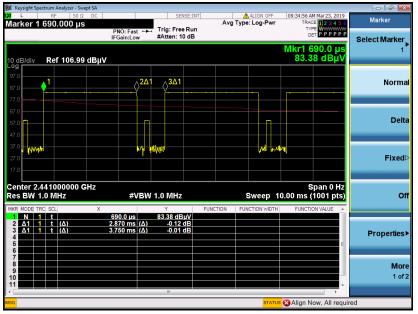
For Average Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- = 32.22(dB/m) + 4.58(dB) + 42.6(dBµV) 35.86 (dB)
- = 43.54 (dBµV/m)
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".

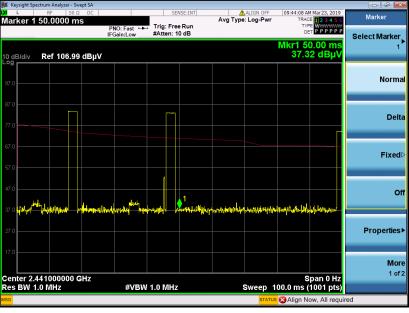


Appendix C. Duty Cycle Plots



DH5 on time (One Pulse) Plot on Channel 39





Note:

- 1. Worst case Duty cycle = on time/100 milliseconds = $2 \times 2.87 / 100 = 5.74 \%$
- 2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.82 dB
- 3. DH5 has the highest duty cycle worst case and is reported.