

# **Variant FCC Test Report**

Report No.: RF191202C10B-1

FCC ID: K7SG1S0001

Test Model: G1S0002

Received Date: Jun. 19, 2020

Test Date: Jul. 01 ~ Jul. 07, 2020

Issued Date: Aug. 17, 2020

Applicant: Belkin International, Inc.

Address: 12045 East Waterfront Drive, Playa Vista, USA, CA 90094

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lin Kou Laboratories

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33383, Taiwan

Test Location (2): B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

FCC Registration / 788550 / TW0003

Designation Number: 427177 / TW0011





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Report No.: RF191202C10B-1 Page No. 1 / 22 Report Format Version: 6.1.1 Reference No.: 200619C18



# **Table of Contents**

Re	ase Control Record	. 3
1	ertificate of Conformity	. 4
2	ummary of Test Results	. 5
	1 Measurement Uncertainty	
3	eneral Information	. 6
	1 General Description of EUT	. 7 . 8 . 9 . 9
4	est Types and Results	10
	1 Radiated Emission and Bandedge Measurement 4.1.1 Limits of Radiated Emission and Bandedge Measurement 4.1.2 Test Instruments 4.1.3 Test Procedures 4.1.4 Deviation from Test Standard 4.1.5 Test Set Up 4.1.6 EUT Operating Conditions 4.1.7 Test Results 2 Conducted Emission Measurement 4.2.1 Limits of Conducted Emission Measurement 4.2.2 Test Instruments 4.2.3 Test Procedures 4.2.4 Deviation from Test Standard 4.2.5 Test Setup 4.2.6 EUT Operating Condition 4.2.7 Test Results	10 11 12 13 14 15 17 17 18 18 18 19
	ctures of Test Arrangements	
Αŗ	endix – Information of the Testing Laboratories	22



## **Release Control Record**

Issue No.	Description	Date Issued
RF191202C10B-1	Original Release	Aug. 17, 2020

Report No.: RF191202C10B-1 Page No. 3 / 22 Report Format Version: 6.1.1 Reference No.: 200619C18



### 1 Certificate of Conformity

**Product:** Smart Speaker

Brand: belkin

Test Model: G1S0002

Sample Status: Engineering Sample

Applicant: Belkin International, Inc

**Test Date:** Jul. 01 ~ Jul. 07, 2020

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10:2013

This report is issued as a supplementary report to BV CPS report no.: RF191202C10-1. This report shall be used by combining with its original report.

Prepared by : \_\_\_\_\_\_\_, Date: \_\_\_\_\_\_\_\_, Aug. 17, 2020

Gina Liu / Specialist

Approved by : , Date: Aug. 17, 2020

Dylan Chiou / Senior Project Engineer

Report No.: RF191202C10B-1 Reference No.: 200619C18



### 2 Summary of Test Results

	47 CFR FCC Part 15, Subpart C (Section 15.247)								
FCC Clause	Test Item	Result	Remarks						
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit.  Minimum passing margin is -23.06 dB at 0.46669 MHz.						
15.247(a)(1) (iii)	(iii) Number of Hopping Frequency Used		Refer to Note						
15.247(a)(1) (iii)			Refer to Note						
15.247(a)(1)	Hopping Channel Separation     Spectrum Bandwidth of a     Frequency Hopping Sequence Spread     Spectrum System	N/A	Refer to Note						
15.247(a)(1)	Maximum Peak Output Power	N/A	Refer to Note						
	Occupied Bandwidth Measurement	N/A	Refer to Note						
15.205 & 209	15.205 & 209 Radiated Emissions  15.247(d) Band Edge Measurement		Meet the requirement of limit.  Minimum passing margin is -13.21 dB at 138.54 MHz.						
15.247(d)			Refer to Note						
15.247(d)	Antenna Port Emission	N/A	Refer to Note						
15.203	Antenna Requirement	N/A	Refer to Note						

### Note:

- 1. Only Spurious Emissions below 1GHz and Conducted Emission tests had been performed for the addendum. Refer to original report for other test data.
- 2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 3. N/A: Not applicable

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
	9 kHz ~ 30 MHz	3.04 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
Radiated Effissions above 1 GHz	18 GHz ~ 40 GHz	1.1508 dB

### 2.2 Modification Record

There were no modifications required for compliance.

Report No.: RF191202C10B-1 Page No. 5 / 22 Report Format Version: 6.1.1



### 3 General Information

### 3.1 General Description of EUT

Product	Smart Speaker
Brand	belkin
Test Model	G1S0002
Status of EUT	Engineering Sample
Power Supply Rating	19.0 Vdc (Adapter)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Antenna Type	Dipole antenna with 4.34 dBi gain
Antenna Connector	lpex 1
Accessory Device	Adapter
Data Cable Supplied	N/A

#### Note

This report is prepared for FCC class II permissive change. This report is issued as a supplementary
report of BV CPS report no.: RF191202C10-1. Difference compared with original report is listed as below.
Therefore, test items for conducted emission and radiated emission below 1GHz test had been re-tested
in this report.

No.	Description
1.	Adding MF chip (Brand: Microchip; Model: MFI343S00177)
2.	System changed to support Alexa Voice Service+Airplay 2
3.	Adding new model (G1S0002)

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Switching Adapter	belkin	DSA-65PFB-19 FUS 190342	I/P: 100-240 Vac, 50/60 Hz, 1.5 A O/P: 19 Vdc, 3.42 A 1.45 meter, non-shielded cable, with one ferrite core

3. The antenna information is listed as below.

Antenna	ntenna Frequency (MHz)							
Type		2400	2450	2500	5150	5470	5725	5850
6	Peak Gain (dBi) Antenna 1	3.75	4.16	4.34	4.38	4.13	3.59	3.96
Dipole	Peak Gain (dBi) Antenna 2	2.64	2.64	2.67	2.75	3.81	3.26	2.54

- 4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
- 5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

Report No.: RF191202C10B-1 Page No. 6 / 22 Report Format Version: 6.1.1



#### 3.2 **Description of Test Modes**

79 channels are provided to this EUT:

Channel	Freq. (MHz)						
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

Report No.: RF191202C10B-1 Reference No.: 200619C18 Page No. 7 / 22 Report Format Version: 6.1.1



### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure	Applic	able To	D
Mode	RE<1G	PLC	Description
-	V	V	-

Where

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

### Radiated Emission Test (Below 1 GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
 Following channel(s) was (were) selected for the final test as listed below.

	EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
Ī	-	0 to 78	0	FHSS	8DPSK	3DH5

### **Power Line Conducted Emission Test:**

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
 Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	0	FHSS	8DPSK	3DH5

### **Test Condition:**

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Harry Hsueh
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang

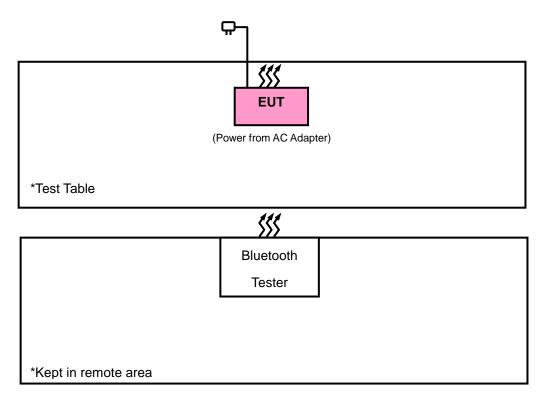
Report No.: RF191202C10B-1 Page No. 8 / 22 Report Format Version: 6.1.1



### 3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

### 3.3.1 Configuration of System under Test



### 3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

### **Test Standard:**

# FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

### **References Test Guidance:**

### KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

Report No.: RF191202C10B-1 Reference No.: 200619C18 Page No. 9 / 22

Report Format Version: 6.1.1



### 4 Test Types and Results

## 4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (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

### Note:

- a. The lower limit shall apply at the transition frequencies.
- b. Emission level  $(dBuV/m) = 20 \log Emission level (uV/m)$ .
- c. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Report No.: RF191202C10B-1 Page No. 10 / 22 Report Format Version: 6.1.1



### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 26, 2019	Aug. 25, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 08, 2019	Oct. 07, 2020
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 12, 2019	Nov. 11, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 24, 2019	Nov. 23, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Bluetooth Tester	CBT	100980	Jul. 14, 2019	Jul. 13, 2021
Loop Antenna	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Sep. 03, 2020
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Sep. 03, 2020
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12/24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien Chamber 1.

Report No.: RF191202C10B-1 Reference No.: 200619C18 Page No. 11 / 22

Report Format Version: 6.1.1



#### 4.1.3 Test Procedures

#### For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

#### For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

#### Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ? 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ? 98 %) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 1 kHz)
- 4. All modes of operation were investigated and the worst-case emissions are reported.

## 4.1.4 Deviation from Test Standard

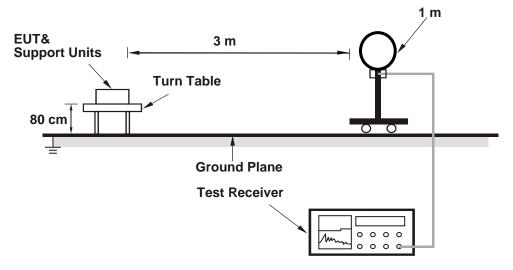
No deviation.

Report No.: RF191202C10B-1 Page No. 12 / 22 Report Format Version: 6.1.1

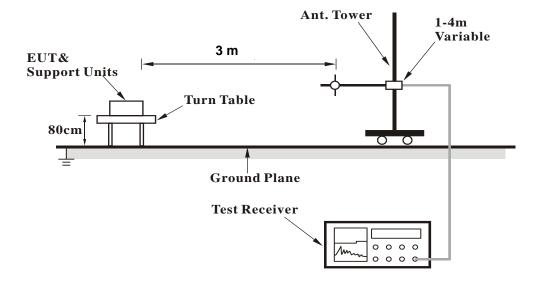


### 4.1.5 Test Set Up

### <Radiated Emission below 30 MHz>

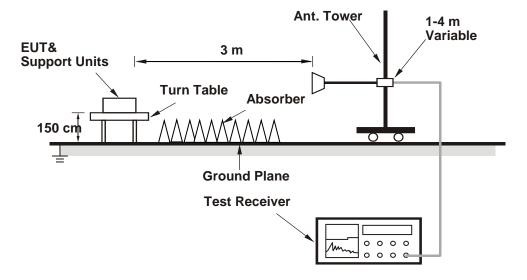


### <Radiated Emission 30 MHz to 1 GHz>





## <Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

Report No.: RF191202C10B-1 Reference No.: 200619C18



### 4.1.7 Test Results

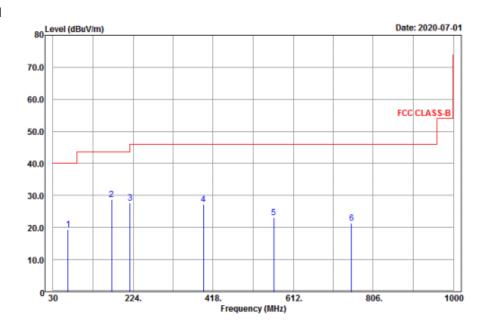
### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

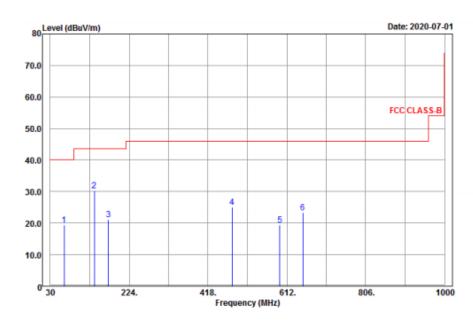
30 MHz ~ 1 GHz Worst-Case Data:

EUT Test Condition		Measurement Detail			
Channel	Channel 0	Frequency Range	30 MHz ~ 1 GHz		
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh		

### Horizontal



### Vertical



Report No.: RF191202C10B-1 Reference No.: 200619C18 Page No. 15 / 22

Report Format Version: 6.1.1



	Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark	
66.72	19.39	37.72	-18.33	40	-20.61	102	132	Peak	
172.02	28.85	49.06	-20.21	43.5	-14.65	165	195	Peak	
216.57	27.61	45.56	-17.95	46	-18.39	144	187	Peak	
395.2	27.16	41.2	-14.04	46	-18.84	114	124	Peak	
565.3	23.09	34.35	-11.26	46	-22.91	146	132	Peak	
753.6	21.46	29.89	-8.43	46	-24.54	106	135	Peak	
		Antenn	a Polarity &	Test Dista	nce: Vertica	l at 3 m			
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark	
64.29	19.43	36.67	-17.24	40	-20.57	166	195	Peak	
138.54	30.29	51.24	-20.95	43.5	-13.21	105	187	Peak	
172.56	21.06	41.22	-20.16	43.5	-22.44	142	132	Peak	
477.8	24.97	37.71	-12.74	46	-21.03	115	132	Peak	
594.7	19.37	30.13	-10.76	46	-26.63	165	142	Peak	
651.4	23.34	33.37	-10.03	46	-22.66	105	124	Peak	

## Remarks:

- 1. Emission Level = Read Level + Factor Margin value = Emission level – Limit value
- 2. The emission levels of other frequencies were very low against the limit.

Report No.: RF191202C10B-1 Reference No.: 200619C18 Page No. 16 / 22 Report Format Version: 6.1.1



### 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

Fraguency (MU=)	Conducted Limit (dBuV)					
Frequency (MHz)	Quasi-Peak	Average				
0.15 - 0.5	66 - 56	56 - 46				
0.50 - 5.0	56	46				
5.0 - 30.0	60	50				

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 20, 2020	Feb. 19, 2021
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The test was performed in HwaYa Shielded Room 1.
- 3. The VCCI Site Registration No. is C-12040.

Report No.: RF191202C10B-1 Page No. 17 / 22 Report Format Version: 6.1.1



### 4.2.3 Test Procedures

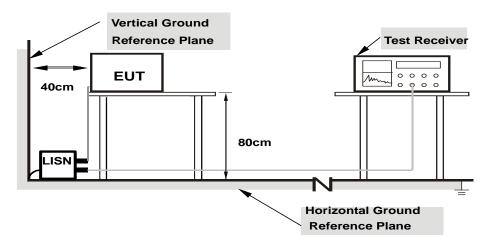
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit 20 dB) was not recorded.

**Note:** The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

### 4.2.4 Deviation from Test Standard

No deviation.

### 4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.2.6 EUT Operating Condition

Set the EUT under transmission condition continuously at specific channel frequency.

Report No.: RF191202C10B-1 Page No. 18 / 22 Report Format Version: 6.1.1



### 4.2.7 Test Results

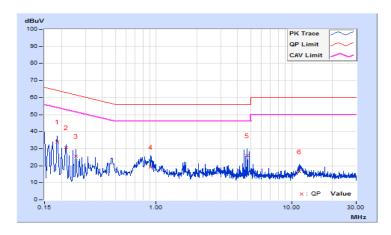
### **CONDUCTED WORST-CASE DATA: 8DPSK**

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz				
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH				
Tested by	Jisyong Wang	Test Date	2020/7/7				

	Phase Of Power : Line (L)									
	Frequency	Correction	Readin	Reading Value		Emission Level		nit	Margin	
No		Factor	(dB	uV)	(dBuV)		(dBuV)		(dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18519	9.62	24.50	20.48	34.12	30.10	64.25	54.25	-30.13	-24.15
2	0.21647	9.62	21.13	20.10	30.75	29.72	62.95	52.95	-32.20	-23.23
3	0.25557	9.63	16.08	10.29	25.71	19.92	61.57	51.57	-35.86	-31.65
4	0.90854	9.68	9.65	3.69	19.33	13.37	56.00	46.00	-36.67	-32.63
5	4.66996	9.80	16.23	10.06	26.03	19.86	56.00	46.00	-29.97	-26.14
6	11.44599	9.88	6.51	3.35	16.39	13.23	60.00	50.00	-43.61	-36.77

### Remarks:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value



Report No.: RF191202C10B-1 Page No. 19 / 22 Reference No.: 200619C18

Report Format Version: 6.1.1

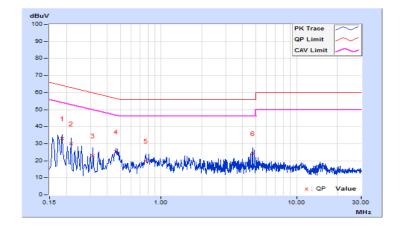


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Jisyong Wang	Test Date	2020/7/7

	Phase Of Power : Neutral (N)									
	Frequency	Correction	Readin	g Value	Emission Level		Limit		Margin	
No		Factor	(dB	uV)	(dB	uV)	(dB	uV)	(d	B)
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18519	9.65	23.36	20.57	33.01	30.22	64.25	54.25	-31.24	-24.03
2	0.21647	9.64	20.17	18.54	29.81	28.18	62.95	52.95	-33.14	-24.77
3	0.31422	9.66	13.16	11.05	22.82	20.71	59.86	49.86	-37.04	-29.15
4	0.46669	9.67	15.69	13.84	25.36	23.51	56.57	46.57	-31.21	-23.06
5	0.77169	9.69	10.05	8.86	19.74	18.55	56.00	46.00	-36.26	-27.45
6	4.77553	9.83	14.27	12.03	24.10	21.86	56.00	46.00	-31.90	-24.14

### Remarks:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





5 Pictures of Test Arrangements	
Please refer to the attached file (Test Setup Photo).	

Report No.: RF191202C10B-1 Reference No.: 200619C18



### Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

Hsin Chu EMC/RF/Telecom Lab

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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Report No.: RF191202C10B-1 Page No. 22 / 22 Report Format Version: 6.1.1