EMTEK (Dongguan) Co., Ltd
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EMTEK
Access to the World

Certificate of Conformity

NO.: ED161018004

The following products have been tested by us with the listed standards and found in conformity with the RED directive 2014/53/EU. It is possible to use CE marking to demonstrate the conformity with RED directive.

Applicant	:	
Address	:	
Manufacturer	:	
Address	:	
EUT	:	Foldable Bluetooth headphone
Trade Mark	:	N/A
Model Number	:	P326.701, P326.703, P326.705
Report Number	:	ED161018004E, ED161018004R, ED161018004H
Test Standards	:	ETSI EN 301 489-1 V1.9.2: 2011 ETSI EN 301 489-17 V2.2.1: 2012 ETSI EN 300 328 V1.9.1: 2015 EN 62479: 2010

CE

EMTEK (DONGGUAN) CO., LTD. CERTIFICATE

(Manager)

October 25, 2016

The certificate is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. logo.

Ver.1.0

ETSI EN 301 489-1 v 1.9.2: 2011/-17 v 2.2.1: 2012

Test Report

For

Foldable Bluetooth headphone

Model No.: P326.701, P326.703, P326.705

Trademark: N/A

Report No.: ED161018004E

Issue Date: October 25, 2016

Prepared for

Prepared by

EMTEK(DONGGUAN) CO., LTD.
No.281,Guantai Road, Nancheng District,
Dongguan, Guangdong, China
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1. TEST RESULT CERTIFICATION

Applicant:

Equipment Under Test: Foldable Bluetooth headphone

Trademark: N/A

Model Number: P326.701, P326.703, P326.705

Input Rating: DC 3.7V Battery, DC 5V from adapter

Date of Test: October 18, 2016 to October 25, 2016

APPLICABLE STANDARDS		
STANDARD	**TEST RESULT**	
ETSI EN 301 489-1 $_{V1.9.2}$	complied	
ETSI EN 301 489-17 $_{V2.2.1}$	complied	
Applicable Standard	**Class/Limit/Criterion**	**Test Result**
ETSI EN 301 489-1 $_{V1.9.2}$: 2011		
EN 55022: 2010+AC: 2011	Class B	complied
EN 61000-3-2: 2014	Class A	complied
EN 61000-3-3: 2013	Limit	complied
IEC 61000-4-2: 2008	Criterion B	complied
IEC 61000-4-3: 2006+ A1: 2007+ A2: 2010	Criterion A	complied
IEC 61000-4-4: 2012	Criterion B	complied
IEC 61000-4-5: 2014	Criterion B	complied
IEC 61000-4-6: 2013	Criterion A	complied
IEC 61000-4-11: 2004	Criterion B/C/C	complied
Deviation from Applicable Standard		
None		

The above equipment was tested by EMTEK(DONGGUAN) CO., LTD. and EMTEK(SHENZHEN) CO., LTD. for compliance with the requirements set forth in ETSI EN 301 489-17 $V_{2.2.1}$: 2012. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Reviewed and Approved by:

Approved By

Sam Lv / Q.A. Manager
EMTEK(DONGGUAN) CO., LTD.

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED161018004E

2. EUT DESCRIPTION

Details of technical specification, refers to the description in follows:

Applicant	
Manufacturer	
Product	Foldable Bluetooth headphone
Model Number	P326.701
Trademark	N/A
Kind of Device	Bluetooth 2.1
Power Supply for Test	AC 230V/50Hz for adapter
Frequency Range	2402~2480MHz
Type of Modulation	GFSK, pi/4-DQPSK, 8DPSK
Antenna Gain	0 dBi

3. TEST METHODOLOGY

As per table 1 of clause 7.1 of ETSI EN 301 489-1 V1.9.2, the measurement was performed under EUT combined condition during the tests. The ports on the ancillary left empty during the measurement in this report.

3.1 UNIT OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the Spectrum analyzers were converted to dB (uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors and subtracting the Amplifier Gain from the measured reading. The following is a sample calculation:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB are added. The Amplifier Gain of 29 dB is subtracted, giving field strength of 32 dBuV/m. The 32-dBuV/m values was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBuV/m

Note: *Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m*

3.2 ANTENNA

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 meters from the leading edge of the turntable.

3.3 DECISION OF FINAL TEST MODE

1. The following test mode was scanned during the preliminary test:

Mode 1: Normal

After the preliminary scan, the following test mode was found to produce the highest emission level.Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.

Modes: TX, RX

4. INSTRUMENT AND CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

FACILITIES AND ACCREDITATIONS

4.2 FACILITIES

Site Description

EMC Lab.	:	Registered on FCC, June 18, 2014 The Certificate Number is 247565. Registered on Industry Canada, February 19, 2014 The Certificate Number is 9444A
Name of Firm	:	EMTEK(DONGGUAN) CO., LTD.
Site Location	:	No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China

4.3 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5. SETUP OF EQUIPMENT UNDER TEST

5.1 SETUP CONFIGURATION OF EUT

Setup Diagram

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

5.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Adapter	N/A	YSV6-0501000	N/A	N/A	N/A	N/A

Note: *All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.*

Grounding: *Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.*

5.3 TEST SETUP

The equipment under test was configured and operated in a manner to communicate continuously. EUT tends to maximize its emission characteristics in a typical application for conducted and radiated emission measurement. The RF module plus ancillary (stand alone unit) was evaluated as per table 1 of clause 7.1 of ETSI EN 301 489-1 V1.9.2: 2011. The transmitter was active during the conducted and radiated emission measurements.

6. ETSI EN 301 489-1/-17 REQUIREMENTS

6.1 RADIATED EMISSION LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.2.3, Table 3 and EN 55022: 2010+AC: 2011 Clause 6, Table 6, Table 9,Class B

Limits for radiated disturbance Below 1GHz

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47
Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.		

Limits for radiated disturbance Above 1GHz

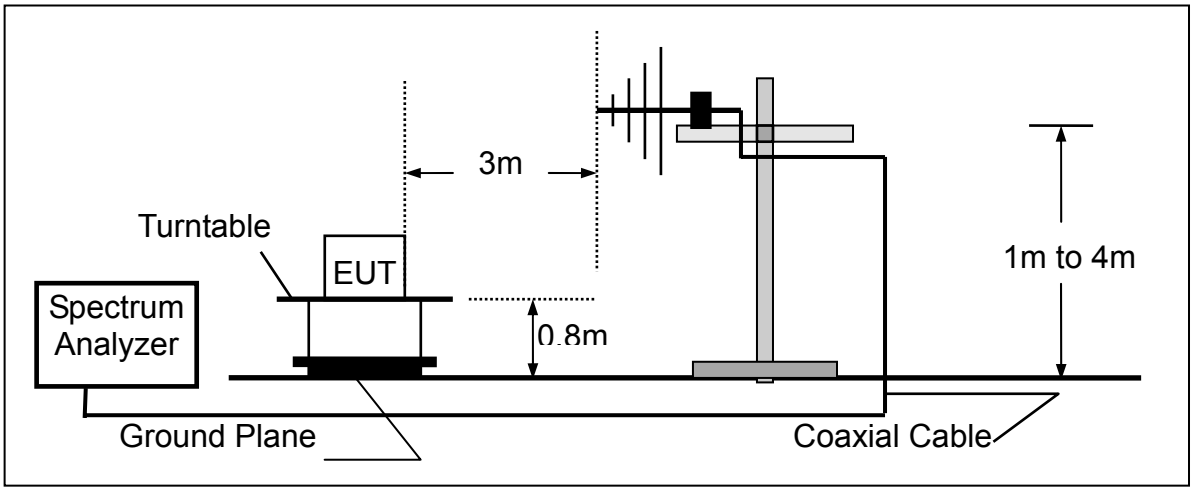
FREQUENCY (MHz)	DISTANCE (Meters)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
1000 ~ 3000	3	50	70
3000 ~ 6000	3	54	74
Note: The lower limit applies at the transition frequency.			

MEASUREMENT EQUIPMENT USED

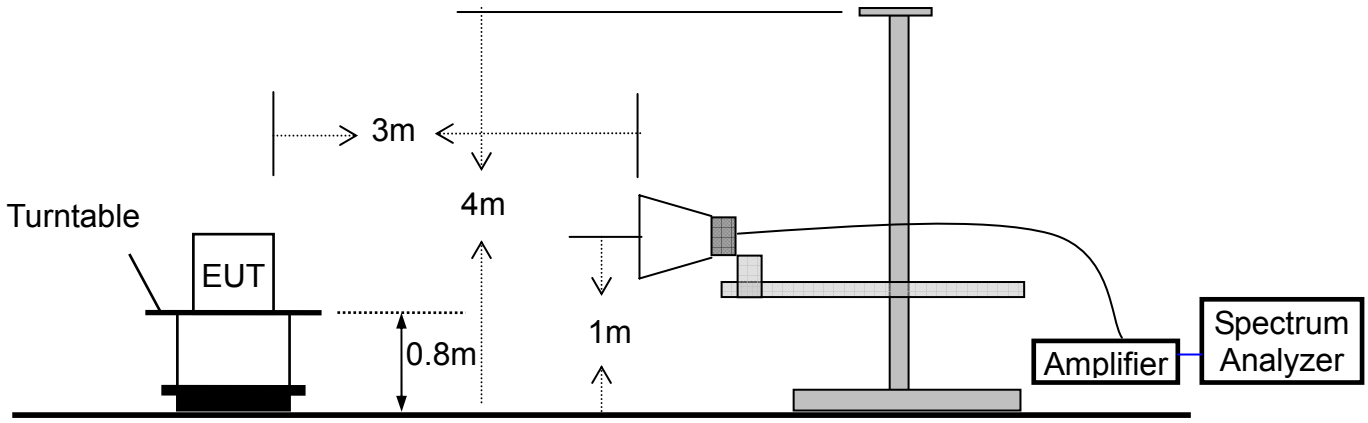
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	May 16, 2016	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	May 16, 2016	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	May 16, 2016	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	May 16, 2016	1 Year
5.	Color Monitor	SUNSPO	SP-140A	N/A	May 16, 2016	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	May 16, 2016	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	May 16, 2016	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	May 16, 2016	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	May 16, 2016	1 Year
10.	Cable	Schwarzbeck	PLF-100	549489	May 19, 2016	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	May 19, 2016	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	May 19, 2016	1 Year
13.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	Dec 29, 2015	1 Year
14.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	Dec 29, 2015	1 Year
15.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	Dec 29, 2015	1 Year
16.	Cable	H+S	CBL-26	N/A	Dec 29, 2015	1 Year
17.	Cable	H+S	CBL-26	N/A	Dec 29, 2015	1 Year
18.	Cable	H+S	CBL-26	N/A	Dec 29, 2015	1 Year

Test Configuration

1) Radiated Emission Test Set-Up, Frequency Below 1000MHz



2) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.2.2 and EN 55022:2010+AC: 2011 Clause 6 for the measurement methods.

TEST RESULTS

No non-compliance noted.

Test Data

Please refer to the following pages:

Test Mode: TX (30-1000MHz)	**Tested by:** YF
Test voltage: AC 230V/50Hz	**Test Distance:** 3m
Detector Function: Quasi-peak/Peak	**Test Results:** Passed

Polarization	Frequency MHz	Emission Level dBμV/m	Limits dBμV/m	Margin dBμV/m
Horizontal	32.9100	15.53	40.00	-24.47
	36.7900	15.26	40.00	-24.74
	42.0065	15.17	40.00	-24.83
	239.5200	25.43	47.00	-21.57
	359.8000	34.73	47.00	-12.27
	600.3600	32.48	47.00	-14.52
Vertical	30.0000	17.73	40.00	-22.27
	367.5600	15.95	47.00	-31.05
	430.6100	16.91	47.00	-30.09
	480.0800	18.12	47.00	-28.88
	537.3100	19.02	47.00	-27.98
	600.3600	22.98	47.00	-24.02

Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.*
4. *Measurements above show only up to 6 maximum emissions noted.*
5. *The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.*

Test Mode: TX (Above 1GHz)	**Tested by:** YF
Test voltage: AC 230V/50Hz	**Test Distance:** 3m
Detector Function: Peak+ AV	**Test Results:** Passed

Ant.Pol.	Frequency (MHz)	Emission Level(dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
Horizontal	1269	59.35	40.21	70	50	-10.65	-9.79
	1485	59.33	43.2	70	50	-10.67	-6.8
	2369	57.32	40.55	70	50	-12.68	-9.45
	2501	62.22	42.72	70	50	-7.78	-7.28
	2947	58.55	42.32	70	50	-11.45	-7.68
	3048	60.05	42.49	74	54	-13.95	-11.51
Vertical	1368	63.05	41.36	70	50	-6.95	-8.64
	1428	58.49	38.75	70	50	-11.51	-11.25
	1946	58.67	49.56	70	50	-11.33	-0.44
	2533	59.32	36.48	70	50	-10.68	-13.52
	2948	61.28	41.35	70	50	-8.72	-8.65
	3146	61.87	42.68	70	50	-8.13	-7.32

Test Mode: RX (30-1000MHz)	**Tested by:** YF
Test voltage: AC 230V/50Hz	**Test Distance:** 3m
Detector Function: Quasi-peak/Peak	**Test Results:** Passed

Polarization	Frequency MHz	Emission Level dBμV/m	Limits dBμV/m	Margin dBμV/m
Horizontal	36.7900	14.97	40.00	-25.03
	41.6400	15.31	40.00	-24.69
	43.5800	14.76	40.00	-25.24
	167.7400	22.26	40.00	-17.74
	512.0900	28.42	47.00	-18.58
	768.1700	28.09	47.00	-18.91
Vertical	30.0000	17.56	40.00	-22.44
	32.0667	16.76	40.00	-23.24
	37.7600	15.19	40.00	-24.81
	40.6700	16.56	40.00	-23.44
	42.4508	14.95	40.00	-25.05
	48.4300	14.32	40.00	-25.68

Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.*
4. *Measurements above show only up to 6 maximum emissions noted.*
5. *The IF bandwidth of SPA 30MHz to 1GHz was 100KHz.*

Test Mode: RX (Above 1GHz)	**Tested by:** YF
Test voltage: AC 230V/50Hz	**Test Distance:** 3m
Detector Function: Peak+ AV	**Test Results:** Passed

Ant.Pol.	Frequency (MHz)	Emission Level(dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
Horizontal	1365	56.29	41.82	70	50	-13.71	-8.18
	1542	60.24	43.69	70	50	-9.76	-6.31
	2018	55.21	40.15	70	50	-14.79	-9.85
	2295	55.92	40.69	70	50	-14.08	-9.31
	2876	58.72	42.95	70	50	-11.28	-7.05
	3208	61.39	46.16	74	54	-12.61	-7.84
Vertical	1095	62.38	43.69	70	50	-7.62	-6.31
	1428	58.16	39.42	70	50	-11.84	-10.58
	1935	60.04	39.56	70	50	-9.96	-10.44
	2235	57.38	37.41	70	50	-12.62	-12.59
	2684	60.42	43.33	70	50	-9.58	-6.67
	3048	59.67	48.95	70	50	-10.33	-1.05

6.2 AC MAINS LINE CONDUCTED EMISSION

LIMIT

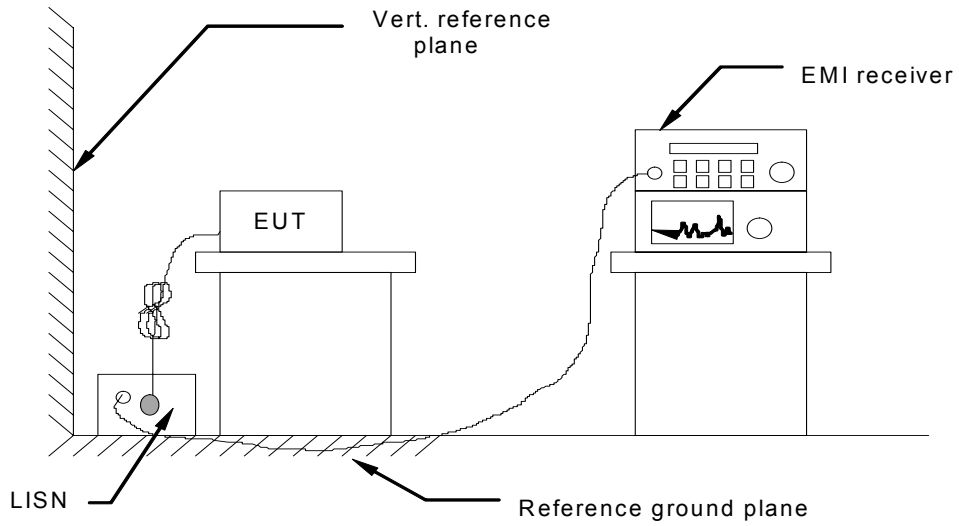
Please refer to ETSI EN 301 489-1 Clause 8.4.3, Table 8 and EN 55022: 2010+AC: 2011 Clause 5, Table 2, Class B

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde&Schwarz	ESCI	100137	May 16, 2016	1 Year
2.	L.I.S.N.	Rohde&Schwarz	ENV216	100017	May 16, 2016	1Year
3.	RF Switching Unit	CDS	RSU-M2	38401	May 16, 2016	1Year

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration

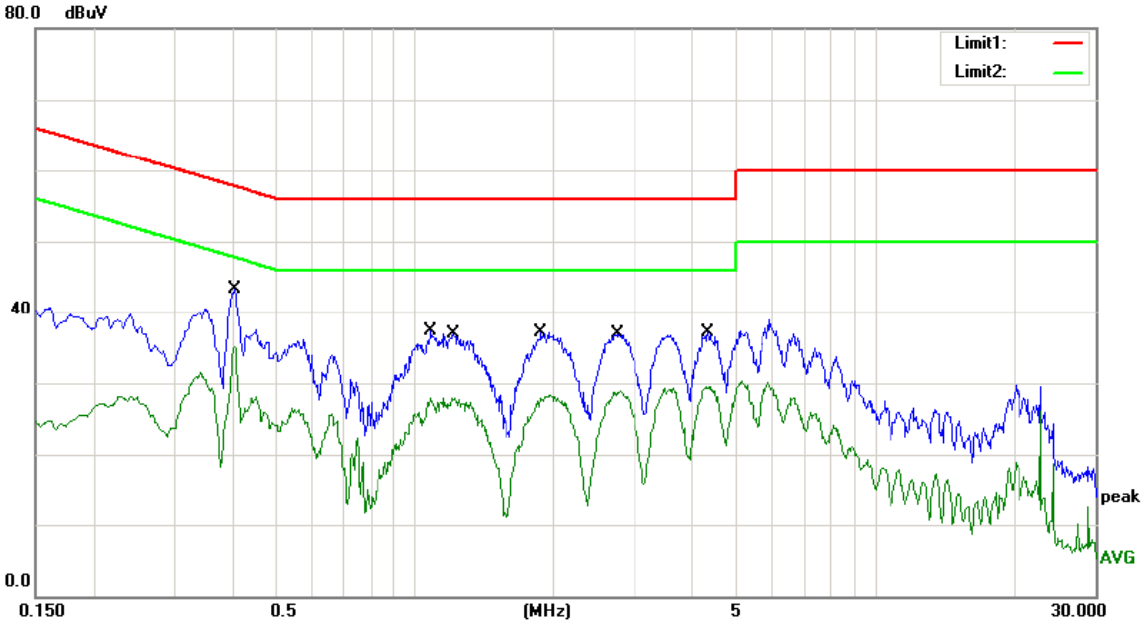


TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.2 and EN 55022: 2010+AC: 2011 Clause 5 for the measurement methods.

TEST RESULTS

Pass.
Please refer to the following data.



Site site #1 Phase: *L1* Temperature: 24

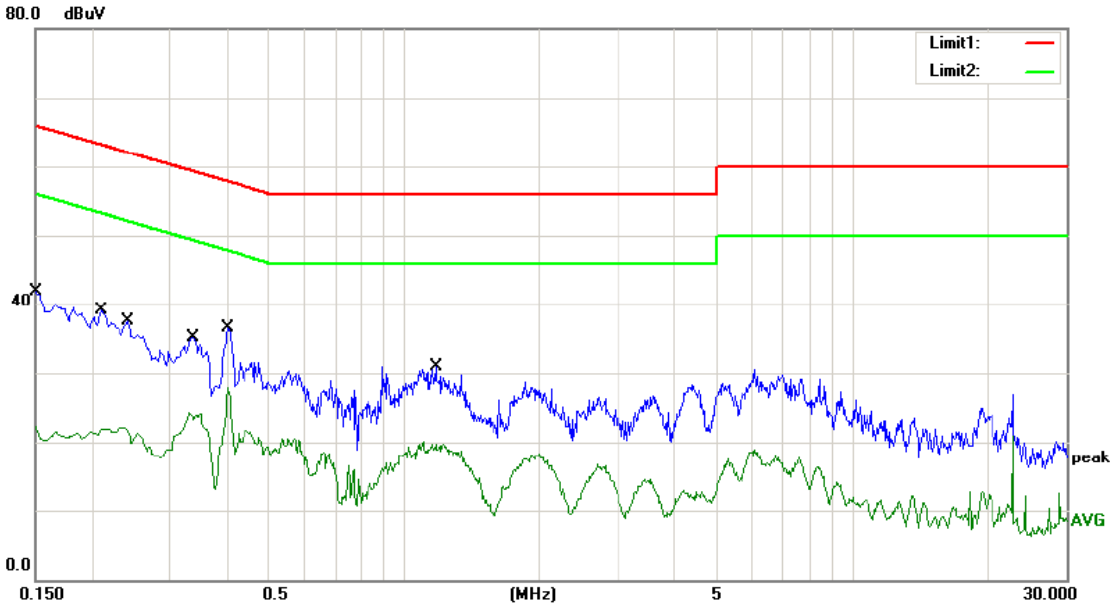
Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4060	30.07	10.08	40.15	57.73	-17.58	QP	
2	*	0.4060	25.06	10.08	35.14	47.73	-12.59	AVG	
3		1.0860	24.50	10.10	34.60	56.00	-21.40	QP	
4		1.0860	16.84	10.10	26.94	46.00	-19.06	AVG	
5		1.2140	22.50	10.10	32.60	56.00	-23.40	QP	
6		1.2140	17.64	10.10	27.74	46.00	-18.26	AVG	
7		1.8820	23.80	10.10	33.90	56.00	-22.10	QP	
8		1.8820	16.67	10.10	26.77	46.00	-19.23	AVG	
9		2.7460	24.00	10.10	34.10	56.00	-21.90	QP	
10		2.7460	18.42	10.10	28.52	46.00	-17.48	AVG	
11		4.3220	23.50	10.10	33.60	56.00	-22.40	QP	
12		4.3220	19.44	10.10	29.54	46.00	-16.46	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: *N* Temperature: 24

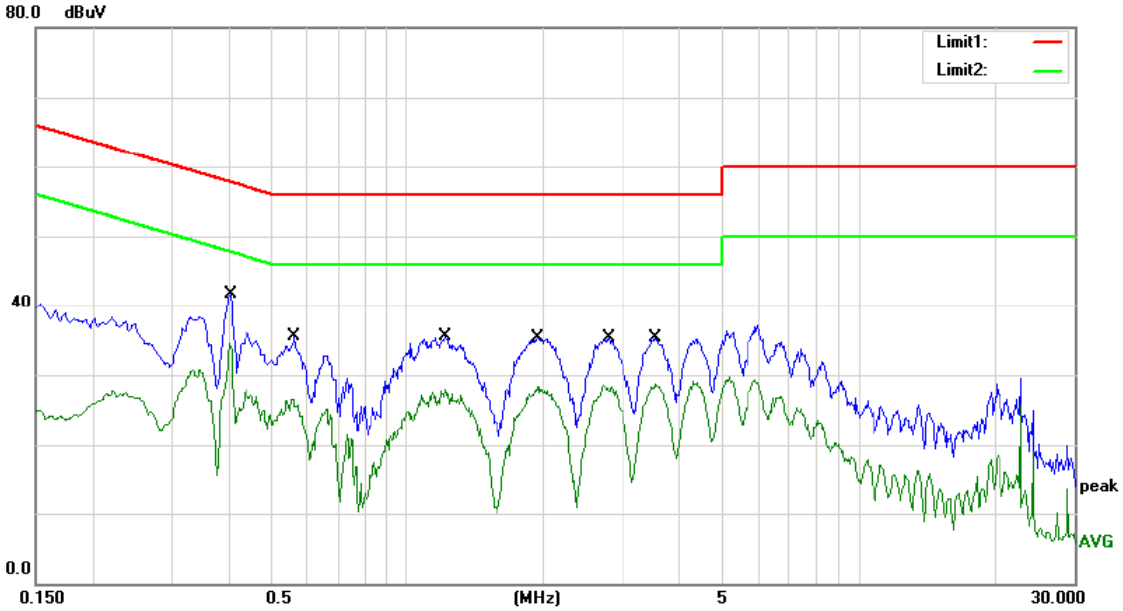
Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1516	28.59	10.01	38.60	65.91	-27.31	QP	
2		0.1516	12.36	10.01	22.37	55.91	-33.54	AVG	
3		0.2100	26.17	10.03	36.20	63.21	-27.01	QP	
4		0.2100	11.79	10.03	21.82	53.21	-31.39	AVG	
5		0.2420	24.17	10.03	34.20	62.03	-27.83	QP	
6		0.2420	11.61	10.03	21.64	52.03	-30.39	AVG	
7		0.3380	22.54	10.06	32.60	59.25	-26.65	QP	
8		0.3380	13.85	10.06	23.91	49.25	-25.34	AVG	
9		0.4020	23.19	10.07	33.26	57.81	-24.55	QP	
10	*	0.4020	17.82	10.07	27.89	47.81	-19.92	AVG	
11		1.1780	18.10	10.10	28.20	56.00	-27.80	QP	
12		1.1780	9.10	10.10	19.20	46.00	-26.80	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: *L1* Temperature: 24

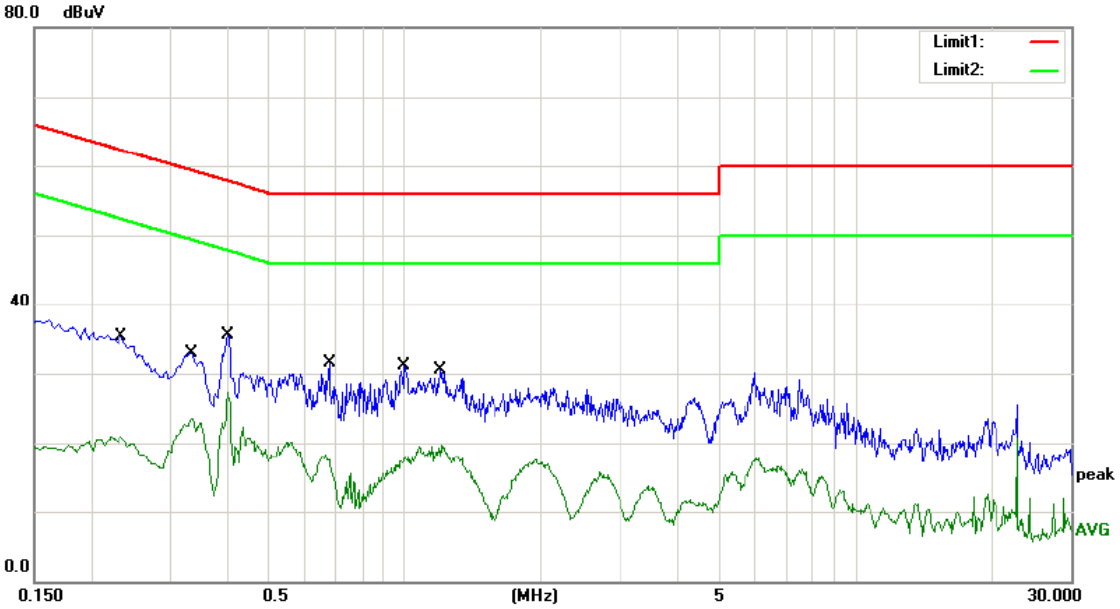
Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Idle

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4060	27.77	10.08	37.85	57.73	-19.88	QP	
2	*	0.4060	24.34	10.08	34.42	47.73	-13.31	AVG	
3		0.5620	23.00	10.10	33.10	56.00	-22.90	QP	
4		0.5620	15.40	10.10	25.50	46.00	-20.50	AVG	
5		1.2100	22.46	10.10	32.56	56.00	-23.44	QP	
6		1.2100	17.22	10.10	27.32	46.00	-18.68	AVG	
7		1.9460	22.30	10.10	32.40	56.00	-23.60	QP	
8		1.9460	18.20	10.10	28.30	46.00	-17.70	AVG	
9		2.7940	22.50	10.10	32.60	56.00	-23.40	QP	
10		2.7940	17.94	10.10	28.04	46.00	-17.96	AVG	
11		3.5460	22.80	10.10	32.90	56.00	-23.10	QP	
12		3.5460	17.94	10.10	28.04	46.00	-17.96	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: N Temperature: 24

Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Idle

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2340	22.57	10.03	32.60	62.31	-29.71	QP	
2		0.2340	10.78	10.03	20.81	52.31	-31.50	AVG	
3		0.3340	21.44	10.06	31.50	59.35	-27.85	QP	
4		0.3340	13.42	10.06	23.48	49.35	-25.87	AVG	
5		0.4020	22.09	10.07	32.16	57.81	-25.65	QP	
6	*	0.4020	17.32	10.07	27.39	47.81	-20.42	AVG	
7		0.6780	18.60	10.10	28.70	56.00	-27.30	QP	
8		0.6780	7.32	10.10	17.42	46.00	-28.58	AVG	
9		0.9980	18.30	10.10	28.40	56.00	-27.60	QP	
10		0.9980	7.42	10.10	17.52	46.00	-28.48	AVG	
11		1.1940	17.50	10.10	27.60	56.00	-28.40	QP	
12		1.1940	8.01	10.10	18.11	46.00	-27.89	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington

6.3 AC MAINS HARMONIC CURRENT EMISSION

LIMIT

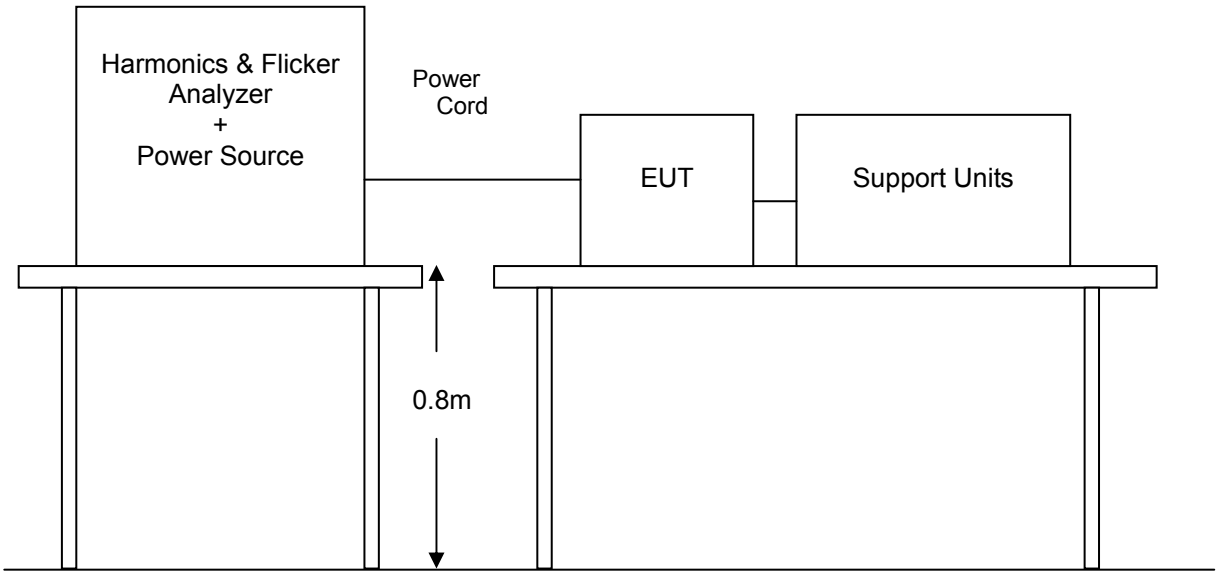
Please refer to EN 61000-3-2.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	EMTEST	DPA500	U0526100506	May 16, 2016	1 Year
2.	AC Frequency Conversion Power	EMTEST	ACS 500	V526100507	May 16, 2016	1 Year
3.	PC	LENOVO	T2900D	SS12485803	May 16, 2016	1 Year

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to EN 61000-3-2: 2014 for the measurement methods.

TEST RESULTS

No non-compliance noted.

Test Mode: TX

Note: *According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply.*

6.4 AC MAINS VOLTAGE FLUCTUATION AND FLICKER

LIMIT

Please refer to EN 61000-3-3.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	EMTEST	DPA500	U0526100506	May 16, 2016	1 Year
2.	AC Frequency Conversion Power	EMTEST	ACS 500	V526100507	May 16, 2016	1 Year
3.	PC	LENOVO	T2900D	SS12485803	May 16, 2016	1 Year

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

(Same as the configuration of the AC MAINS HARMONIC CURRENT EMISSIONS TEST)

Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to EN 61000-3-3 for the measurement methods.

TEST RESULTS

Pass.

Please refer to the following page.

Test Report

Report title:	Flicker
Company Name:	EMTEK
Date of test:	15:43 October 20, 2016
Tester:	Snake
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Customer:	Casada International GmbH
E. U. T.:	Foldable Bluetooth headphone
M/N	P326.701
Mode	TX

Test Result	PASS

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.027	1.00	PASS
Plt	0.027	0.65	PASS
dc [%]	0.005	3.30	PASS
dmax [%]	0.235	4.00	PASS
dt [s]	0.000	0.50	PASS

6.5 ELECTROSTATIC DISCHARGE

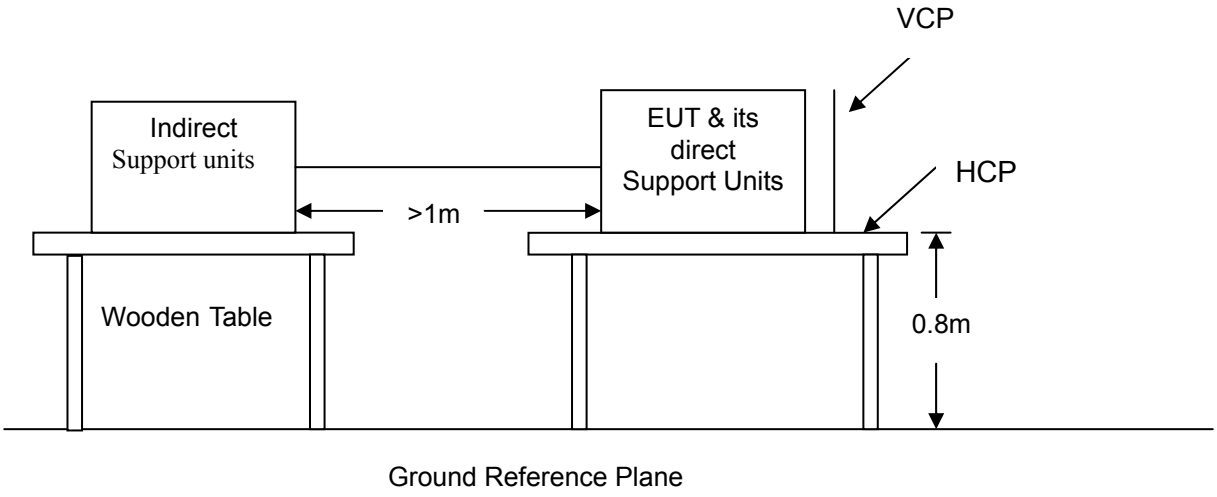
LIMIT

Please refer to IEC 61000-4-2.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ AG	NSG437	EE166	May 16, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar	**Ground Bond Resistance**	0.2 Ω

Test Procedure:

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and IEC 61000-4-2 for the measurement. methods.

TEST RESULTS

PASS (EUT continued to operate normally during test.)

Test Mode: TX, RX
Description of the Electrostatic Discharges (ESD)

Amount of discharge	Voltage	Coupling	Location	Result (Pass/Fail)
Mini 20 /Point	±2; 4; 8 kV	Air Discharge	Slot	Pass
Mini 20 /Point	±2; 4 kV	Contact Discharge	Metal, Port	Pass
Mini 20 /Point	± 2; 4 kV	Indirect Discharge HCP	HCP	Pass
Mini 20 /Point	±2; 4 kV	Indirect Discharge VCP	VCP	Pass

PERFORMANCE CRITERIA	
Criteria requested	☐ A / ☒ B / ☐ C
Criteria meet	☐ A / ☒ B / ☐ C

Performance & Result:

	During Test	After Test
☐ **Criteria A:**	Shall operate as intended May show degradation of performance (note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
☒ **Criteria B:**	May show loss of function (one or more) May show degradation of performance (note 1) No unintentional transmissions	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (note 2) Shall be no loss of stored data or user programmable functions
☐ **Criteria C:**	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (note 2)

☒ ***PASS*** ☐ ***FAILED***
Observation: No unintentional transmission found during the tests.

6.6 RF ELECTROMAGNETIC FIELD

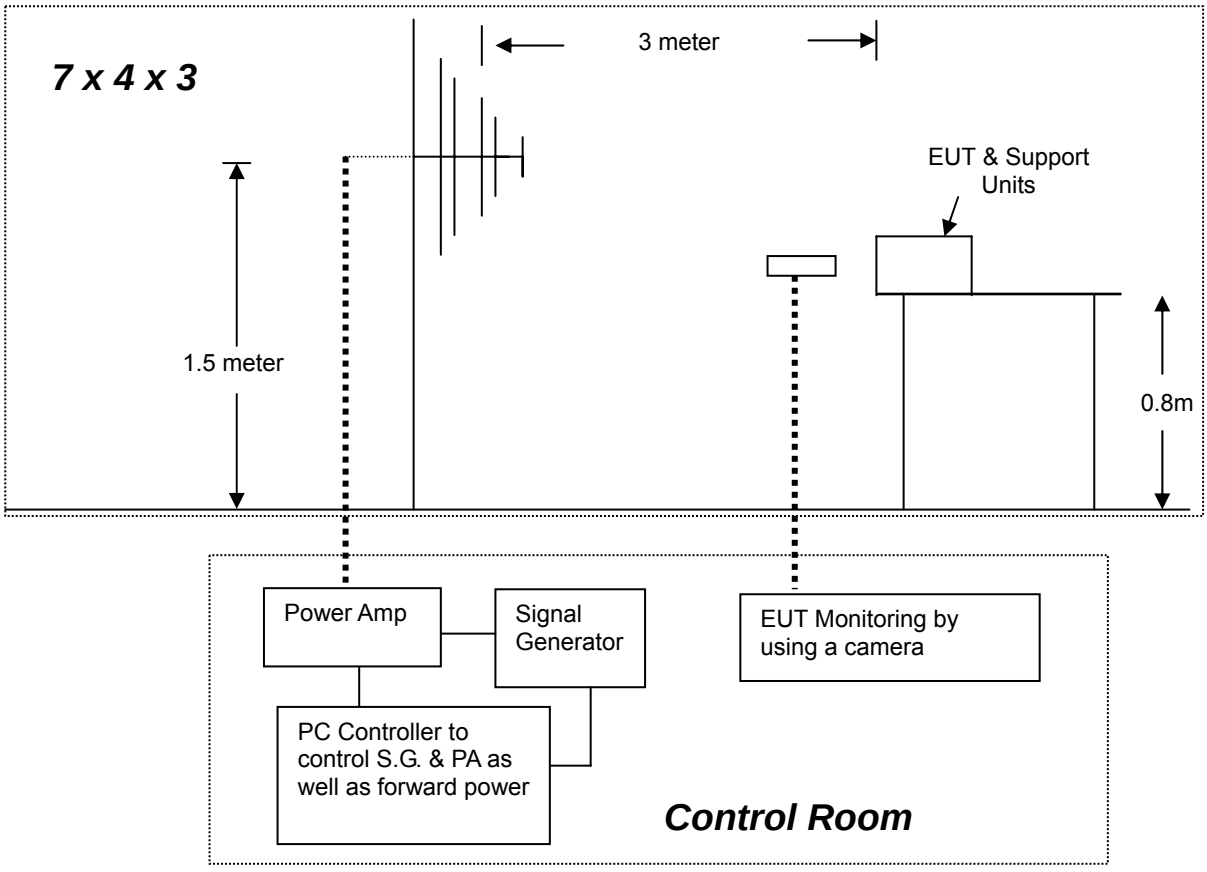
LIMIT

Please refer to IEC 61000-4-3.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 17, 2016	1 Year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 17, 2016	1 Year
3.	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 17, 2016	1 Year
4.	Power Amplifier	PRANA	AP32MT215	N/A	May 17, 2016	1 Year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	May 17, 2016	1 Year
6.	Signal Generator	AEROFLEX	2023B	N/A	May 17, 2016	1 Year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	May 17, 2016	1 Year
8.	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 17, 2016	1 Year
9.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 17, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and IEC 61000-4-3 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX, RX

Test conditions:

Test level : 3V/m unmodulated
Steps : 1 % of fundamental
Interfere signal : AM 80% 1KHz audio signal
Dwell Time : 3 sec

Result of Final Tests (Normal Modes)

	Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Selection for the final test
1	80-1000	3V/m	Yes	H / V	Front	☒
	1400-2700	3V/m	Yes	H / V	Front	☒
2	80-1000	3V/m	Yes	H / V	Right	☒
	1400-2700	3V/m	Yes	H / V	Right	☒
3	80-1000	3V/m	Yes	H / V	Back	☒
	1400-2700	3V/m	Yes	H / V	Back	☒
4	80-1000	3V/m	Yes	H / V	Left	☒
	1400-2700	3V/m	Yes	H / V	Left	☒

Remark:

1. These test result outsourced to EMTEK(SHENZHEN) CO., LTD.

PERFORMANCE CRITERIA	
Criteria requested	☒ **A** / ☐ **B** / ☐ **C**
Criteria meet	☒ **A** / ☐ **B** / ☐ **C**

6.7 AC MAINS FAST TRANSIENTS COMMON MODE

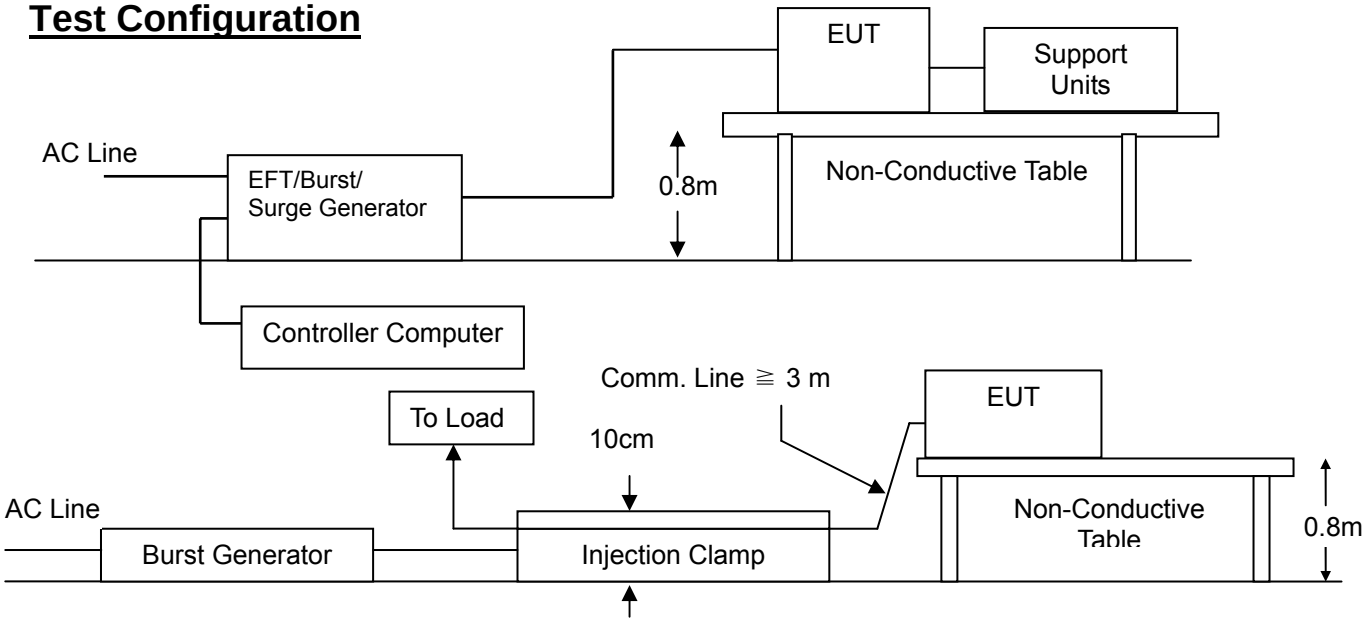
LIMIT

Please refer to IEC 61000-4-4.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS500M6B	V0526100502	May 16, 2016	1 Year
2.	Coupling Clamp	EM TEST	HFK	0605-10	May 16, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and IEC 61000-4-4 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX, RX

TEST CONDITIONS

☒ **Results of Final Tests (Normal Mode)**

Impulse Frequency: 5kHz
Tr/Th: 5/50ns
Burst Duration: 15ms
Burst Period: 3Hz

Injection Line	Voltage (kV)	Injected Method	Result (Pass / Fail)
☒ Live	±1	Direct	Pass
☒ Neutral	±1	Direct	Pass
☐ PE	± 1	Direct	Pass
☒ Live + Neutral	±1	Direct	Pass
☐ L + PE	± 1	Direct	Pass
☐ N + PE	± 1	Direct	Pass
☐ L + N + PE	± 1	Direct	Pass
☐ RJ45 port (LAN cable)	±0.5	Clamp	Pass
☐ RJ11 port (Line cable)	±0.5	Clamp	Pass

PERFORMANCE CRITERIA	
Criteria requested	☐ **A /** ☒ **B /** ☐ **C**
Criteria meet	☐ **A /** ☒ **B /** ☐ **C**

6.8 AC MAINS SURGE

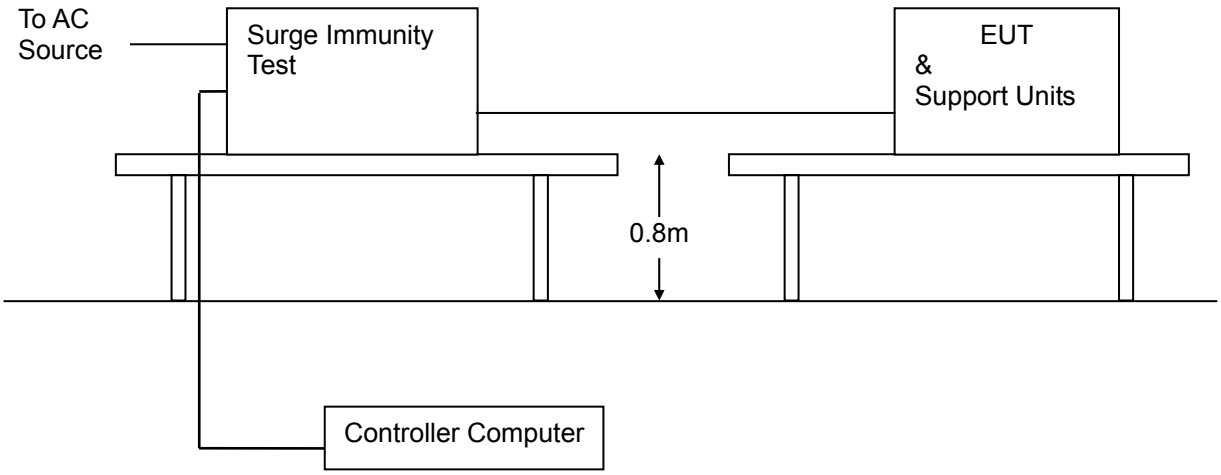
LIMIT

Please refer to IEC 61000-4-5.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	EM TEST	VCS 500M6T	V0526100503	May 16, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

Test Procedure:

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and IEC 61000-4-5 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX, RX

Test conditions

☒ **Results of Final Tests (Normal Mode)**

Voltage Waveform: 1.2/50 us
Current Waveform: 8/20 us
Polarity: Positive/Negative
Phase angle: 0^{o}, 90^{o}, 180^{o}, 270^{o}

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
☒ Live + Neutral	1	Pos./ Neg.	Capacitive	Pass
☐ L + PE	2	Pos./ Neg.	Capacitive	Pass
☐ N + PE	2	Pos./ Neg.	Capacitive	Pass
☐ T, R-Ground	0.5	Pos./ Neg.	Capacitive	Pass
☐ L1, 2, 3, 4-G (LAN)	0.5	Pos./ Neg.	Capacitive	Pass

PERFORMANCE CRITERIA	
Criteria requested	☐ **A /** ☒ **B /** ☐ **C**
Criteria meet	☐ **A /** ☒ **B /** ☐ **C**

6.9 AC MAINS RF – COMMON MODE

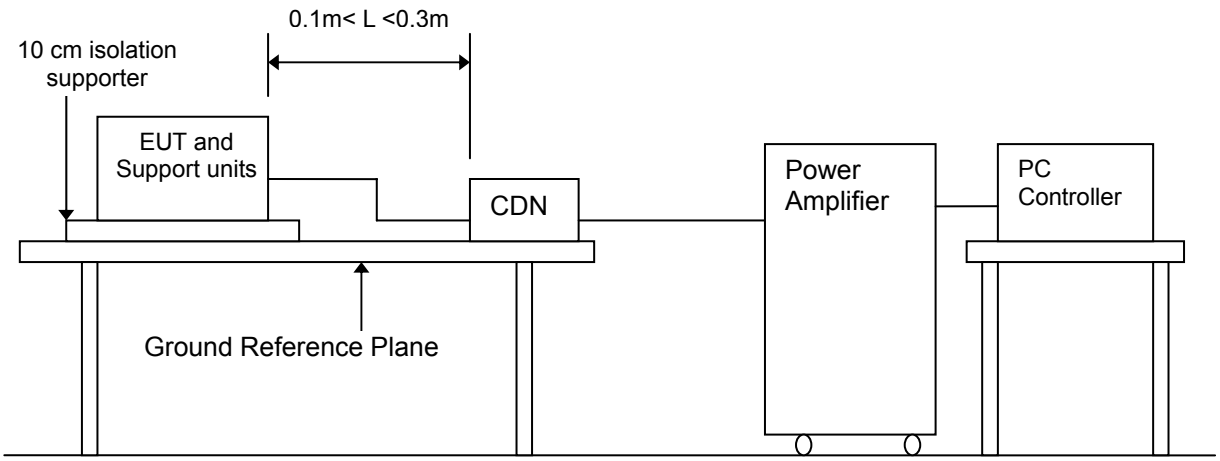
LIMIT

Please refer to IEC 61000-4-6.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Simulator	FRANKONIA	CIT-10	126B121012012	May 17, 2016	1 Year
2.	CDN	EM TEST	CDN-M2	5100100100	May 17, 2016	1 Year
3.	CDN	EM TEST	CDN-M3	0900-11	May 17, 2016	1 Year
4.	Injection Clamp	EM TEST	F-2031-23MM	368	May 17, 2016	1 Year
5.	Attenuator	EM TEST	ATT6	0010222A	May 17, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2, IEC 61000-4-6 for the measurement methods.

TEST RESULTS

PASS (EUT continued to operate normally during test)

Test Mode: TX, RX

TEST CONDITIONS

☒ **Results of Final Tests (Normal Mode)**

Frequency Range: 0.15MHz~80MHz
Frequency Step: 1% of fundamental
Dwell time: 3 Sec.

☒ **80% A.M., 1 kHz Sine wave (Field Strength: 3 V/m)**

☐ **Coupling type:** ☒ **CDN /** ☐ **RF Current Probe**

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass
Remark: 1. These test result outsourced to EMTEK(SHENZHEN) CO., LTD.			

PERFORMANCE CRITERIA	
Criteria requested	☒ **A /** ☐ **B /** ☐ **C**
Criteria meet	☒ **A /** ☐ **B /** ☐ **C**

6.10 VOLTAGE DIPS AND INTERRUPTION

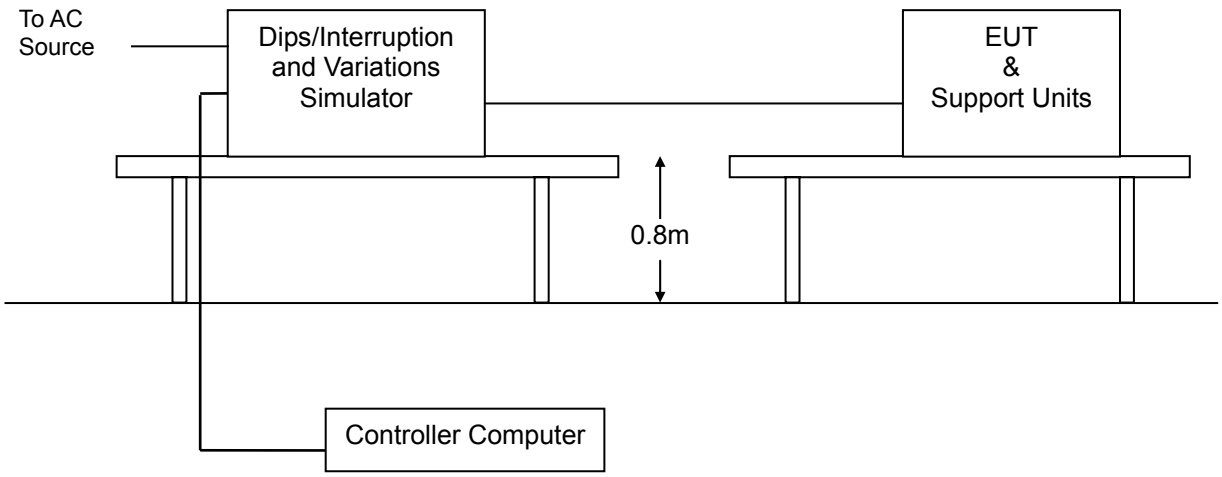
LIMIT

Please refer to IEC 61000-4-11.

MEASUREMENT EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	HAEFELY	Pline1610	083732-12	May 17, 2016	1 Year

Test Configuration



Ambient Condition of the Test Site			
Temperature	25°C	**Test Voltage**	AC 230V/50Hz
Humidity	50%RH	**Tested by**	YF
Pressure	1022mbar		

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and IEC 61000-4-11 for the measurement methods.

TEST RESULTS

PASS(EUT continued to operate normally during test)

Test Mode: TX, RX

TEST CONDITIONS

☒ *Interruption at phase angles of 0, 45, 90, 135, 180, 225, 270 and 315 degree in a 10 sec-interval.*

	Test Level (% U_T)	Reduction (%)	Duration (ms)	Criterion
Voltage Dips	70	30%	500	B
	0	100%	20	B
	0	100%	10	B
Voltage Interruption	0	100%	5000	C

Note: *The duration with a sequence of three dips/interruptions with a minimum interval of 10 s between each test event.*

☒ **Results of Final Tests (Normal Mode)**

☒ *Voltage Dips*

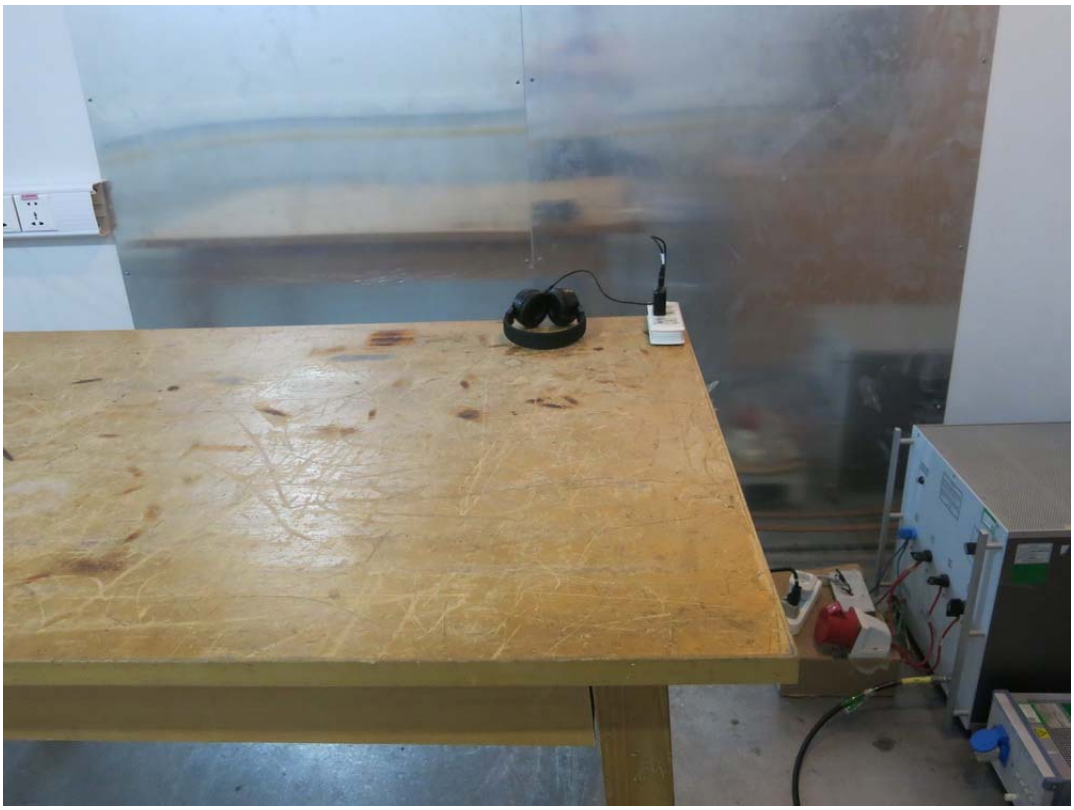
Test Level (% U_T)	Reduction (%)	Duration (ms)	Observation	Criterion
70	30%	500	Normal	B
0	100%	20	Normal	B
0	100%	10	Normal	B
Remark: 1. These test result outsourced to EMTEK(SHENZHEN) CO., LTD.				

☒ *Voltage Interruption*

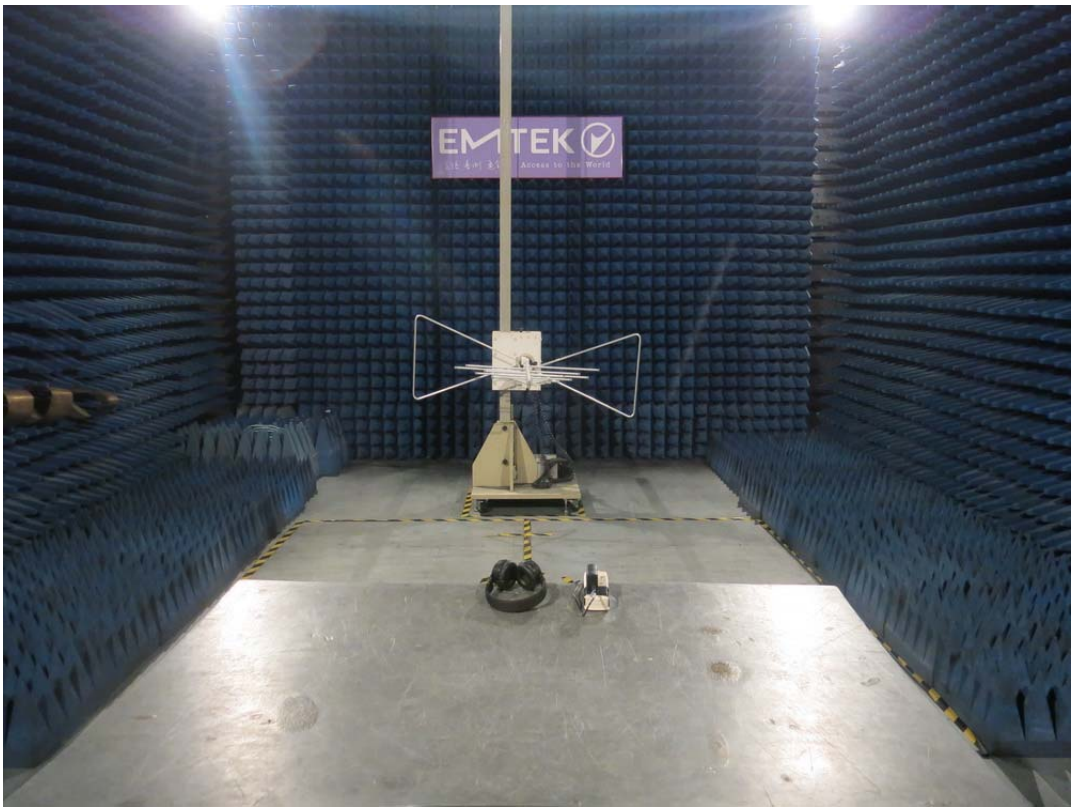
Test Level (% U_T)	Reduction (%)	Duration (ms)	Observation	Criterion
0	100%	5000	Normal	C
Remark: 1. These test result outsourced to EMTEK(SHENZHEN) CO., LTD.				

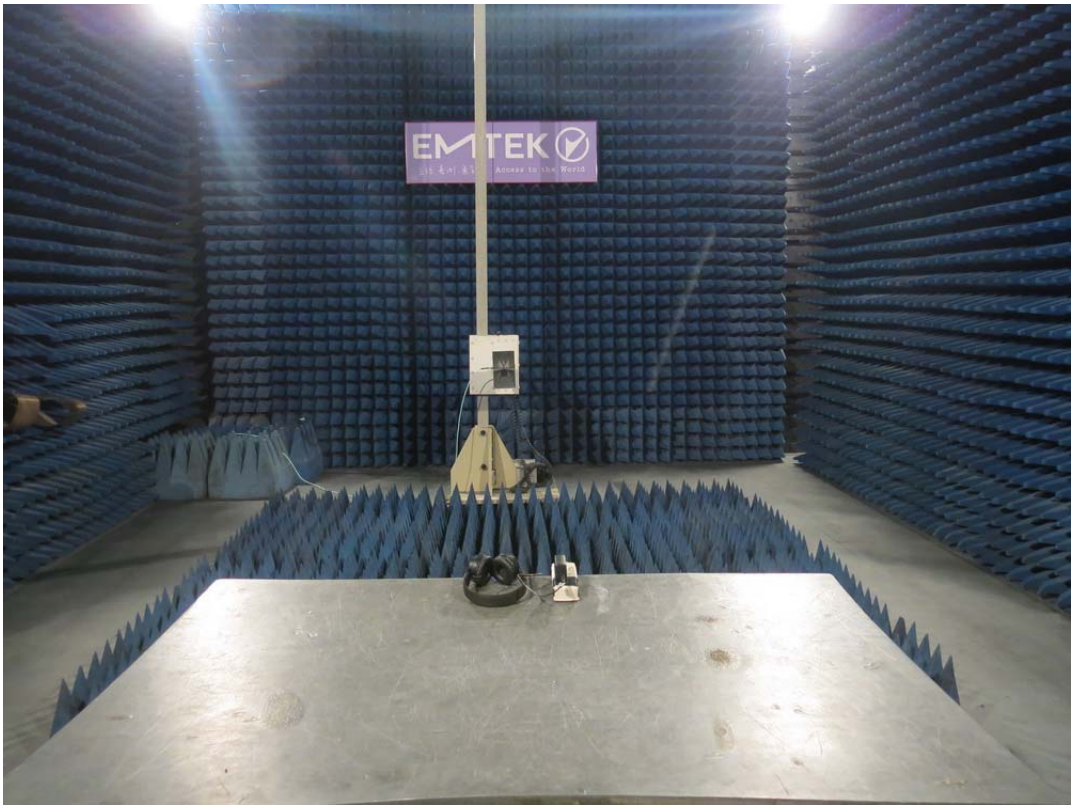
APPENDIX 1
PHOTOGRPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST

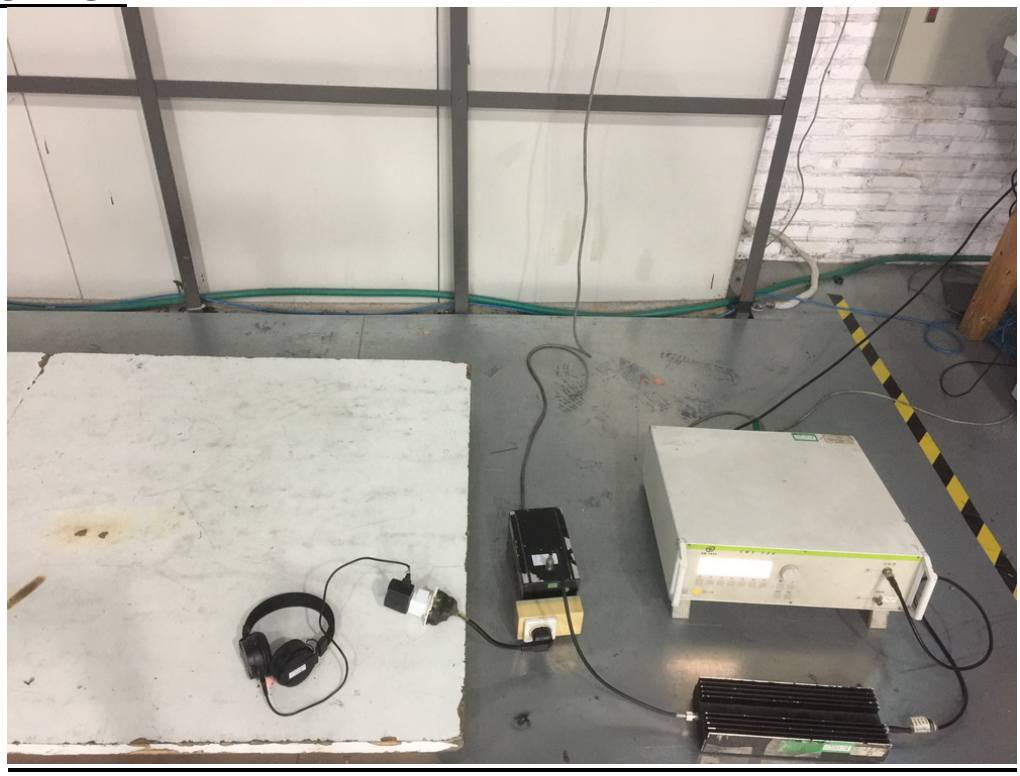
ELECTROSTATIC DISCHARGE TEST

RADIATED ELECTROMAGNETIC FIELD TEST

FAST TRANSIENTS/BURST TEST

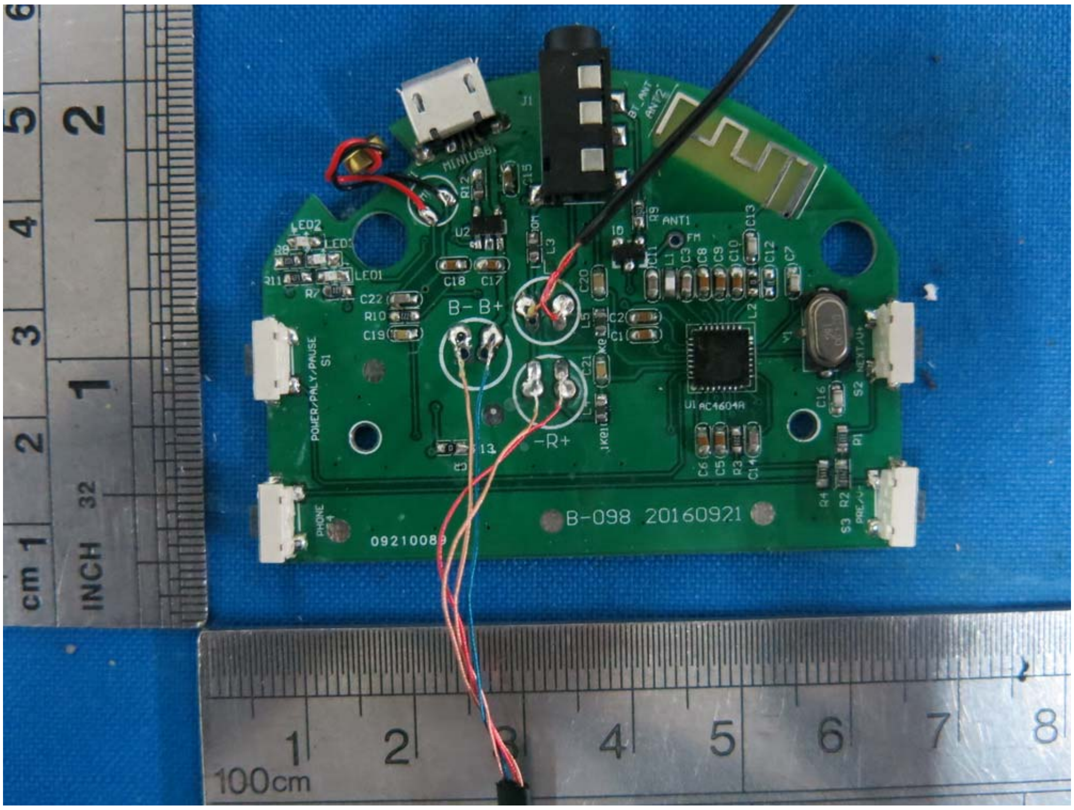
SURGE IMMUNITY TEST

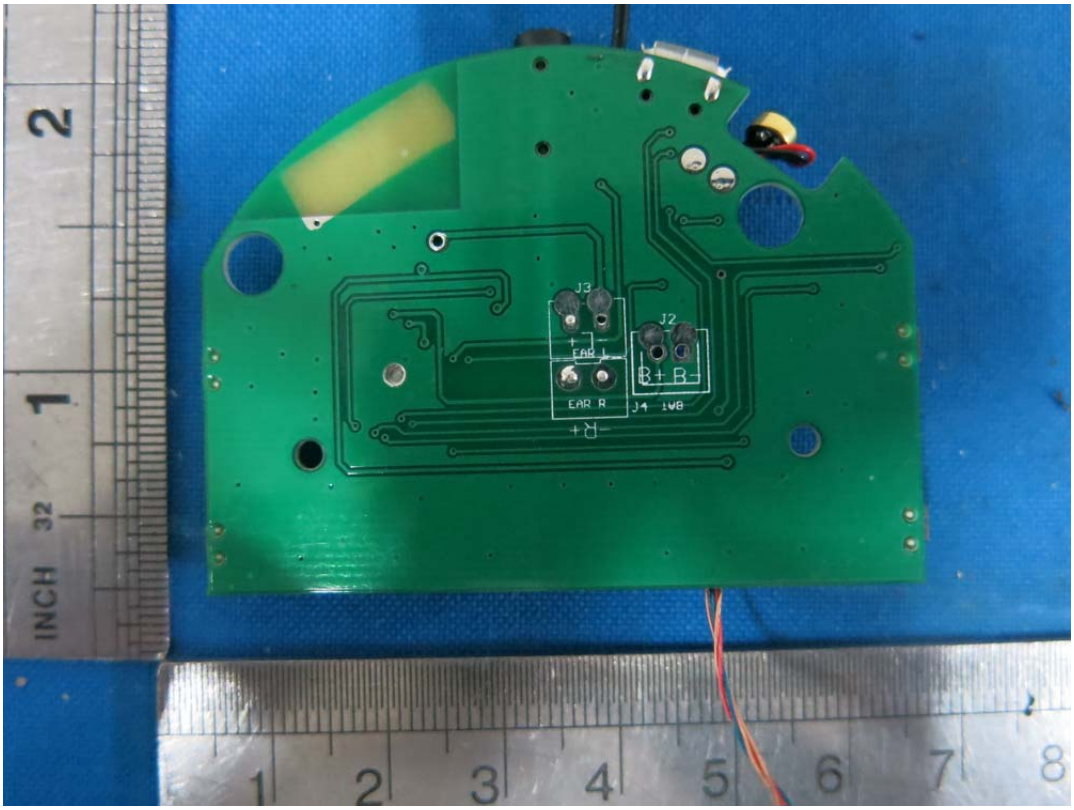
CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST



VOLTAGE DIPS / INTERRUPTION TEST

APPENDIX II
(Photos of EUT)


B-098 20160921


J3
J2
EAR L
B+ B-
EAR R
J4 1W8
R+ R-
INCH
1
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8

EMTEK
Access to the World

ETSI EN 300 328 V1.9.1: 2015

TEST REPORT

FOR

Foldable Bluetooth headphone

Model No.: P326.701, P326.703, P326.705

Trademark: N/A

Report No.: ED161018004R

Issue Date: October 25, 2016

Prepared for

Prepared by

EMTEK(DONGGUAN) CO., LTD.
No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China
TEL: 86-769-22807078
FAX: 86-769-22807079

TABLE OF CONTENTS

TEST RESULT CERTIFICATION

Applicant	:	
EUT	:	Foldable Bluetooth headphone
Model No.	:	P326.701, P326.703, P326.705 (Note: These models are same except model number and appearance, here P326.701 was selected for full test.)
Trademark	:	N/A

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
ETSI EN 300 328 V1.9.1: 2015	PASS

The device described above is tested by EMTEK(DONGGUAN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK(DONGGUAN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the ETSI EN 300 328 V1.9.1: 2015 requirements.

Date of Test : October 18, 2016 to October 25, 2016

Prepared by : Abby Li

Abby Li/Editor

Reviewer : Alan He

Alan He/Supervisor

Approved & Authorized Signer :

EMTEK (DONGGUAN) CO., LTD. * TESTING *

Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED161018004R

EUT DESCRIPTION

Product	Foldable Bluetooth headphone
Model Number	P326.701
Input Rating	DC 3.7V Battery, DC 5V from adapter
Power supply for Test	AC 230V/50Hz for adapter
Kind of Device	Bluetooth Ver.2.1
Operating Frequency Range	2402-2480MHz
Modulation	GFSK, pi/4-DQPSK, 8DPSK
Number of Channels	79 channels
Antenna Type	Internal antenna
Antenna Gain	0dBi
Transmit Power Max	1.07dBm
Temperature Range	-20°C ~ +35°C

Note: *for more details, please refer to the User's manual of the EUT.*

SUMMARY OF TEST RESULT

Clause (EN 300 328)	Test Parameter	Verdict	Remark
4.3.1.1	RF Output Power	PASS	
4.3.1.2	Duty Cycle and Tx-Sequence and Tx-Gap	N/A	Only for non-adaptive equipment and RF Output Power>10dBm
4.3.1.3	Dwell Time and Minimum Frequency Occupation	PASS	
4.3.1.3	Hopping Frequency Sequence	PASS	
4.3.1.4	Hopping Frequency Separation	PASS	
4.3.1.5	Medium Utilisation Factor	N/A	Only for non-adaptive equipment and RF Output Power>10dBm
4.3.1.6	Adaptivity	N/A	Only for adaptive equipment and RF Output Power>10dBm
4.3.1.7	Occupied Channel Bandwidth	PASS	
4.3.1.8	Transmitter Unwanted Emission in the Out-of Band	PASS	
4.3.1.9	Transmitter Unwanted Emissions in the Spurious Domain	PASS	
4.3.1.10	Receiver Spurious Emissions	PASS	
4.3.1.11	Receiver Blocking	N/A	Only for adaptive equipment and RF Output Power>10dBm
Remark: 1. When determining the test conclusion, the Measurement Uncertainty of test has been considered. 2. N/A is an abbreviation for Not Applicable.			

TEST METHODOLOGY

1.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

ETSI EN 300 328 – Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2.4GHz ISM band and using spread spectrum modulation techniques: Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.

1.2 MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CAL DUE.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/28/2017
Pre-Amplifier	HP	8447D	2944A07999	05/28/2017
Bilog Antenna	Schwarzbeck	VULB9163	142	05/28/2017
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/28/2017
Horn Antenna	Schwarzbeck	BBHA9120D	D143	05/28/2017
Cable	Schwarzbeck	AK9513	ACRX1	05/28/2017
Cable	Rosenberger	N/A	FP2RX2	05/28/2017
Cable	Schwarzbeck	AK9513	CRPX1	05/28/2017
Cable	Schwarzbeck	AK9513	CRRX2	05/28/2017
RF Power Meter	BOONTON	4232A	10539	05/28/2017
Temp. / Humidity Chamber	Kingson	THS-M1	242	05/28/2017
EMI Test Receiver	Rohde & Schwarz	ESCI	101045	05/28/2017
Vector Signal Generater	Agilent	N5182B	My53050553	05/28/2017
Analog Signal Generator	Agilent	N5171B	My53050878	05/28/2017
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Power Meter	Agilent	U2531A	N/A	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Power Sensor	Agilent	U2021XA	N/A	05/28/2017
Temperature Chamber	ESPEC	EL-02KA	12107166	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

1.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition. so those data rates (1Mbps GFSK; 2Mbps pi/4-DQPSK modulation; 3Mbps 8DQPSK modulation) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

FACILITIES AND ACCREDITATIONS

1.4 FACILITIES

All measurement facilities used to collect the measurement data are located at No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.5 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

1.6 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by CNAS, 2015.09.24
The certificate is valid until 2018.07.03
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2006
The Certificate Registration Number is L3150

Accredited by TUV Rheinland, 2016.02.02
The certificate is valid until 2017.02.01
The Laboratory has been assessed according to the requirements ISO/IEC 17025: 2005

Registered on FCC, June 18, 2014
The Certificate Number is 247565.

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A.

Name of Firm : EMTEK(DONGGUAN) CO., LTD.
Site Location : No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China

SETUP OF EQUIPMENT UNDER TEST

1.7 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Adapter	N/A	YSV6-0501000	N/A	N/A	N/A	N/A

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

ETSI EN 300 328 REQUIREMENTS

1.8 RF OUTPUT POWER

LIMIT

EN 300 328 Clause 4.3.1.1

The Maximum RF Output Power <= 100 mW (20 dBm) (EIRP) at both Normal and Extreme conditions.

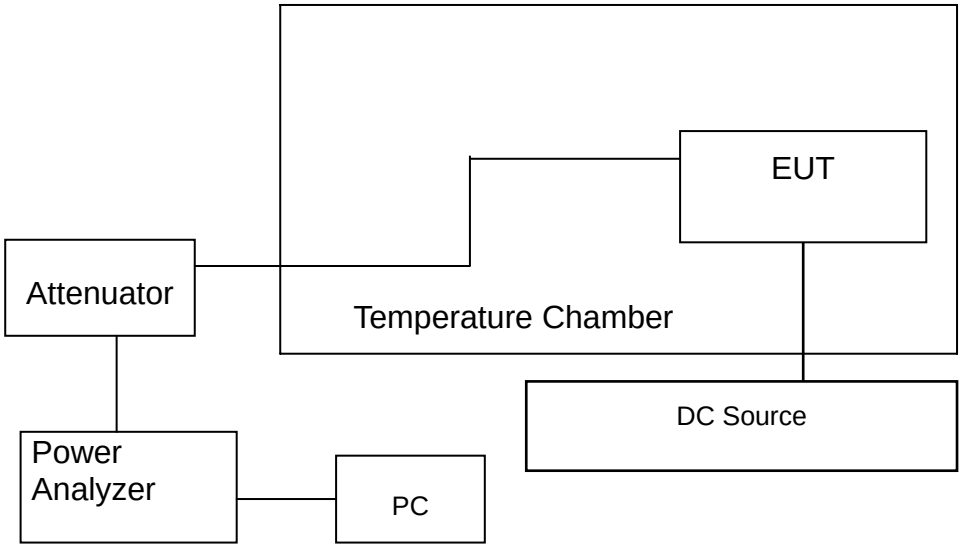
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Temperature Chamber	ESPEC	EL-02KA	12107166	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Power Sensor	Agilent	U2021XA	N/A	05/28/2017
DC Source	TASI	TASI1603	N/A	05/28/2017
Test Software	N/A	CSR BlueSuite 2.4.8	N/A	N/A
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

Temperature and Voltage Measurement (under normal and extreme test conditions)



TEST PROCEDURE

Apart from the RF output power, these measurements need only to be performed at normal environmental conditions. The measurements for RF output power shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.
The equipment shall be operated under its worse case configuration (modulation, bandwidth, power, etc.) with respect to the requirement being tested. Measurement of multiple data sets may be required.
For systems using FHSS modulation, the measurements shall be performed during normal operation (hopping). For systems using wide band modulations other than FHSS, the measurement shall be performed at the lowest, the middle, and the highest channel on which the equipment can operate. These frequencies shall be recorded.

The test procedure shall be as follows:

Step 1:
Use a fast power sensor suitable for 2.4 GHz and capable of 1 MS/s.
Use the following settings:
- Sample speed 1 MS/s or faster.
- The samples must represent the power of the signal.
- Measurement duration: For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured.
Almost 100000 bursts were scanned in 200ms per time.
NOTE 1: For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.

Step 2:
For conducted measurements on devices with one transmit chain:
- Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.
For conducted measurements on devices with multiple transmit chains:
- Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports.
- Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than half the time between two samples.
- For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.

Step 3:
Find the start and stop times of each burst in the stored measurement samples.
NOTE 2: The start and stop times are defined as the points where the power is at least 20 dB below the RMS burst power calculated in step 4.

Step 4:
Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these P burst values, as well as the start and stop times for each burst.

Step 5:
The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.

Step 6:
Add the (stated) antenna assembly gain "G" in dBi of the individual antenna.
If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain G shall be used.
The RF Output Power (P) shall be calculated using the formula below:

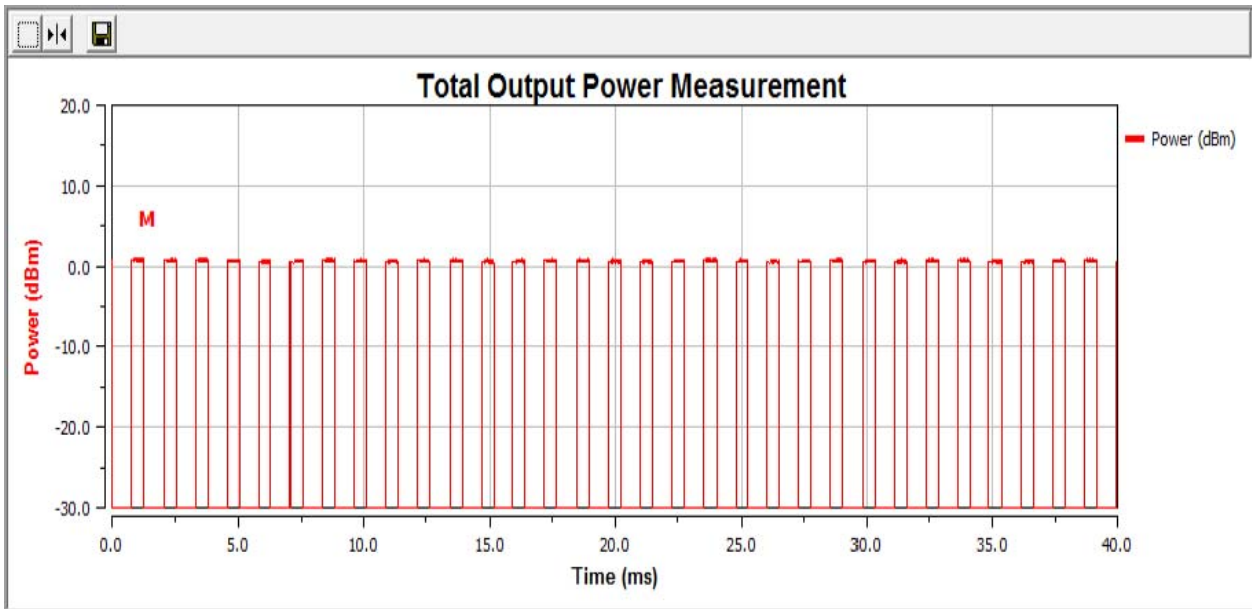
$$P = A + G$$

Step 7:
The measurement shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range. These frequencies shall be recorded. FHSS equipment shall be made to hop continuously to each of these three frequencies separately. These measurements shall be performed at normal and extreme test conditions.

TEST RESULT

Test Conditions		Transmitter Power (dBm)				
		Temp (25)°C	Temp (-20)°C		Temp (35)°C	
Modes	Channel	230V	207V	253V	207V	253V
GFSK	2402 MHz	**1.07**	0.99	0.80	0.91	0.92
	2441 MHz	0.93	0.94	0.81	0.89	0.81
	2480 MHz	0.95	0.88	0.86	0.81	0.81
Limit		**20dBm**				

Worst Test Plot (Modulation: GFSK Low Temperature and High Voltage)



1.9 DUTY CYCLE AND TX-SEQUENCE AND TX-GAP

LIMIT

ETSI EN 300 328 clause 4.3.1.2

The requirement apply to non-adaptive equipment or to adaptive equipment when operating in a non-adapter mode

These requirement do not apply for equipment with a maximum declared RF output power level of less than 10 dBm(EIRP) or for equipment when operating in a mode where the RF output power is less than 10 dBm(EIRP);

the maximum duty cycle is less than 1;

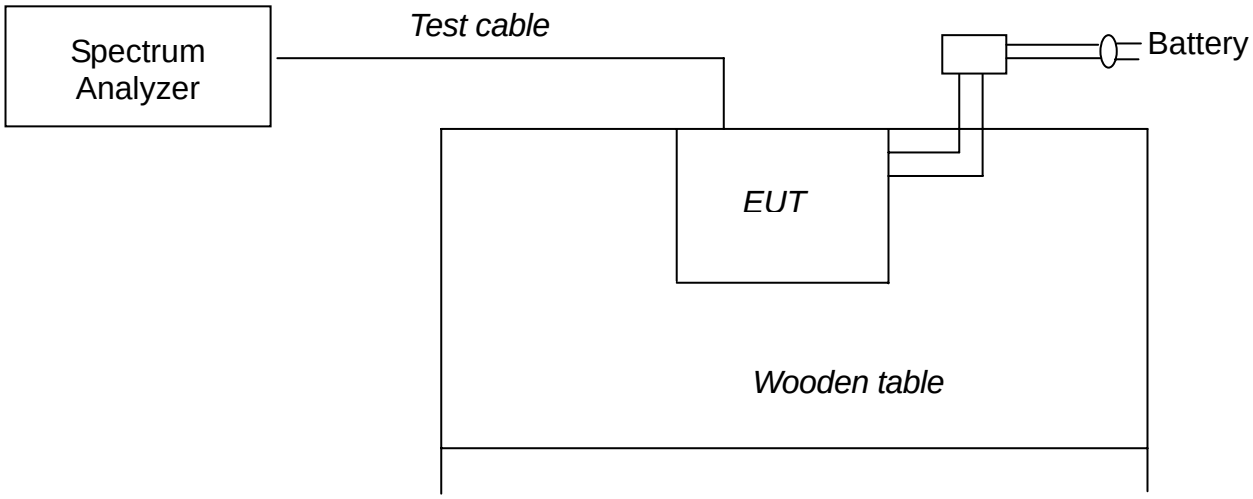
the maximum Tx-sequence time and minimum Tx-gap time shall be 5ms.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Vector Signal Generator	Agilent	N5182B	My53050553	05/28/2017
Analog Signal Generator	Agilent	N5171B	My53050878	05/28/2017
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.2.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.2.2.1.2 for the measurement method.

Use a fast power sensor suitable 2.4GHz and sample speed 1Ms/s or faster.
Between the save start and stop times of each individual burst ,calculate the TxOn time ,save these TxOn values
Between the save stop and start times of two subsequent burst ,calculate the TxOff time ,save these TxOff values
Duty cycle is the sum of all TxOn times divided by the observation period
For equipment using blacklisting ,the TxOn time measured for a single hopping frequency shall be multiplied by the number of blacklisted frequency . this value shall be add up to the sum calculated in the previous bullet point . if the number of blacklisted frequencies cannot be determined ,the minimum number of hopping frequencies shall be assumed.
The above calculated value for duty cycle shall be recorded in the report
Any TxOff time that is greater than the minimum Tx-gap time is considered a Tx-gap .the lowest Tx-gap time shall be recorded in the report
The Tx-sequence time is the time between two subsequent Tx-gaps, the maximum Tx-sequence time shall be recorded in the report.

The measurement shall be performed during normal operation (hopping)

TEST RESULTS

Not Applicable

Because RF Output power of EUT is less than10dBm, according to standard EN300 328, Duty cycle, Tx-Sequence, Tx-gap is not required.

1.10 DWELL TIME AND MINIMUM FREQUENCY OCCUPATION

LIMIT

ETSI EN 300 328 clause 4.3.1.3

The requirement applies to all types of frequency hopping equipment.

- For non-adaptive frequency hopping system

The accumulated Dwell Time on any hopping frequency shall not be greater than 15ms within any period of 15ms multiplied by the minimum number of hopping frequency (N)

Non-adaptive medical devices are allowed to have an operating mode in which the maximum dwell time is 400ms

The Minimum Frequency Occupation Time shall be equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.

The hopping sequences shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum hopping frequency separation in MHz

- For adaptive frequency hopping system

The maximum accumulated Dwell Time on any hopping frequency shall be 400ms within any period of 400ms multiplied by the minimum number of hopping frequency (N)

The Minimum Frequency Occupation Time shall be equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.

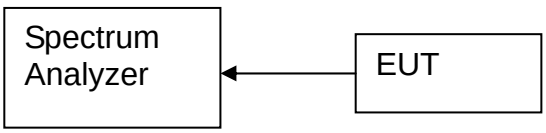
The hopping sequences shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum hopping frequency separation in MHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.4.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.4.2 for the measurement method.

Step1:The output of the transmitter shall be connected to a spectrum analyzer. The analyser shall be set as follows Centre frequency : equal to the hopping frequency being investigated Frequency Span: 0Hz; RBW: 50% of the Occupied Channel Bandwidth; VBW:=RBW; Detector mode: RMS; Sweep Point: 30000; Trace Mode: Clear/Write; Trigger:Free Run Sweep Time: equal to the dwell time multiple by minimum number of hopping frequencies(N);
Step2: indentify the data points related to the frequency being investigated by applying a threshold
Step3: the result in step2 is the accumulated Dwell Time which shall comply with the limit provided in clauses 4.3.1.3.2.1
Step4: make the following changes on the analyser and repeat step2
Sweep time : 4×dwell time×actual number of hopping frequencies in use
The result shall be compared to the limit for the minimum frequency occupation time defined in clause 4.3.1.3.2.1
Step5: make the following changes on the analyser: Start frequency:2400MHz; stop frequency: 2483.5MHz; RBW: 50% of the Occupied Channel Bandwidth; VBW:=RBW=430KHz;Detector mode: RMS; Sweep Time: Auto; Trace Mode: Maxhold; Trigger: Free Run
When the trace has completed, indentify the number of hopping frequencies used by the hopping sequence. The result shall be compared to the limit (N) defined in clauses 4.3.1.3.2.1
Step6: for adaptive systems, using the lowest and highest -20dB points from the total spectrum envelope obtained in step5, it shall be verified whether the system uses 70% of the band specified in clause 1.
The measurement shall be performed during normal operation (hopping)

TEST RESULTS

Worst Case-Modulation Type: GFSK, Date Rate: 1Mbps

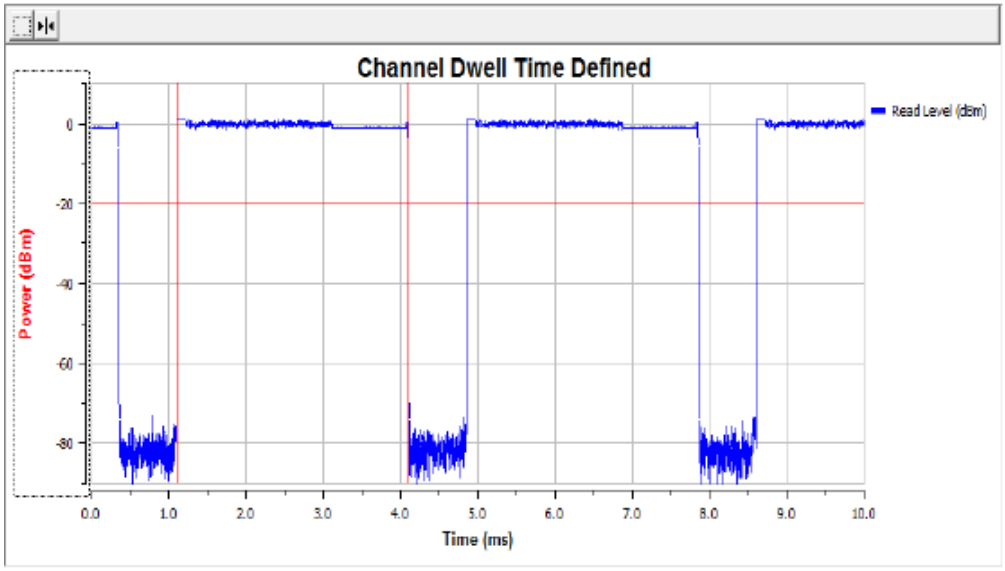
TEST CONDITION			Dwell Time Per Hop (ms)	Minimun Number of Hop Frequency	400msX minimum number of hopping frequencies (s)	maximum accumulated dwell time (ms)	Limited (ms)
Dwell Time	2402MHz	DH 5	2.99	79	31.6	334.88	<=400
	2441MHz	DH 5	1.65	79	31.6	156.8	<=400
	2480MHz	DH 5	2.89	79	31.6	278.25	<=400
Verdict			PASS				
Measurement uncertainty(%)			+2.3/-2.4				

Worst Case-Modulation Type: GFSK, Date Rate: 1Mbps

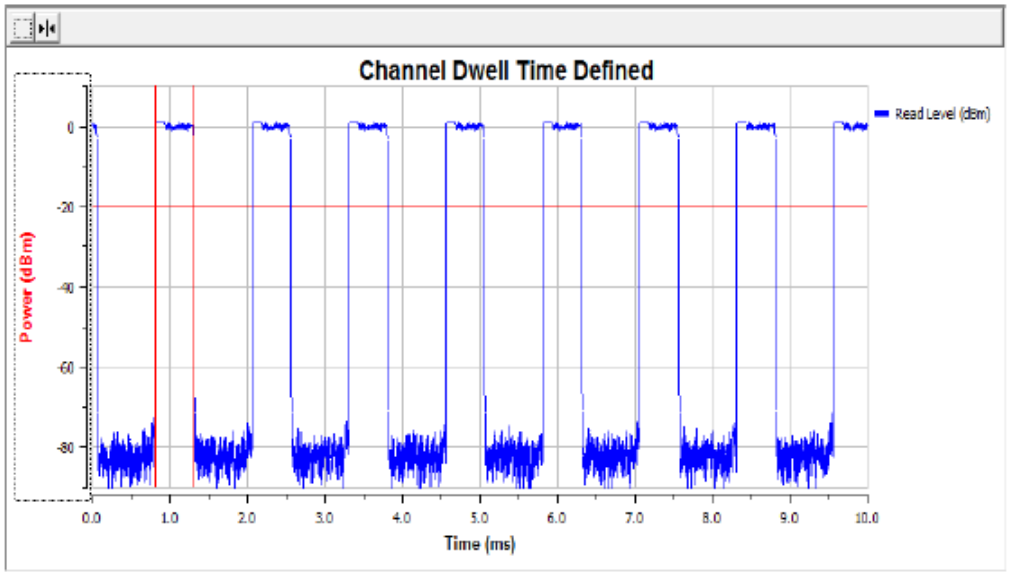
TEST CONDITION			Dwell Time Per Hop (ms)	Actual Number of Hop Frequency(N)	[4*Dwell time per hop*N] (ms)	Number of hop in [4*Dwell time per hop*N]	Minimum Number of Hopping Limit in [4*Dwell time per hop*N] (ms)	Limited (ms)
Minimum Frequency Occupation	2402MHz	DH 5	2.99	79	1309.62	4	1	>=400
	2441MHz	DH 5	0.49	79	627.2	4	1	>=400
	2480MHz	DH 5	1.75	79	1116.5	4	1	>=400
Verdict			PASS					
Measurement uncertainty(%)			+2.3/-2.4					

Test Plot:

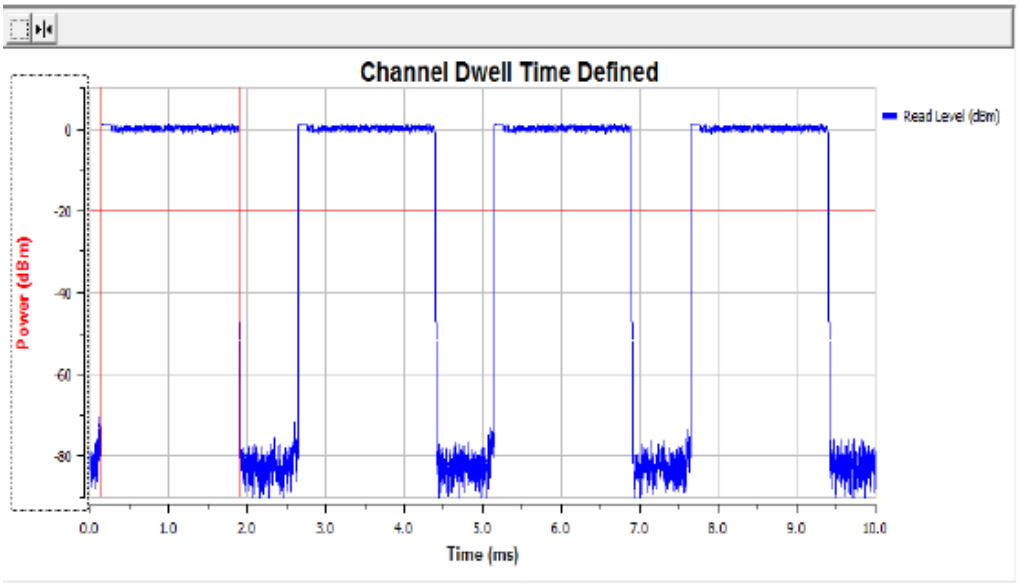
Length of Transimission Time (ms)	2.99	
Dwell Time (ms)	334.88	Pass
Minimum Frequency Occupation (ms)	1309.62	Pass



Length of Transimission Time (ms)	0.49	
Dwell Time (ms)	156.8	Pass
Minimum Frequency Occupation (ms)	627.2	Pass



Length of Transimission Time (ms)	1.75	-
Dwell Time (ms)	278.25	Pass
Minimum Frequency Occupation (ms)	1116.5	Pass



1.11 HOPPING FREQUENCY SEQUENCE

LIMIT

ETSI EN 300 328 clause 4.3.1.3

The requirement applies to all types of frequency hopping equipment.

- For non-adaptive frequency hopping system

The hopping sequences shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum hopping frequency separation in MHz

- For adaptive frequency hopping system

Adaptive frequency hopping systems shall be capable of operating over a minimum of 70% of the band specified in clause1.

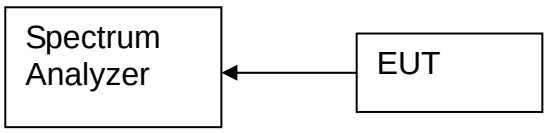
The hopping sequences shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum hopping frequency separation in MHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.4.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.4.2 for the measurement method.

Step1:The output of the transmitter shall be connected to a spectrum analyser
The analyser shall be set as follows
Centre frequency : equal to the hopping frequency being investigated
Frequency Span: 0Hz; RBW: 50% of the Occupied Channel Bandwidth;
VBW:=RBW=1MHz;
Detector mode: RMS; Sweep Point: 30000; Trace Mode: Clear/Write; Trigger:Free Run
Sweep Time: equal to the dwell time multiple by minimum number of hopping frequencies(N);
Step2: indentify the data points related to the frequency being investigated by applying a threshold
Step3: the result in step2 is the accumulated Dwell Time which shall comply with the limit provided in clauses 4.3.1.3.2.1
Step4: make the following changes on the analyser and repeat step2
Sweep time :4×dwell time×actual number of hopping frequencies in use
The result shall be compared to the limit for the minimum frequency occupation time defined in clause 4.3.1.3.2.1
Step5:make the following changes on the analyser:
Start frequency:2400MHz; stop frequency: 2483.5MHz;
RBW: 50% of the Occupied Channel Bandwidth; VBW:=RBW;
Detector mode: RMS; Sweep Time: Auto; Trace Mode: Maxhold; Trigger: Free Run
When the trace has completed, indentify the number of hopping frequencies used by the hopping sequence. The result shall be compared to the limit (N) defined in clauses 4.3.1.3.2.1
Step6:for adaptive systems, using the lowest and highest -20dB points from the total spectrum envelope obtained in step5, it shall be verified whether the system uses 70% of the band specified in clause 1.

The measurement shall be performed during normal operation (hopping)

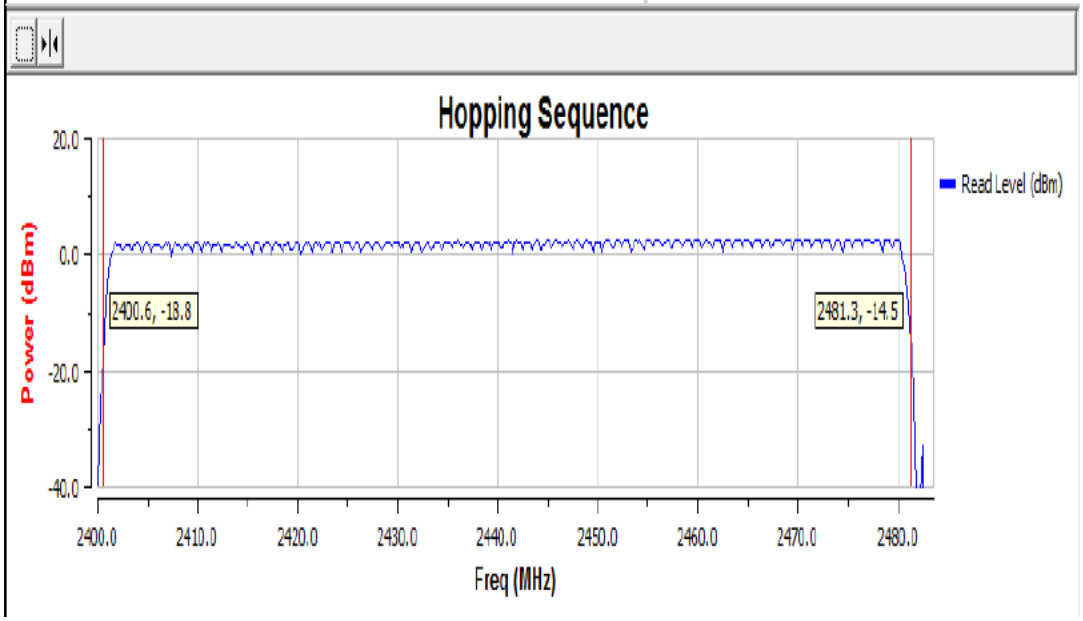
TEST RESULTS

Worst Case-Modulation Type: GFSK, Date Rate: 1Mbps

Frequency Band	Number of Hopping Frequencies (N)		Limit	Result
2400MHz – 2483.5MHz	79		15	Pass
	-20dB Points Occupied Bandwidth	**Minimum Hopping Range (%)**	**Minimum Hopping Range Limit** (%)	**Result**
	80.58MHz	96.5%	70%	Pass

Test Plot:

Hopping Sequence (MHz)	80.58
Hopping Number	79



1.12 HOPPING FREQUENCY SEPARATION

LIMIT

ETSI EN 300 328 clause 4.3.1.4

The requirement applies to all types of frequency hopping equipment.

- For non-adaptive frequency hopping system

  The minimum Hopping Frequency Separation shall be equal to Occupied Bandwidth of a single hop, with a minimum separation of 100kHz

- For adaptive frequency hopping system

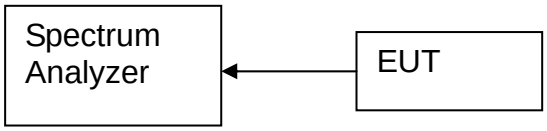
  The minimum Hopping Frequency Separation shall be 100kHz

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.5.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.5.2 for the measurement method.

Step1:The output of the transmitter shall be connected to a spectrum analyser
The analyser shall be set as follows
Centre frequency : centre frequency of the two adjacent hopping frequencies
Frequency Span: sufficient to see the complete power envelope of bith hopping frequencies; RBW: 1% of the Span; RBW=20KHz, VBW=60KHz;
Detector mode: RMS; Trace Mode:Maxhold; Sweep Time: auto;
Step2:use the marker function of the analyser to define the lower and the upper -20dBr points for the both hopping frequencies F1 and F2. This will result in $F1_L$ and $F1_H$ for the hopping frequency F1 and $F2_L$ and $F2_H$ for hopping frequencies F2.
Step3:Calculate the centre frequencies $F1_c$ and $F2_c$ for both hopping frequencies using the formulas below. $F1_c=(F1_L + F1_H)/2$, $F2_c=(F2_L + F2_H)/2$

Calculate the -20dBr channel bandwidth (BWchan) using the formula below. BWchan= $F1_H - F1_L$.

Calculate the hopping separation(F_{hs}) using the formula below. $F_{hs}= F2_c - F1_c$

Compare the measured hopping frequency separation with the limit defined in clause 4.3.1.4.2. In addition, for non-adaptive frequency hopping equipment, the hopping frequency separation shall be equal to or greater than the -20dBr channel bandwidth or F_{hs}>= BWchan
For adaptive systems, in case of overlapping channels which will prevent the definition of -20dBr reference points $F1_H$ and $F2_L$, a higher reference level (e.g. -10dBr or -6dBr) may be chosen to define the reference points $F1_L$: $F1_H$; $F2_L$: $F2_H$
Alternatively, special test software may be used to:

Force the EUT to hop or transmit on a single hopping frequency by which the -20dBr reference points can be measured separately for the 2 adjacent hopping frequencies; and Force the EUT to operate without modulation by which the centre frequencies $F1_C$ and $F2_C$ can be measured directly.

The measurement shall be performed during normal operation (hopping)

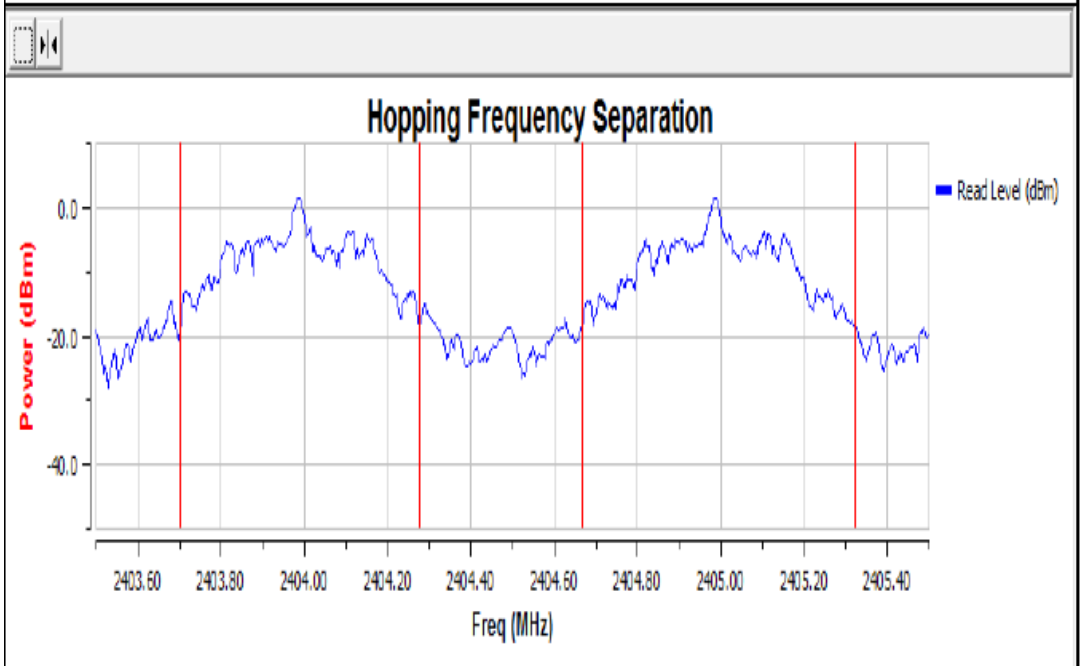
TEST RESULTS

Worst Case-Modulation Type: GFSK, Date Rate: 1Mbps

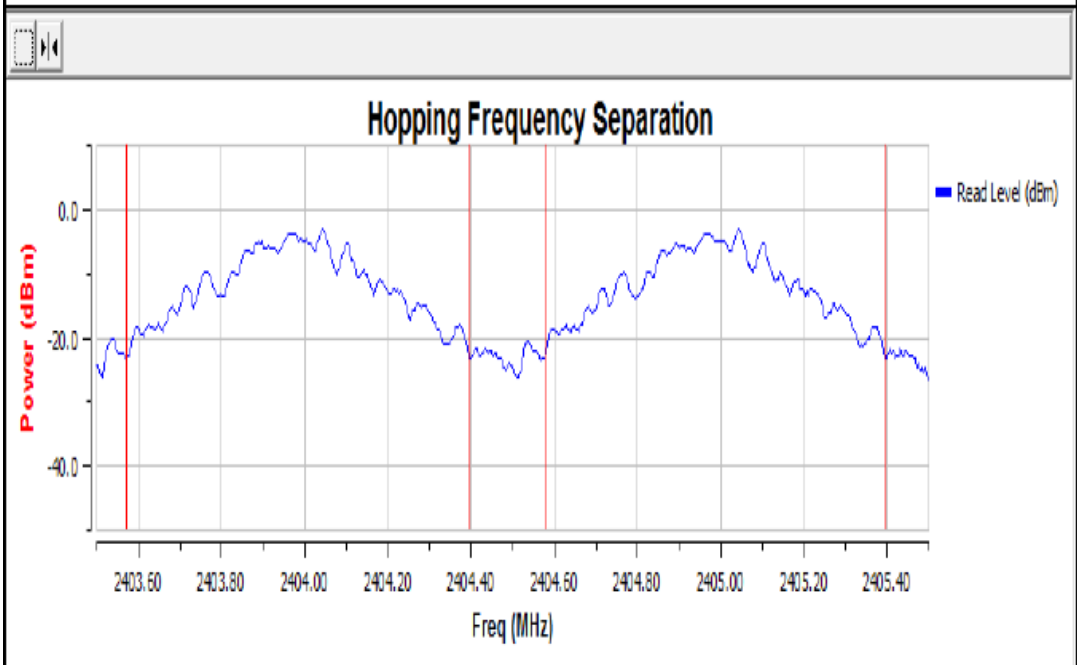
Test Channel (MHz)	Channel Separation (KHz)	Limit (KHz)
2402	1010	100
2441	1000	100
2480	1000	100

Test Plot:

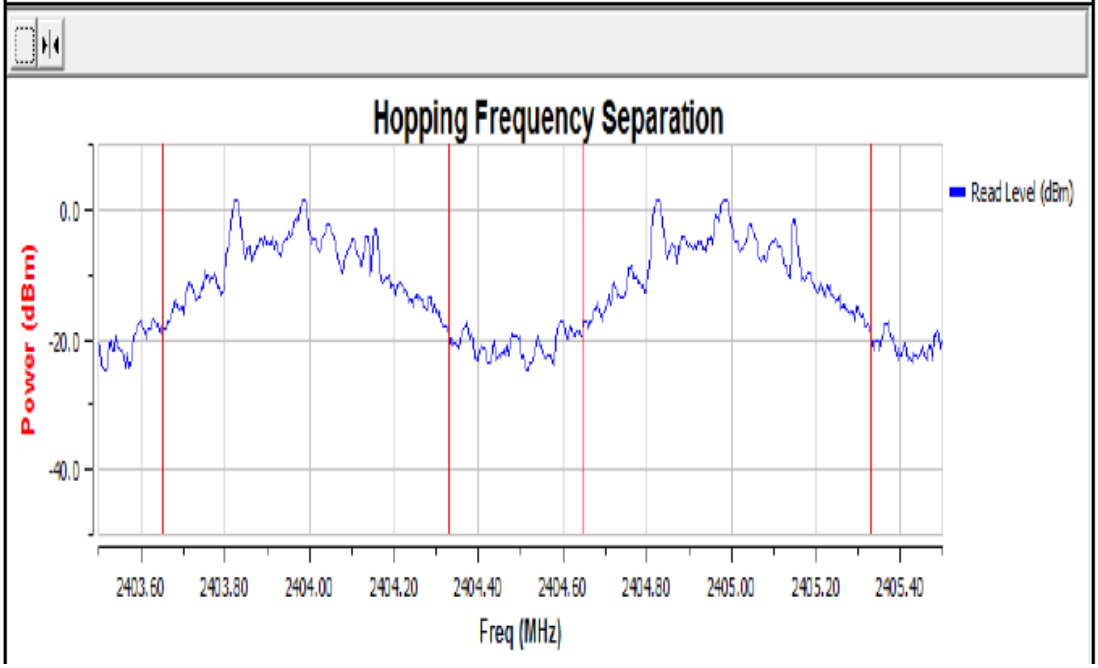
Hopping Frequency Separation (MHz)	1.01



Hopping Frequency Separation (MHz)	1.00



Hopping Frequency Separation (MHz)	1.00



1.13 MEDIUM UTILISATION FACTOR

LIMIT

ETSI EN 300 328 clause 4.3.1.5

This requirement apply to non-adaptive mode or adaptive equipment operating in a non-adaptive mode

In addition, this requirement does not apply for equipment with a maximum declared RF output power level of less than 10 dBm(EIRP) or for equipment when operating in a mode where the RF output power is less than 10 dBm(EIRP)

For non-adaptive equipment using wide band modulations other than FHSS, the Maximum Medium Utilization Factor shall be 10%.

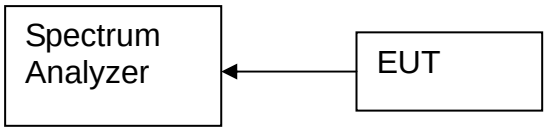
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION

Temperature and Voltage Measurement (under normal and extreme test conditions)



Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.2.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.2.2.1.3 for the measurement method.

   Use a fast power sensor suitable for 2.4GHz and capable of 1Ms/s
   According to RF output power test procedure, measure the maximum RF output power
   According to duty cycle test procedure, measure the duty cycle and Tx-On and Tx-Off
   For each burst, calculate the product of (Pburst/100mW) and the Tx-On time
   NOTE: Pburst is expressed in mW,TxOn time is expressed in ms.
   Medium utilisation is the sum of all these products divided by the observation period (expressed in ms) . this value shall be recorded in the test report.

TEST RESULTS

Not Applicable

Because RF Output power of EUT is less than 10dBm, according to standard EN300 328, Medium Utilisation is not required.

1.14 OCCUPIED CHANNEL BANDWIDTH

LIMIT

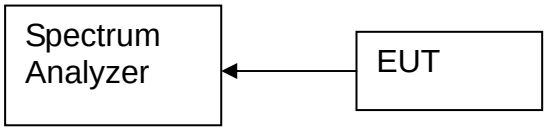
The requirement applies to all types of equipment using wide band modulation other than FHSS
The occupied channel bandwidth is the bandwidth that contains 99% of the power of the signal
The occupied channel bandwidth for each hopping frequency shall fall completely within the band given in the clause 1.
For non-adaptive frequency hopping systems with EIRP greater than 10 dBm, the Occupied Channel Bandwidth shall be less than 5MHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	05/28/2017

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328(V1.9.1) clause 5.3.8.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.8.2 for the measurement method.

STEP 1:Connect the antenna to the spectrum analyzer and use the following setting
Centre Frequency : the centre frequency of the channel under test
Resolution Bandwidth: 30KHz, Video Bandwidth: 100KHz
Frequency Span: 2 nominal bandwidth
Detector Mode : RMS Trace Mode: max hold
Step 2: When the trace is completed, capture the trace and find the peak value and place the analyzer marker on this peak
Step 3: Use the 99% bandwidth function of the spectrum analyzer to measure the Occupied Channel Bandwidth of the EUT.

The measurement shall be performed at the lowest and the highest channel on which the equipment can operate.

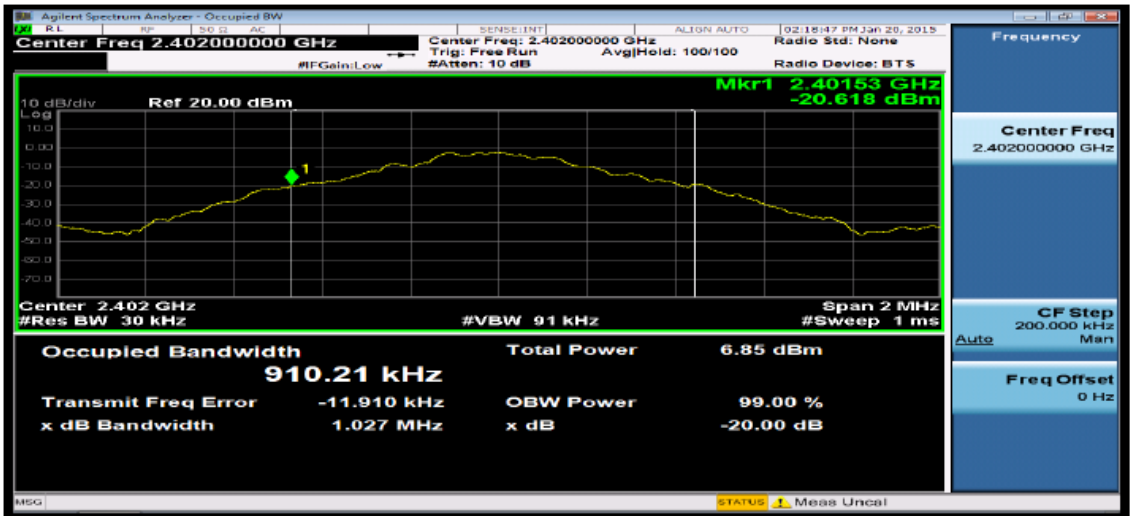
WORST TEST RESULTS

Modes	Frequency (MHz)	99% Bandwidth Result (MHz)
GFSK	2402 MHz	0.910
	2480 MHz	0.916
Limit	＜=5MHz	

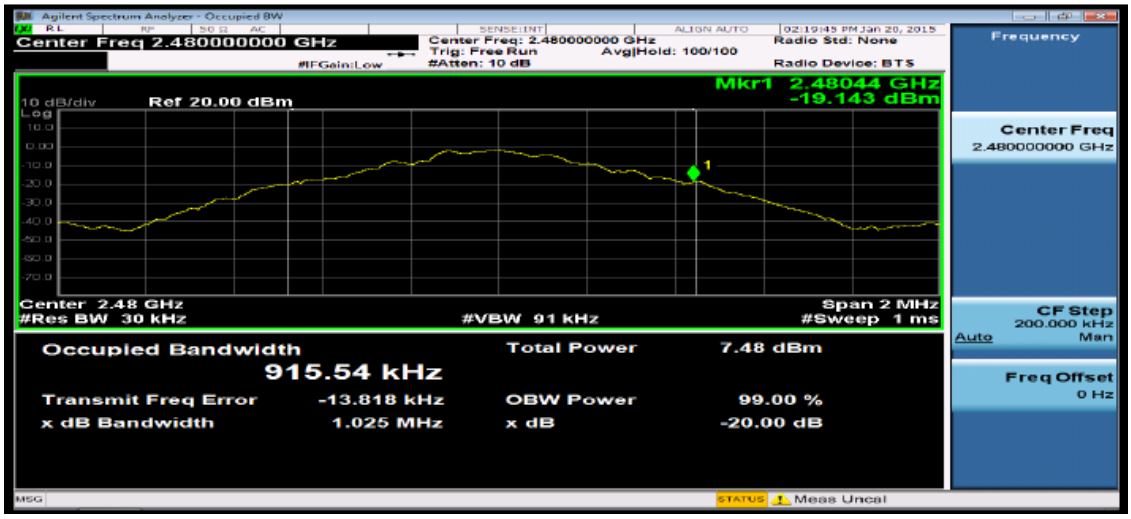
Test Plot:

Modulation: GFSK

	Occupied BandWidth (MHz)	Measured Channel	Limit Frequency (MHz)	Limit (MHz)	Status
	0.91	CH Low-2402	2401.53	2400	Pass



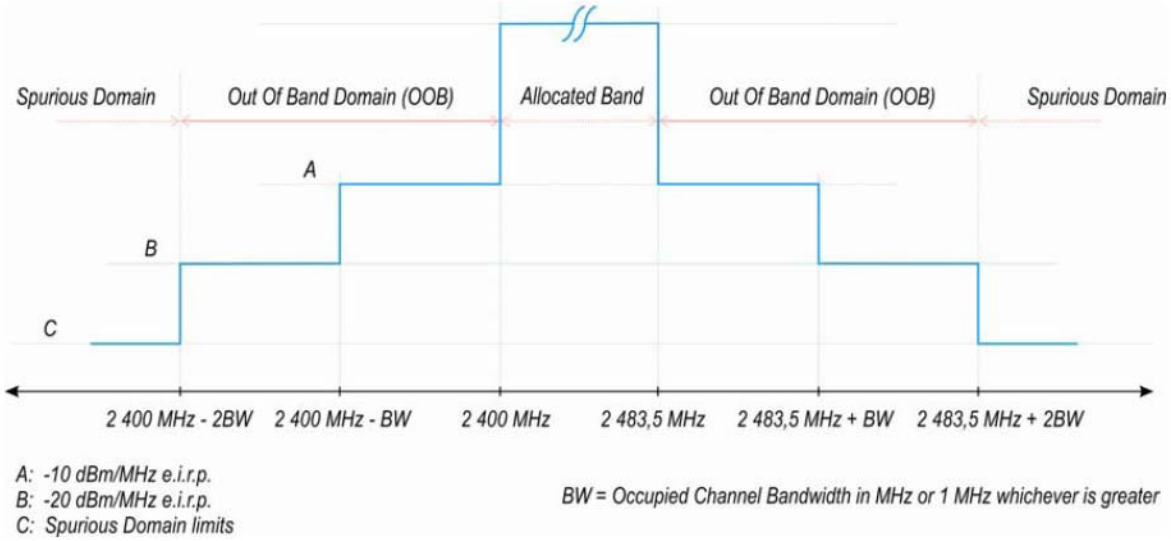
	Occupied BandWidth (MHz)	Measured Channel	Limit Frequency (MHz)	Limit (MHz)	Status
	0.916	CH High-2480	2480.44	2483.5	Pass



1.15 TRANSMITTER UNWANTED EMISSION IN THE OUT-OF BAND

LIMIT

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the limits of the mask given in below figure.

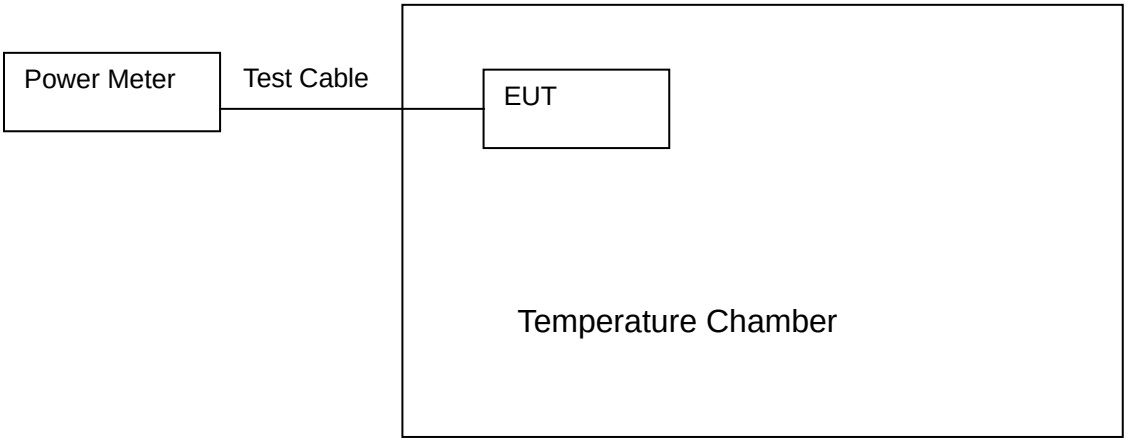


MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CAL DUE.
Vector Signal Generater	Agilent	N5182B	My53050553	05/28/2017
Analog Signal Generator	Agilent	N5171B	My53050878	05/28/2017
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Temperature Chamber	ESPEC	EL-02KA	12107166	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.9.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) Annex B and C for the measurement methods.

The antenna shall be connected to the spectrum analyzer of RF power measurement and use the following settings

Step 1: Resolution bandwidth: 1MHz, Video bandwidth: 3MHz, Detector mode: RMS
Trace mode: Clear/Write, Sweep point: 5000, Span :0Hz ;Sweep Mode: Continuous
Centre frequency: 2484MHz , Trigger Mode: Video Trigger

Step 2: Adjust the trigger level to select the transmissions with the highest power level
Set a window to match the start and end of the burst and in which the RMS power shall be measured using the time domain power function
Select RMS power to be measure within the selected window and note the result which is the RMS power within this 1MHz segment (2483,5MHz to 2484,5MHz). Compare this value with the applicable limit provided by the mask

Step3:Change the centre frequency of the analyser to 2484MHz +BW and perform the measurement for the first 1MHz segment within range 2483,5MHz +BW to 2483,5MHz+2BW.
Increase the centre frequency in 1MHz steps and repeat the measurements to cover this whole range .
The centre frequency of the last 1MHz segment shall be set to 2483,5MHz +2BW-0,5MHz.

Step4:Change the centre frequency of the analyser to 2399,5MHz and perform the measurement for the first 1MHz segment within range 2400MHz -BW to 2400MHz.
Reduce the centre frequency in 1MHz steps and repeat the measurements to cover this whole range .
The centre frequency of the last 1MHz segment shall be set to 2400MHz -2BW+0,5MHz.

Step5:Change the centre frequency of the analyser to 2399,5MHz-BW and perform the measurement for the first 1MHz segment within range 2400MHz -2BW to 2400MHz-BW.
Reduce the centre frequency in 1MHz steps and repeat the measurements to cover this whole range .

The centre frequency of the last 1MHz segment shall be set to 2400MHz -2BW+0,5MHz.

Step6: In case of conducted measurements on equipment with a single transmit chain , the declared antenna assembly gain “G” in dBi shall be added to the results for each of the 1MHz segment and compare with the limits provided by the mask . if more than one antenna assembly is intended for this power setting , the antenna with the highest gain shall be considered

For smart antenna systems, the measurements need to be repeated for each of the active transmit chains. The declared antenna assembly gain “G” in dBi for a single antenna shall be added to these results. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered .

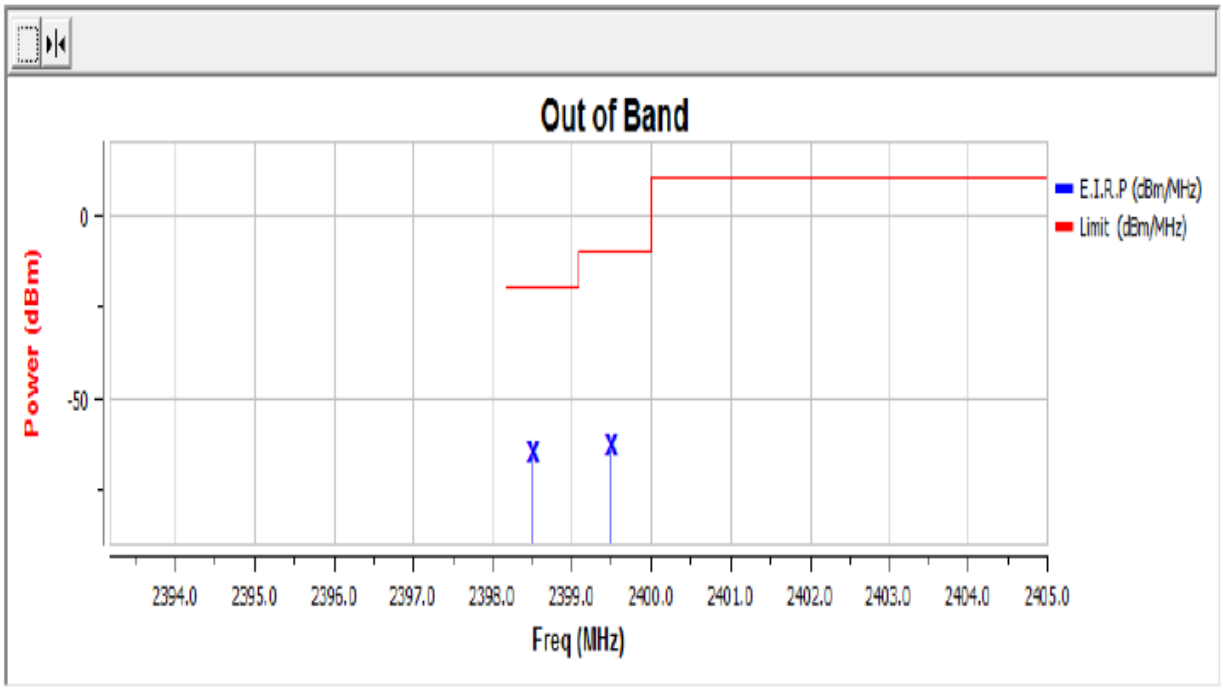
The measurement shall be performed at the lowest, the middle and the highest channel on which the equipment can operate.

TEST RESULTS

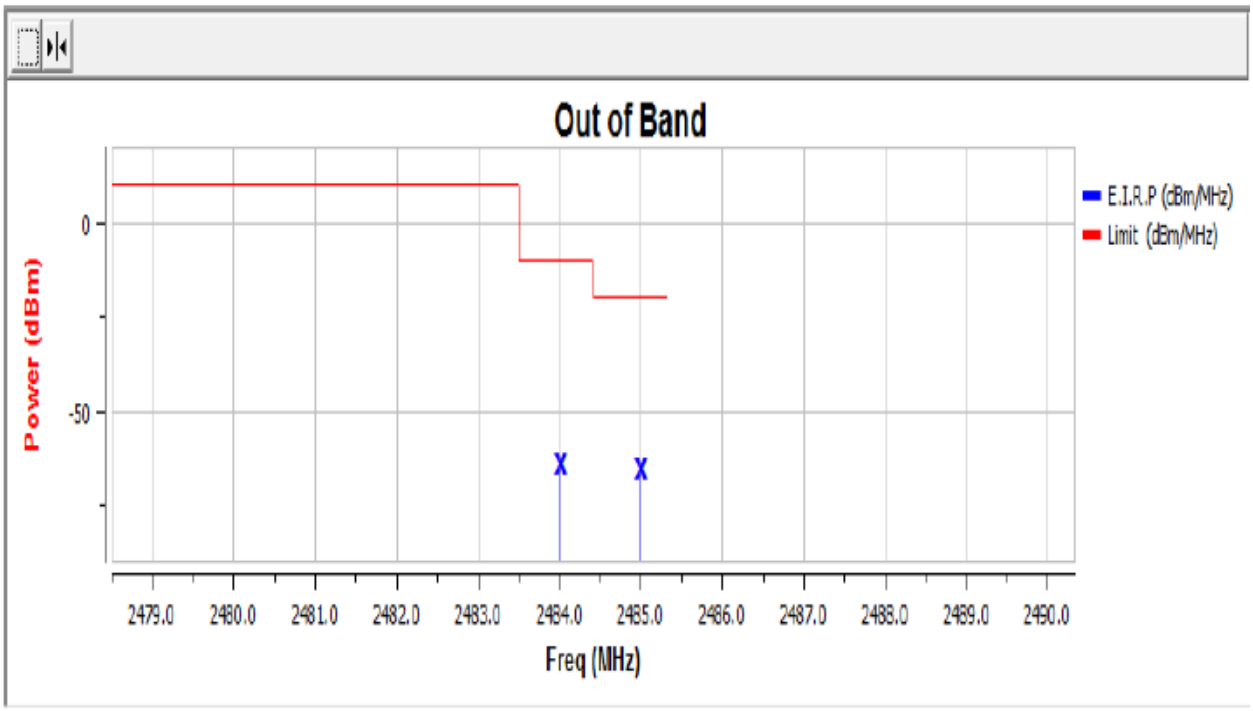
PASS.

Worst Test Plot

Segment	Antenna	Freq(MHz)	Level	Limit
-BW	Antenna 1	2399.5	-64.67	-10
-2BW	Antenna 1	2398.5	-66.29	-20



Segment	Antenna	Freq(MHz)	Level	Limit
+BW	Antenna 1	2484	-66.13	-10
+2BW	Antenna 1	2485	-67.5	-20



1.16 TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

LIMIT

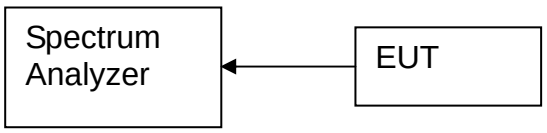
The transmitter unwanted emissions in the spurious domain shall not exceed the values in tables in the indicated bands:

Frequency Range	Maximum power ERP(<=1GHz) ERP(>GHz)	bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87.5 MHz	-36dBm	100kHz
87.5MHz to118 MHz	-54dBm	100kHz
118 MHz to174MHz	-36dBm	100kHz
174MHz to 230MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 862 MHz	-54dBm	100kHz
862 MHz to1 GHz	-36dBm	100kHz
1GHz to12.75 GHz	-30dBm	1MHz

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.10.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.10.2 for the measurement methods.

The antenna shall be connected to a spectrum analyzer of RF power measurements
Step 1: the unwanted emission over the range 30MHz to 1000MHz shall be identified
Spectrum analyzer setting:
Resolution bandwidth :100kHz , video bandwidth :300kHz
Detector mode :Peak trace mode: Maxhold Sweep point :>=9970, sweep time:200ms
Step 2: the unwanted emission over the range 1GHz to 12.75GHz shall be identified
Spectrum analyzer setting:
Resolution bandwidth :1MHz , Video bandwidth :3MHz
Detector mode :Peak Trace mode: Maxhold Sweep point :>=11750, sweep time:200ms

The measurement shall be performed at the lowest and the highest channel on which the equipment can operate.

TEST RESULTS

All the modulation modes were tested, the data of the worst mode are recorded in the following pages and the others modulation methods do not exceed the limits.

Worst Test Mode: GFSK **Tested by:** YF
Ambient temperature: 25°C **Relative humidity:** 53.7 % RH **Date:** August 02, 2016

Frequency (MHz)	Emission level (dBm)	Limit (dBm)	Margin(dB)	Verdict
521.713	-75.41	-54.00	-21.41	PASS
521.810	-75.40	-54.00	-21.40	PASS
604.508	-74.42	-54.00	-20.42	PASS
760.954	-74.98	-54.00	-20.98	PASS
761.051	-74.98	-54.00	-20.98	PASS
842.095	-75.54	-54.00	-21.54	PASS

1.17 RECEIVER SPURIOUS EMISSIONS

LIMIT

The level of spurious emissions shall be measured as, either:

1. Their power in specified load (conducted spurious emissions); and
2. Their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation); or
3. Their effective radiated power when radiated by cabinet and antenna.

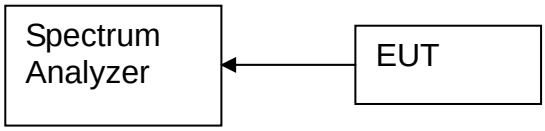
The spurious emissions of the receiver shall not exceed the values in tables in the indicated bands:

Frequency Range	Maximum power (ERP)	Measurement Width
30 MHz to 1 GHz	-57 dBm	100kHz
1 GHz to 12.75 GHz	-47 dBm	1MHz

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.11.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.11.2 for the measurement methods.

The antenna shall be connected to a spectrum analyzer of RF power measurements

Step 1: the unwanted emission over the range 30MHz to 1000MHz shall be identified
Spectrum analyzer setting:
Resolution bandwidth :100kHz , video bandwidth :300kHz
Detector mode :Peak trace mode: Maxhold Sweep point :>=9970, sweep time: auto
Step 2: the unwanted emission over the range 1GHz to 12.75GHz shall be identified
Spectrum analyzer setting:
Resolution bandwidth :1MHz , Video bandwidth :3MHz

Detector mode :Peak Trace mode: Maxhold Sweep point :>=25000, sweep time: auto

The measurement shall be performed at the lowest and the highest channel on which the equipment can operate.

TEST RESULTS

All the modulation modes were tested, the data of the worst mode are recorded in the following pages and the others modulation methods do not exceed the limits.

Worst Test Mode: GFSK **Tested by:** YF
Ambient temperature: 25°C **Relative humidity:** 53.7 % RH **Date:** August 02, 2016

Frequency (MHz)	Emission level (dBm)	Limit (dBm)	Margin(dB)	Verdict
833.242	-75.28	-57.00	-18.28	PASS
862.818	-75.16	-57.00	-18.16	PASS
897.065	-66.19	-57.00	-9.19	PASS
897.162	-64.99	-57.00	-7.99	PASS
897.260	-63.91	-57.00	-6.91	PASS
897.357	-67.01	-57.00	-10.01	PASS
5843.000	-62.77	-47.00	-15.77	PASS
5917.000	-62.99	-47.00	-15.99	PASS
6755.000	-62.69	-47.00	-15.69	PASS
7151.000	-62.93	-47.00	-15.93	PASS
7240.000	-62.49	-47.00	-15.49	PASS
12707.000	-62.45	-47.00	-15.45	PASS

1.18 ADAPTIVITY AND RECEIVER BLOCKING

LIMIT OF ADAPTIVITY AND BLOCKING

Only for adaptive equipment and RF output power >=10dBm(ERP)

- For non-LBT based Detect and avoid equipment shall comply with the following requirement

The unavailable channel shall remain unavailable for a minimum time equal to 1s after which the channel may be considered again as an “available” channel.

The Channel Occupancy Time shall be less than 40ms . each such transmission sequence shall be followed with an idle period of minimum 5% of the channel occupancy time with a minimum of 100us,after this, the procedure need to repeated.

The detection threshold shall be proportional to the transmit power of the transmitter:

For a 20dBm(ERP)transmitter the detection threshold level shall be equal to or lower than -70dBm/MHz at the input to the receiver.

For power level below 20dBm(ERP),the detection threshold level may be relaxed to TL=-70dBm/MHz+20-Pout(ERP)

- For LBT based Detect and avoid equipment shall comply with the following requirement

The Clear Channel Assessment check observation time shall be not less than 20us.

The Channel Occupancy Time shall be less than 60ms followed by an idle period of at least 5% of the channel occupancy time used in the equipment for the current fixed frame period

The detection threshold for the CCA shall be proportional to the transmit power of the transmitter:

For a 20dBm(ERP)transmitter the CCA threshold level(TL) shall be equal to or lower than -70dBm/MHz at the input to the receiver.

For power level below 20dBm(ERP),the CCA threshold level may be relaxed to TL=-70dBm/MHz+20-Pout(ERP)

- Short control signalling transmissions

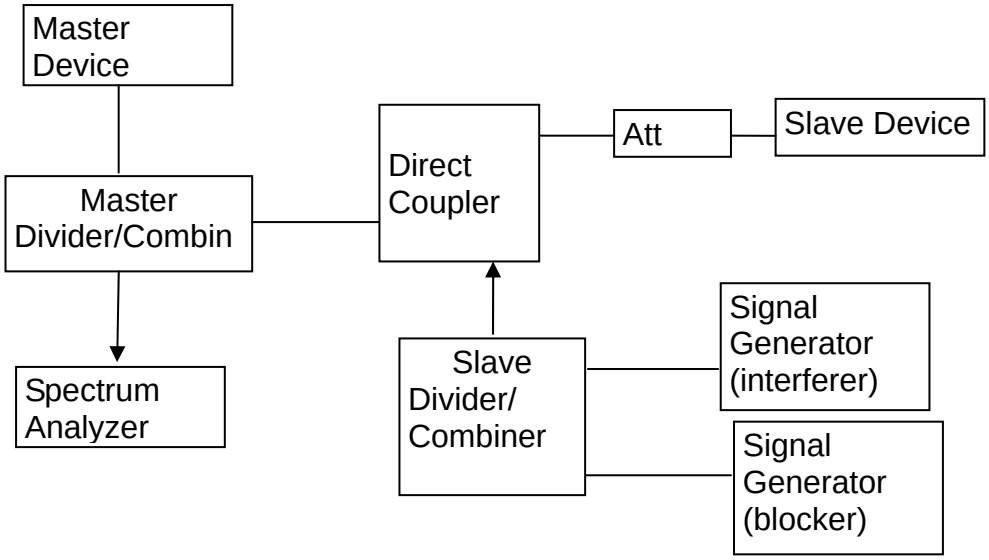
Short control signalling transmissions of adaptive equipment using wide band modulations shall have a maximum duty cycle of 10 % within an observation period of 50ms.

MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.
Vector Signal Generator	Agilent	N5182B	My53050553	05/28/2017
Analog Signal Generator	Agilent	N5171B	My53050878	05/28/2017
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Spectrum Analyzer	Agilent	N9010A	My53470879	05/28/2017
Power Analyzer	Agilent	PS-X10-100	N/A	05/28/2017
Notebook	ASUS	P45V	N/A	N/A

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST CONFIGURATION



***Remarks**:*
The Spectrum Analyzer could be connected to a monopole antenna or directly connected to the EUT through divider, if the EUT has already employing an antenna connector.

TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.7.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.9.1) clause 5.3.7.2 for the measurement method.

The EUT may connect to a companion device during the test, the interference signal generator, the blocking signal generator, the spectrum analyzer , the EUT and the companion device are connected using direction coupler and divider. Although the interference and blocking signal generators do not generate any signal at the point in time, the spectrum analyzer is used to monitor the transmissions of the EUT in response to the interfering and the blocking signals.
Step1:The analyzer shall be set as follows
RBW: >=Occupied Channel Bandwidth; Filter type: Channel Filter; VBW:RBW
Centre Frequency: tested frequency; Span: 0Hz; Sweep Time: 20ms ;
Trace Mode: clear/write; Trigger Mode: Video.
Step2: configure the EUT for normal transmission with a sufficiently high payload to allow demonstration of compliance of the adaptive mechanism on the hopping frequency.
Step3:add the interference signal
A 100% duty cycle interference signal is injected centred on the hopping frequency being tested. This interference signal shall be a band limited noise signal which has a flat power spectrum density and shall have a bandwidth greater than the occupied channel bandwidth of the EUT
Step4:Verfication of reaction to the interference signal
The spectrum analyzer shall be used to monitor the transmissions of the EUT on the selected hopping frequency with the interfering signal injected. This may require the

spectrum analyzer sweep to be triggered by the start of the interfering signal.
Step5:adding the blocking signal
With the interfering signal preset ,a 100% duty cycle CW signal is inserted as the blocking signal, the frequency and the level are provided in table3 if clause 4.3.1.10.2
Repeat step4 to verify that the EUT does not resume any normal transmissions on the hopping frequency being investigated.
Step6: removing the interference and blocking signal
On removal of the interference and blocking signal ,the EUT is allowed to re-include any channel previously marked as unavailable ;

The steps 2 to steps 6 shall be repeated for each of the hopping frequencies to be tested.

The measurement shall be performed at the lowest and the highest channel on which the equipment can operate.

TEST RESULTS

Not Applicable

Because RF Output power of EUT is less than10 dBm, according to standard EN300 328, adaptivity and receiver blocking is not required.

EMTEK
Access to the World

THE TEST REPORT

For

SHENZHEN C-STAR ELECTRONIC TECH. CO., LTD

Foldable Bluetooth headphone

Model No.: P326.701, P326.703, P326.705

Prepared for :
Address :

Prepared by : EMTEK(DONGGUAN) CO., LTD.
Address : No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China.

Tel :(0769) 22807078
Fax :(0769) 22807079

Report No. : ED161018004H
Date of Test : October 18, 2016 to October 25, 2016
Date of Report : October 25, 2016

TABLE OF CONTENT

Description Page

TEST REPORT DESCRIPTION

Applicant	:	
Manufacturer	:	
EUT	:	Foldable Bluetooth headphone
Model No.	:	P326.701, P326.703, P326.705
Input Rating	:	DC 3.7V Battery, DC 5V from adapter

Test Procedure Used:

EN 62479: 2010

The device described above is tested by EMTEK(DONGGUAN) CO., LTD. To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report shows the EUT to be technically compliant with the EN 62479: 2010 requirements. The test results are contained in this report and EMTEK(DONGGUAN) CO., LTD. Is assumed full responsibility for the accuracy and completeness of these tests.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK(DONGGUAN) CO., LTD.

Date of Test : October 18, 2016 to October 25, 2016

Prepared by : Abby Li
Abby Li/Editor

Reviewer : Alan He
Alan He/Supervisor

Approved & Authorized Signer :
Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED161018004H

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	Foldable Bluetooth headphone
Model Number	:	P326.701, P326.703, P326.705 (Note: These models are same except model number and appearance, here P326.701 was selected for full test.)
Trademark	:	N/A
Power	:	1.07 dBm Max
Applicant	:	
Address	:	
Manufacturer	:	
Address	:	
Date of received	:	October 18, 2016
Date of Test	:	October 18, 2016 to October 25, 2016

1.2 Test Facility

Site Description

EMC Lab. : Registered on FCC, June 18, 2014
The Certificate Number is 247565.

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A

Name of Firm : EMTEK(DONGGUAN) CO., LTD.

Site Location : No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China.

2. GENERAL PRODUCT INFORMATION

2.1 Product Function and Intended Use

The submitted sample is wireless transceiver includes transmitter and receiver.

2.2 Ratings and System Details

		Transceiver
Frequency Range	:	2402~2480MHz
Number of Channels	:	79
Power Supply	:	AC 230V/50Hz
Protection Class	:	III

3. EN 62479 REQUIREMENT

3.1 General Description of Applied Standards

Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz).

3.2 Human exposure to the Electromagnetic fields

This International Standard provides simple conformity assessment methods for low-power electronic and electrical equipment to an exposure limit relevant to electromagnetic fields (EMF). If such equipment cannot be shown to comply with the applicable EMF exposure requirements using the methods included in this standard for EMF assessment, then other standards, including IEC 62311 or other (EMF) product standards, may be used for conformity assessment.

3.3 RF Exposure Evaluation

3.3.1 Limit:

According to EN 62479 clause 4.2 Low-power electronic and electrical equipment is deemed to comply with the provisions of this standard if it can be demonstrated using routes B, C or D that the available antenna power and/or the average total radiated power is less than or equal to the applicable low-power exclusion level Pmax.
P max = 20 mW (13 dBm) according to ICNIRP guidelines, since the EUT is General public used.
Remark:
B: The input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available antenna power and/or the average total radiated power cannot exceed the low-power exclusion level defined in EN 62479 clause 4.2
C: The available antenna power and/or the average total radiated power are limited by product standards for transmitters to levels below the low-power exclusion level defined in EN 62479 clause 4.2
D: Measurements or calculations show that the available antenna power and/or the average total radiated power are below the low-power exclusion level defined in EN 62479 clauses 4.2.

3.3.2 Test result

The EIRP of the EUT are below the max permitted sending level of 20 mW, and then the EUT is not need to conduct SAR measurement.
More details please refer to ED161018004R.