

RADIO TEST REPORT

Report No: STS1506120F01

Issued for

Shenzhen Longzy Technology Co., Ltd

5F Building B, zhuangbian 2nd industrial Park, Hezhou Hezhou industrial District, Xixiang,baoan,Shenzhen, GuangDong,China

Product Name:	smart glasses
Brand Name:	N/A
Model No.:	LY-83
Series Model:	N/A
FCC ID:	2AFCBLY-83
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant'sname	Shenzhen Longzy Technology Co., Ltd
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Manufacture's Name	. Shenzhen Longzy Technology Co., Ltd
Address	5F Building B, zhuangbian 2nd industrial Park, Hezhou industrial District, Xixiang,baoan,Shenzhen, GuangDong, China
Product description	
Product name	. smart glasses
Band name	. N/A
Model and/or type reference	LY-83
Ratings	. DC 3.7V/120mA
Standards	. FCC Part 15.247
Test procedure	. ANSI C63.4-2014
sample identified in the report. This report shall not be re	produced except in full, without the written approval of STS, this revised by STS, personal only, and shall be noted in the revision of the
Date (s) of performance of tes	sts 27 June. 2015 ~03 July. 2015
Date of Issue	04 July. 2015
Test Result	Pass
Testing En	(Jin Ming)
Authorized	Signatory: Trong Yorky

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	04 July. 2015	STS1506120F01	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(a)(1)	Hopping Channel Separation	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(c)	Radiated Spurious Emission	PASS	
15.247(d)	Conducted Spurious Emission	PASS	
15.247(a)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(iii)	Dwell Time	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.205	Band Edge Emission PASS		
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

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1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

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Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

CNAS Registration No.: L7649;

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 % $^{\circ}$

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.70dB
4	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
6	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
7	All emissions,radiated(>1G)	±3.03dB
8	Temperature	±0.5°C
9	Humidity	±2%





2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	smart glasses
Trade Name	N/A
Model Name	LY-83
Serial Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
Bluetooth	Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
Battery	Rated Voltage: 3.7V
Zattery	capacity :120mAh
Hardware version number	LBG200 V2.0-A CSR8635
Software versioning number	LBG200 V2.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

	Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
00	2402	27	2429	54	2456	
01	2403	28	2430	55	2457	
02	2404	29	2431	56	2458	
03	2405	30	2432	57	2459	
04	2406	31	2433	58	2460	
05	2407	32	2434	59	2461	
06	2408	33	2435	60	2462	
07	2409	34	2436	61	2463	
08	2410	35	2437	62	2464	
09	2411	36	2438	63	2465	
10	2412	37	2439	64	2466	
11	2413	38	2440	65	2467	
12	2414	39	2441	66	2468	
13	2415	40	2442	67	2469	
14	2416	41	2443	68	2470	
15	2417	42	2444	69	2471	
16	2418	43	2445	70	2472	
17	2419	44	2446	71	2473	
18	2420	45	2447	72	2474	
19	2421	46	2448	73	2475	
20	2422	47	2449	74	2476	
21	2423	48	2450	75	2477	
22	2424	49	2451	76	2478	
23	2425	50	2452	77	2479	
24	2426	51	2453	78	2480	
25	2427	52	2454			
26	2428	53	2455			

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Dipole Antenna	N/A	1	BT Antenna

The EUT antenna is Dipole Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78
Mode 4	Charging+ Keeping TX Mode

For Conducted Emission		
Final Test Mode	Description	
Mode 4	Charging+ Keeping TX Mode	

For Radiated Emission					
Final Test Mode Description					
Mode 1	CH00				
Mode 2	CH39				
Mode 3	CH78				
Mode 4	Charging+ Keeping TX Mode				

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	Test program: N/A			
Frequency	2402 MHz 2441 MHz 2480 MHz			
Parameters(1Mbps)	DEF	DEF	DEF	





2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Radiated Spurious Emission Test

E-1 EUT

Conducted Emission Test

E-1 EUT





2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	smart glasses	N/A	LY-83	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A N/A		N/A
			7.7	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>"Length_"</code> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".





2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.25	2015.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.06	2016.03.05
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.06	2016.06.05
PreAmplifier	Agilent	8449B	60538	2014.10.25	2015.10.24
Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2014.10.25	2015.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	
EMI Test Receiver	R&S	ESPI	102086	2014.11.20	2015.11.19	
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24	



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

FDEOLIENCY (MU=)	Class B	Standard	
FREQUENCY (MHz)	Quasi-peak Average		
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00 50.00		CISPR
0.15 -0.5	66 - 56 *	56 - 46 *	FCC

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

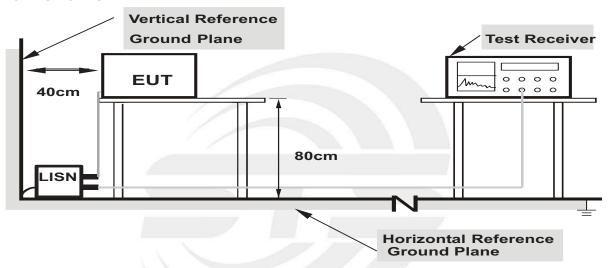




3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.3 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

3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.





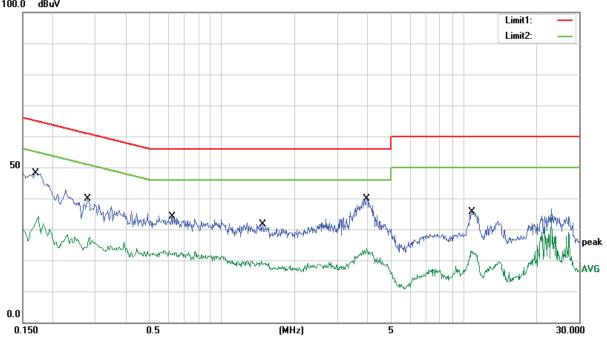
3.1.5 TEST RESULTS

EUT:	Smart glasses	Model Name.:	LY-83
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	L
Test Voltage:	DC 3.7V	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Domork
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remark
0.1700	38.24	10.00	48.24	64.96	-16.72	QP
0.1700	22.37	10.00	32.37	54.96	-22.59	AVG
0.2780	30.06	9.92	39.98	60.88	-20.90	QP
0.2780	15.51	9.92	25.43	50.88	-25.45	AVG
0.6220	24.10	9.96	34.06	56.00	-21.94	QP
0.6220	12.49	9.96	22.45	46.00	-23.55	AVG
1.4740	21.58	9.95	31.53	56.00	-24.47	QP
1.4740	8.74	9.95	18.69	46.00	-27.31	AVG
3.9660	29.67	10.19	39.86	56.00	-16.14	QP
3.9660	13.67	10.19	23.86	46.00	-22.14	AVG
10.8300	25.29	10.36	35.65	60.00	-24.35	QP
10.8300	11.68	10.36	22.04	50.00	-27.96	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss - Pre-amplifier. 100.0 dBuV





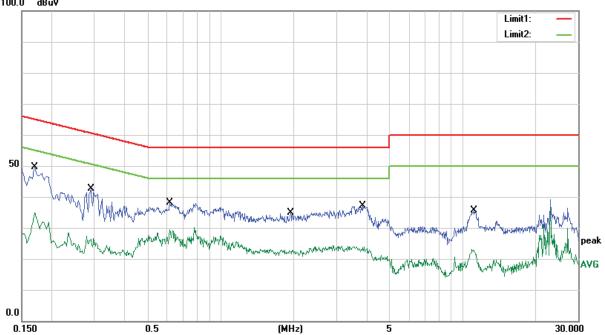


EUT:	Smart glasses	Model Name. :	LY-83
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	N
Test Voltage:	DC 3.7V	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remark
0.1700	39.67	10.00	49.67	64.96	-15.29	QP
0.1700	24.82	10.00	34.82	54.96	-20.14	AVG
0.2900	32.71	9.91	42.62	60.52	-17.90	QP
0.2900	15.95	9.91	25.86	50.52	-24.66	AVG
0.6140	28.23	9.96	38.19	56.00	-17.81	QP
0.6140	19.50	9.96	29.46	46.00	-16.54	AVG
1.9460	24.81	10.00	34.81	56.00	-21.19	QP
1.9460	12.29	10.00	22.29	46.00	-23.71	AVG
3.8780	26.83	10.20	37.03	56.00	-18.97	QP
3.8780	13.37	10.20	23.57	46.00	-22.43	AVG
11.1940	25.27	10.30	35.57	60.00	-24.43	QP
11.1940	12.22	10.30	22.52	50.00	-27.48	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15247&205(a), then the Part 15 247&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

EIMITO OF TOOMINED EIMIOOFOR METOOREMENT (OOMINE TOOMINE)					
Frequencies	Field Strength	Measurement Distance			
(MHz)	(micorvolts/meter)	(meters)			
0.009~0.490	2400/F(KHz)	300			
0.490~1.705	24000/F(KHz)	30			
1.705~30.0	30	30			
30~88	100	3			
88~216	150	3			
216~960	200	3			
Above 960	500	3			
216~960	200	3			

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

EDEOLIENCY (MHz)	Class B (dBuV/m) (at 3M)					
FREQUENCY (MHz)	PEAK	AVERAGE				
Above 1000	74	54				

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

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Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak	
Start Frequency	1000 MHz(Peak/AV)	
Stop Frequency	10th carrier harmonic(Peak/AV)	
RB / VB (emission in restricted	1 MU-7 / 1 MU-7 AV/-1 MU-7 / 10U-7	
band)	1 MHz / 1 MHz, AV=1 MHz / 10Hz	

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

Both horizontal and vertical antenna polarities were tested

and performed pretest to three orthogonal axis. The worst case emissions were reported

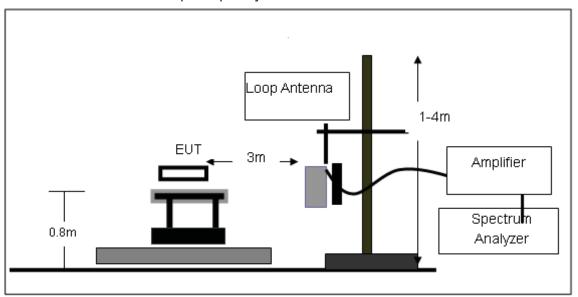
3.2.3 DEVIATION FROM TEST STANDARD

No deviation

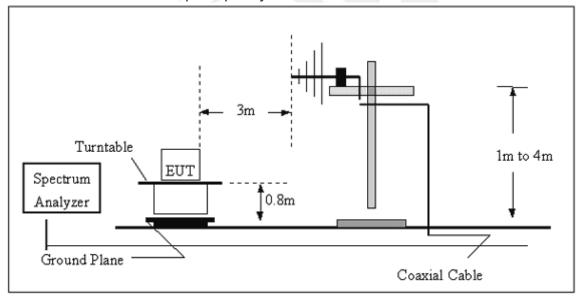


3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz

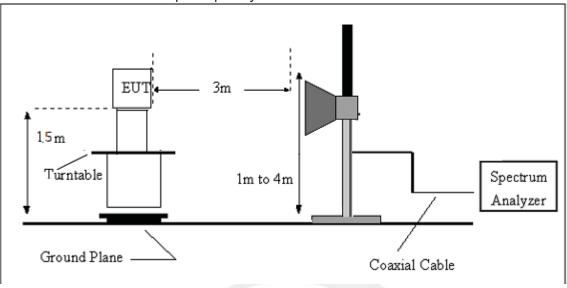


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

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3.2.6 TEST RESULTS

Below 30MHz

EUT:	Smart glasses	Model Name.:	LY-83
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	DC 3.7V	Test Mode:	N/A

Freq.	Reading	Limit	Margin	State	Test Result	
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	rest Result	
					PASS	
					PASS	

NOTE

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

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.





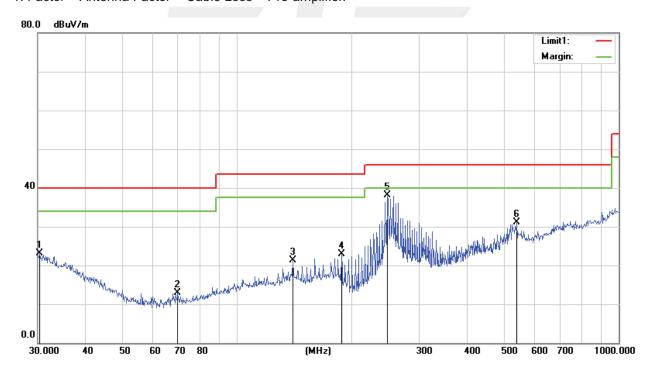
Between 30-1000MHz

EUT:	Smart glasses	Model Name.:	LY-83
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	DC 3.7V	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
30.3171	4.63	18.54	23.17	40.00	-16.83	QP
69.8450	6.61	6.28	12.89	40.00	-27.11	QP
139.8506	9.24	12.02	21.26	43.50	-22.24	QP
187.7530	13.39	9.52	22.91	43.50	-20.59	QP
247.6820	24.80	13.27	38.07	46.00	-7.93	QP
541.3723	9.46	21.63	31.09	46.00	-14.91	QP

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



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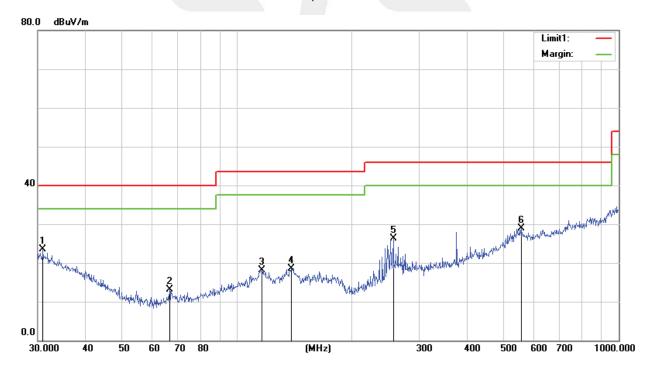


EUT:	Smart glasses	Model Name.:	LY-83
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	DC 3.7V	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
30.9618	5.35	18.20	23.55	40.00	-16.45	QP
66.4990	7.20	5.83	13.03	40.00	-26.97	QP
116.1320	5.89	12.27	18.16	43.50	-25.34	QP
138.8735	6.02	12.57	18.59	43.50	-24.91	QP
256.5210	11.78	14.57	26.35	46.00	-19.65	QP
556.7744	6.34	22.64	28.98	46.00	-17.02	QP

Remark

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.







Above 1000 MHz

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	0	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment	
		Lo	ow Channel (2402	MHz)				
4804.20	66.03	-3.62	62.41	74	-11.59	PK	Vertical	
4804.21	45.93	-3.62	42.31	54	-11.69	AV	Vertical	
7206.13	61.51	-0.9	60.61	74	-13.39	PK	Vertical	
7206.12	40.90	-0.9	40	54	-14	AV	Vertical	
4804.00	61.41	-3.65	57.76	74	-16.24	PK	Horizontal	
4803.99	44.30	-3.65	40.65	54	-13.35	AV	Horizontal	
	Mid Channel (2441 MHz)							
4882.08	64.45	-3.65	60.8	74	-13.2	PK	Vertical	
4882.07	49.24	-3.65	45.59	54	-8.41	AV	Vertical	
7323.22	60.55	-0.84	59.71	74	-14.29	PK	Vertical	
7323.21	43.92	-0.84	43.08	54	-10.92	AV	Vertical	
4882.18	60.81	-3.68	57.13	74	-16.87	PK	Horizontal	
4882.14	44.78	-3.68	41.1	54	-12.9	AV	Horizontal	
	High Channel (2480 MHz)							
4960.26	60.90	-3.59	57.31	74	-16.69	PK	Vertical	
4960.30	44.92	-3.59	41.33	54	-12.67	AV	Vertical	
7440.33	60.47	-0.83	59.64	74	-14.36	PK	Vertical	
7440.31	44.70	-0.83	43.87	54	-10.13	AV	Vertical	
4960.33	60.64	-3.59	57.05	74	-16.95	PK	Horizontal	
4960.30	45.08	-3.59	41.49	54	-12.51	AV	Horizontal	

Note:

- 1) 30MHz~25GHz:(Scan with GFSK, π/4-DQPSK,8DPSK, the worst casw is GFSK Mode)
- 2) Factor = Antenna Factor + Cable Loss Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Limit - Emission Leve



Band edge

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment	
	GFSK							
2399.9	68.10	-12.99	55.11	74	-18.89	PK	Vertical	
2399.9	54.17	-12.99	41.18	54	-12.82	AV	Vertical	
2399.9	69.05	-12.99	56.06	74	-17.94	PK	Horizontal	
2399.9	53.10	-12.99	40.11	54	-13.89	AV	Horizontal	
2483.6	69.99	-12.78	57.21	74	-16.79	PK	Vertical	
2483.6	52.79	-12.78	40.01	54	-13.99	AV	Vertical	
2483.6	69.94	-12.78	57.16	74	-16.84	PK	Horizontal	
2483.6	53.13	-12.78	40.35	54	-13.65	AV	Horizontal	
	π/4-DQPSK							
2399.9	70.32	-12.99	57.33	74	-16.67	PK	Vertical	
2399.9	53.45	-12.99	40.46	54	-13.54	AV	Vertical	
2399.9	68.97	-12.99	55.98	74	-18.02	PK	Horizontal	
2399.9	53.98	-12.99	40.99	54	-13.01	AV	Horizontal	
2483.6	70.12	-12.78	57.34	74	-16.66	PK	Vertical	
2483.6	54.90	-12.78	42.12	54	-11.88	AV	Vertical	
2483.6	69.82	-12.78	57.04	74	-16.96	PK	Horizontal	
2483.6	53.54	-12.78	40.76	54	-13.24	AV	Horizontal	
			8DPSK					
2399.9	70.26	-12.99	57.27	74	-16.73	PK	Vertical	
2399.9	54.25	-12.99	41.26	54	-12.74	AV	Vertical	
2399.9	69.11	-12.99	56.12	74	-17.88	PK	Horizontal	
2399.9	55.22	-12.99	42.23	54	-11.77	AV	Horizontal	
2483.6	70.33	-12.78	57.55	74	-16.45	PK	Vertical	
2483.6	53.98	-12.78	41.2	54	-12.8	AV	Vertical	
2483.6	70.55	-12.78	57.77	74	-16.23	PK	Horizontal	
2483.6	53.38	-12.78	40.6	54	-13.40	AV	Horizontal	

Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz.

Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz.





Hopping

Поррину								
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	Commont	
	GFSK							
2390	68.12	-12.99	55.13	74	-18.87	PK	Vertical	
2390	54.08	-12.99	41.09	54	-12.91	AV	Vertical	
2390	67.48	-12.99	54.49	74	-19.51	PK	Horizontal	
2390	52.97	-12.99	39.98	54	-14.02	AV	Horizontal	
2483.5	66.09	-12.78	53.31	74	-20.69	PK	Vertical	
2483.5	53.80	-12.78	41.02	54	-12.98	AV	Vertical	
2483.5	66.84	-12.78	54.06	74	-19.94	PK	Horizontal	
2483.5	54.02	-12.78	41.24	54	-12.76	AV	Horizontal	
	π/4-DQPSK							
2390	67.90	-12.99	54.91	74	-19.09	PK	Vertical	
2390	55.27	-12.99	42.28	54	-11.72	AV	Vertical	
2390	66.69	-12.99	53.7	74	-20.3	PK	Horizontal	
2390	53.05	-12.99	40.06	54	-13.94	AV	Horizontal	
2483.5	67.00	-12.78	54.22	74	-19.78	PK	Vertical	
2483.5	52.80	-12.78	40.02	54	-13.98	AV	Vertical	
2483.5	68.15	-12.78	55.37	74	-18.63	PK	Horizontal	
2483.5	53.98	-12.78	41.2	54	-12.8	AV	Horizontal	
	//		8DPSK					
2390	68.05	-12.99	55.06	74	-18.94	PK	Vertical	
2390	53.84	-12.99	40.85	54	-13.15	AV	Vertical	
2390	66.83	-12.99	53.84	74	-20.16	PK	Horizontal	
2390	53.84	-12.99	40.85	54	-13.15	AV	Horizontal	
2483.5	67.84	-12.78	55.06	74	-18.94	PK	Vertical	
2483.5	53.81	-12.78	41.03	54	-12.97	AV	Vertical	
2483.5	66.70	-12.78	53.92	74	-20.08	PK	Horizontal	
2483.5	53.95	-12.78	41.17	54	-12.83	AV	Horizontal	

Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz.

Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz.



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4. CONDUCTED SPURIOUS EMISSIONS

4.1 REQUIREMENT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

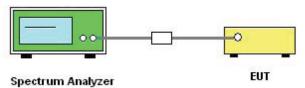
Spectrum Parameter	Setting		
Detector	Peak		
Start/Stop Frequency	30 MHz to 10th carrier harmonic		
RB / VB (emission in restricted band)	100 KHz/300 KHz		
Trace-Mode:	Max hold		

For Band edge

Spectrum Parameter	Setting		
Detector	Peak		
Start/Stan Eraguanay	Lower Band Edge: 2310 – 2404 MHz		
Start/Stop Frequency	Upper Band Edge: 2478 – 2500 MHz		
RB / VB (emission in restricted band)	100 KHz/300 KHz		
Trace-Mode:	Max hold		

Remark: Hopping on and Hopping off mode all have been tested, only worst case hopping off is reported.

4.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

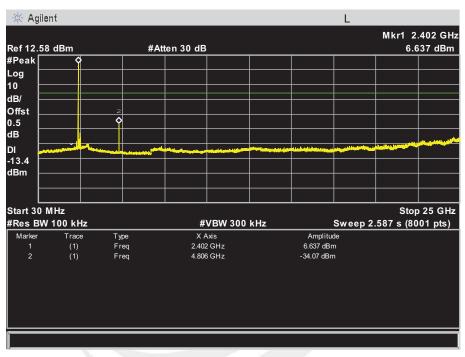
Report No.: STS1506120F01

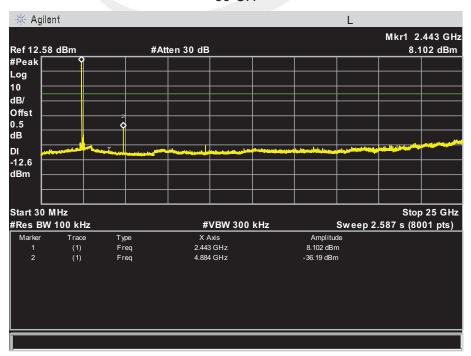


4.5 TEST RESULTS

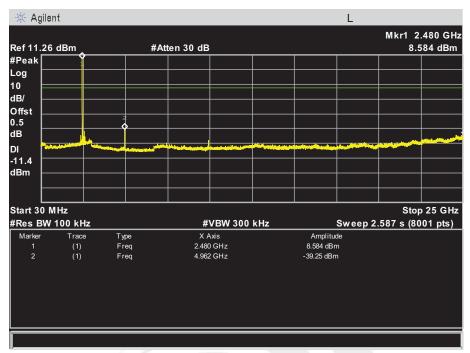
EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-00/39/78 CH		

00 CH







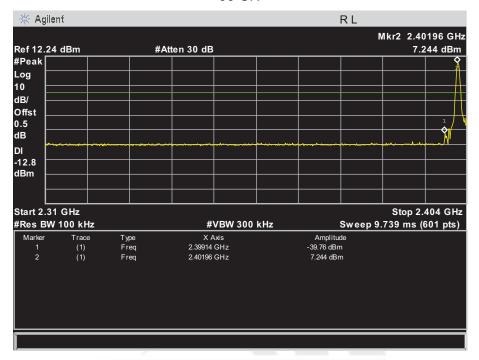


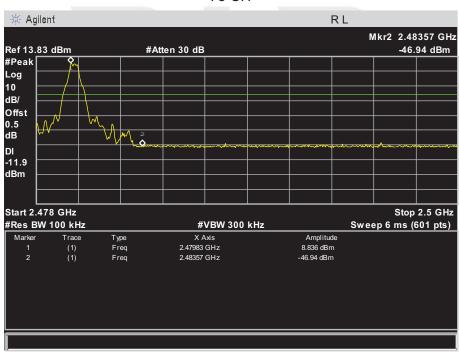




For Band edge

00 CH



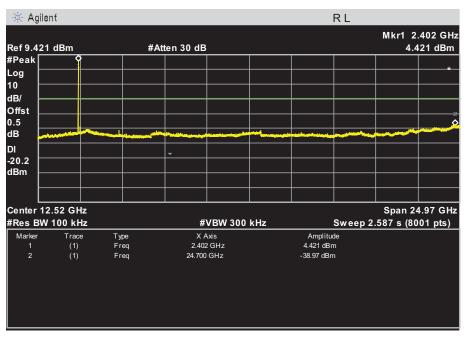


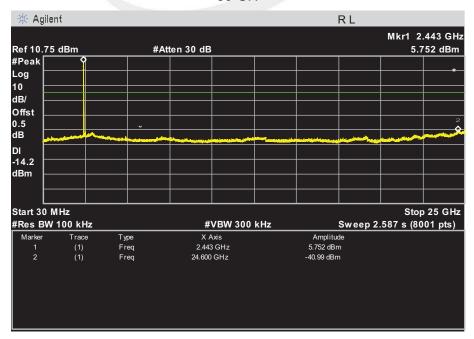


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EUT:	Smart glasses	Model Name :	LY-83		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure :	1012 hPa	Test Voltage :	DC 3.7V		
Test Mode :	π/4-DQPSK(2Mbps) –00/39/78 CH				

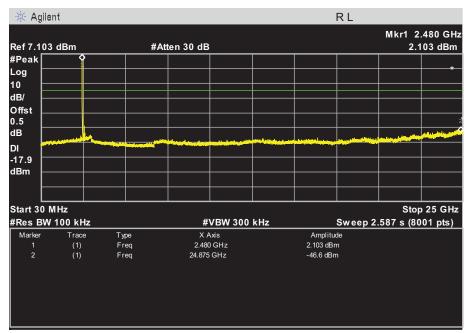
00 CH







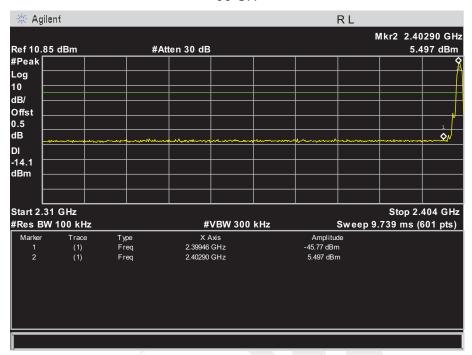


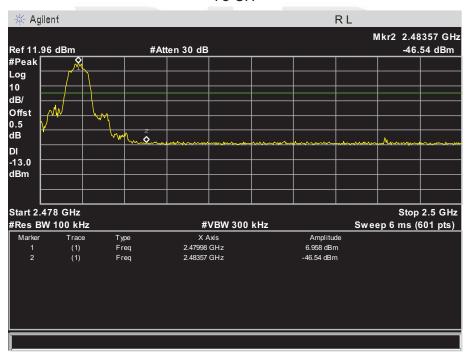




For Band edge

00 CH



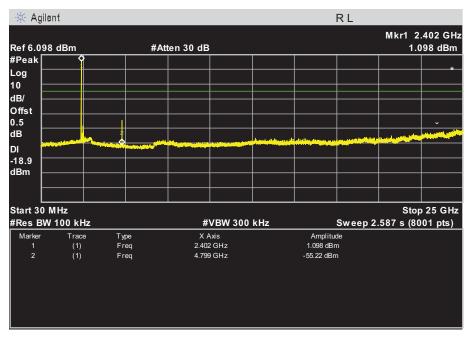


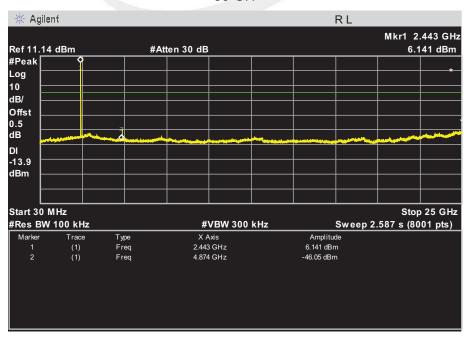


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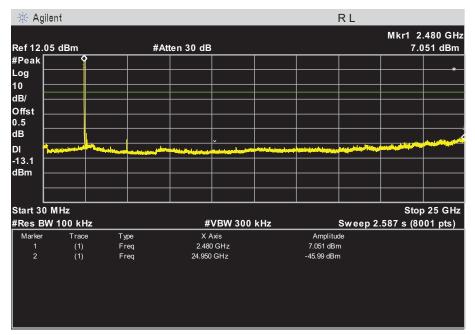
EUT:	Smart glasses	Model Name :	LY-83		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure :	1012 hPa	Test Voltage :	DC 3.7V		
Test Mode :	8-DPSK(3Mbps) -00/39/78 CH				

00 CH





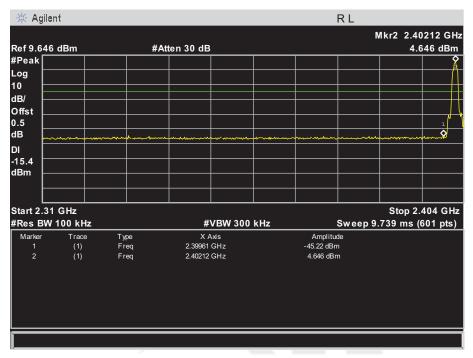




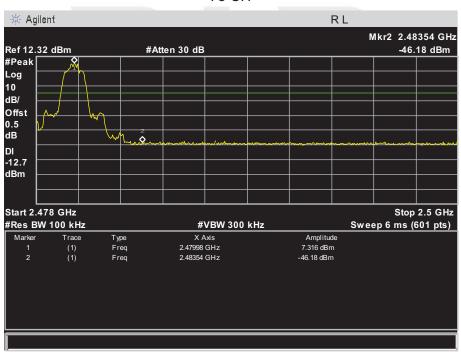


For Band edge

00 CH



78 CH







5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS	

Spectrum Parameters	Setting	
Attenuation	Auto	
Span Frequency	> Operating Frequency Range	
RB	100 KHz	
VB	100 KHz	
Detector	Peak	
Trace	Max Hold	
Sweep Time Auto		

5.2 TEST PROCEDURE

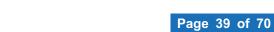
- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100K, VBW=100K, Sweep time = Auto.

5.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.





5.5 TEST RESULTS

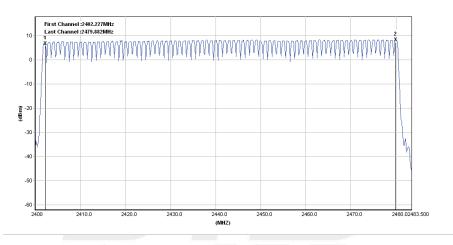
EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	Hopping Mode		

Number of Hopping Channel

79

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Hopping channel







6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS	

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

6.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



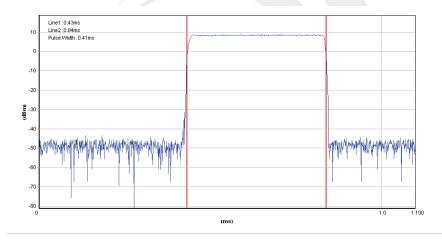


6.5 TEST RESULTS

EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-DH1/DH3/DH5		

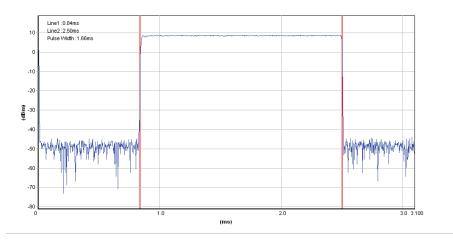
Data Packet	Frequency	Pulse Duration	Dwell Time	Limits(s)
DH1	2441 MHz	(ms)	(S)	0.4
		0.410	0.131	
DH3	2441 MHz	1.660	0.266	0.4
DH5	2441 MHz	2.910	0.310	0.4

CH39-DH1

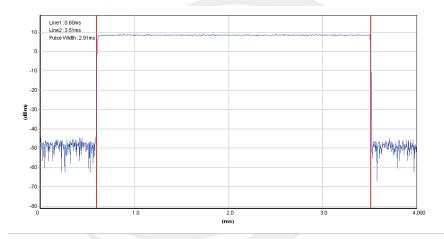




CH39-DH3



CH39-DH5



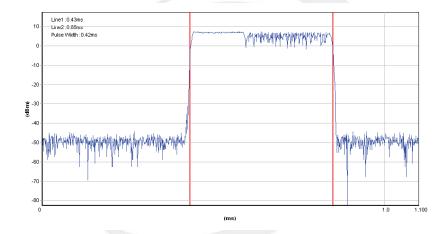


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EUT:	Smart glasses	Model Name :	LY-83		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure :	1012 hPa Test Voltage : DC 3.7V				
Test Mode :	π/4-DQPSK(2Mbps) –2DH1/2DH3/2DH5				

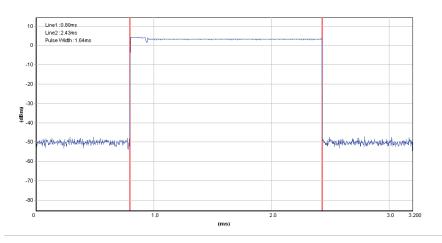
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
DH1	2441 MHz	0.420	0.134	0.4
DH3	2441 MHz	1.640	0.262	0.4
DH5	2441 MHz	2.920	0.311	0.4

CH39-2DH1

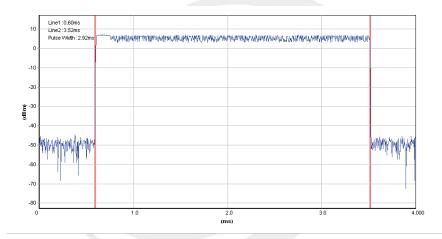




CH39-2DH3



CH39-2DH5



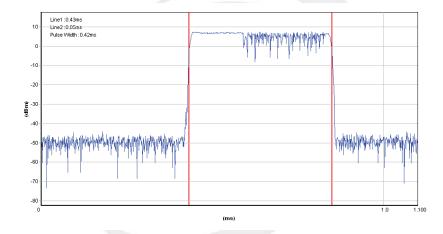


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EUT:	Smart glasses	Model Name :	LY-83		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure :	1012 hPa Test Voltage : DC 3.7V				
Test Mode :	8DPSK(3Mbps) -3DH1/3DH3/3DH5				

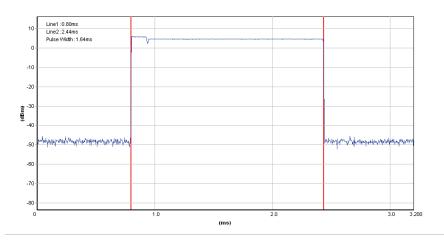
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
DH1	2441 MHz	0.420	0.134	0.4
DH3	2441 MHz	1.640	0.262	0.4
DH5	2441 MHz	2.920	0.311	0.4

CH39-3DH1

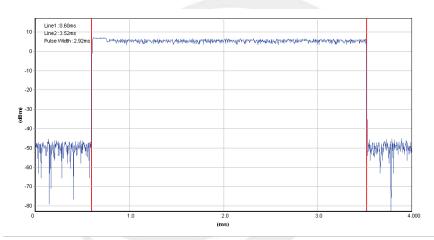




CH39-3DH3



CH39-3DH5





7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 APPLIED PROCEDURES / LIMIT

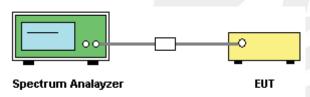
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

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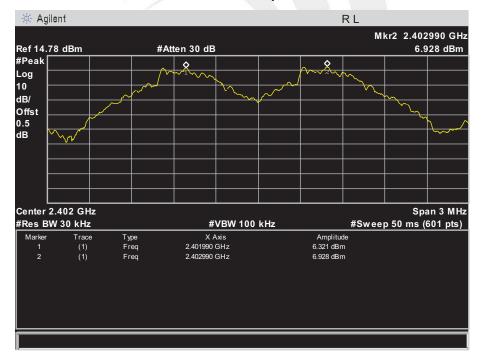
7.5 TEST RESULTS

EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (GFSK(1Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.000	0.881	Complies
2441 MHz	1.000	0.878	Complies
2480 MHz	0.995	0.837	Complies

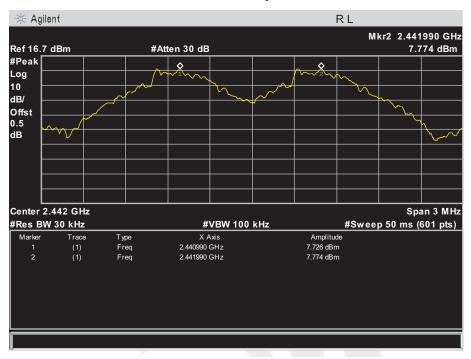
For GFSK: Ch. Separation Limits: >20dB bandwidth

CH00 -1Mbps

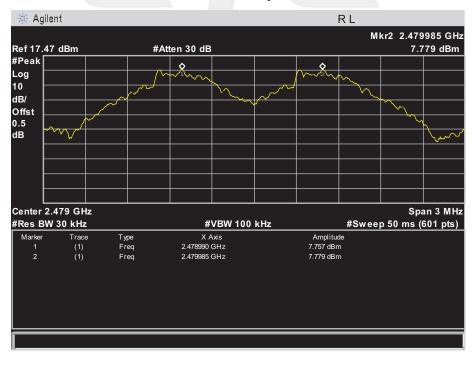




CH39 -1Mbps



CH78 -1Mbps



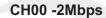


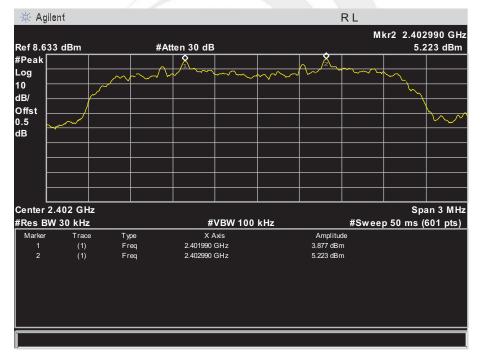
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EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (π/4-DQPSK(2Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.000	0.823	Complies
2441 MHz	1.005	0.803	Complies
2480 MHz	1.000	0.797	Complies

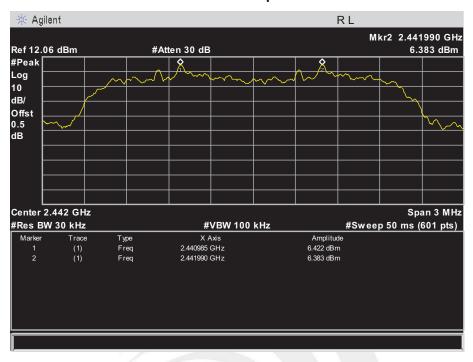
For $\pi/4$ -DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth



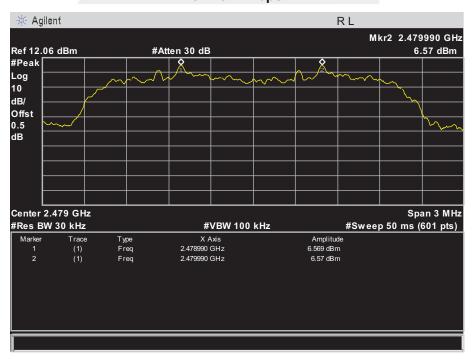




CH39 -2Mbps



CH78 -2Mbps





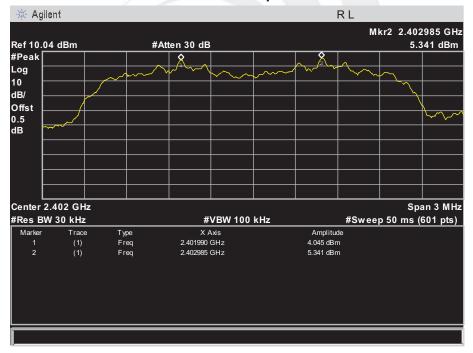
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EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (8-DPSK(3Mbps)Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	0.995	0.798	Complies
2441 MHz	1.005	0.809	Complies
2480 MHz	1.000	0.808	Complies

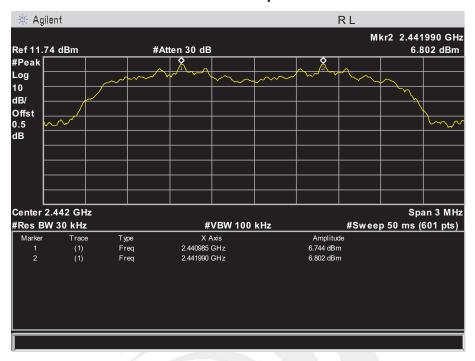
For 8-DPSK(3Mbps):

Ch. Separation Limits: > two-thirds 20dB bandwidth CH00 -3Mbps

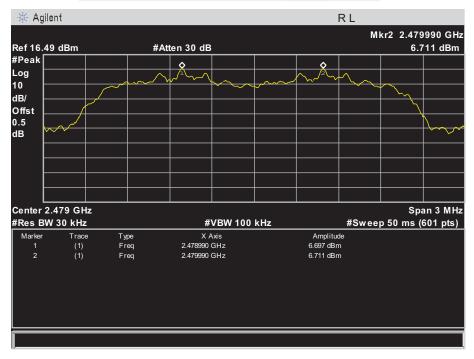




CH39 -3Mbps



CH78 -3Mbps







8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> Measurement Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

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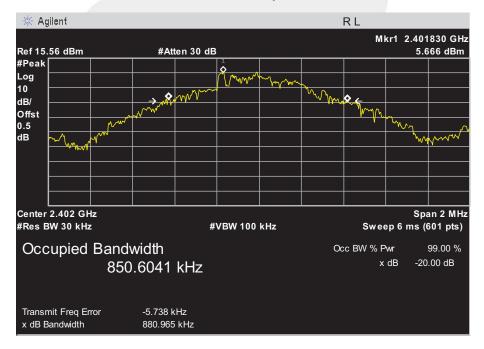


8.5 TEST RESULTS

EUT:	Smart glasses	Model Name :	LY-83	
Temperature :	25 ℃	Relative Humidity:	50%	
Pressure :	Test Voltage : DC 3.7V			
Test Mode :	GFSK(1Mbps)CH00 / CH39 /C78			

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.881	PASS
2441 MHz	0.878	PASS
2480 MHz	0.837	PASS

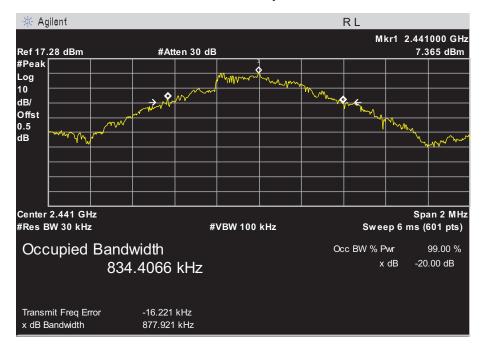
CH00 -1Mbps



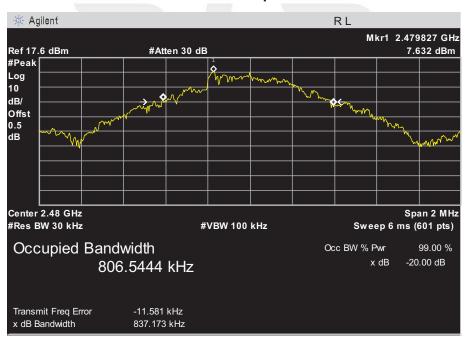




CH39 -1Mbps



CH78 -1Mbps



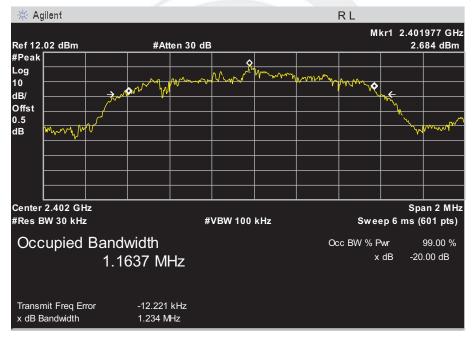


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EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	π/4-DQPSK(2Mbps)CH00 / CH	139 /C78	

Frequency	20dB Bandwidth(MHz)	Result
2402 MHz	1.234	PASS
2441 MHz	1.205	PASS
2480 MHz	1.196	PASS

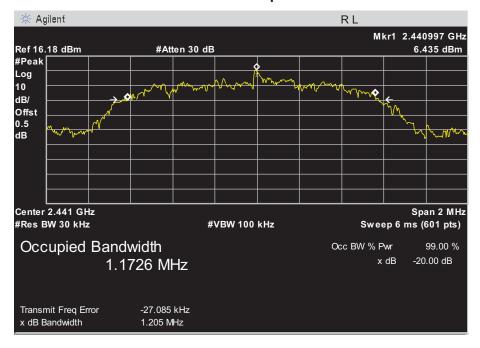
CH00 -2Mbps



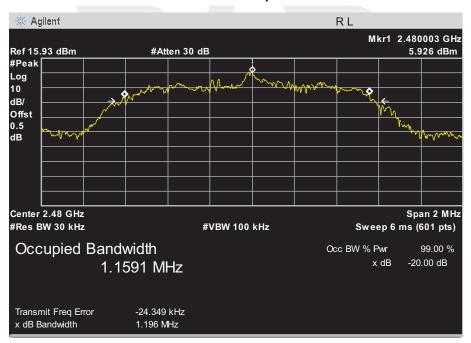




CH39 -2Mbps



CH78 -2Mbps



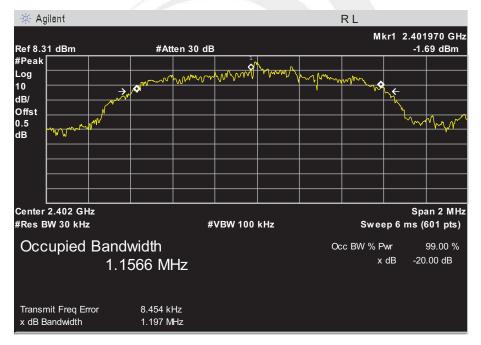


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EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	8DPSK(3Mbps)CH00 / CH39 /0	C78	

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.197	PASS
2441 MHz	1.213	PASS
2480 MHz	1.212	PASS

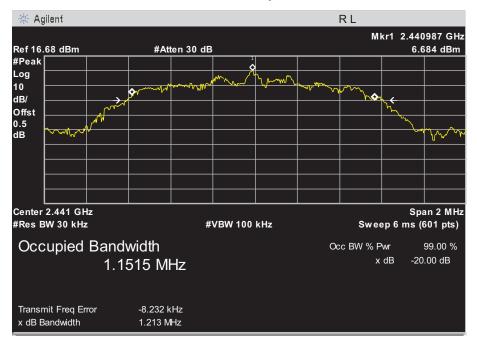
CH00 -3Mbps



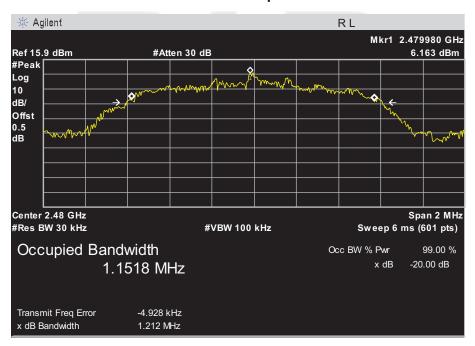




CH39 -3Mbps



CH78 -3Mbps







9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Peak	1 W or 0.125W		
(b)(i)	Output Power	Or if channel separation > 2/3 bandwidthprovided the systems operatewith an output power no greater than125 mW(20.96dBm)	2400-2483.5	PASS

9.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: GFSK(1Mbps):RBW= 1MHz, VBW= 3MHz, Sweep time = Auto.
- c. Spectrum Setting: $\pi/4$ -DQPSK(2Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.
- d. Spectrum Setting: 8-DPSK(3Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

9.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

9.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.





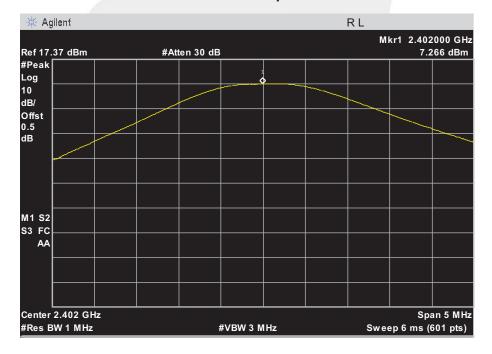
9.5 TEST RESULTS

EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 GFSK(1Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	7.266	30
CH39	2441	8.768	30
CH78	2480	8.977	30

Note: the channel separation > bandwidth

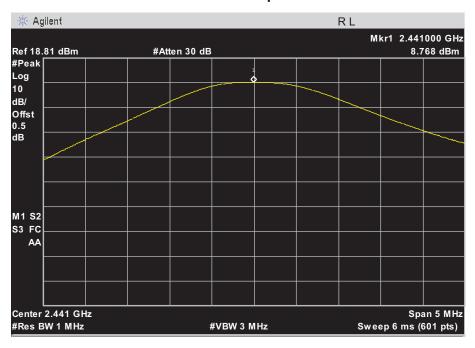
CH00 -1Mbps



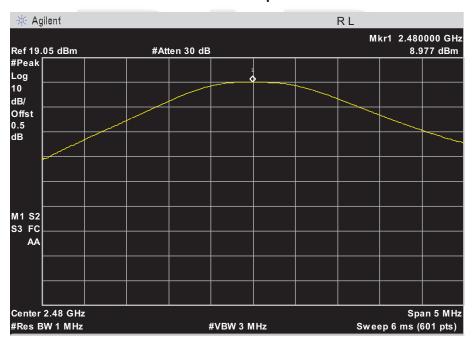




CH39 -1Mbps



CH78 -1Mbps





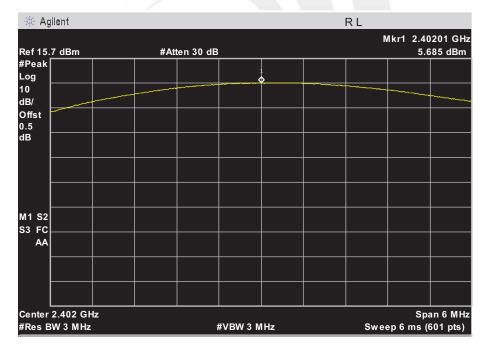
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EUT:	Smart glasses	Model Name :	LY-83
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 π/4-DQPSK(2Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	5.685	20.96
CH39	2441	7.858	20.96
CH78	2480	7.963	20.96

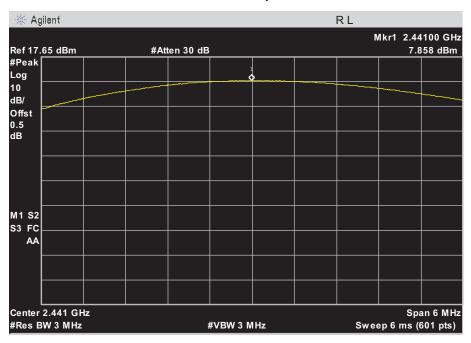
Note: the channel separation >2/3 bandwidth

CH00 -2Mbps

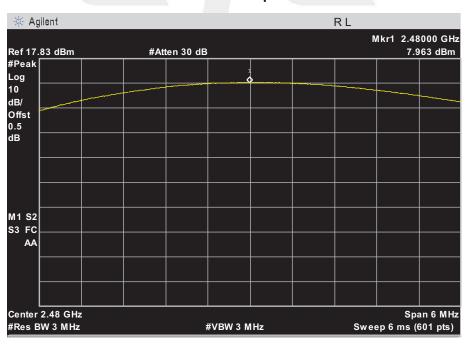




CH39 -2Mbps



CH78 -2Mbps





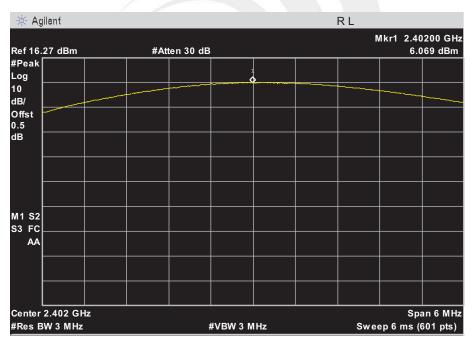
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EUT:	Smart glasses	Model Name :	LY-83	
Temperature :	25 ℃	Relative Humidity:	60%	
Pressure :	1012 hPa	Test Voltage :	DC 3.7V	
Test Mode :	CH00/ CH39 /CH78 8-DPSK(3I	CH00/ CH39 /CH78 8-DPSK(3Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	6.069	20.96
CH39	2441	8.199	20.96
CH78	2480	8.357	20.96

Note: the channel separation >2/3 bandwidth

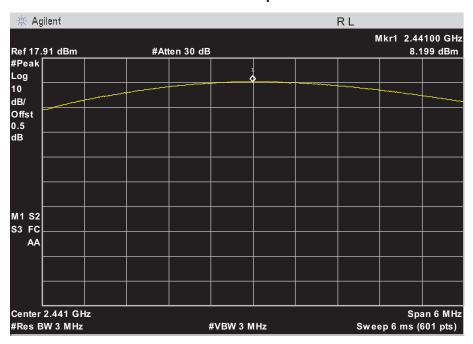
CH00 -3Mbps



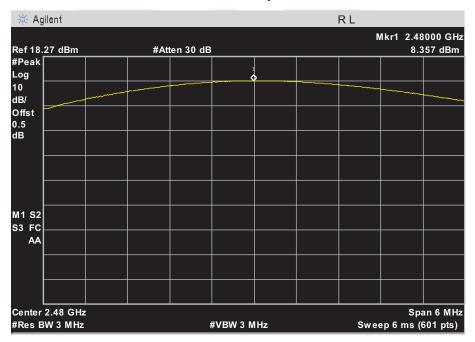




CH39 -3Mbps



CH78 -3Mbps





10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is Dipole Antenna. It comply with the standard requirement.





APPENDIX- PHOTOS OF TEST SETUP

Radiated Measurement Photos







Conducted Measurement Photos



* * * * * END OF THE REPORT * * * *