

FCC REPORT

Applicant: Dongguan Hele Electronics Co., Ltd.

Address of Applicant: Dalingya Industrial Zone, Daojiao Town, Dongguan City, Guangdong China

Manufacturer/Factory: Dongguan Hele Electronics Co., Ltd.

Address of Manufacturer/Factory: Dalingya Industrial Zone, Daojiao Town, Dongguan City, Guangdong China

Equipment Under Test (EUT)

Product Name: Bluetooth headset

Model No.: QY20

FCC ID: RDR-QY20

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249:2017

Date of sample receipt: July 03, 2017

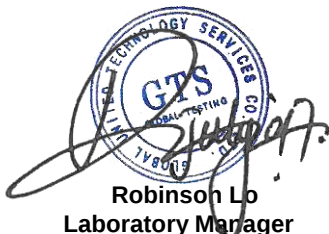
Date of Test: July 04-06, 2017

Date of report issued: July 07, 2017

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo
Laboratory Manager

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2 Version

Version No.	Date	Description
00	July 07, 2017	Original

Prepared By:

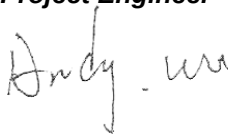


Date:

July 07, 2017

Project Engineer

Check By:



Date:

July 07, 2017

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10: 2013 and ANSI C63.4: 2014.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Bluetooth headset
Model No.:	QY20
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	40
Channel separation:	2MHz
Modulation type:	GFSK
Antenna Type:	Chip antenna
Antenna gain:	0dBi(declare by Applicant)
Power supply:	DC 5V Or DC 3.7V Li-ion Battery

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	89.38	89.44	88.68

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	FCC DoC
DELTA	ADAPTER	ADP-60ADT	N/A	FCC DoC

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2017	June 28 2018
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2017	June 28 2018
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2017	June 28 2018
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2017	June 28 2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2017	June 28 2018
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	June 29 2017	June 28 2018
10	Coaxial Cable	GTS	N/A	GTS211	June 29 2017	June 28 2018
11	Coaxial cable	GTS	N/A	GTS210	June 29 2017	June 28 2018
12	Coaxial Cable	GTS	N/A	GTS212	June 29 2017	June 28 2018
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2017	June 28 2018
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2017	June 28 2018
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2017	June 28 2018
16	Band filter	Amindeon	82346	GTS219	June 29 2017	June 28 2018
17	Power Meter	Anritsu	ML2495A	GTS540	June 29 2017	June 28 2018
18	Power Sensor	Anritsu	MA2411B	GTS541	June 29 2017	June 28 2018

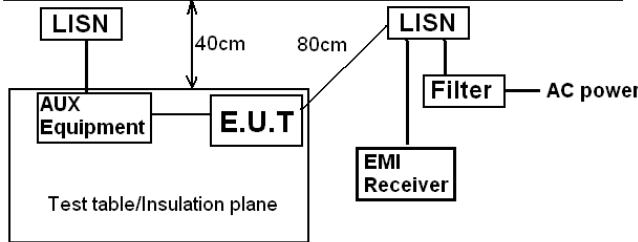
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June 29 2017	June 28 2018
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 29 2017	June 28 2018
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June 29 2017	June 28 2018
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June 29 2017	June 28 2018

7 Test results and Measurement Data

7.1 Antenna requirement

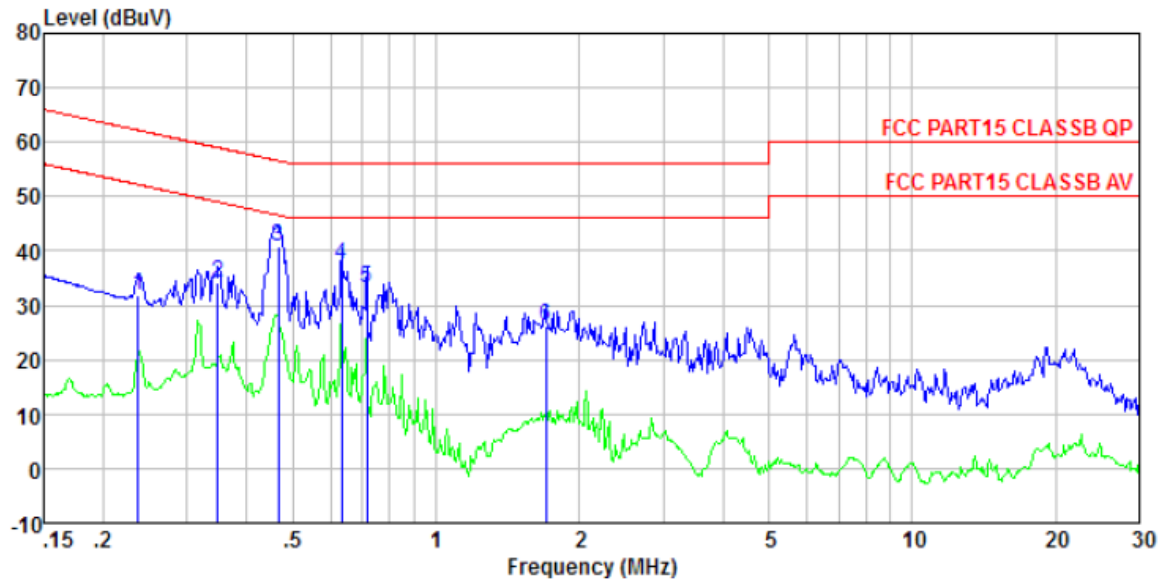
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
<i>The antenna is chip antenna, the best case gain of the antenna is 0dBi</i>	
	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207			
Test Method:	ANSI C63.10:2013			
Test Frequency Range:	150KHz to 30MHz			
Class / Severity:	Class B			
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto			
Limit:	Frequency range (MHz)	Limit (dBuV)		
		Quasi-peak	Average	
		0.15-0.5	66 to 56*	56 to 46*
		0.5-5	56	46
		5-30	60	50
* Decreases with the logarithm of the frequency.				
Test setup:	Reference Plane  40cm 80cm LISN AUX Equipment E.U.T Test table/Insulation plane LISN Filter AC power EMI Receiver Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m			
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.			
Test Instruments:	Refer to section 6.0 for details			
Test mode:	Refer to section 5.2for details			
Test results:	Pass			

Measurement data:

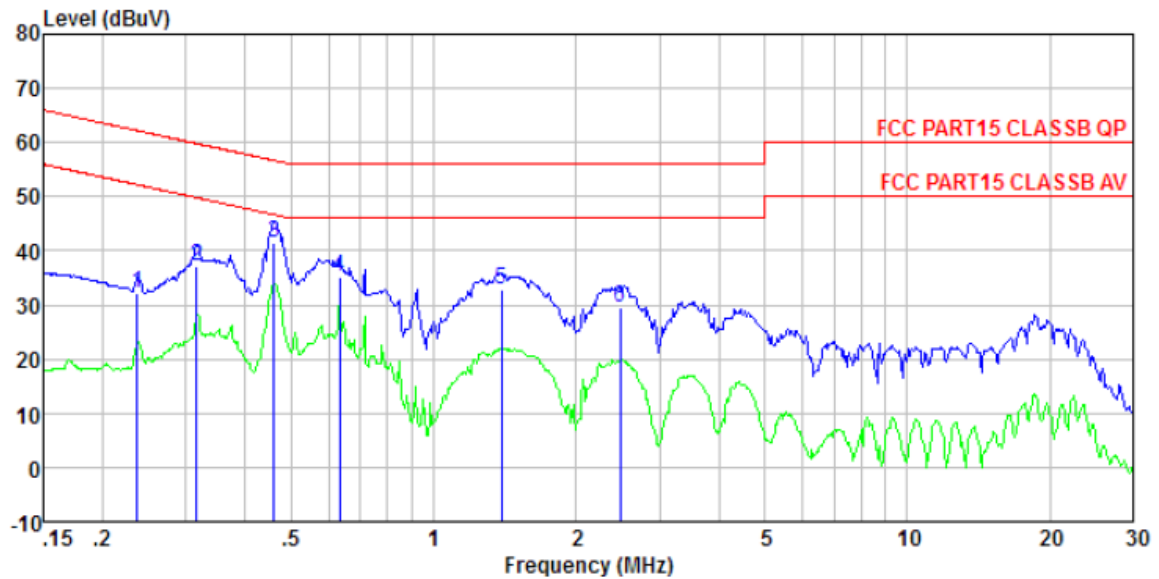
Line:



Site : Shielded room
Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 0206
Test mode : Bluetooth 4.0 mode
Test Engineer: Sky

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.237	31.61	0.12	0.12	31.85	62.22	-30.37	QP
2	0.348	34.05	0.11	0.10	34.26	59.00	-24.74	QP
3	0.466	40.42	0.12	0.11	40.65	56.58	-15.93	QP
4	0.634	37.11	0.13	0.13	37.37	56.00	-18.63	QP
5	0.716	33.00	0.14	0.13	33.27	56.00	-22.73	QP
6	1.698	25.85	0.12	0.14	26.11	56.00	-29.89	QP

Neutral:



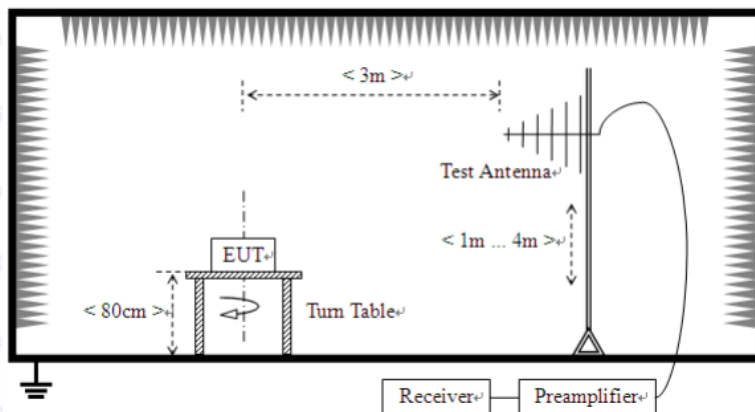
Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0206
 Test mode : Bluetooth 4.0 mode
 Test Engineer: Sky

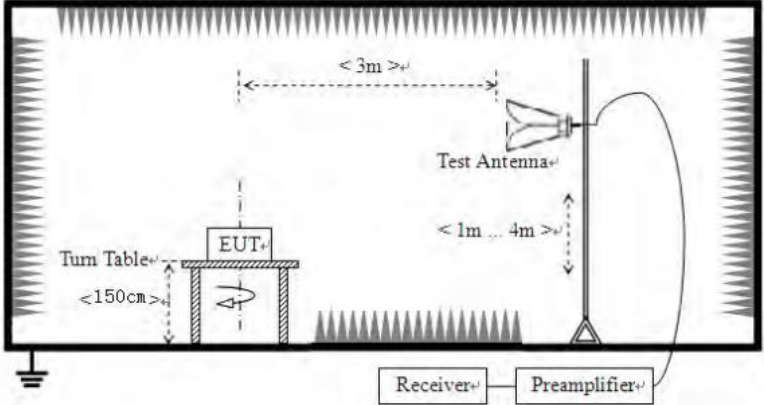
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.237	32.03	0.06	0.12	32.21	62.22	-30.01	QP
2	0.317	37.07	0.06	0.10	37.23	59.80	-22.57	QP
3	0.461	41.42	0.06	0.11	41.59	56.67	-15.08	QP
4	0.634	34.97	0.07	0.13	35.17	56.00	-20.83	QP
5	1.388	32.64	0.09	0.13	32.86	56.00	-23.14	QP
6	2.474	29.41	0.10	0.15	29.66	56.00	-26.34	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit: (Field strength of the fundamental signal)	Frequency		Limit (dBuV/m @3m)		Remark
	2400MHz-2483.5MHz		94.00		Average Value
Limit: (Spurious Emissions)	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.00		Quasi-peak Value
	88MHz-216MHz		43.50		Quasi-peak Value
	216MHz-960MHz		46.00		Quasi-peak Value
	960MHz-1GHz		54.00		Quasi-peak Value
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test setup:	Below 1GHz				
					
	Above 1GHz				

	
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	90.20	27.58	5.39	34.01	89.16	114.00	-24.84	Vertical
2402.00	85.17	27.58	5.39	34.01	84.13	114.00	-29.87	Horizontal
2440.00	90.49	27.48	5.43	33.96	89.44	114.00	-24.56	Vertical
2440.00	84.59	27.48	5.43	33.96	83.54	114.00	-30.46	Horizontal
2480.00	89.59	27.52	5.47	33.92	88.66	114.00	-25.34	Vertical
2480.00	83.83	27.52	5.47	33.92	82.90	114.00	-31.10	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	80.52	27.58	5.39	34.01	79.48	94.00	-14.52	Vertical
2402.00	75.50	27.58	5.39	34.01	74.46	94.00	-19.54	Horizontal
2440.00	80.52	27.48	5.43	33.96	79.47	94.00	-14.53	Vertical
2440.00	73.99	27.48	5.43	33.96	72.94	94.00	-21.06	Horizontal
2480.00	79.55	27.52	5.47	33.92	78.62	94.00	-15.38	Vertical
2480.00	74.16	27.52	5.47	33.92	73.23	94.00	-20.77	Horizontal

7.3.2 Spurious emissions

■ Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
33.45	42.61	14.31	0.59	30.08	27.43	40.00	-12.57	Vertical
38.08	43.92	15.11	0.64	30.05	29.62	40.00	-10.38	Vertical
148.96	37.28	10.26	1.56	29.41	19.69	43.50	-23.81	Vertical
167.82	41.97	10.90	1.67	29.33	25.21	43.50	-18.29	Vertical
302.48	37.30	15.08	2.37	29.98	24.77	46.00	-21.23	Vertical
779.61	30.21	21.82	4.38	29.20	27.21	46.00	-18.79	Vertical
52.03	28.36	15.16	0.79	29.98	14.33	40.00	-25.67	Horizontal
84.11	39.38	12.02	1.06	29.78	22.68	40.00	-17.32	Horizontal
167.24	53.22	10.87	1.67	29.33	36.43	43.50	-7.07	Horizontal
280.02	32.91	14.67	2.27	29.86	19.99	46.00	-26.01	Horizontal
304.61	37.44	15.13	2.38	29.97	24.98	46.00	-21.02	Horizontal
747.48	26.14	21.43	4.27	29.20	22.64	46.00	-23.36	Horizontal

■ Above 1GHz

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	37.74	31.78	8.60	32.09	46.03	74.00	-27.97	Vertical
7206.00	32.12	36.15	11.65	32.00	47.92	74.00	-26.08	Vertical
9608.00	31.73	37.95	14.14	31.62	52.20	74.00	-21.80	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	42.12	31.78	8.60	32.09	50.41	74.00	-23.59	Horizontal
7206.00	33.91	36.15	11.65	32.00	49.71	74.00	-24.29	Horizontal
9608.00	31.19	37.95	14.14	31.62	51.66	74.00	-22.34	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	26.47	31.78	8.60	32.09	34.76	54.00	-19.24	Vertical
7206.00	20.76	36.15	11.65	32.00	36.56	54.00	-17.44	Vertical
9608.00	19.81	37.95	14.14	31.62	40.28	54.00	-13.72	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	30.75	31.78	8.60	32.09	39.04	54.00	-14.96	Horizontal
7206.00	22.96	36.15	11.65	32.00	38.76	54.00	-15.24	Horizontal
9608.00	19.57	37.95	14.14	31.62	40.04	54.00	-13.96	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.

Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	36.98	31.85	8.67	32.12	45.38	74.00	-28.62	Vertical
7320.00	31.61	36.37	11.72	31.89	47.81	74.00	-26.19	Vertical
9760.00	31.27	38.35	14.25	31.62	52.25	74.00	-21.75	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	41.19	31.85	8.67	32.12	49.59	74.00	-24.41	Horizontal
7320.00	33.34	36.37	11.72	31.89	49.54	74.00	-24.46	Horizontal
9760.00	30.67	38.35	14.25	31.62	51.65	74.00	-22.35	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	25.86	31.85	8.67	32.12	34.26	54.00	-19.74	Vertical
7320.00	20.34	36.37	11.72	31.89	36.54	54.00	-17.46	Vertical
9760.00	19.44	38.35	14.25	31.62	40.42	54.00	-13.58	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	30.06	31.85	8.67	32.12	38.46	54.00	-15.54	Horizontal
7320.00	22.50	36.37	11.72	31.89	38.70	54.00	-15.30	Horizontal
9760.00	19.14	38.35	14.25	31.62	40.12	54.00	-13.88	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*”*, means this data is the too weak instrument of signal is unable to test.

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	36.10	31.93	8.73	32.16	44.60	74.00	-29.40	Vertical
7440.00	31.03	36.59	11.79	31.78	47.63	74.00	-26.37	Vertical
9920.00	30.76	38.81	14.38	31.88	52.07	74.00	-21.93	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	40.14	31.93	8.73	32.16	48.64	74.00	-25.36	Horizontal
7440.00	32.68	36.59	11.79	31.78	49.28	74.00	-24.72	Horizontal
9920.00	30.07	38.81	14.38	31.88	51.38	74.00	-22.62	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

Average value:

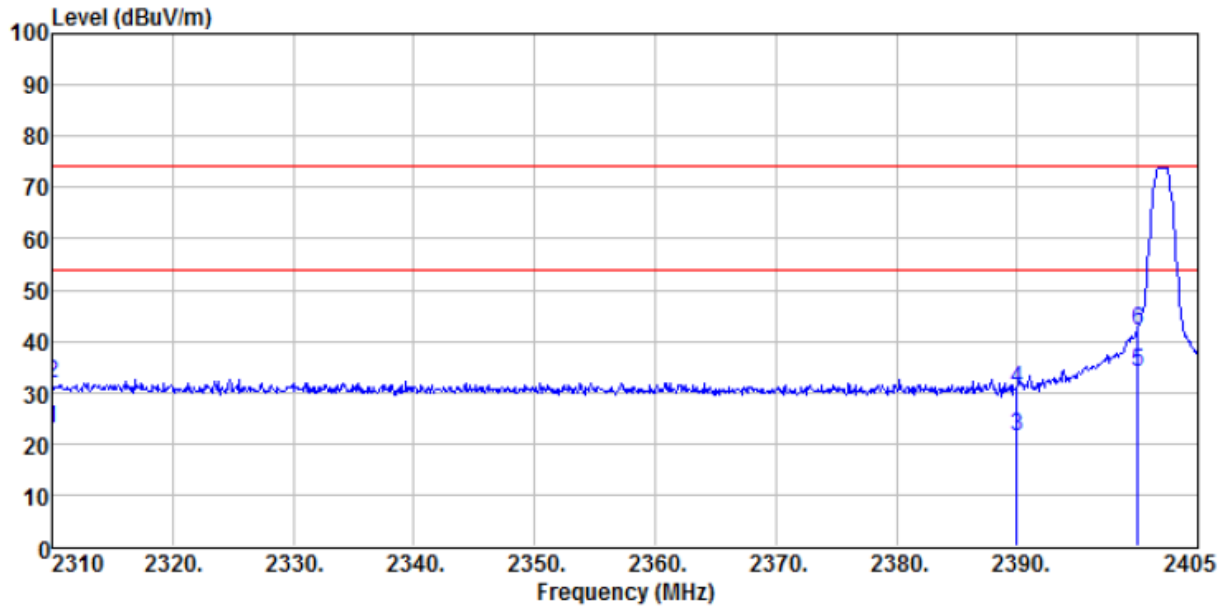
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	25.19	31.93	8.73	32.16	33.69	54.00	-20.31	Vertical
7440.00	19.89	36.59	11.79	31.78	36.49	54.00	-17.51	Vertical
9920.00	19.04	38.81	14.38	31.88	40.35	54.00	-13.65	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	29.30	31.93	8.73	32.16	37.80	54.00	-16.20	Horizontal
7440.00	21.99	36.59	11.79	31.78	38.59	54.00	-15.41	Horizontal
9920.00	18.67	38.81	14.38	31.88	39.98	54.00	-14.02	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

7.3.3 Bandedge emissions

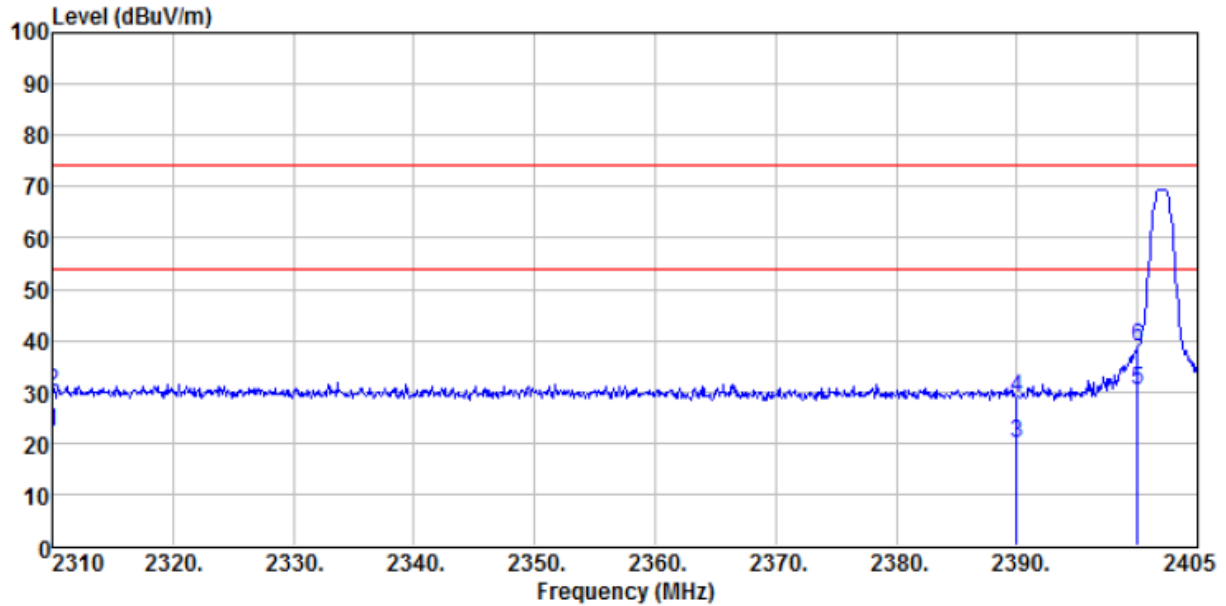
Test channel:	Lowest channel
Polarization	Horizontal



Site : 3m chamber
Condition: FCC PART 15 (PK) 3m HORIZONTAL
: RBW:1000.000KHz VBW:3000.000KHz
Remark : 2402MHz

	Freq	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	26.13	27.91	36.64	5.30	22.70	54.00	-31.30	Average
2	2310.000	35.13	27.91	36.64	5.30	31.70	74.00	-42.30	Peak
3	2390.000	25.08	27.59	36.71	5.38	21.34	54.00	-32.66	Average
4	2390.000	34.45	27.59	36.71	5.38	30.71	74.00	-43.29	Peak
5	2400.000	37.76	27.58	36.71	5.39	34.02	54.00	-19.98	Average
6	2400.000	45.83	27.58	36.71	5.39	42.09	74.00	-31.91	Peak

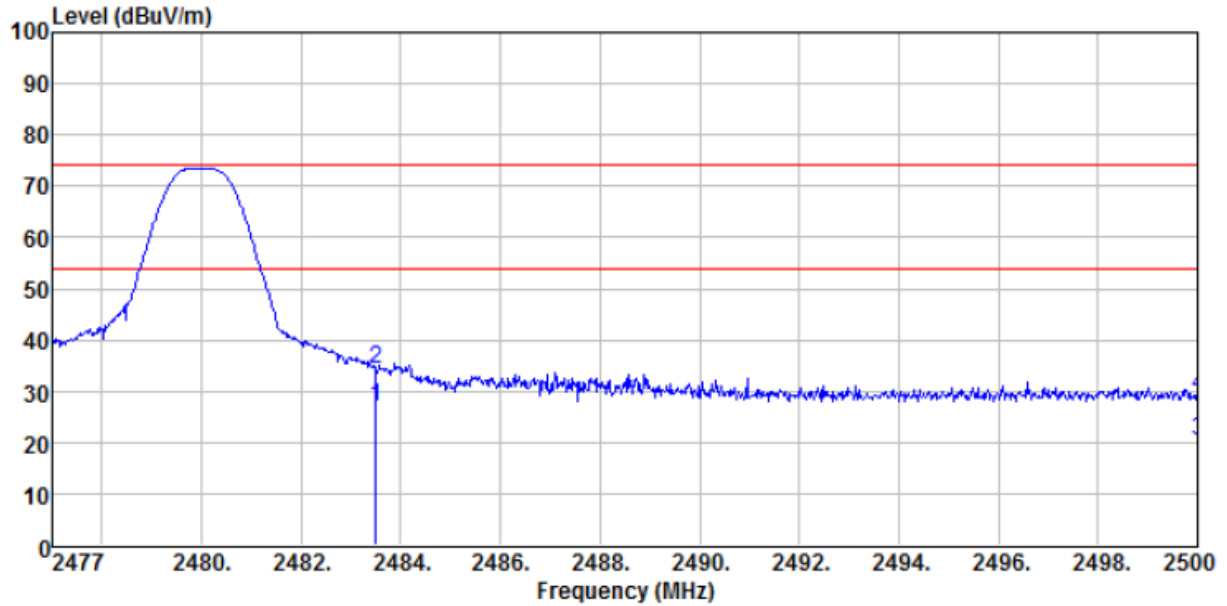
Test channel:	Lowest channel
Polarization	Vertical



Site : 3m chamber
Condition: FCC PART 15 (PK) 3m VERTICAL
: RBW:1000.000KHz VBW:3000.000KHz
Remark : 2402MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	25.62	27.91	36.64	5.30	22.19	54.00	-31.81	Average
2	2310.000	33.29	27.91	36.64	5.30	29.86	74.00	-44.14	Peak
3	2390.000	23.80	27.59	36.71	5.38	20.06	54.00	-33.94	Average
4	2390.000	32.57	27.59	36.71	5.38	28.83	74.00	-45.17	Peak
5	2400.000	34.05	27.58	36.71	5.39	30.31	54.00	-23.69	Average
6	2400.000	42.43	27.58	36.71	5.39	38.69	74.00	-35.31	Peak

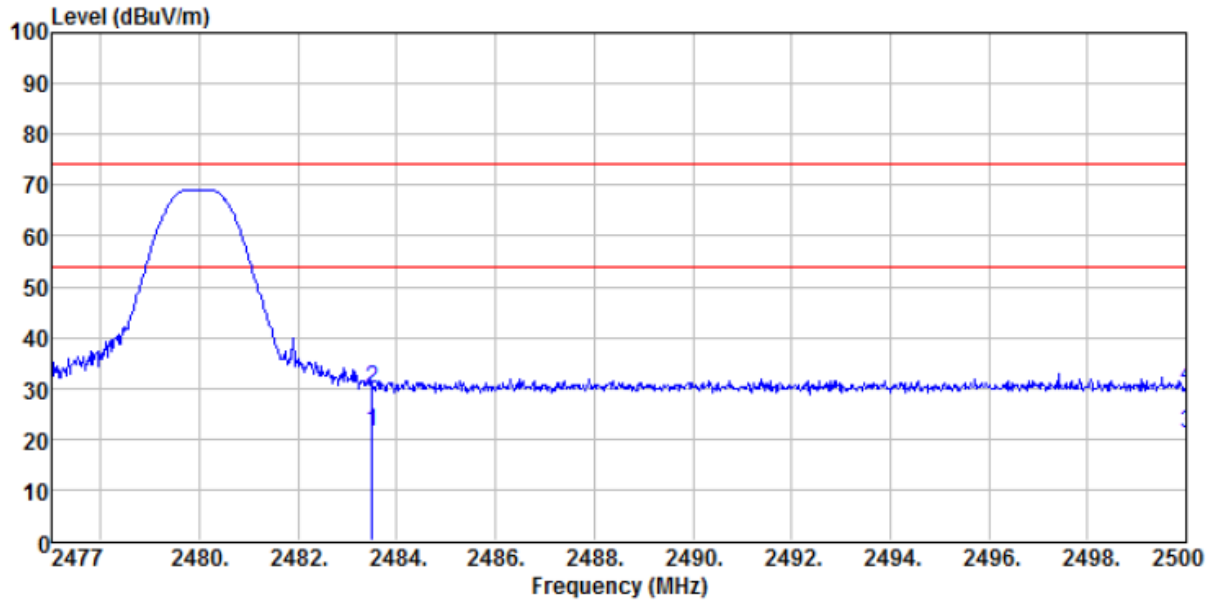
Test channel:	Highest channel
Polarization	Horizontal



Site : 3m chamber
Condition: FCC PART 15 (PK) 3m HORIZONTAL
: RBW:1000.000KHz VBW:3000.000KHz
Remark : 2480MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	30.87	27.53	36.78	5.47	27.09	54.00	-26.91	Average
2	2483.500	38.05	27.53	36.78	5.47	34.27	74.00	-39.73	Peak
3	2500.000	24.01	27.55	36.79	5.49	20.26	54.00	-33.74	Average
4	2500.000	33.07	27.55	36.79	5.49	29.32	74.00	-44.68	Peak

Test channel:	Highest channel
Polarization	Vertical



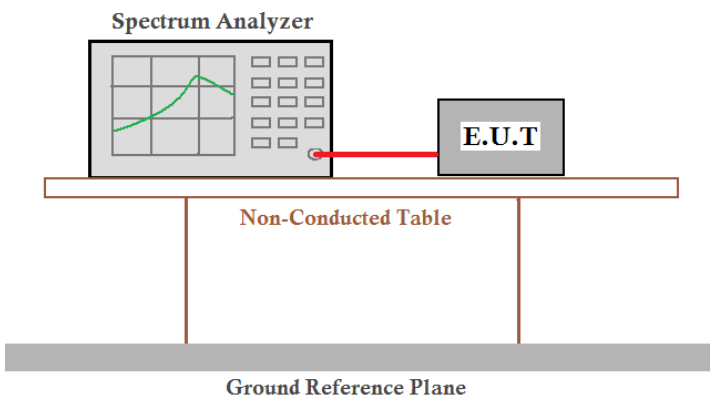
Site : 3m chamber
Condition: FCC PART 15 (PK) 3m VERTICAL
: RBW:1000.000KHz VBW:3000.000KHz
Remark : 2480MHz

	Read	Antenna	Preamp	Cable		Limit	Over	
Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 2483.500	25.26	27.53	36.78	5.47	21.48	54.00	-32.52	Average
2 2483.500	33.82	27.53	36.78	5.47	30.04	74.00	-43.96	Peak
3 2500.000	24.75	27.55	36.79	5.49	21.00	54.00	-33.00	Average
4 2500.000	33.88	27.55	36.79	5.49	30.13	74.00	-43.87	Peak

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. RBW 1MHz, VBW 3MHz , peak detector for PK value, RBW 1MHz, VBW 10Hz AV detector for AV value

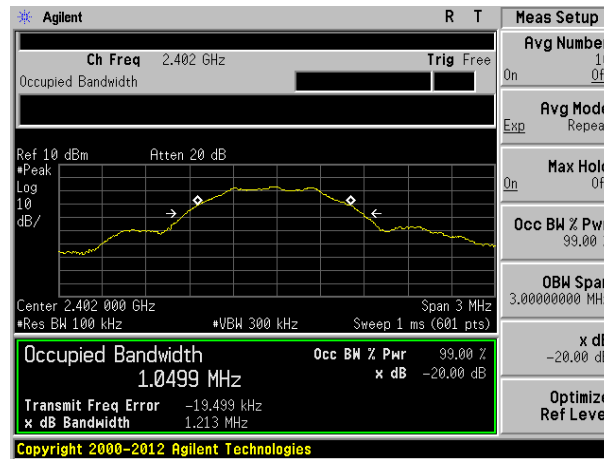
7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2for details
Test results:	Pass

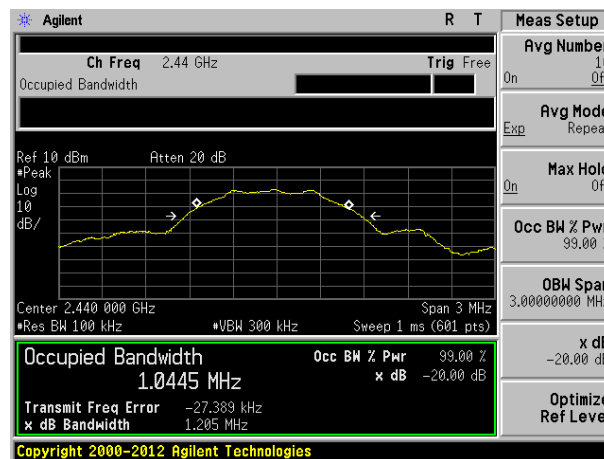
Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	1.213	Pass
Middle	1.205	Pass
Highest	1.209	Pass

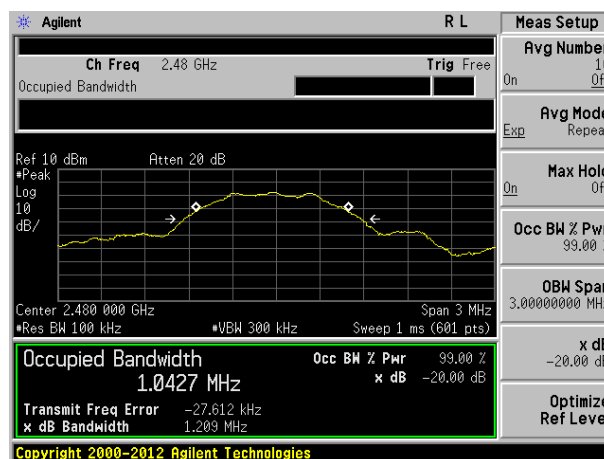
Test plot as follows:



Lowest channel



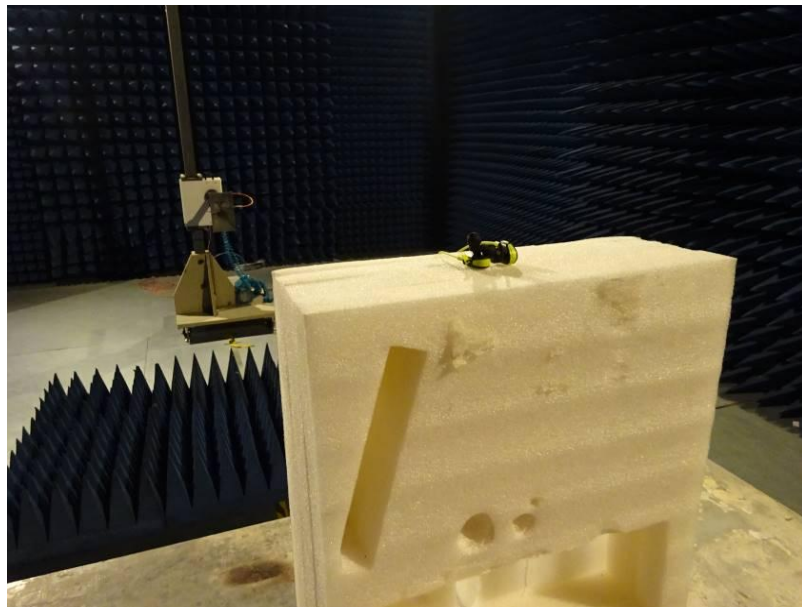
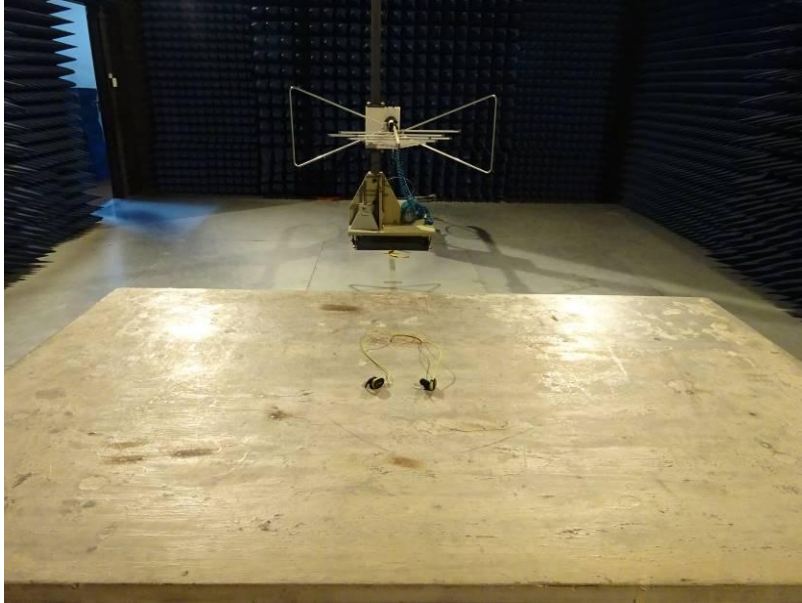
Middle channel



Highest channel

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201607000206E01

----- End -----