TEST REPORT

Report No.:	**EM201400722-5**	**Application No.:**	**ZJ00051749-1**
Client:	Harman International Industries, Incorporated		
Address:	8500 Balboa Blvd, Northridge, CA 91329, United States		
Sample Description:	Wireless Speaker Dock For iPad, iPhone and iPod		
Model:	Harman Kardon Go+Play Wireless		
Adding Model:	/		
FCC ID	APIGPWIRELESSR		
Test Specification:	FCC Part 15,Subpart C:2012		
Test Date:	2014-09-16 to 2014-09-29		
Issue Date:	2014-09-29		
Test Result:	*Pass.*		

Prepared By:	**Reviewed By:**	**Approved By:**
Brian Xiao / Test Engineer	Jane Cao / Technical Manager	Gavin Wu / Manager
Brian Xiao Date:2014-09-29	Jane Cao Date:2014-09-29	Gavin Wu Date:2014-09-29

Other Aspects:

/

Abbreviations: *ok / P = passed; fail / F = failed; n.a. / N = not applicable*

The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.

DIRECTIONS OF TEST

1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.

2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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1. TEST RESULT SUMMARY

Section B of FCC Part 15.247:2012			
Standard	Item	Limit / Severity	Result
FCC Part 15,Subpart C (15.247)	Maximum Peak Output Power	Section 15.247(b)(1)	PASS
	Conducted Emission	Section 15.207	PASS
	Conducted Spurious Emission (30MHz to 25GHz)	Section 15.209 &15.247(d)	PASS
	Radiated Spurious Emission (9kHz to 25GHz)	Section 15.209 &15.247(d)	PASS
	Band Edges Measurement	Section 15.247 (d) &15.205	PASS

Model No.: Harman Kardon Go+Play Wireless
This test report (report No.: EM201400722-5) is only valid with the original test report (report No.: EM201200634).

Review this report and original report; this report just changed the AC adapter. Now this EUT contains two AC adapters.
Original adapter information:
Model: EFS06501800360CE
Input: 100-240V~50/60Hz 2A
Output: 18V 3.6A
Add new adapter information:
Model: S065BP1800350
Input: 100-240V~50/60Hz 1800mA
Output: 18V 3500mA

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report **AC power line conducted emission, conducted peak output power, Conducted Spurious Emission ,radiated spurious emission and band edge(radiated emission)** were fully retested on model: Harman Kardon Go+Play Wireless and shown the data in this report, other tests please refer to original report EM201200634.

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name:	Harman International Industries, Incorporated
Address:	8500 Balboa Blvd, Northridge, CA 91329, United States

2.2 MANUFACTURER

Name:	Harman International Industries, Incorporated
Address:	8500 Balboa Blvd, Northridge, CA 91329, United States

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Wireless Speaker Dock For iPad, iPhone and iPod
Model No.:	Harman Kardon Go+Play Wireless
Adding Model：	/
Trade Name:	JBL
Power supply:	120V/60Hz
Adapter1(new):	Model: S065BP1800350 Input:100-240V~50/60Hz 1800mA Output:18V 3500mA
Adapter2(Original):	Model:EFS06501800360CE Input:100-240V~50/60Hz 2A Output:18V 3.6A
Frequency Range	2402MHz~2480MHz
Type of Modulation	GFSK, 8DPSK, Pi/4 QPSK
Channels:	Channels with 1MHz step
Antenna Type	Ceramic antenna
Antenna gain	3dBi

2.4 DESCRIPTION OF SUPPORT UNITS

Name of Equipment	Manufacturer	Model	Serial Number
iphone	APPLE	A1303	/
PC	Lenovo	E40	0578DTC

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test CO., LTD.

Add. : 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China
Telephone: +86-20-38699959, 38699960, 38699961
Fax : +86-20-38695185

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab (No. 688188)
China	CNAS （No.L0446）
China	DILAC (No.DL175)
Canada	Registration No.:8355A-1

3.3 MEASUREMENT UNCERTAINTY

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

Measurement		**Frequency**	**Uncertainty**
Radiated Emission	Horizontal	30MHz～1000MHz	4.2dB
		1GHz～26.5GHz	4.2dB
	Vertical	30MHz～1000MHz	4.4dB
		1GHz～26.5GHz	4.4dB
Conducted Emission		9kHz～30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of *k*=2.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
6 dB bandwidth/ carrier frequencies separated/ hopping channel number/ dwell time/ maximum peak output power/100kHz bandwidth of frequency band edge/ Spurious Emissions at Antenna Port/ Restricted Bands				
Receiver	R&S	ESU40	100106	2015-01-24
Conducted Emissions				
EMI Receiver	R&S	ESCI	100529	2015-04-22
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2015-08-18
Radiated Spurious Emissions				
Receiver	R&S	ESU40	100106	2015-01-24
Loop antenna	R&S	HFH2-Z2	881058/58	2016-04-17
Biconical Log-periodic Antenna	ETS.LINDGREN	3142C	00075971	2016-04-17
Horn antenna	SCHWARZBECK	BBHA9120D	D752	2015-11-24
Horn antenna	SCHWARZBECK	BBHA 9170	411	2015-11-21
Pre-amplifier	SCHWARZBECK	9742	332	2014-11-25
Pre-amplifier	Decentest	DC7110EMA	001	2014-10-10

4. TEST RESULTS

4.1 E.U.T. TEST CONDITIONS

Type of antenna: **Integral**

Temperature: **22.0 °C**

Humidity: **54 % RH**

Atmospheric Pressure: **1011 mbar**

Test frequencies: **According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. if required. reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:**

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top. 1 near middle and 1 near bottom

EUT channels and frequencies list:

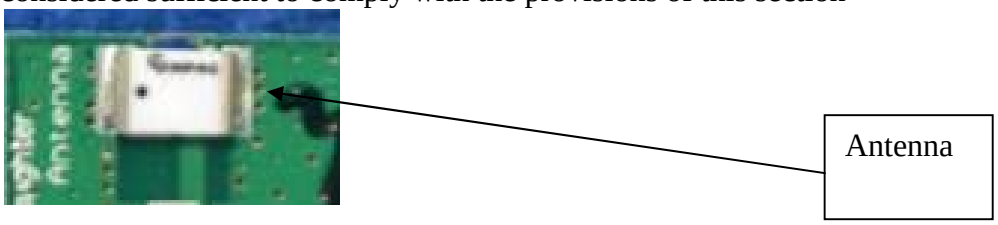
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2416	28	2430
1	2403	15	2417	29	2431
2	2404	16	2418	30	2432
3	2405	17	2419	31	2433
4	2406	18	2420	32	2434
5	2407	19	2421	33	2435
6	2408	20	2422	34	2436
7	2409	21	2423	35	2437
8	2410	22	2424	36	2438
9	2411	23	2425	37	2439
10	2412	24	2426	38	2440
11	2413	25	2427	39	2441
12	2414	26	2428	40	2442
13	2415	27	2429	41	2443

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	2444	55	2457	68	2470
43	2445	56	2458	69	2471
44	2446	57	2459	70	2472
45	2447	58	2460	71	2473
46	2448	59	2461	72	2474
47	2449	60	2462	73	2475
48	2450	61	2463	74	2476
49	2451	62	2464	75	2477
50	2452	63	2465	76	2478
51	2453	64	2466	77	2479
52	2454	65	2467	78	2480
53	2455	66	2468		
54	2456	67	2469		

Test frequency is the lowest channel: 0 channel(2402MHz), middle channel: 39 channel(2441MHz) and highest channel: 78 channel(2480MHz)

4.2 ANTENNA REQUIREMENT

The EUT antenna is Ceramic antenna. Max Antenna gain is 3dBi .which accordance 15.203.is considered sufficient to comply with the provisions of this section



4.3 CONDUCTED EMISSION MEASUREMENT

4.3.1 LIMITS

Frequency range	Limits (dBμV)	
	Quasi-peak	Average
150kHz ～ 0.5MHz	66～56	56～46
0.5 MHz ～ 5 MHz	56	46
5 MHz ～ 30 MHz	60	50

4.3.2 TEST PROCEDURES

Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) Place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

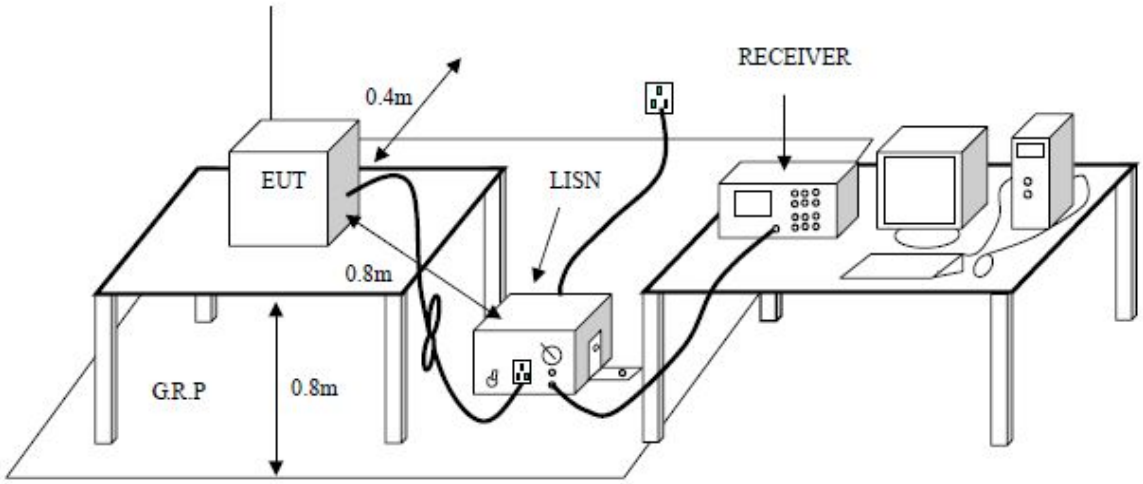
The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

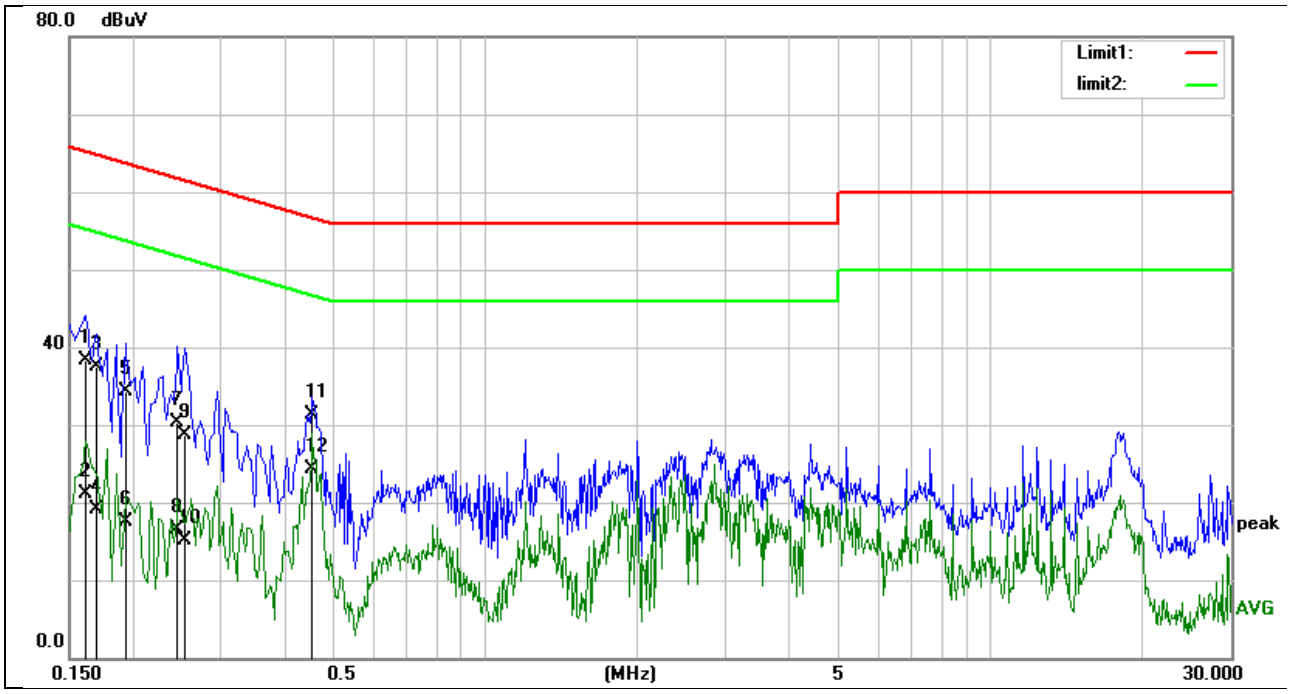
Note: Pre-test for normal mode and EDR mode, to find the EDR (3DH5 packet type) is the worst case. The test data of the worst-case condition(s) was recorded.

4.3.3 TEST SETUP



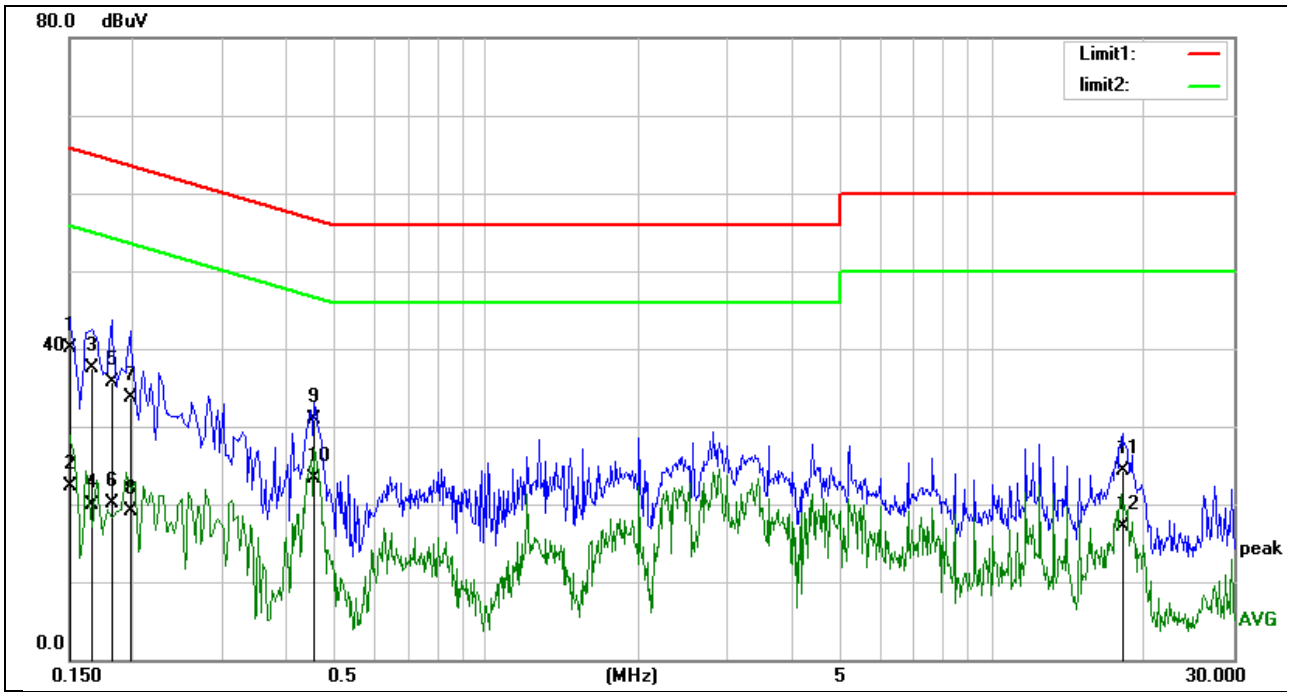
4.3.4 TEST RESULTS

Project No.:	**ZJ00051749-1**	**Probe:**	**L1**
Standard:	**(CE)FCC PART 15 class B_QP**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Conduction Test**	**Date:**	**2014-9-18**
Temp./Hum.(%RH):	**23/64%RH**	**Time:**	**15:17:41**
EUT:	**Wireless Speaker Dock For iPad, iPhone and iPod**		
Model:	**HARMAN KARDON GO+PLAY WIRELESS**	**Test Result:**	**Pass**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1620	31.76	6.54	38.30	65.36	-27.06	QP
2	0.1620	14.66	6.54	21.20	55.36	-34.16	AVG
3	0.1700	30.96	6.54	37.50	64.96	-27.46	QP
4	0.1700	12.66	6.54	19.20	54.96	-35.76	AVG
5	0.1940	27.80	6.50	34.30	63.86	-29.56	QP
6	0.1940	11.10	6.50	17.60	53.86	-36.26	AVG
7	0.2460	23.81	6.49	30.30	61.89	-31.59	QP
8	0.2460	10.11	6.49	16.60	51.89	-35.29	AVG
9	0.2540	22.30	6.50	28.80	61.62	-32.82	QP
10	0.2540	8.60	6.50	15.10	51.62	-36.52	AVG
11	0.4540	24.78	6.52	31.30	56.80	-25.50	QP
12	0.4540	17.88	6.52	24.40	46.80	-22.40	AVG

Project No.:	**ZJ00051749-1**	**Probe:**	**N**
Standard:	**(CE)FCC PART 15 class B_QP**	**Power Source:**	**AC 120V/60Hz**
Test item:	**Conduction Test**	**Date:**	**2014-9-18**
Temp./Hum.(%RH):	**23/64%RH**	**Time:**	**15:11:47**
EUT:	**Wireless Speaker Dock For iPad, iPhone and iPod**		
Model:	**HARMAN KARDON GO+PLAY WIRELESS**	**Test Result:**	**Pass**
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	33.72	6.48	40.20	65.99	-25.79	QP
2	0.1500	15.92	6.48	22.40	55.99	-33.59	AVG
3	0.1660	31.05	6.55	37.60	65.15	-27.55	QP
4	0.1660	13.35	6.55	19.90	55.15	-35.25	AVG
5	0.1819	29.28	6.52	35.80	64.39	-28.59	QP
6	0.1819	13.68	6.52	20.20	54.39	-34.19	AVG
7	0.1980	27.31	6.49	33.80	63.69	-29.89	QP
8	0.1980	12.61	6.49	19.10	53.69	-34.59	AVG
9	0.4580	24.38	6.52	30.90	56.73	-25.83	QP
10	0.4580	16.88	6.52	23.40	46.73	-23.33	AVG
11	18.0419	17.36	7.04	24.40	60.00	-35.60	QP
12	18.0419	10.16	7.04	17.20	50.00	-32.80	AVG

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS

Regulation 15.247 (b)(1)For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. Refer to the result “Hopping channel number” of this document. The 1 watt (30.0dBm) limit applies.

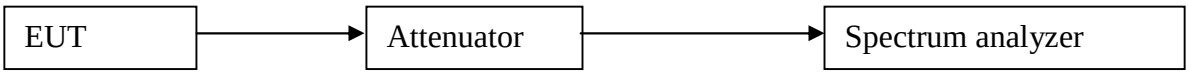
4.4.2 TEST PROCEDURES

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Remark:

1. Pre-test the 3 modulation to find GFSK and 8DPSK is worse case, so only record GFSK and 8DPSK test data.
2. Cable loss = 0.5dB， the receiver offset loss 0.5dB

4.4.3 TEST SETUP



4.4.4 TEST RESULTS

For GFSK:

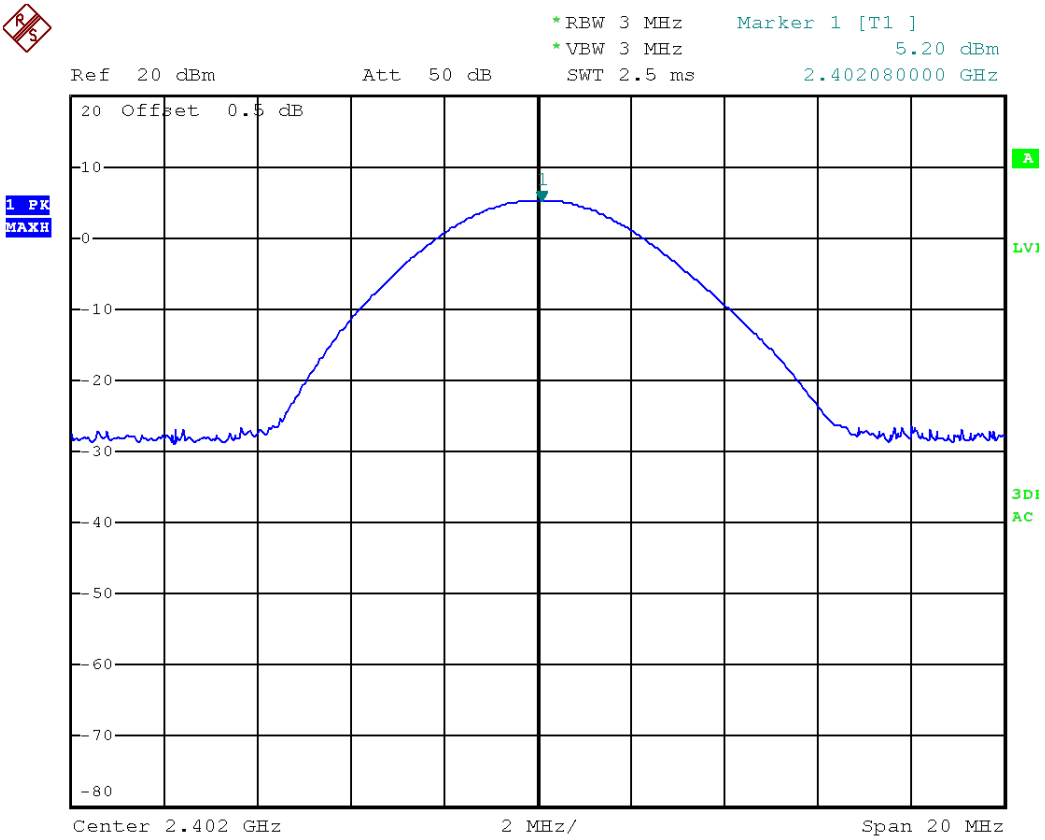
Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Pass/Fail
Lowest	2.402	5.20	30.0	**Pass**
Middle	2.441	4.69	30.0	**Pass**
Highest	2.480	4.09	30.0	**Pass**

For 8DPSK:

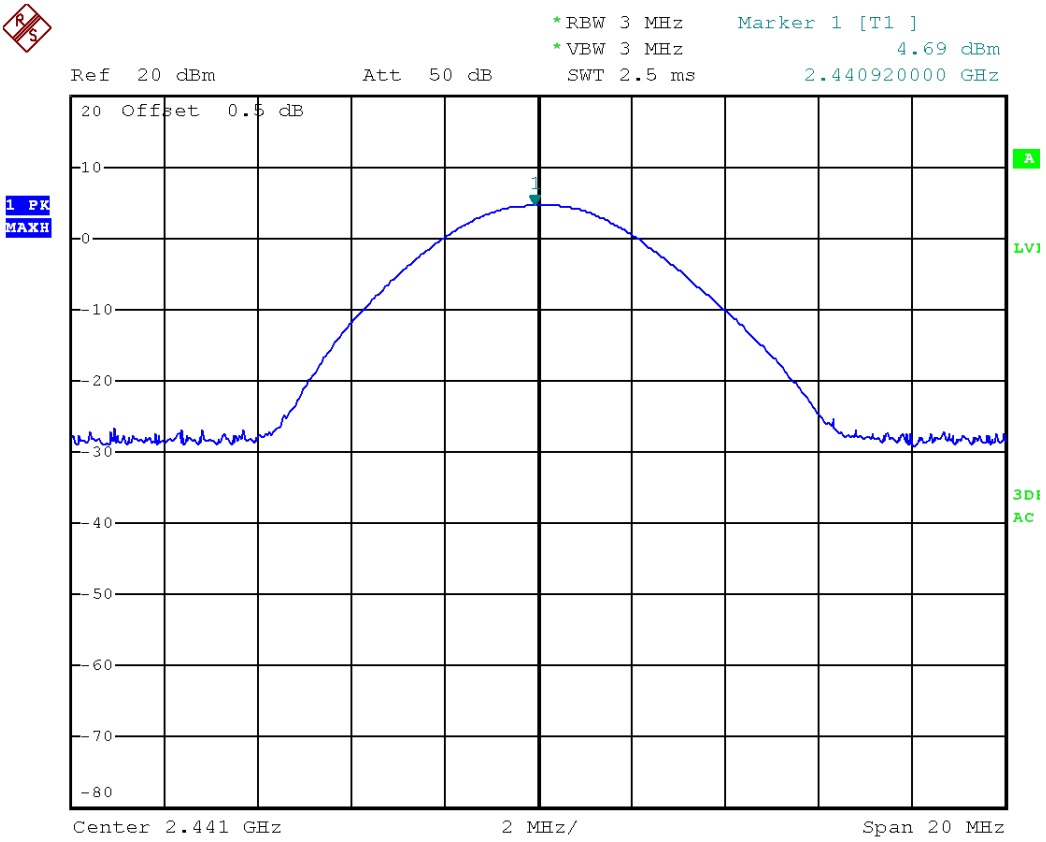
Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Pass/Fail
Lowest	2.402	3.86	30.0	**Pass**
Middle	2.441	3.47	30.0	**Pass**
Highest	2.480	2.79	30.0	**Pass**

Test result: The unit does meet the FCC requirements.

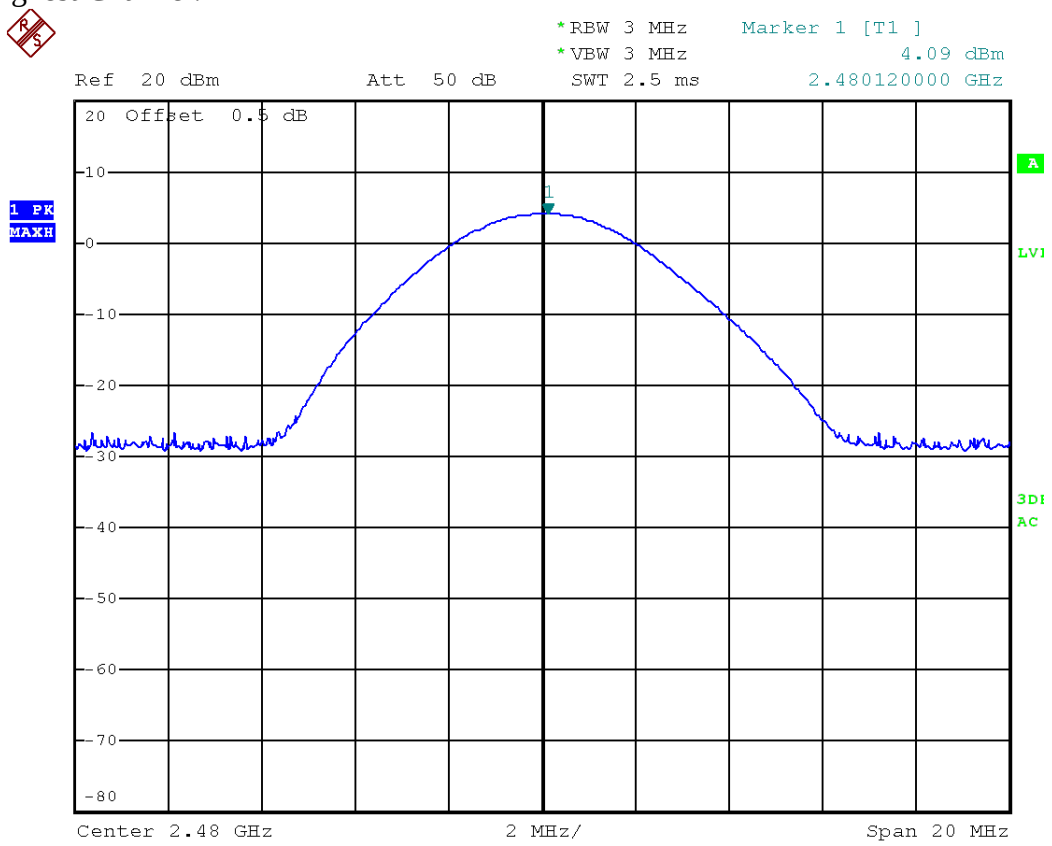
Test result plot as follows:
GFSK Lowest Channel:



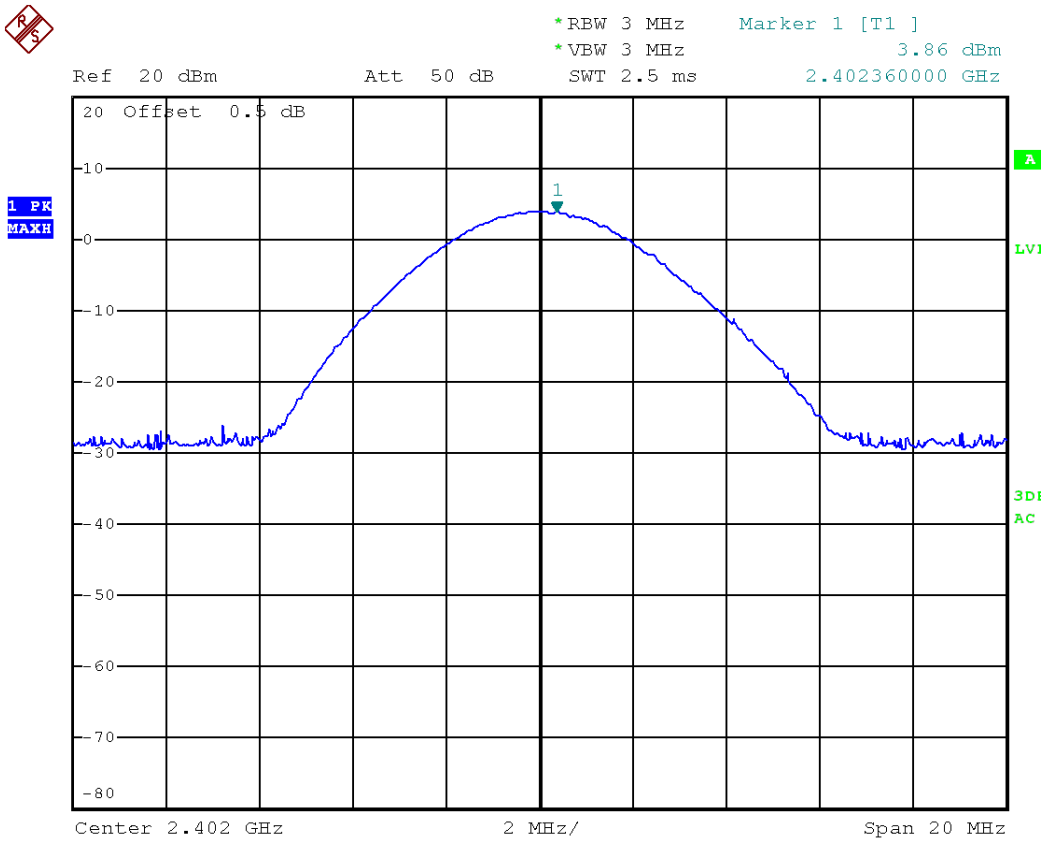
GFSK Middle Channel:



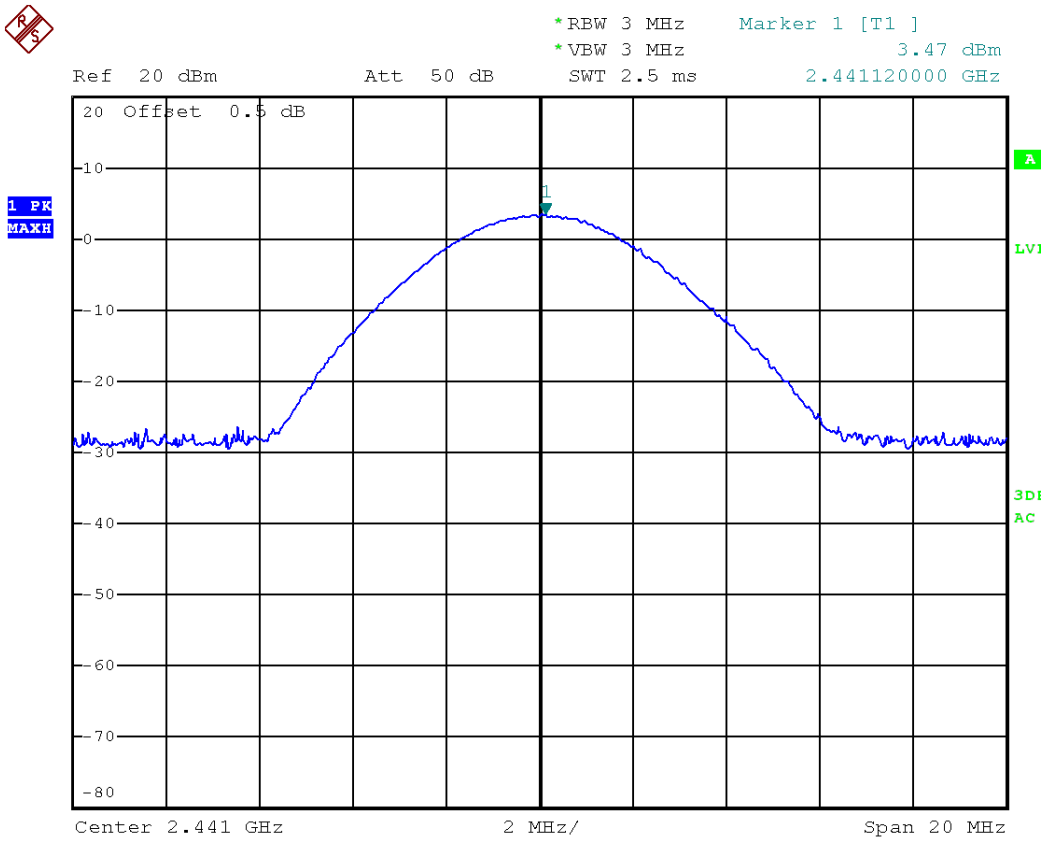
GFSK Highest Channel:



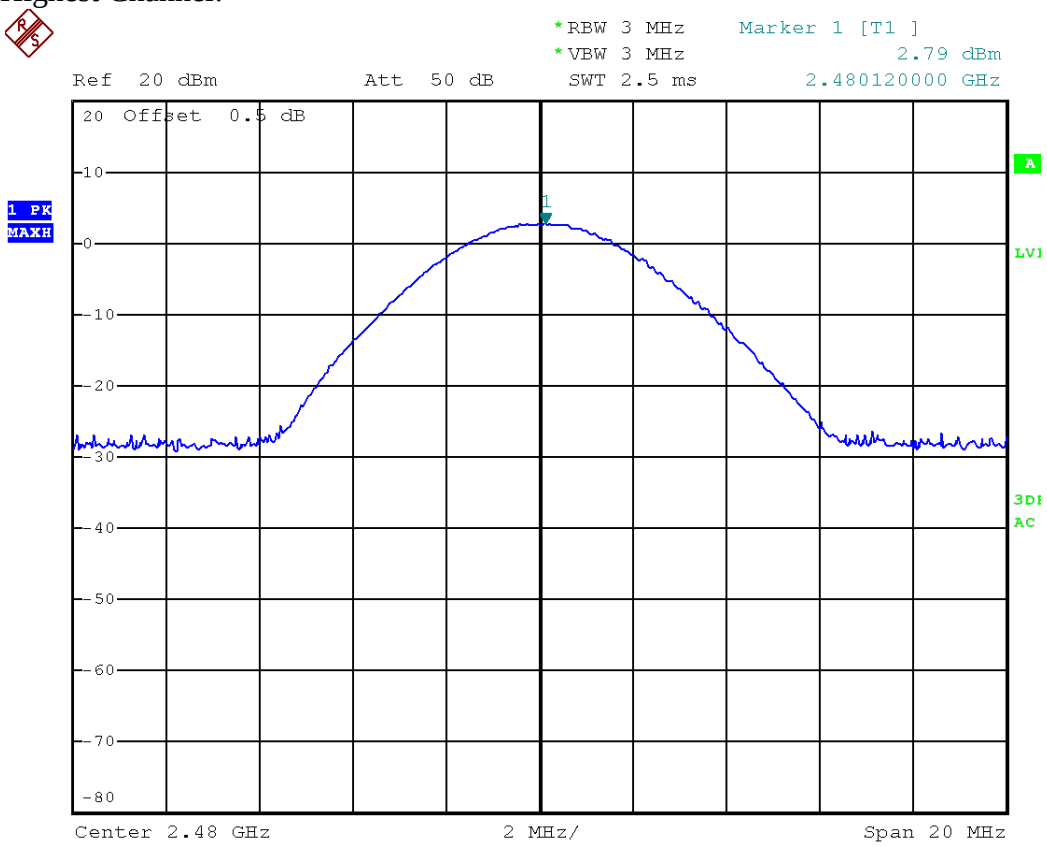
8DPSK Lowest Channel:



8DPSK Middle Channel:



8DPSK Highest Channel:



4.5 CONDUCTED SPURIOUS EMISSIONS

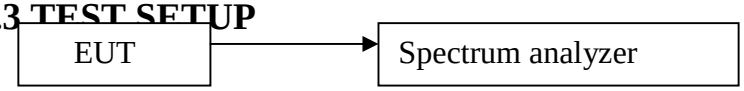
4.5.1 LIMITS

(d) In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. based on either an RF conducted or a radiated measurement. provided the transmitter demonstrates compliance with the peak conducted power limits.

4.5.2 TEST PROCEDURES

Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW >= RBW , Span = enough to captch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.
Above 1GHz Set the spectrum analyzer: RBW =1MHz VBW >= RBW , Span = enough to captch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.

4.5.3 TEST SETUP



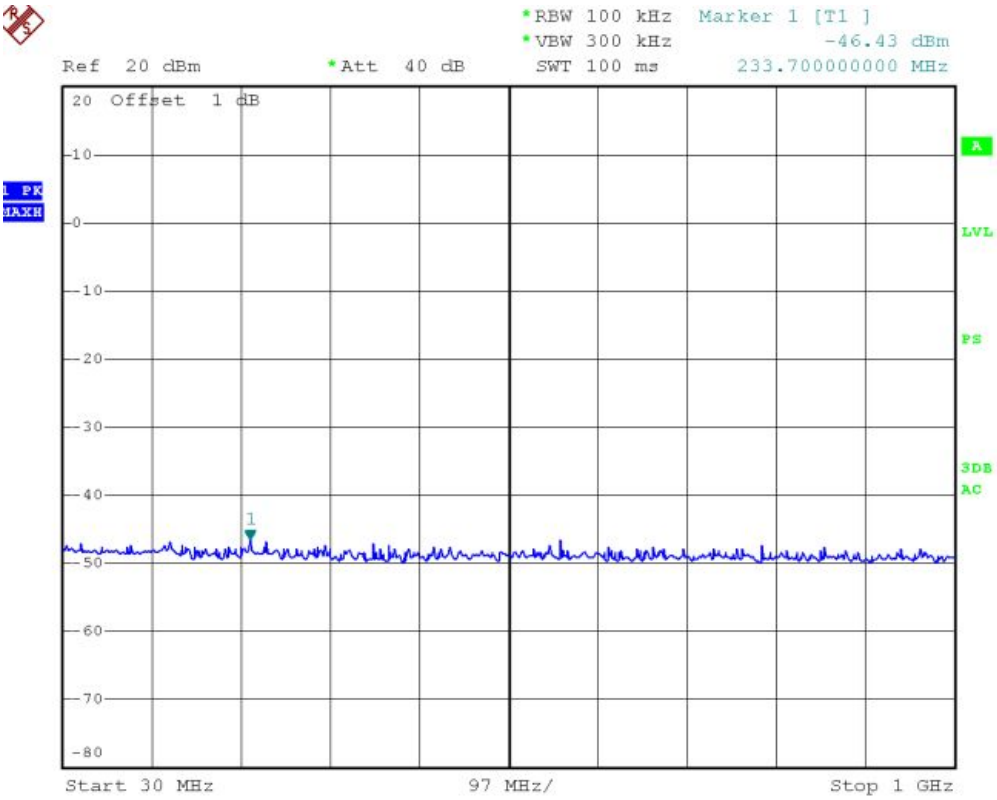
4.5.4 TEST RESULTS

Test result plot as follows:

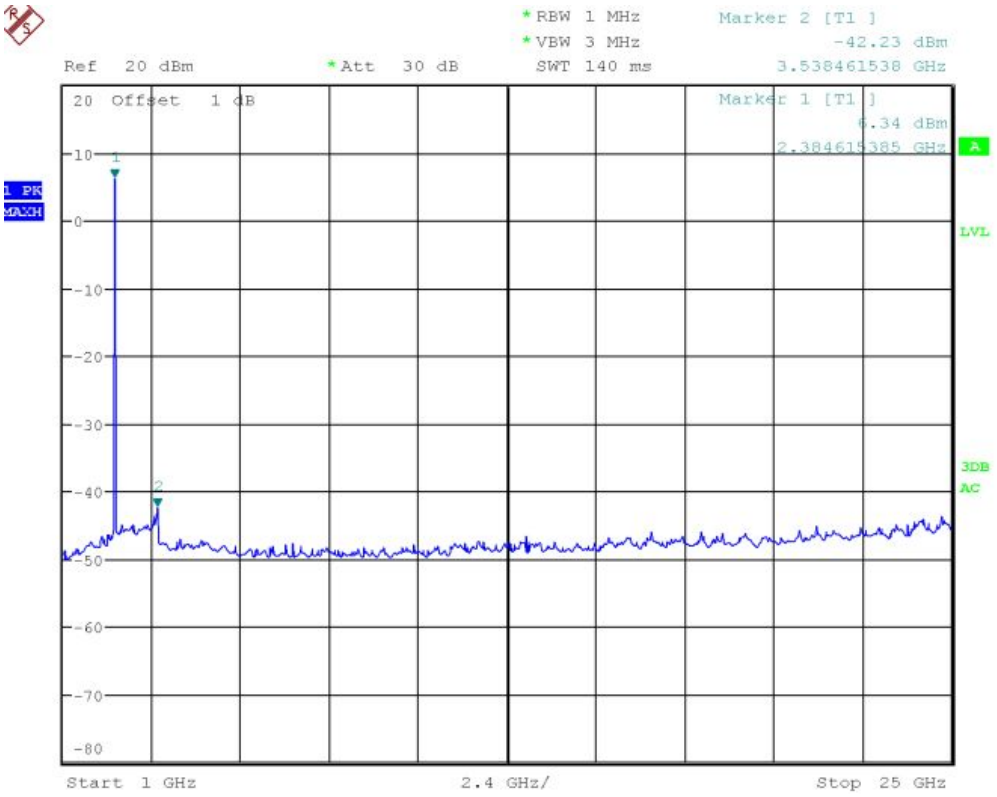
For GFSK

Lowest Channel:

30M to 1GHz

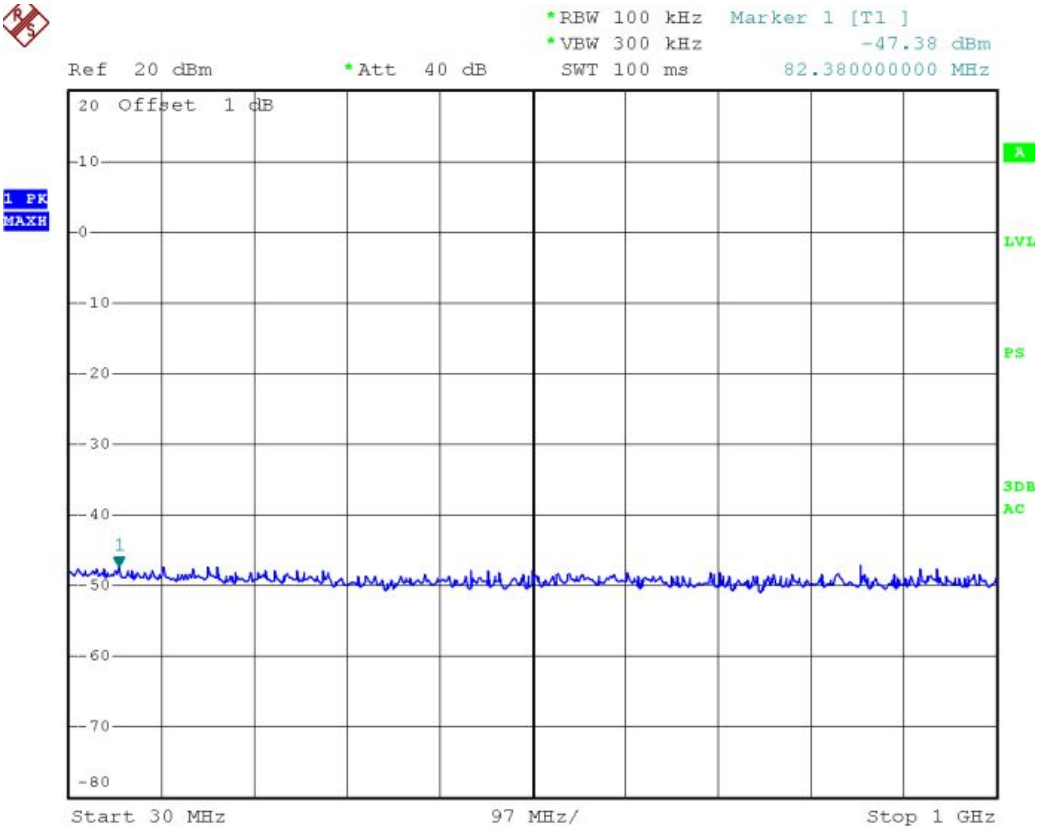


1G to 25GHz

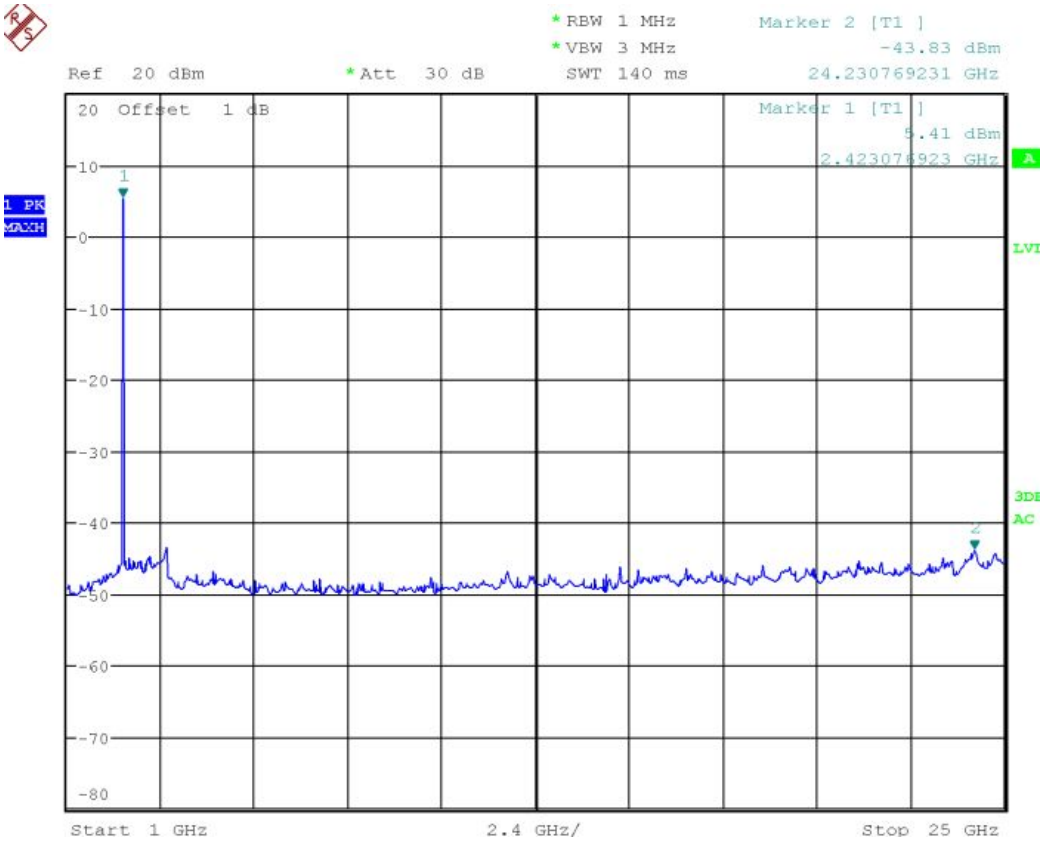


Middle Channel:

30M to 1GHz

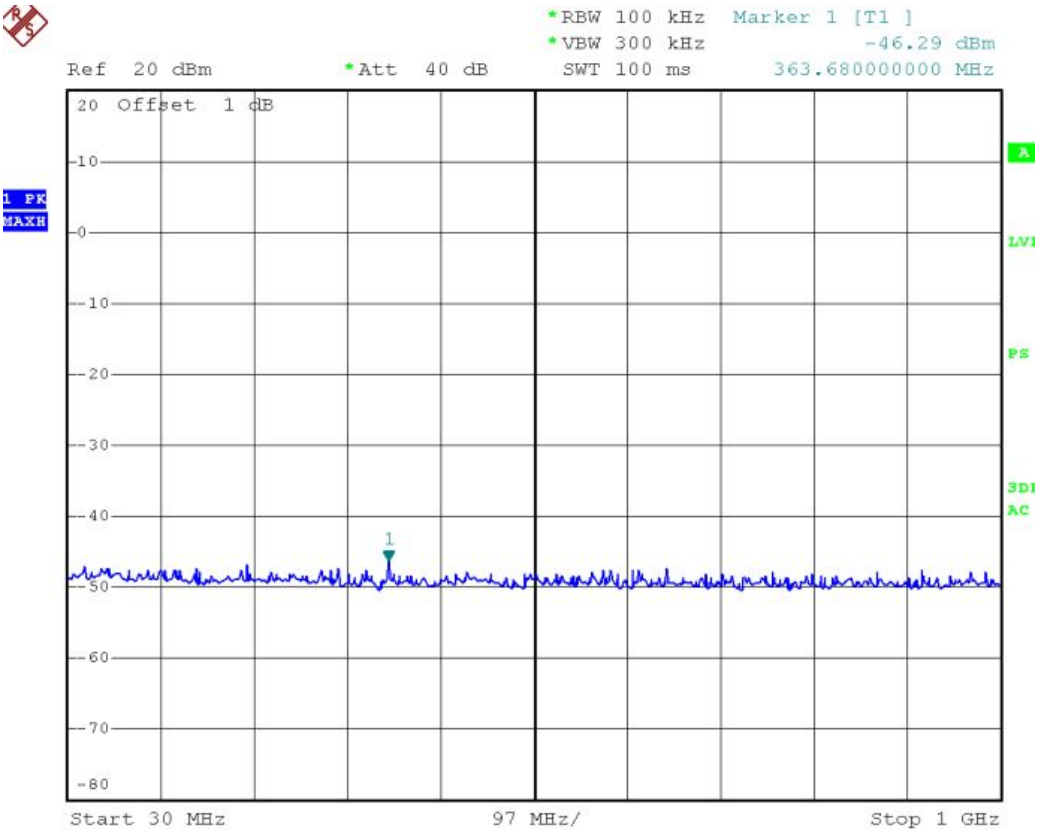


1G to 25GHz

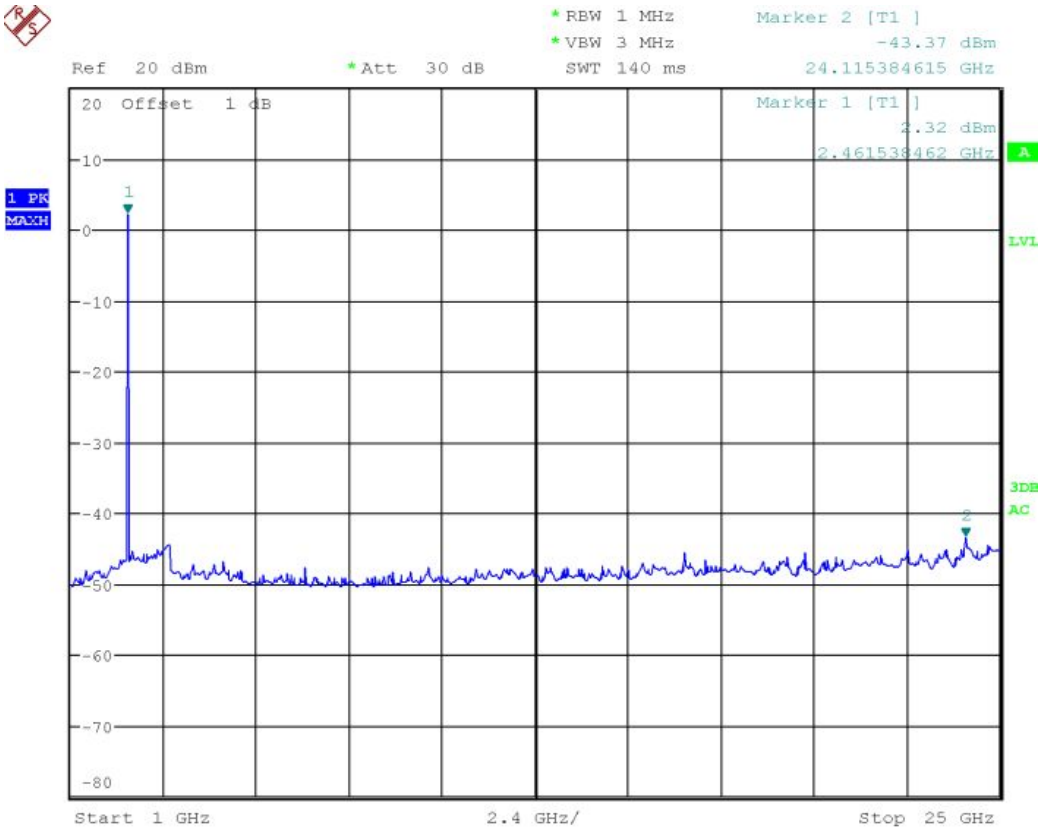


Highest Channel

30M to 1GHz



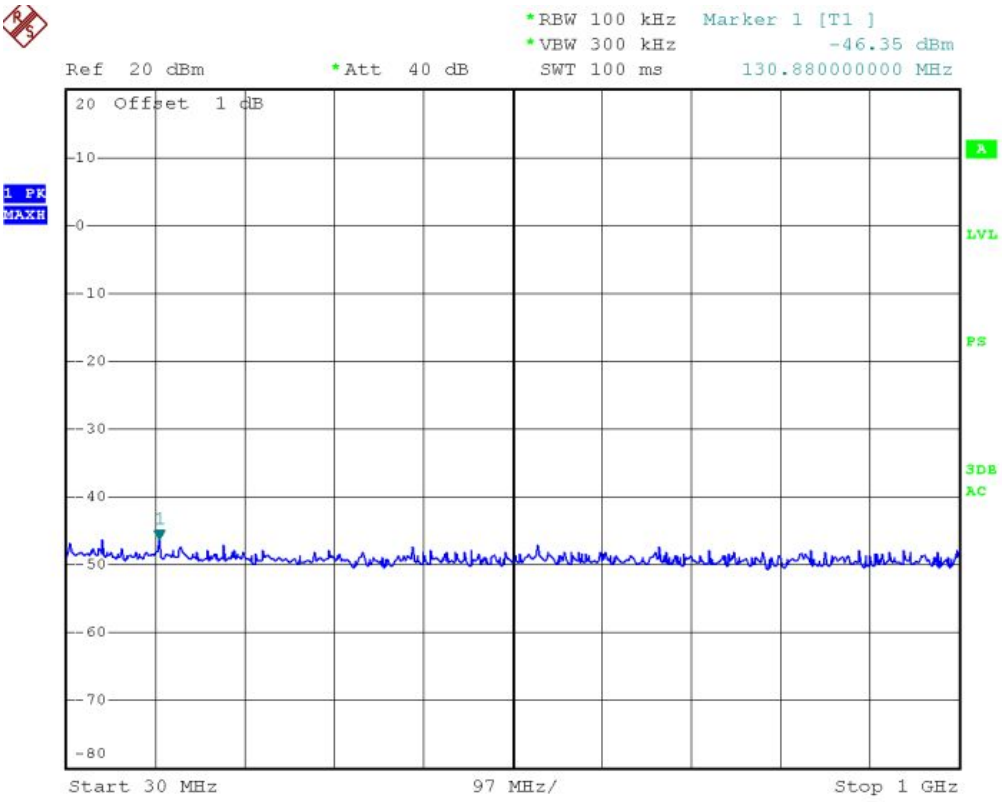
1G to 25GHz



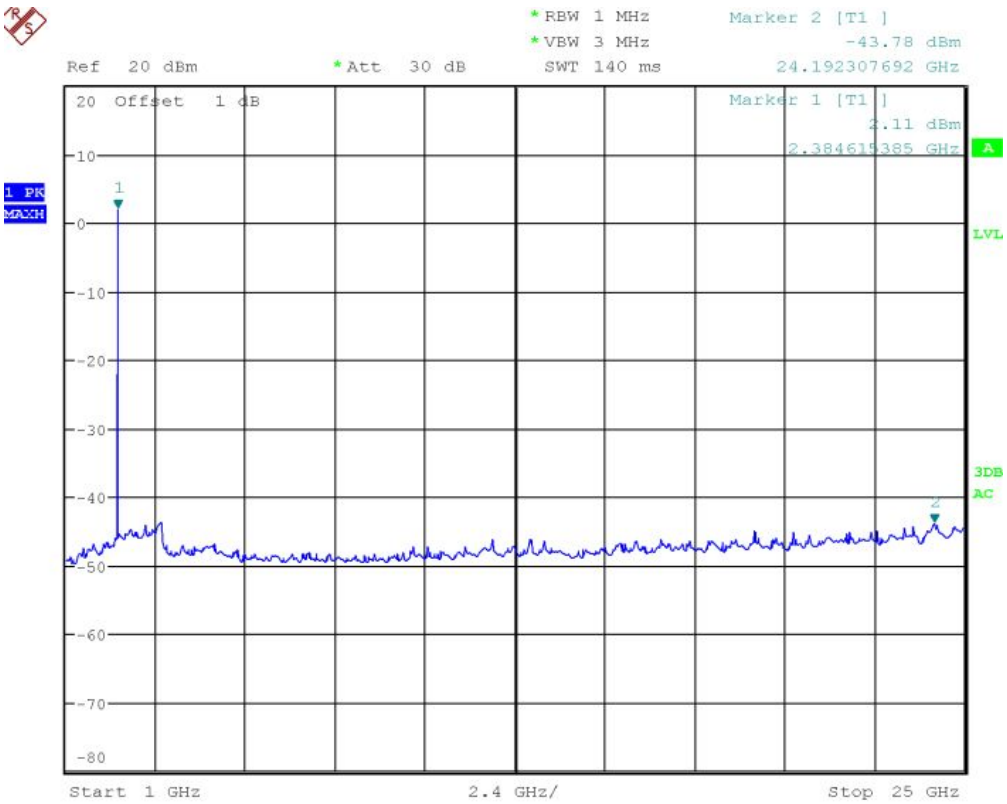
For 8DPSK

Lowest Channel:

30M to 1GHz

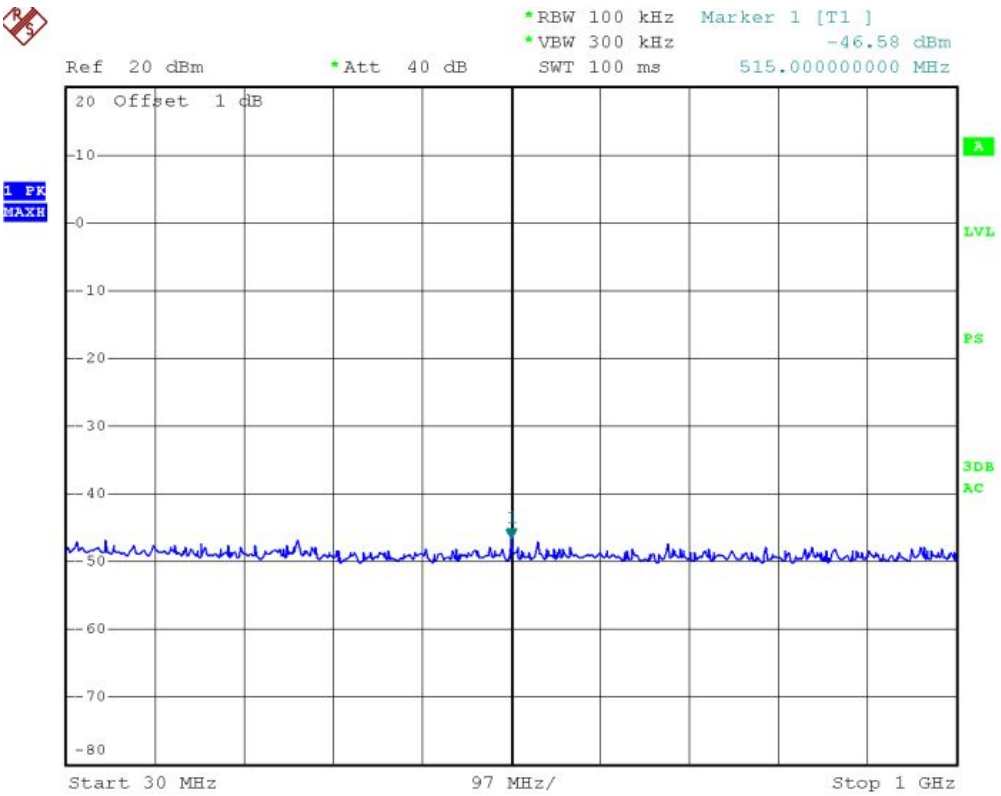


1G to 25GHz

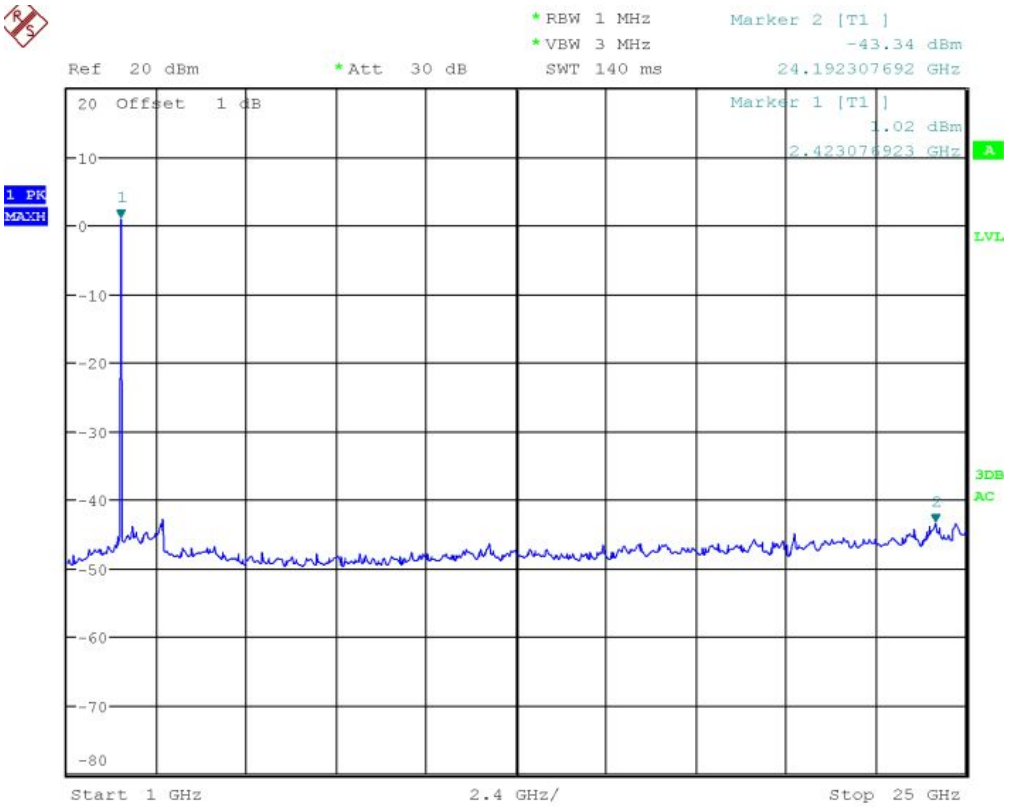


Middle Channel:

30M to 1GHz

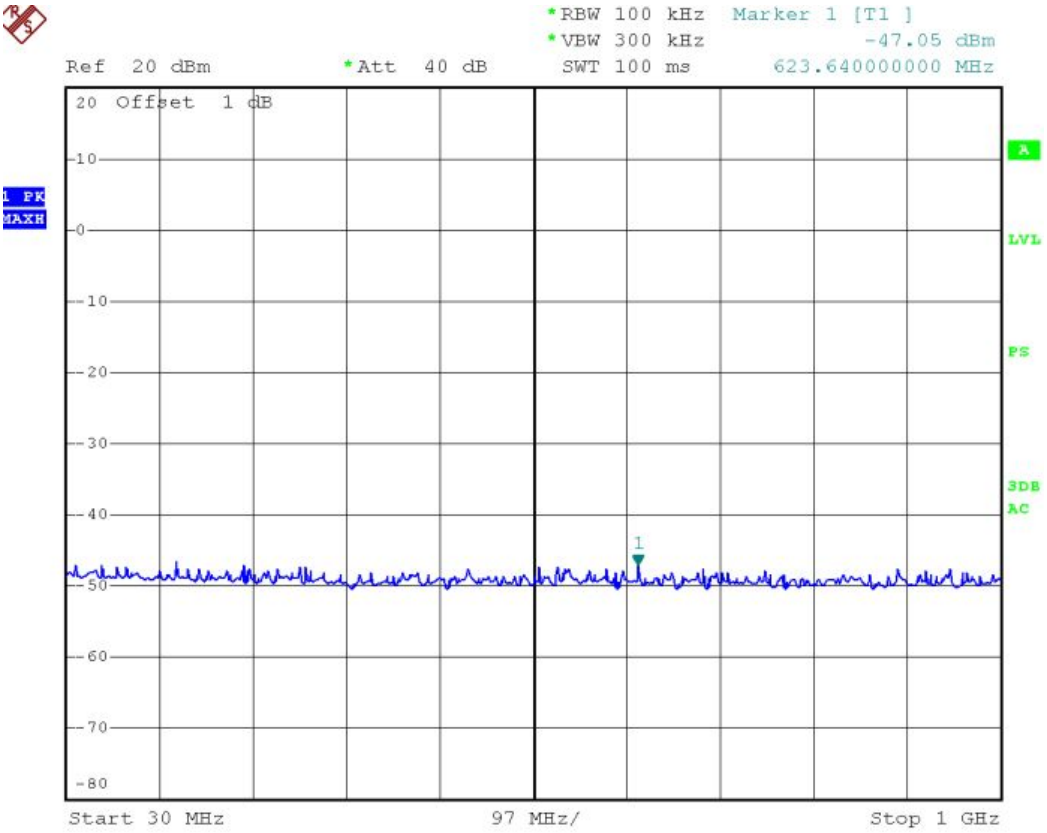


1G to 25GHz

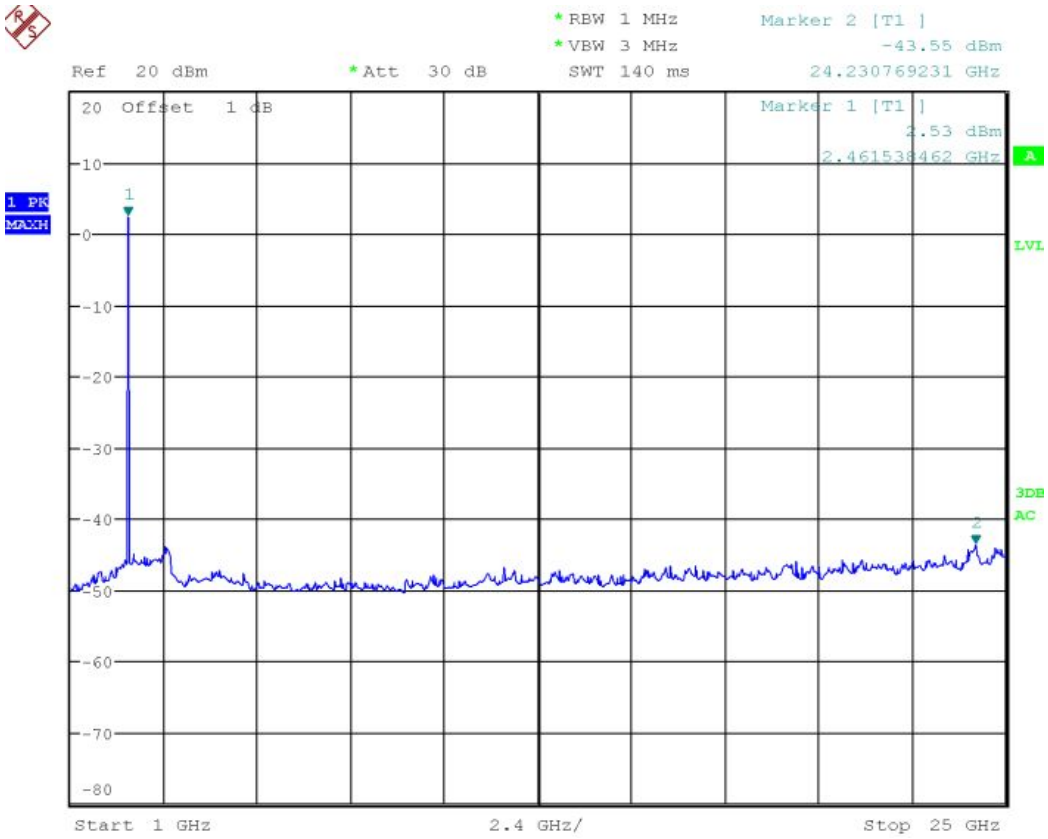


Highest Channel

30M to 1GHz



1G to 25GHz



4.6 RADIATED SPURIOUS EMISSIONS

4.6.1 LIMITS

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	53.8~88.5
0.490-1.705	24000/F(kHz)	30	43~53.8
1.705-30.0	30	30	49.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

Frequency (GHz)	Quasi-peak(dBμV/m)
1 ~ 26.5	74
1~ 26.5	54

4.6.2 TEST PROCEDURES

Procedure of Preliminary Test

According to ANSI C63.10:2009, a calibrated, linearly polarized antenna shall be positioned at the specified distance from the periphery of the EUT. The specified distance is the distance between the horizontal projection onto the ground plane of the closest periphery of the EUT and the projection onto the ground plane of the center of the axis of the elements of the receiving antenna.

Measurements shall be made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna shall be varied in height above the reference ground plane to obtain the maximum signal strength. Unless otherwise specified, the measurement distance shall be 3 m. At any measurement distance, the antenna height shall be varied from 1 m to 4 m. These height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. For a tuned dipole, the minimum heights as measured from the center of the antenna are those specified in the NSA measurement requirements.

For tabletop systems, cables or wires should be manipulated within the range of likely arrangements. For floor-standing equipment, the cables or wires should be located in the same manner as the user would install them and no further manipulation is made. For combination EUTs, the tabletop and floor-standing portions of the EUT shall follow the procedures for their respective setups and cable manipulation.

Table-top equipment is placed on a non-conductive set-up table with height 0, 8 m ± 0, 01 m, ANSI C63.10:2009 specifies the method to determine the impact of the non-conductive set-up table on test results. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation required to be tested, the frequency spectrum shall be monitored. Variations in antenna height between 1 m and 4 m, antenna polarization, EUT azimuth, and cable or wire placement shall be explored to produce the emission that has the highest amplitude relative to the limit.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW >= RBW , Span = enough to captch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.

Above 1GHz Set the spectrum analyzer: RBW =1MHz VBW >= RBW , Span = enough to captch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.

Pre-test for normal mode and EDR mode, to find the EDR (3DH5 packet type) is the worst case. Pre-test for EUT in three axes and find the X axe is the worst case.

The worst case emissions were reported.

4.6.3 TEST SETUP

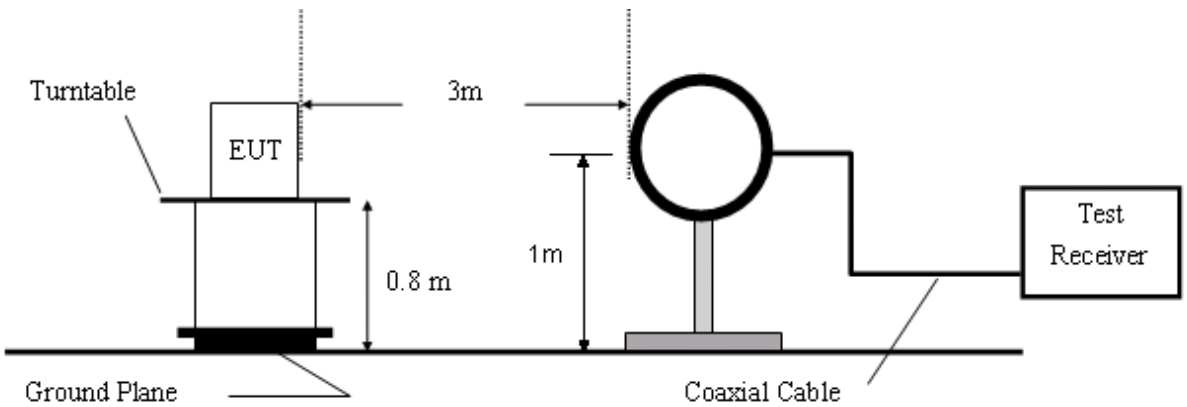


Figure 1. 9 KHz to 30MHz radiated emissions test configuration

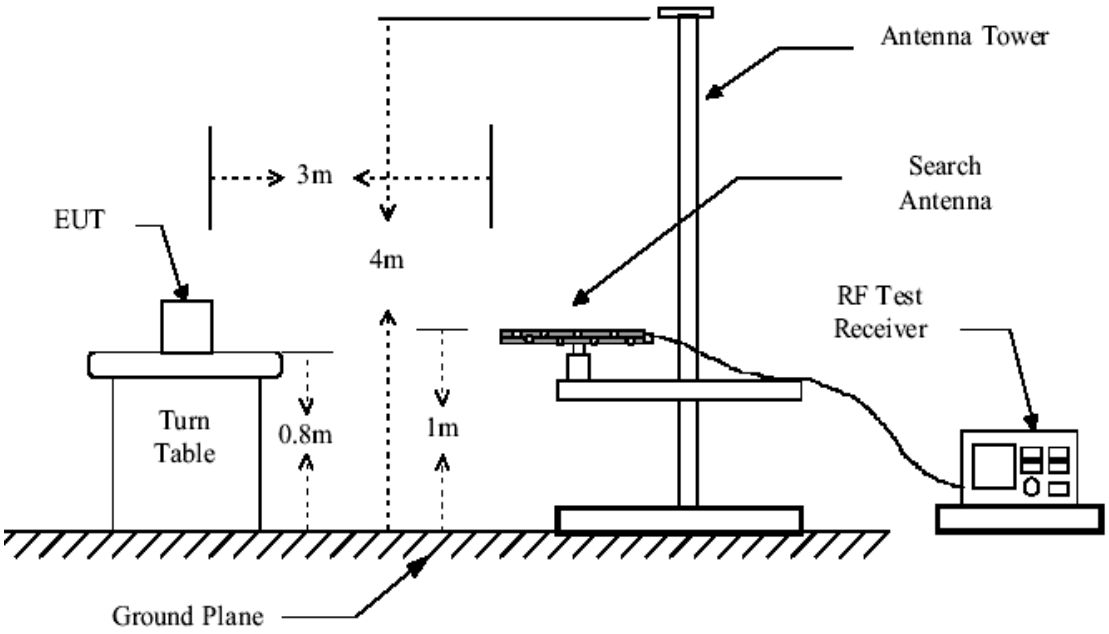


Figure 2. 30MHz to 1GHz radiated emissions test configuration

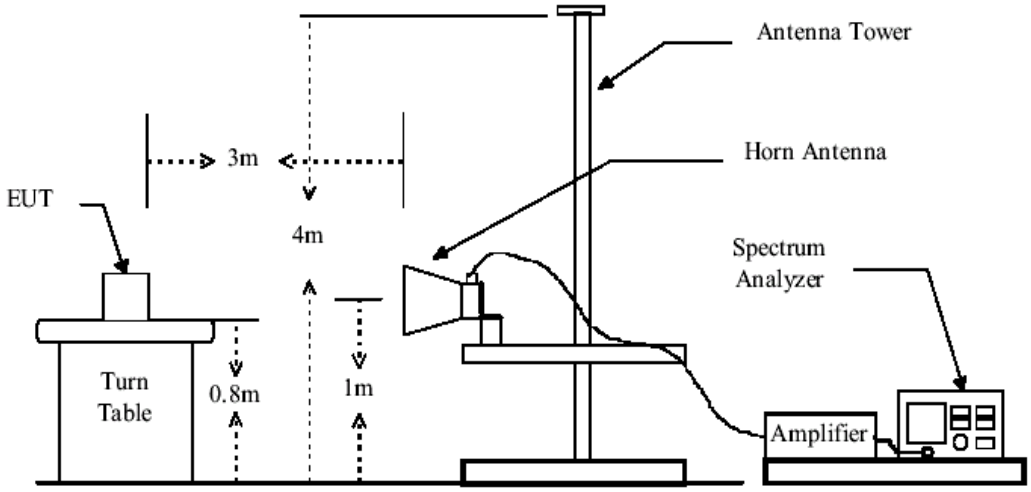


Figure 3. Above 1GHz radiated emissions test configuration

4.6.4 TEST RESULTS

1. Low Frequency 2402MHz

30MHz~1GHz Spurious Emissions.

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	37.1416	19.64	15.06	34.70	40.00	-5.30	QP
2	39.2885	19.95	13.75	33.70	40.00	-6.30	QP
3	40.4081	21.04	13.16	34.20	40.00	-5.80	QP
4	41.0951	21.87	12.93	34.80	40.00	-5.20	QP
5	45.4694	22.93	11.37	34.30	40.00	-5.70	QP
6	49.7470	19.57	9.83	29.40	40.00	-10.60	QP

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	39.7326	16.53	13.47	30.00	40.00	-10.00	QP
2	160.1008	24.61	10.69	35.30	43.50	-8.20	QP
3	169.3552	22.78	10.52	33.30	43.50	-10.20	QP
4	181.1693	24.19	11.11	35.30	43.50	-8.20	QP
5	256.6826	25.55	13.85	39.40	46.00	-6.60	QP
6	263.9970	22.48	14.02	36.50	46.00	-9.50	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2886.022	29.06	10.26	39.32	74.00	-34.68	peak
2	2886.022	17.64	10.26	27.90	54.00	-26.10	AVG
3	2937.283	30.09	10.88	40.97	74.00	-33.03	peak
4	2937.283	18.42	10.88	29.30	54.00	-24.70	AVG
5	2994.723	28.83	11.58	40.41	74.00	-33.59	peak
6	2994.723	17.12	11.58	28.70	54.00	-25.30	AVG
7	3093.159	37.02	11.71	48.73	74.00	-25.27	peak
8	3093.159	16.99	11.71	28.70	54.00	-25.30	AVG
9	3333.244	37.12	11.85	48.97	74.00	-25.03	peak
10	3333.244	17.25	11.85	29.10	54.00	-24.90	AVG
11	4199.646	37.41	14.01	51.42	74.00	-22.58	peak
12	4199.646	17.59	14.01	31.60	54.00	-22.40	AVG

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2723.123	29.58	8.20	37.78	74.00	-36.22	peak
2	2723.123	16.60	8.20	24.80	54.00	-29.20	AVG
3	2845.658	30.83	9.76	40.59	74.00	-33.41	peak
4	2845.658	18.14	9.76	27.90	54.00	-26.10	AVG
5	2926.959	30.46	10.75	41.21	74.00	-32.79	peak
6	2926.959	18.75	10.75	29.50	54.00	-24.50	AVG
7	4541.017	36.94	15.19	52.13	74.00	-21.87	peak
8	4541.017	17.71	15.19	32.90	54.00	-21.10	AVG
9	4618.825	35.93	15.46	51.39	74.00	-22.61	peak
10	4618.825	17.14	15.46	32.60	54.00	-21.40	AVG
11	4762.254	33.93	15.95	49.88	74.00	-24.12	peak
12	4762.254	17.85	15.95	33.80	54.00	-20.20	AVG

The field strength is calculated by adding the Antenna Factor. Correct Factor.

The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Correct Factor

2. Middle Frequency 2441MHz

30MHz~1GHz Spurious Emissions.

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	39.2885	20.15	13.75	33.90	40.00	-6.10	QP
2	42.5042	20.25	12.45	32.70	40.00	-7.30	QP
3	43.7155	21.38	12.02	33.40	40.00	-6.60	QP
4	44.7093	23.14	11.66	34.80	40.00	-5.20	QP
5	181.1693	16.49	11.11	27.60	43.50	-15.90	QP
6	256.6826	17.25	13.85	31.10	46.00	-14.90	QP

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	160.1008	23.61	10.69	34.30	43.50	-9.20	QP
2	179.1446	25.28	11.02	36.30	43.50	-7.20	QP
3	183.2170	25.90	11.20	37.10	43.50	-6.40	QP
4	191.6416	20.35	11.45	31.80	43.50	-11.70	QP
5	256.6826	24.05	13.85	37.90	46.00	-8.10	QP
6	343.7977	12.41	17.09	29.50	46.00	-16.50	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2555.884	32.11	6.18	38.29	74.00	-35.71	peak
2	2555.884	17.72	6.18	23.90	54.00	-30.10	AVG
3	2652.150	33.48	7.28	40.76	74.00	-33.24	peak
4	2652.150	16.52	7.28	23.80	54.00	-30.20	AVG
5	2850.673	33.52	9.84	43.36	74.00	-30.64	peak
6	2850.673	16.86	9.84	26.70	54.00	-27.30	AVG
7	16073.216	27.53	31.04	58.57	74.00	-15.43	peak
8	16073.216	14.36	31.04	45.40	54.00	-8.60	AVG
9	16913.669	28.35	30.56	58.91	74.00	-15.09	peak
10	16913.669	15.34	30.56	45.90	54.00	-8.10	AVG
11	20251.090	27.11	30.98	58.09	74.00	-15.91	peak
12	20251.090	13.82	30.98	44.80	54.00	-9.20	AVG

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2596.705	34.76	6.56	41.32	74.00	-32.68	peak
2	2596.705	16.74	6.56	23.30	54.00	-30.70	AVG
3	2732.729	31.34	8.32	39.66	74.00	-34.34	peak
4	2732.729	15.58	8.32	23.90	54.00	-30.10	AVG
5	2810.803	30.56	9.34	39.90	74.00	-34.10	peak
6	2810.803	16.46	9.34	25.80	54.00	-28.20	AVG
7	4910.136	29.62	16.47	46.09	74.00	-27.91	peak
8	4910.136	16.63	16.47	33.10	54.00	-20.90	AVG
9	8036.480	29.45	23.33	52.78	74.00	-21.22	peak
10	8036.480	15.97	23.33	39.30	54.00	-14.70	AVG
11	13841.184	28.09	29.73	57.82	74.00	-16.18	peak
12	13841.184	15.07	29.73	44.80	54.00	-9.20	AVG

The field strength is calculated by adding the Antenna Factor. Correct Factor.

The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Correct Factor

3. High Frequency 2480MHz

30MHz~1GHz Spurious Emissions.

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	38.4153	16.01	14.29	30.30	40.00	-9.70	QP
2	42.0293	16.68	12.62	29.30	40.00	-10.70	QP
3	44.4587	22.65	11.75	34.40	40.00	-5.60	QP
4	48.6412	17.67	10.23	27.90	40.00	-12.10	QP
5	50.8779	21.72	9.58	31.30	40.00	-8.70	QP
6	256.6826	18.65	13.85	32.50	46.00	-13.50	QP

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	120.2064	9.33	8.87	18.20	43.50	-25.30	QP
2	160.1008	18.91	10.69	29.60	43.50	-13.90	QP
3	177.1425	25.90	10.90	36.80	43.50	-6.70	QP
4	183.2170	26.90	11.20	38.10	43.50	-5.40	QP
5	187.3820	22.74	11.36	34.10	43.50	-9.40	QP
6	256.6826	25.05	13.85	38.90	46.00	-7.10	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Vertical:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2656.823	31.17	7.34	38.51	74.00	-35.49	peak
2	2656.823	17.16	7.34	24.50	54.00	-29.50	AVG
3	2840.653	30.16	9.70	39.86	74.00	-34.14	peak
4	2840.653	16.00	9.70	25.70	54.00	-28.30	AVG
5	2937.283	30.52	10.88	41.40	74.00	-32.60	peak
6	2937.283	16.02	10.88	26.90	54.00	-27.10	AVG
7	13935.565	27.62	29.95	57.57	74.00	-16.43	peak
8	13935.565	14.85	29.95	44.80	54.00	-9.20	AVG
9	16073.216	27.43	31.04	58.47	74.00	-15.53	peak
10	16073.216	13.86	31.04	44.90	54.00	-9.10	AVG
11	19842.408	27.34	31.15	58.49	74.00	-15.51	peak
12	19842.408	14.65	31.15	45.80	54.00	-8.20	AVG

Horizontal:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	2880.946	29.65	10.20	39.85	74.00	-34.15	peak
2	2880.946	15.90	10.20	26.10	54.00	-27.90	AVG
3	2932.117	30.21	10.82	41.03	74.00	-32.97	peak
4	2932.117	16.68	10.82	27.50	54.00	-26.50	AVG
5	2984.196	29.88	11.45	41.33	74.00	-32.67	peak
6	2984.196	16.15	11.45	27.60	54.00	-26.40	AVG
7	14814.488	28.46	30.19	58.65	74.00	-15.35	peak
8	14814.488	15.01	30.19	45.20	54.00	-8.80	AVG
9	16293.165	27.73	30.57	58.30	74.00	-15.70	peak
10	16293.165	15.23	30.57	45.80	54.00	-8.20	AVG
11	22046.527	27.60	30.40	58.00	74.00	-16.00	peak
12	22046.527	14.60	30.40	45.00	54.00	-9.00	AVG

Remark:

1). No any other emissions level which are attenuated less than 20dB below the limit.
According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.
Hence there no other emissions have been reported.

2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the requirements.

4.7 BAND EDGES REQUIREMENT

4.7.1 LIMITS

Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

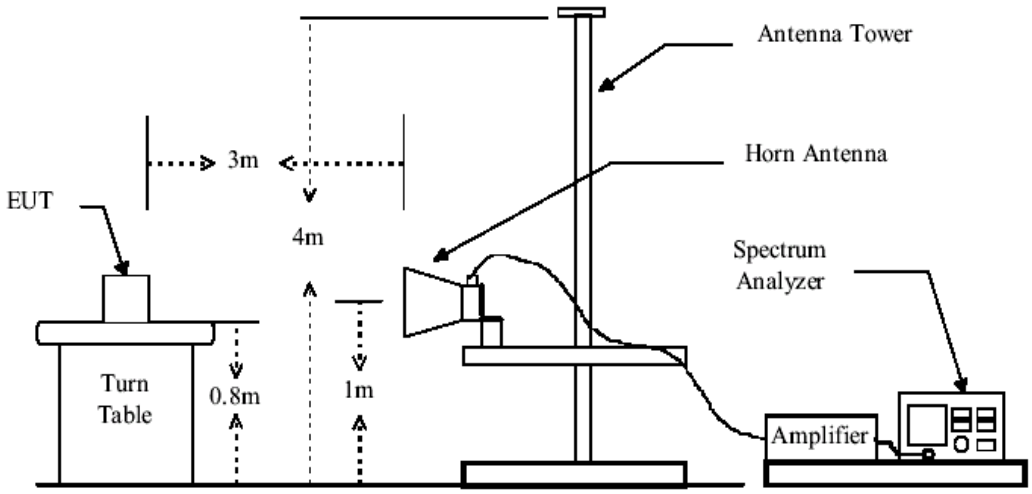
(a) Except as shown in paragraph (d) of this section. Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 -	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.69525	960 - 1240	7.25 - 7.75
4.125 - 4.128	16.80425 -	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	16.80475	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	25.5 - 25.67	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	37.5 - 38.25	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	73 - 74.6	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	74.8 - 75.2	2200 - 2300	14.47 - 14.5
8.291 - 8.294	108 - 121.94	2310 - 2390	15.35 - 16.2
8.362 - 8.366	123 - 138	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	149.9 - 150.05	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.52475 -	3260 - 3267	23.6 - 24.0
12.29 - 12.293	156.52525	3332 - 3339	31.2 - 31.8
12.51975 -	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
12.52025	162.0125 - 167.17	3600 - 4400	
12.57675 -	167.72 - 173.2		
12.57725	240 - 285		
13.36 - 13.41	322 - 335.4		

4.7.2 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Fixing frequency mode：
   Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. Repeat above procedures until all measured frequencies were complete.
4. Frequency Hopping mode:
   Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
   RBW ⩾1 % of spectrum analyzer display span(set 100kHz), VBW ⩾RBW(set 100kHz), Sweep = auto, Detector function = peak, Trace = max hold.
   Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge.

4.7.3 TEST SETUP



4.7.4 TEST RESULTS

Pre-test the Bluetooth normal mode and EDR mode, record normal mode date
The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

Channel Low

No.	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.000	27.52	5.25	32.77	74.00	-41.23	peak	VERTICAL
2	2400.000	29.83	5.29	35.12	74.00	-38.88	peak	VERTICAL
3	2390.000	15.74	5.25	20.99	54.00	-33.01	AVG	VERTICAL
4	2400.000	18.71	5.29	24.00	54.00	-30.00	AVG	VERTICAL
1	2390.000	26.98	5.25	32.23	74.00	-41.77	peak	HORIZONTAL
2	2400.000	29.07	5.29	34.36	74.00	-39.64	peak	HORIZONTAL
3	2390.000	15.73	5.25	20.98	54.00	-33.02	AVG	HORIZONTAL
4	2400.000	16.75	5.29	22.04	54.00	-31.96	AVG	HORIZONTAL

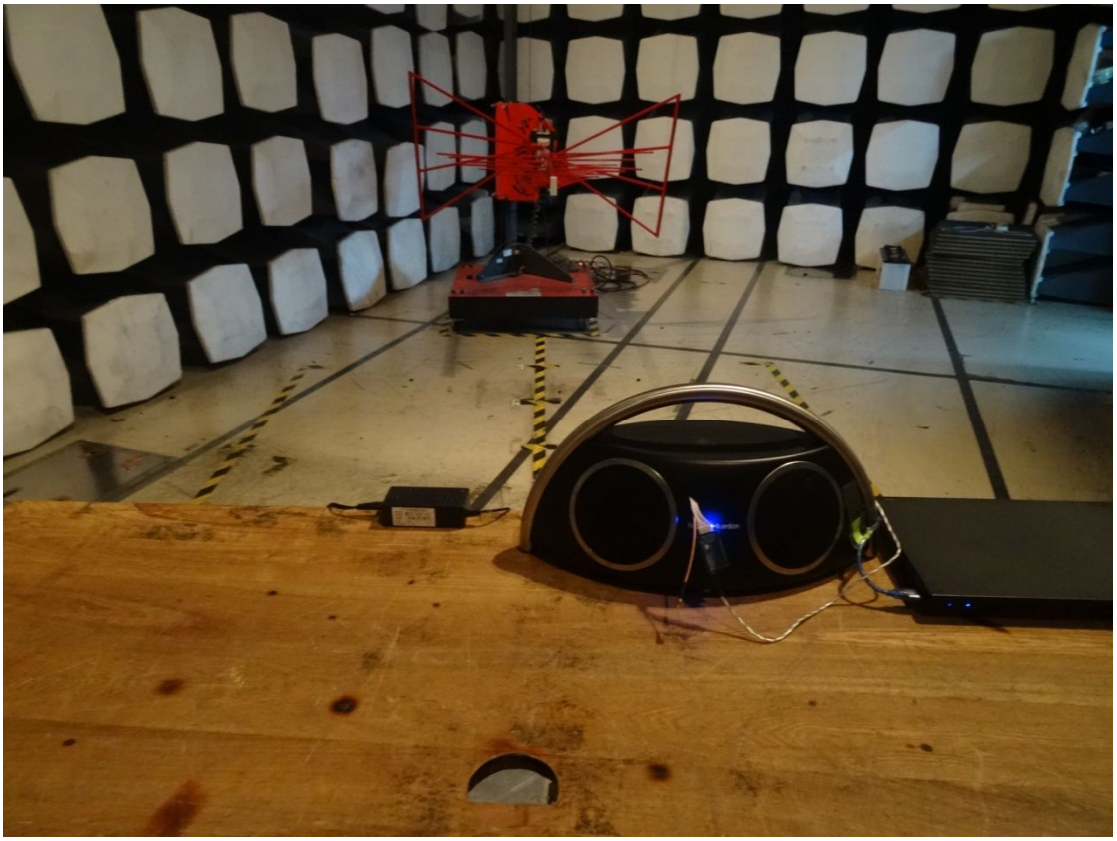
Channel High

No.	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.500	27.16	5.60	32.76	74.00	-41.24	peak	VERTICAL
2	2500.000	27.60	5.66	33.26	74.00	-40.74	peak	VERTICAL
3	2483.500	16.21	5.60	21.81	54.00	-32.19	AVG	VERTICAL
4	2500.000	15.74	5.66	21.40	54.00	-32.60	AVG	VERTICAL
1	2483.500	28.21	5.60	33.81	74.00	-40.19	peak	HORIZONTAL
2	2500.000	25.93	5.66	31.59	74.00	-42.41	peak	HORIZONTAL
3	2483.500	16.18	5.60	21.78	54.00	-32.22	AVG	HORIZONTAL
4	2500.000	15.73	5.66	21.39	54.00	-32.61	AVG	HORIZONTAL

Remark: Max field strength in 3m distance. No any other emission which falls in restricted bands can be detected and be reported.

APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT

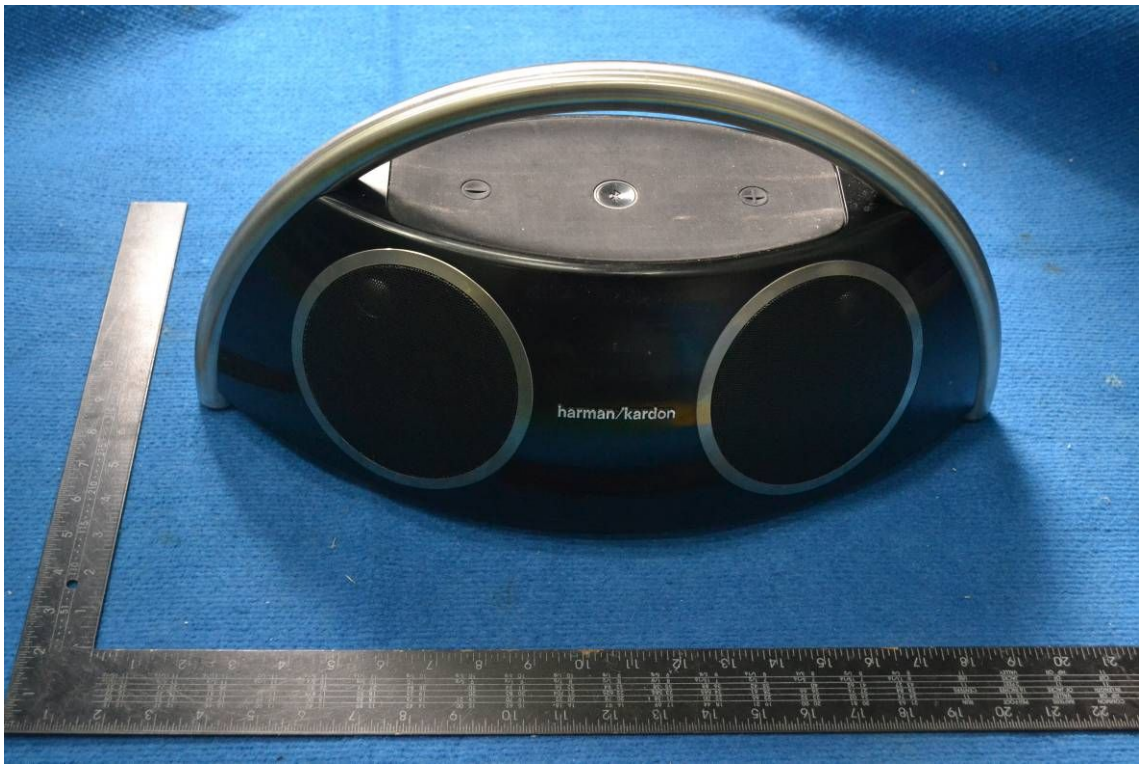
RSE（Below 1GHz）

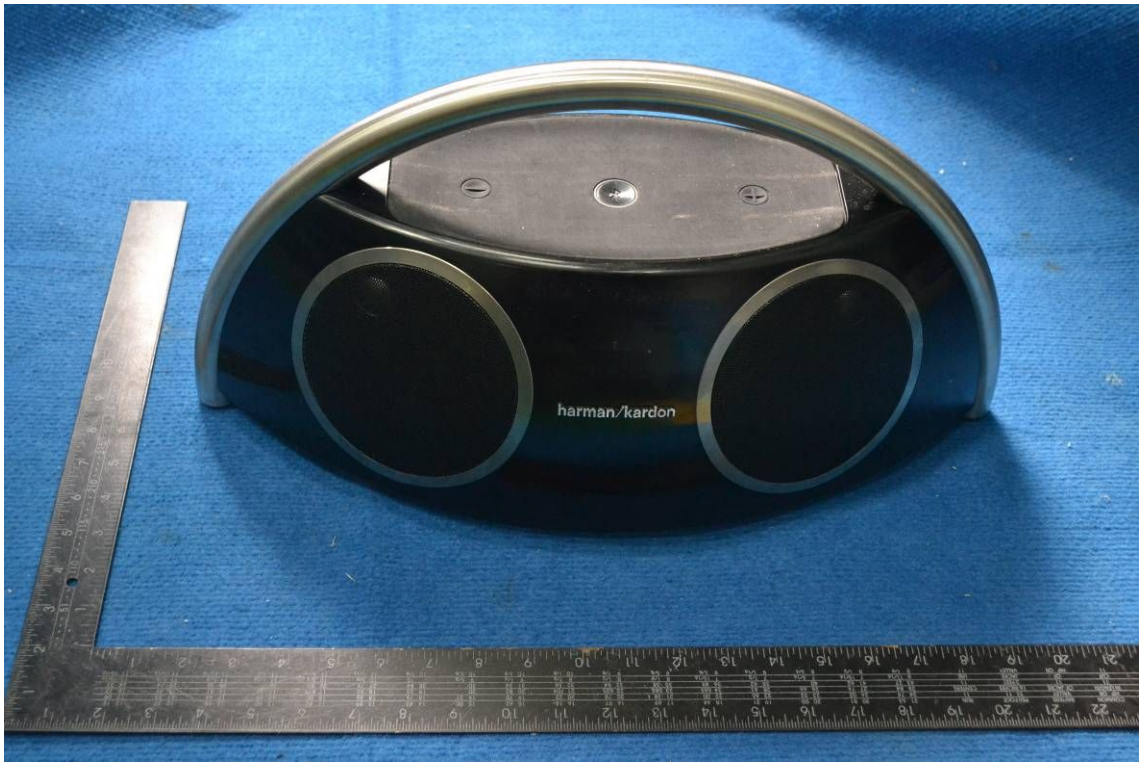


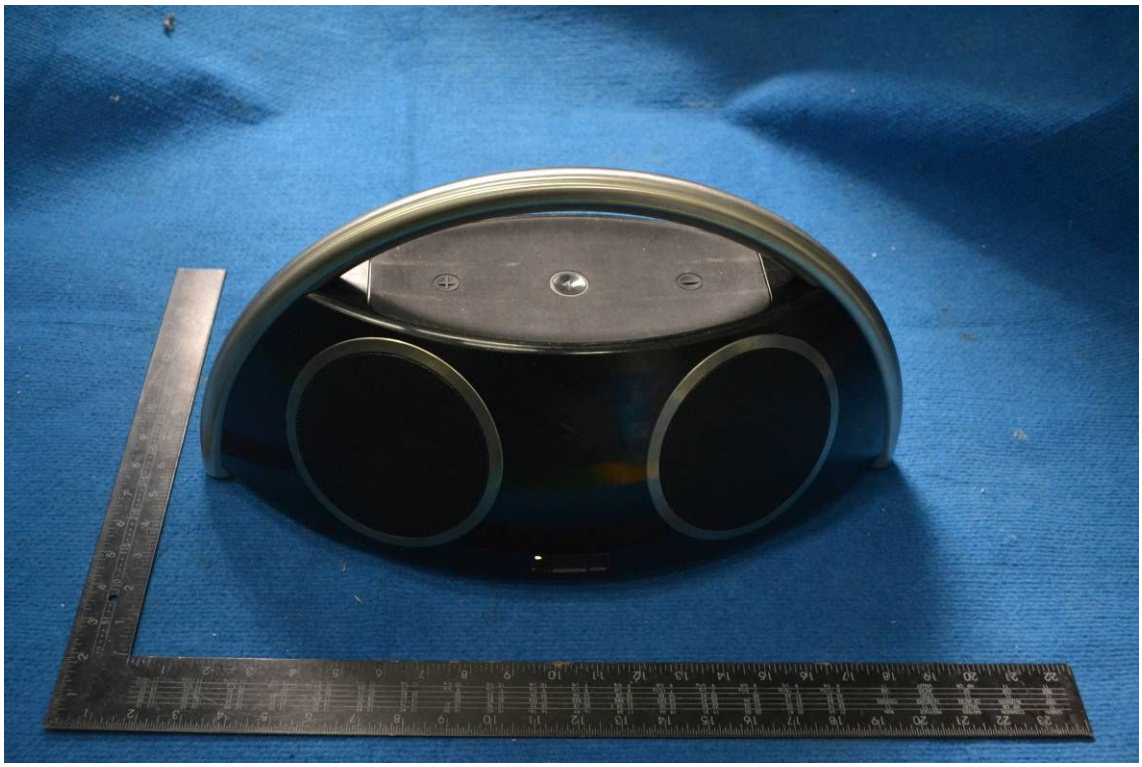
RSE（Above 1GHz）

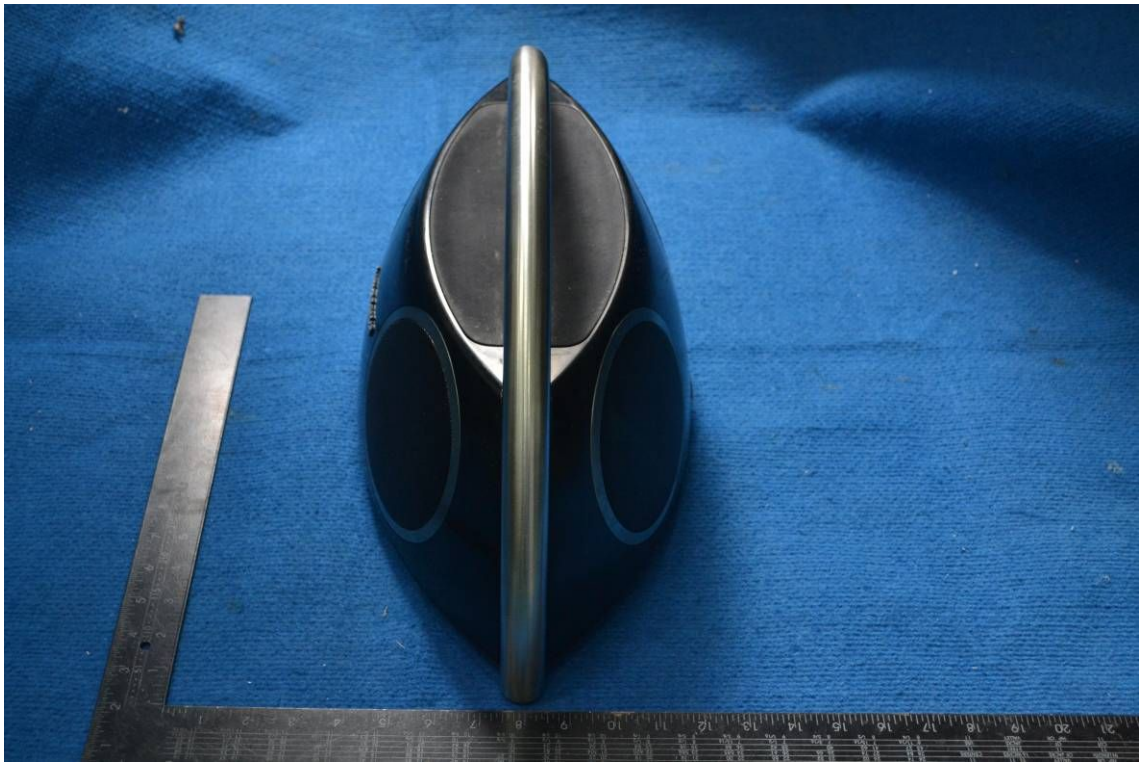
CE

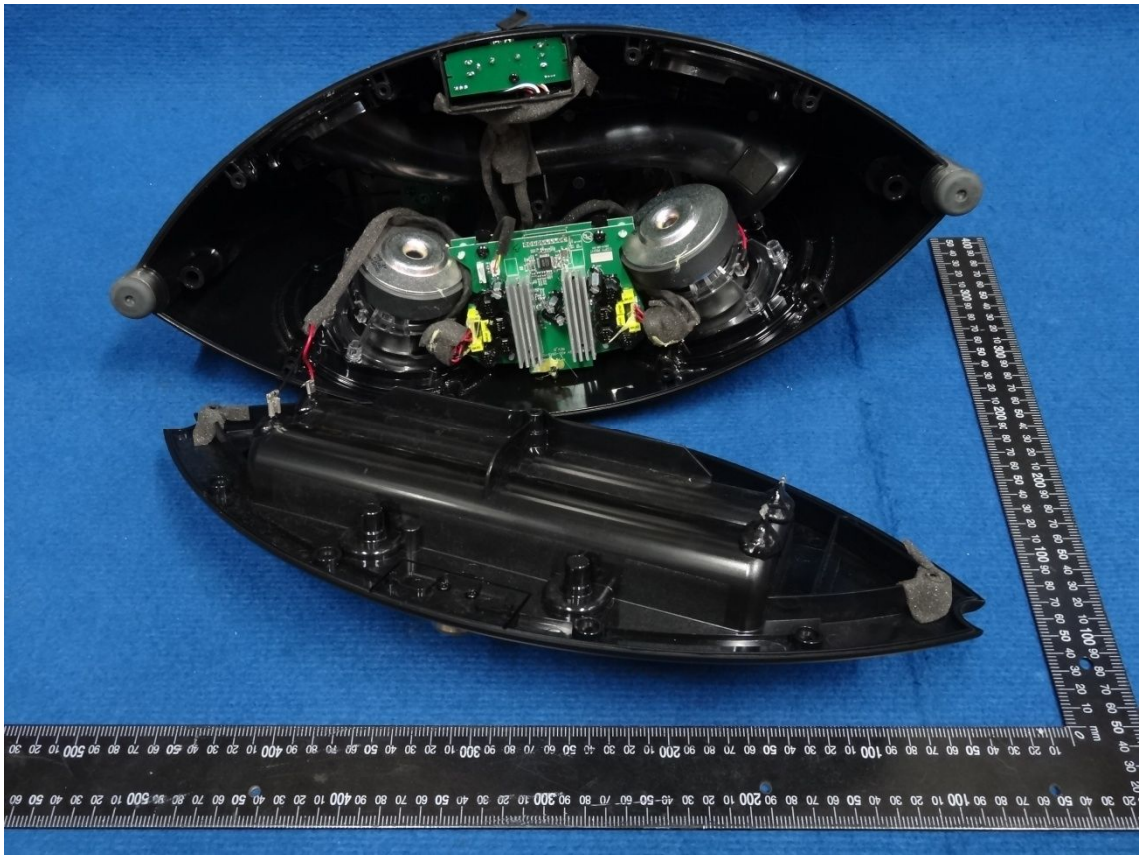
APPENDIX B: PHOTOGRAPH OF THE EUT

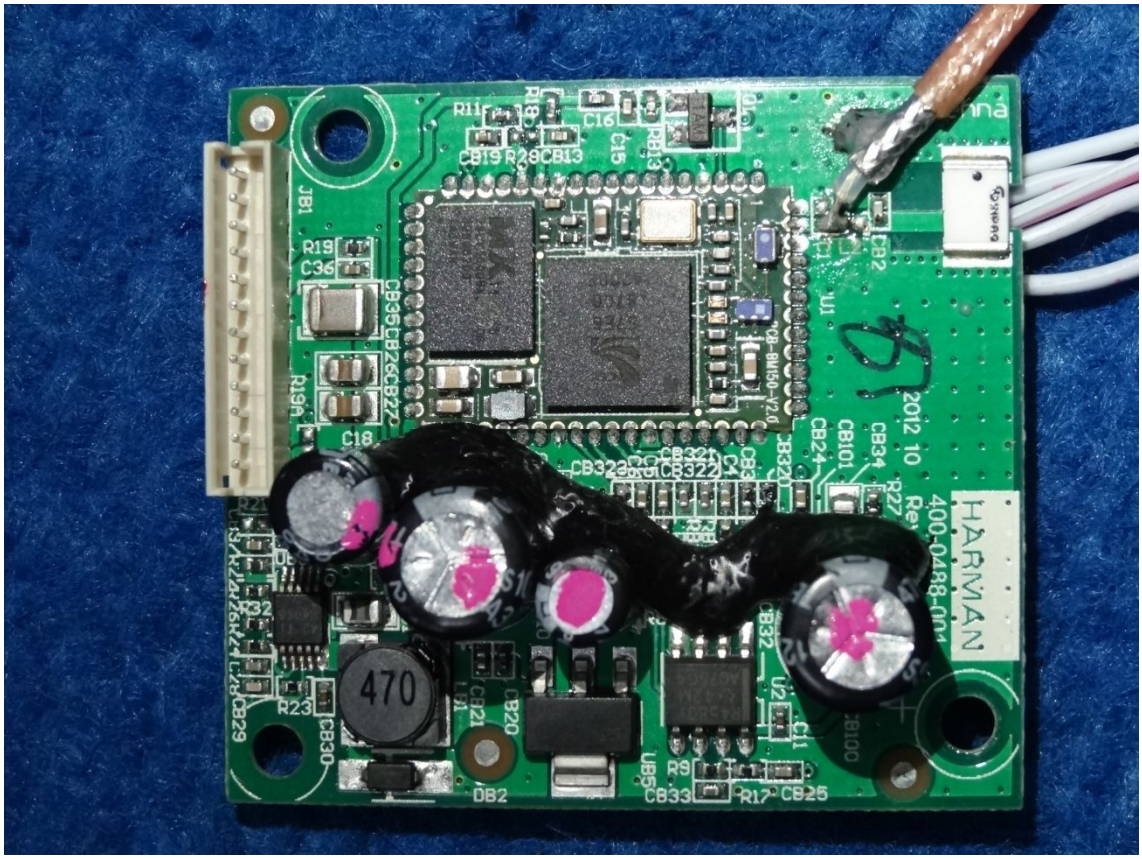


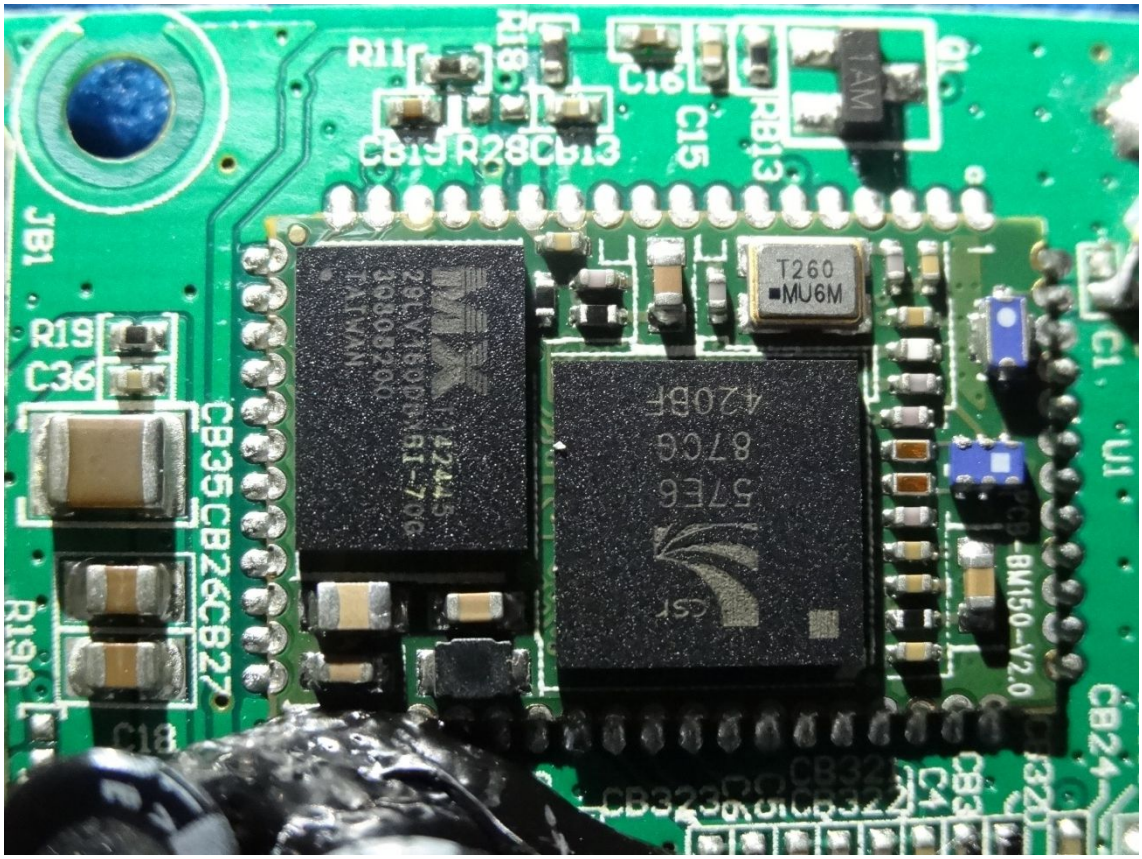

harman/kardon



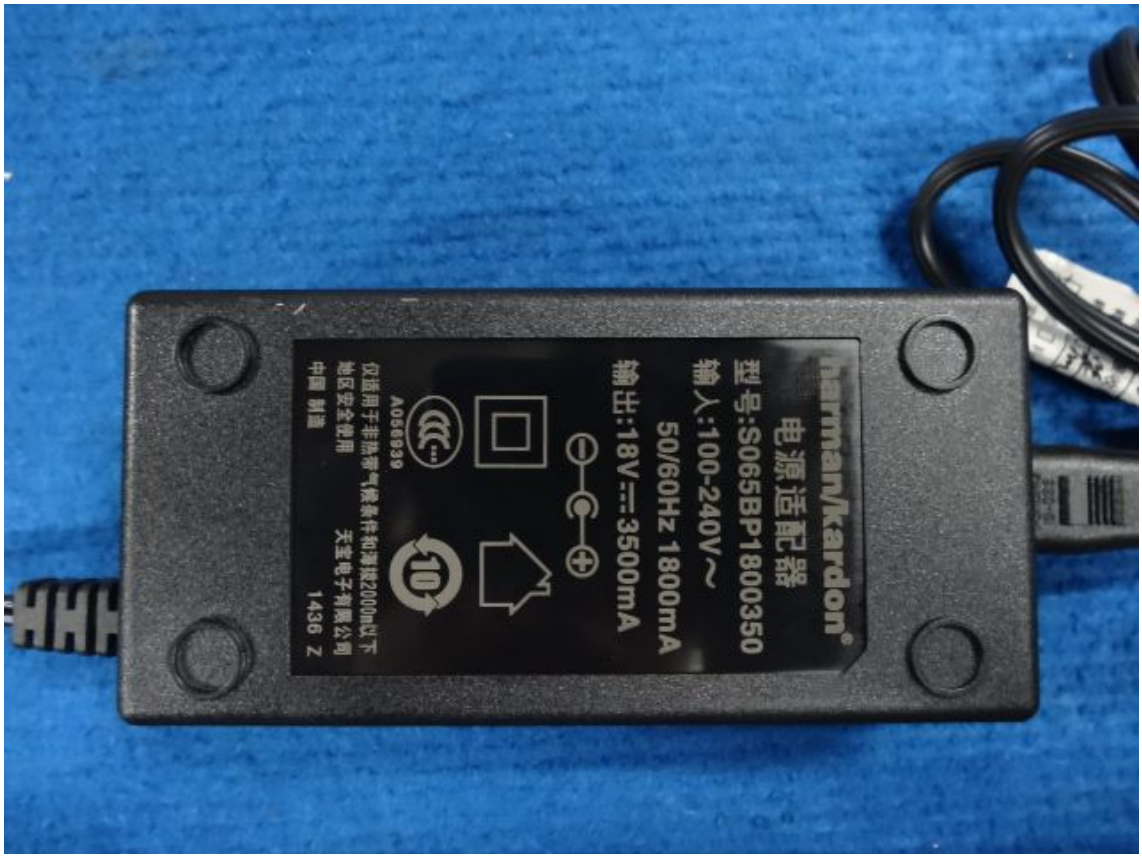





HARMAN
470


T260
MU6M
JB1
R19
C36
CB35CB26CB27
R19A
C18
C1
U1
CB24
CB323
CB322

Adapter 1：Model: S065BP1800350



Adapter 2：Model: EFS06501800360CE

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