



**FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-247 ISSUE 2**

**CERTIFICATION TEST REPORT**

*For*

**Soundbar Home Theater Speaker  
MODEL NUMBER: NS-HSB318**

**FCC ID: UZZHSB318  
IC: 7633A-HSB318**

**REPORT NUMBER: 4787949565-2**

**ISSUE DATE: May 08, 2017**

*Prepared for*

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	05/08/2017	Initial Issue	

<b>Summary of Test Results</b>			
<b>Clause</b>	<b>Test Items</b>	<b>FCC/IC Rules</b>	<b>Test Results</b>
1	20dB Bandwidth	FCC 15.247 (a) (1) RSS-247 Clause 5.1	Complied
2	Peak Conducted Output Power	FCC 15.247 (b) (1) IC RSS-247 Clause 5.4 (b)	Complied
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1) IC RSS-247 Clause 5.1	Complied
4	Number of Hopping Frequency	15.247 (a) (1) III IC RSS-247 Clause 5.1	Complied
5	Time of Occupancy (Dwell Time)	15.247 (a) (1) III IC RSS-247 Clause 5.1	Complied
6	Conducted Bandedge and Spurious	FCC 15.247 (d) IC RSS-247 Clause 5.5	Complied
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 15.205 IC RSS-247 Clause 5.5 IC RSS-GEN Clause 8.9 8.10	Complied
8	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Complied
9	Antenna Requirement	FCC 15.203 RSS-GEN Clause 8.3	Complied
Remark: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device.			

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS</b> .....	<b>6</b>
<b>2. TEST METHODOLOGY</b> .....	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION</b> .....	<b>7</b>
<b>4. CALIBRATION AND UNCERTAINTY</b> .....	<b>8</b>
4.1. MEASURING INSTRUMENT CALIBRATION.....	8
4.2. MEASUREMENT UNCERTAINTY.....	8
<b>5. EQUIPMENT UNDER TEST</b> .....	<b>9</b>
5.1. DESCRIPTION OF EUT.....	9
5.2. MAXIMUM OUTPUT POWER.....	9
5.3. PACKET TYPE CONFIGURATION.....	9
5.4. CHANNEL LIST.....	10
5.5. TEST CHANNEL CONFIGURATION.....	10
5.6. THE WORSE CASE POWER SETTING PARAMETER.....	10
5.7. DESCRIPTION OF AVAILABLE ANTENNAS.....	11
5.8. WORST-CASE CONFIGURATIONS.....	11
5.9. DESCRIPTION OF TEST SETUP.....	11
5.10. MEASURING INSTRUMENT AND SOFTWARE USED.....	13
<b>6. MEASUREMENT METHODS</b> .....	<b>14</b>
6.1. 20 dB BANDWIDTH AND 99% BANDWIDTH.....	15
6.2. PEAK CONDUCTED OUTPUT POWER.....	18
6.3. CARRIER HOPPING CHANNEL SEPARATION.....	22
6.4. NUMBER OF HOPPING FREQUENCY.....	24
6.5. TIME OF OCCUPANCY (DWELL TIME).....	26
6.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS.....	30
<b>7. RADIATED TEST RESULTS</b> .....	<b>34</b>
7.1. LIMITS AND PROCEDURE.....	34
7.2. RESTRICTED BANDEDGE.....	38
7.2.1. GFSK MODE.....	38
7.2.2. 8-DPSK MODE.....	42
7.3. SPURIOUS EMISSIONS (1~25GHz).....	46
7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz.....	47
7.4.1. GFSK MODE.....	47
7.5. SPURIOUS EMISSIONS BELOW 30M.....	50

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<b>8. AC POWER LINE CONDUCTED EMISSIONS.....</b>	<b>51</b>
<b>9. ANTENNA REQUIREMENTS.....</b>	<b>56</b>

## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Beautiful Enterprise Co., Ltd.  
Address: 27th Floor, Beautiful Group Tower, 77 Connaught Road Central, Hong Kong

### Manufacturer Information

Company Name: Shenzhen Synchron Electronics Co., Ltd.  
Address: No. 9 Mei Li Road, Xia Mei Lin, Fu Tian Area, Shenzhen, Guangdong, P.R. China

### EUT Description

Product Name: Soundbar Home Theater Speaker  
Brand Name: N/A  
Model Name: NS-HSB318  
FCC ID: UZZHSB318  
IC: 7633A-HSB318  
Date Tested: May 04, 2017 ~ May 05, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
INDUSTRY CANADA RSS-247 Issue 2	PASS
INDUSTRY CANADA RSS-GEN Issue 4	PASS

Tested By:



Leo Liu  
Engineer

Check By:



Terry Hou  
Project Engineer

Approved By:



Victor Yan  
Laboratory Manager

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

## 3. FACILITIES AND ACCREDITATION

Test Location	Dongguan Dongdian Testing Service Co., Ltd
Address	No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Dongguan City, Guangdong Province, 523808, China
Accreditation Certificate	<p>Dongguan Dongdian Testing Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until January 31, 2018.</p> <p>Dongguan Dongdian Testing Service Co., Ltd. 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 our files. Registration 270092, Renewal date March 11, 2015, valid time is until March 11, 2018.</p> <p>The 3m Alternate Test Site of Dongguan Dongdian Testing Service Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 10288A on April 23, 2015, valid time is until April 23, 2018.</p>

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Bandwidth	1.1%
Peak Output Power(Conducted)( Spectrum analyzer)	0.86dB(10 MHz ≤ f < 3.6GHz);
	1.38dB(3.6GHz ≤ f < 8GHz)
Peak Output Power(Conducted)(Power Sensor)	0.74dB
Dwell Time	0.6%
Conducted spurious emissions	0.86dB(10 MHz ≤ f < 3.6GHz);
	1.40dB(3.6GHz ≤ f < 8GHz)
	1.66dB(8GHz ≤ f < 22GHz)
Uncertainty for radio frequency (RBW<20KHz)	3×10 <sup>-8</sup>
Temperature	0.4°C
Humidity	2%
Uncertainty for Radiation Emission test (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz-18GHz)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
Uncertainty for Power line conduction emission test	3.32dB (150KHz-30MHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

Equipment	Soundbar Home Theater Speaker	
Model Name	NS-HSB318	
Product Description	Operation Frequency	2402 MHz ~ 2480 MHz
	Modulation Type	Data Rate
	GFSK	1Mbps
	π/4-DQPSK	2Mbps
	8-DPSK	3Mbps
Battery	N/A	
Bluetooth Version	BT 4.2	
Adapter 1	Input: AC 100~240V, 50/60Hz, 1.2A Output: DC 18V, 2.5A	
Adapter 2	Input: AC 100~240V, 50/60Hz, 1.5A Output: DC 18V, 2500mA	

### 5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	Number of Transmit Chains (NTX)	Bluetooth Mode	Frequency (MHz)	Channel Number	Max PK Conducted Power (dBm)
2400-2483.5	1	GFSK	2402-2480	0-78[79]	-1.450
2400-2483.5	1	8-DPSK	2402-2480	0-78[79]	0.140

### 5.3. PACKET TYPE CONFIGURATION

Test Mode	Packet Type	Setting
GFSK	DH1	N/A
	DH3	N/A
	DH5	N/A
π/4-DQPSK	2-DH1	N/A
	2-DH3	N/A
	2-DH5	N/A
8-DPSK	3-DH1	N/A
	3-DH3	N/A
	3-DH5	N/A

### 5.4. CHANNEL LIST

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

### 5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel Number	Test Channel
GFSK	CH 00, CH 39, CH 78	Low, Middle, High
8-DPSK	CH 00, CH 39, CH 78	Low, Middle, High

### 5.6. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software Version		ACTsBTAPP.exe		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 00	CH 39	CH 78
GFSK	1	5	5	5
8-DPSK	1	5	5	5

### 5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2402-2480	PCB Antenna	-4.5

Test Mode	Transmit and Receive Mode	Description
GFSK	<input checked="" type="checkbox"/> 1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.
8-DPSK	<input checked="" type="checkbox"/> 1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.

### 5.8. WORST-CASE CONFIGURATIONS

Bluetooth Mode	Modulation Technology	Modulation Type	Data Rate (Mbps)
BR	FHSS	GFSK	1Mbit/s
EDR	FHSS	8-DPSK	3Mbit/s

### 5.9. DESCRIPTION OF TEST SETUP

#### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Remarks
1	Laptop	ThinkPad	Latitude D610	N/A

#### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB out 1	USB	Unshielded	0.50	N/A

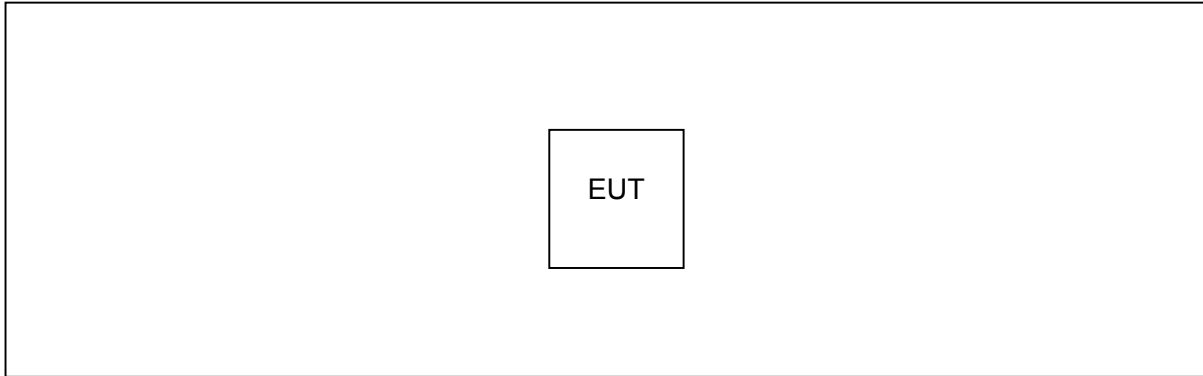
#### ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	Power Adapter 1	JQH	NSA45EU-180250	Input: AC 100~240V, 50/60Hz, 1.2A Output: DC 18V, 2.5A
2	Power Adapter 2	TEN PAO	S048CU1800250	Input: AC 100~240V, 50/60Hz, 1.5A MAX Output: DC 18V, 2500mA

#### TEST SETUP

The EUT can work in an engineer mode with a software through a Laptop.

**SETUP DIAGRAM FOR TESTS**



### 5.10. MEASURING INSTRUMENT AND SOFTWARE USED

Instrument (Conducted for RF Port)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
<input checked="" type="checkbox"/>	Spectrum Analyzer	Agilent	E4447A	MY50180031	Jul.06, 2016	Jul.06, 2017
<input checked="" type="checkbox"/>	Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Power Sensor	Agilent	U2021XA	MY55150010	Apr.04, 2017	Apr.04, 2018
<input checked="" type="checkbox"/>	Power Sensor	Agilent	U2021XA	MY55150011	Apr.18, 2017	Apr.18, 2018
<input checked="" type="checkbox"/>	Attenuator	Mini-Circuits	BW-S10W2	101109	Aug.18, 2016	Aug.18, 2017
<input checked="" type="checkbox"/>	RF Cable	Micable	C10-01-01-1	100309	Aug.18, 2016	Aug.18, 2017
<input checked="" type="checkbox"/>	Test Software	JS Tonscend	JS1120-2	Ver.2.5	N/A	N/A
<input checked="" type="checkbox"/>	USB Data acquisition	Agilent	U2531A	TW55043503	N/A	N/A
<input checked="" type="checkbox"/>	Auto control Unit	JS Tonscend	JS0806-2	158060010	N/A	N/A
Instrument (Radiated Tests)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESU8	100316	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Spectrum analyzer	R&S	FSU26	1166.1660.26	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Oct.27, 2016	Oct.27, 2017
<input checked="" type="checkbox"/>	Double Ridged Horn Antenna	R&S	HF907	100276	Oct.12, 2016	Oct.12, 2017
<input checked="" type="checkbox"/>	Pre-amplifier	A.H.	PAM-0118	360	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X2	W11.03	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X1	W12.02	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	MI Cable	HUBSER	C10-01-01-1M	1091629	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Test software	Audix	E3	V 6.11111b	N/A	N/A
Instrument (Line Conducted Emission (AC Main))						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESU8	100316	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	LISN 1	R&S	ENV216	101109	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	LISN 2	R&S	ESH2-Z5	100309	Oct.16, 2016	Oct.16, 2017

<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	101242	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	CE Cable 1	HUBSER	ESU8/RF2	W10.01	Oct.16, 2016	Oct.16, 2017
<input checked="" type="checkbox"/>	Test software	Audix	E3	V 6.11111b	N/A	N/A

## 6. MEASUREMENT METHODS

No.	Test Item	KDB Name
1	20 dB Bandwidth	FCC Public Notice DA 00-705
2	99% Bandwidth	ANSI C63.10-2013
3	Peak Output Power	FCC Public Notice DA 00-705
4	Power Spectral Density	FCC Public Notice DA 00-705
5	Out-of-band emissions in non-restricted bands	FCC Public Notice DA 00-705
6	Out-of-band emissions in restricted bands	FCC Public Notice DA 00-705
7	Band-edge	FCC Public Notice DA 00-705

ANTENNA PORT TEST RESULTS

**6.1. 20 dB BANDWIDTH AND 99% BANDWIDTH**

**LIMITS**

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1) IC RSS-247 Clause 5.1	20dB Bandwidth	N/A	2400-2483.5
RSS-Gen Clause 6.6	99% Bandwidth	N/A	2400-2483.5

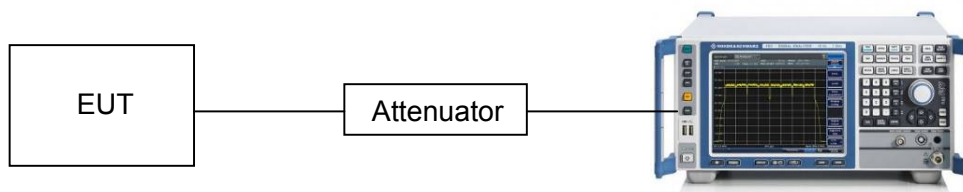
**TEST PROCEDURE**

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$\geq 1\%$ of the 20 dB bandwidth
VBW	$\geq$ RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

**TEST SETUP**



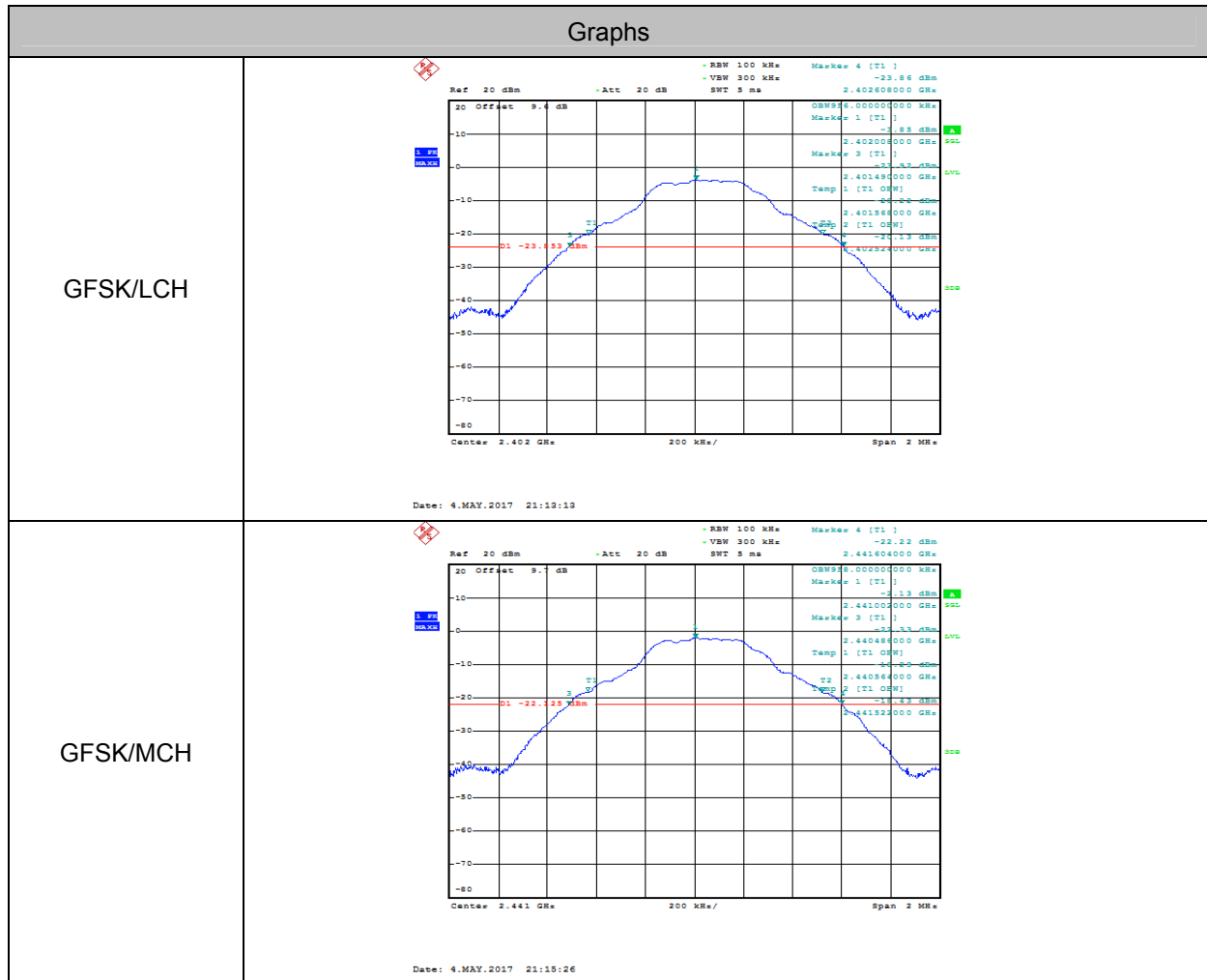
TEST CONDITIONS

Temperature: 26.6°C  
 Relative Humidity: 58%  
 Test Voltage: AC 120V/60Hz

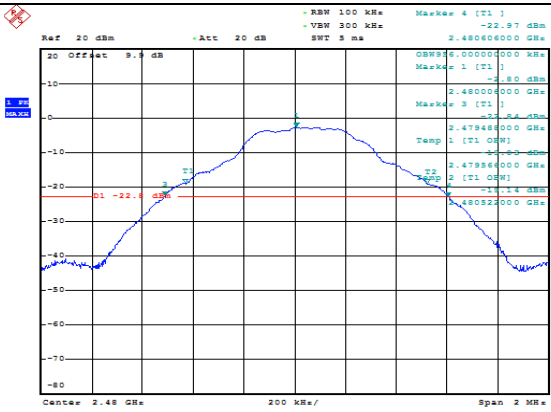
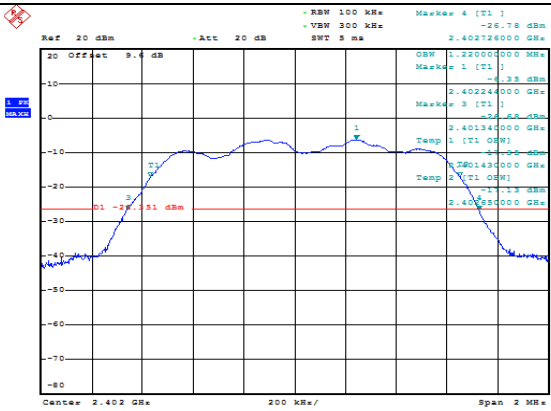
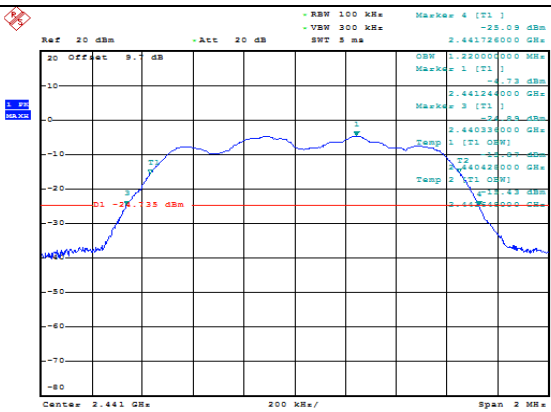
RESULTS

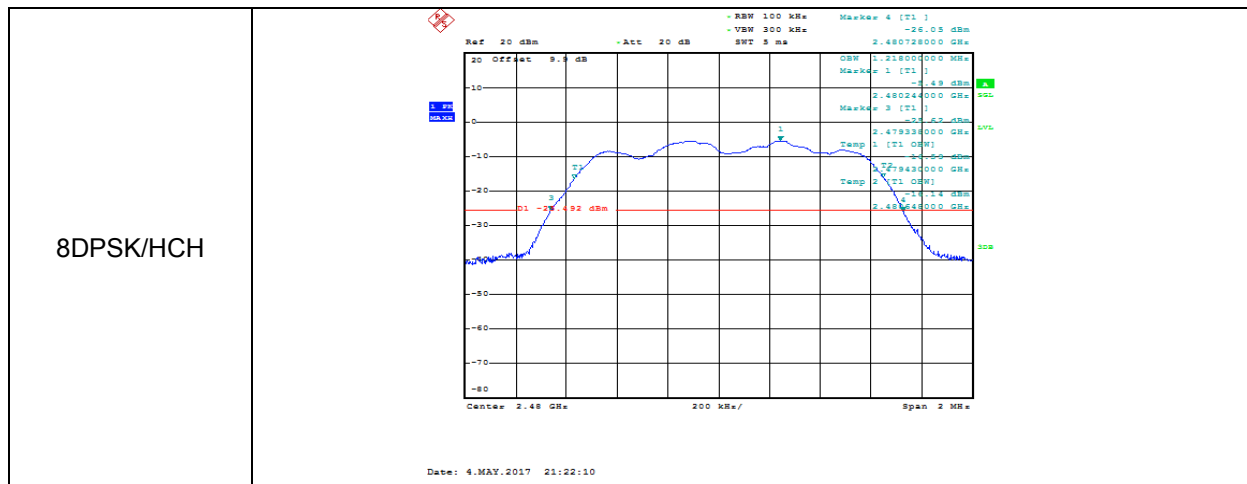
Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
GFSK	LCH	1.118	0.956	PASS
GFSK	MCH	1.118	0.958	PASS
GFSK	HCH	1.118	0.956	PASS
8-DPSK	LCH	1.386	1.220	PASS
8-DPSK	MCH	1.390	1.220	PASS
8-DPSK	HCH	1.390	1.218	PASS

Test Graph





<p>GFSK/HCH</p>	 <p>Ref 20 dBm - Att 20 dB - RBW 100 KHz - VBW 300 KHz - SWT 5 ms - Mask# 4 [T1] -22.97 dBm          2.48000000 GHz</p> <p>20 Offset 9.4 dB          Mask# 1 [T1] -22.80 dBm          2.48000000 GHz          Mask# 3 [T1] -22.80 dBm          2.47980000 GHz          Mask# 1 [T1] -22.80 dBm          2.47950000 GHz          Mask# 2 [T1] -22.80 dBm          2.48020000 GHz          Mask# 3 [T1] -22.80 dBm          2.48050000 GHz</p> <p>Center 2.48 GHz 200 kHz/ Span 2 MHz</p> <p>Date: 4.MAY.2017 21:17:20</p>
<p>8DPSK/LCH</p>	 <p>Ref 20 dBm - Att 20 dB - RBW 100 KHz - VBW 300 KHz - SWT 5 ms - Mask# 4 [T1] -26.78 dBm          2.40272600 GHz</p> <p>20 Offset 9.4 dB          Mask# 1 [T1] -26.33 dBm          2.40224000 GHz          Mask# 3 [T1] -26.33 dBm          2.40336000 GHz          Mask# 1 [T1] -26.33 dBm          2.40140000 GHz          Mask# 2 [T1] -26.33 dBm          2.40252000 GHz          Mask# 3 [T1] -26.33 dBm          2.40350000 GHz</p> <p>Center 2.402 GHz 200 kHz/ Span 2 MHz</p> <p>Date: 4.MAY.2017 21:18:59</p>
<p>8DPSK/MCH</p>	 <p>Ref 20 dBm - Att 20 dB - RBW 100 KHz - VBW 300 KHz - SWT 5 ms - Mask# 4 [T1] -25.09 dBm          2.44172600 GHz</p> <p>20 Offset 9.4 dB          Mask# 1 [T1] -24.73 dBm          2.44124000 GHz          Mask# 3 [T1] -24.73 dBm          2.44036000 GHz          Mask# 1 [T1] -24.73 dBm          2.44240000 GHz          Mask# 2 [T1] -24.73 dBm          2.44140000 GHz          Mask# 3 [T1] -24.73 dBm          2.44250000 GHz</p> <p>Center 2.441 GHz 200 kHz/ Span 2 MHz</p> <p>Date: 4.MAY.2017 21:20:16</p>



## 6.2. PEAK CONDUCTED OUTPUT POWER

### LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (b) (1) IC RSS-247 Clause 5.4 (b)	Peak Conducted Output Power	1 watt or 30dBm	2400-2483.5

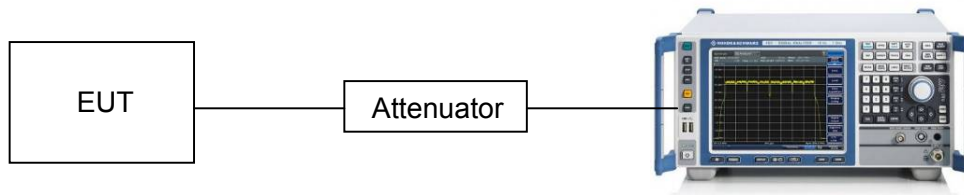
### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	> the 20 dB bandwidth of the emission being measured (e.g. 1 MHz for BT)
VBW	≥RBW
Span	approximately 5 times the 20 dB bandwidth, centered on a hopping channel
Trace	Max hold
Sweep time	Auto couple

Allow trace to fully stabilize and use peak marker function to determine the peak amplitude level.

**TEST SETUP**



**TEST CONDITIONS**

Temperature: 26.6°C  
Relative Humidity: 58%  
Test Voltage: AC 120V/60Hz

**RESULTS**

Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
GFSK	LCH	0.110	PASS
GFSK	MCH	1.450	PASS
GFSK	HCH	1.450	PASS
8-DPSK	LCH	1.090	PASS
8-DPSK	MCH	1.140	PASS
8-DPSK	HCH	0.480	PASS

### 6.3. CARRIER HOPPING CHANNEL SEPARATION

#### LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247 (a) (1) IC RSS-247 Clause 5.1 (2)	Carrier Hopping Channel Separation	25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.	2400-2483.5

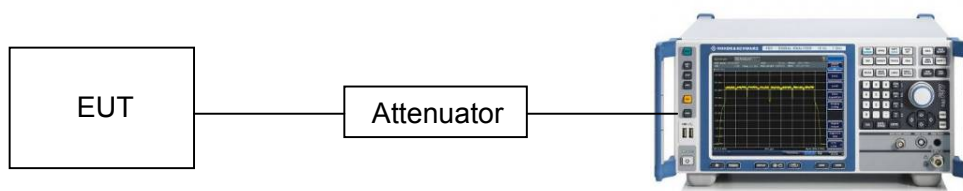
#### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
RBW	$\geq 1\%$ of the span
VBW	$\geq$ RBW
Trace	Max hold
Sweep time	Auto couple

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

#### TEST SETUP



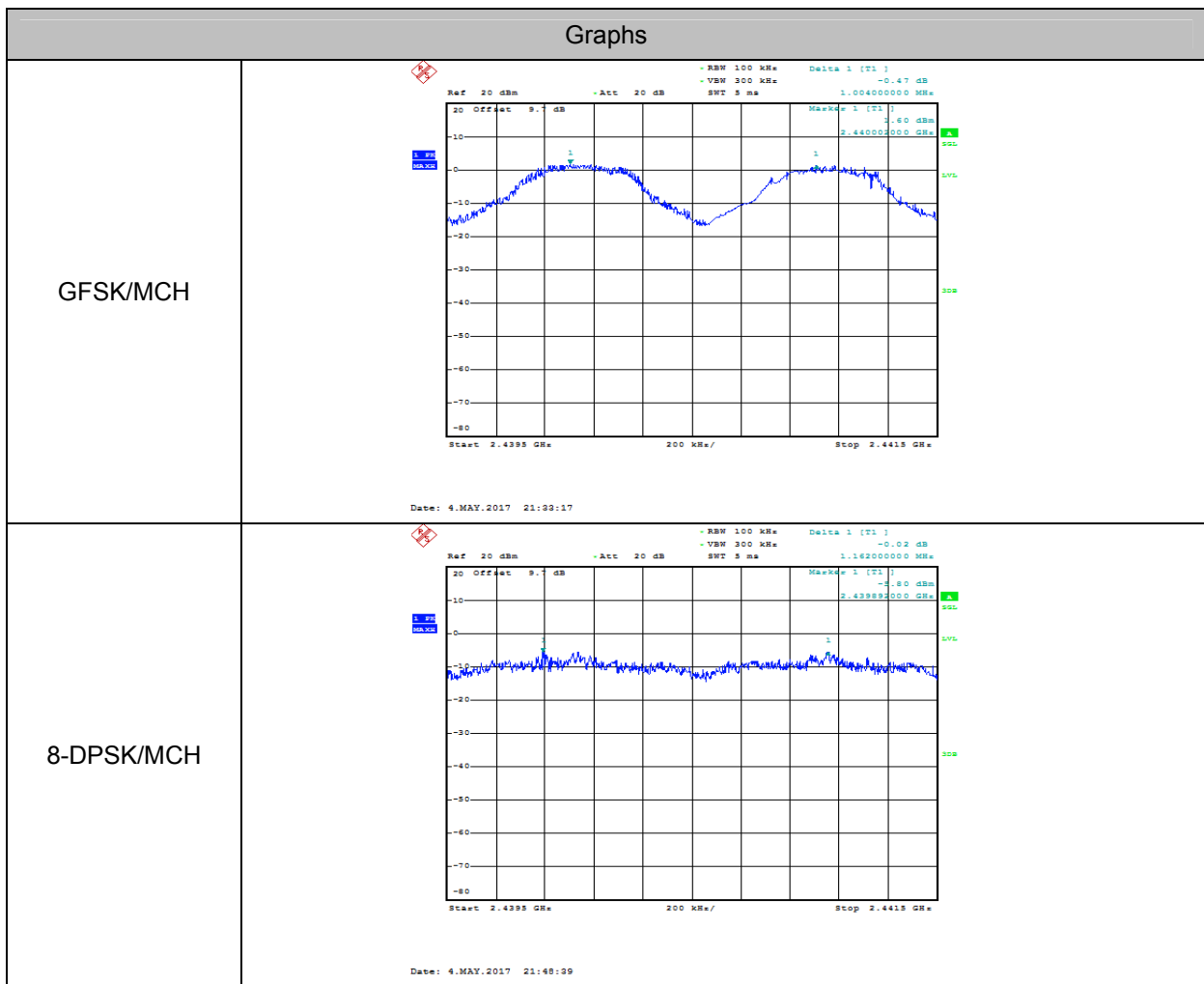
TEST CONDITIONS

Temperature: 28°C  
 Relative Humidity: 60%  
 Test Voltage: AC 120V/60Hz

RESULTS

Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	MCH	1.004	PASS
8-DPSK	MCH	1.162	PASS

Test Graph



## 6.4. NUMBER OF HOPPING FREQUENCY

### LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2		
Section	Test Item	Limit
15.247 (a) (1) III IC RSS-247 Clause 5.1	Number of Hopping Frequency	at least 15 hopping channels

### TEST PROCEDURE

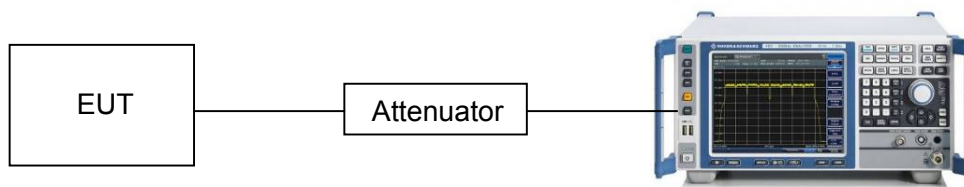
Connect the EUT to the spectrum analyser and use the following settings:

Detector	Peak
RBW	1% of the span
VBW	$\geq$ RBW
Span	The frequency band of operation
Trace	Max hold
Sweep time	Auto couple

Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.

Count the quantity of peaks to get the number of hopping channels.

### TEST SETUP



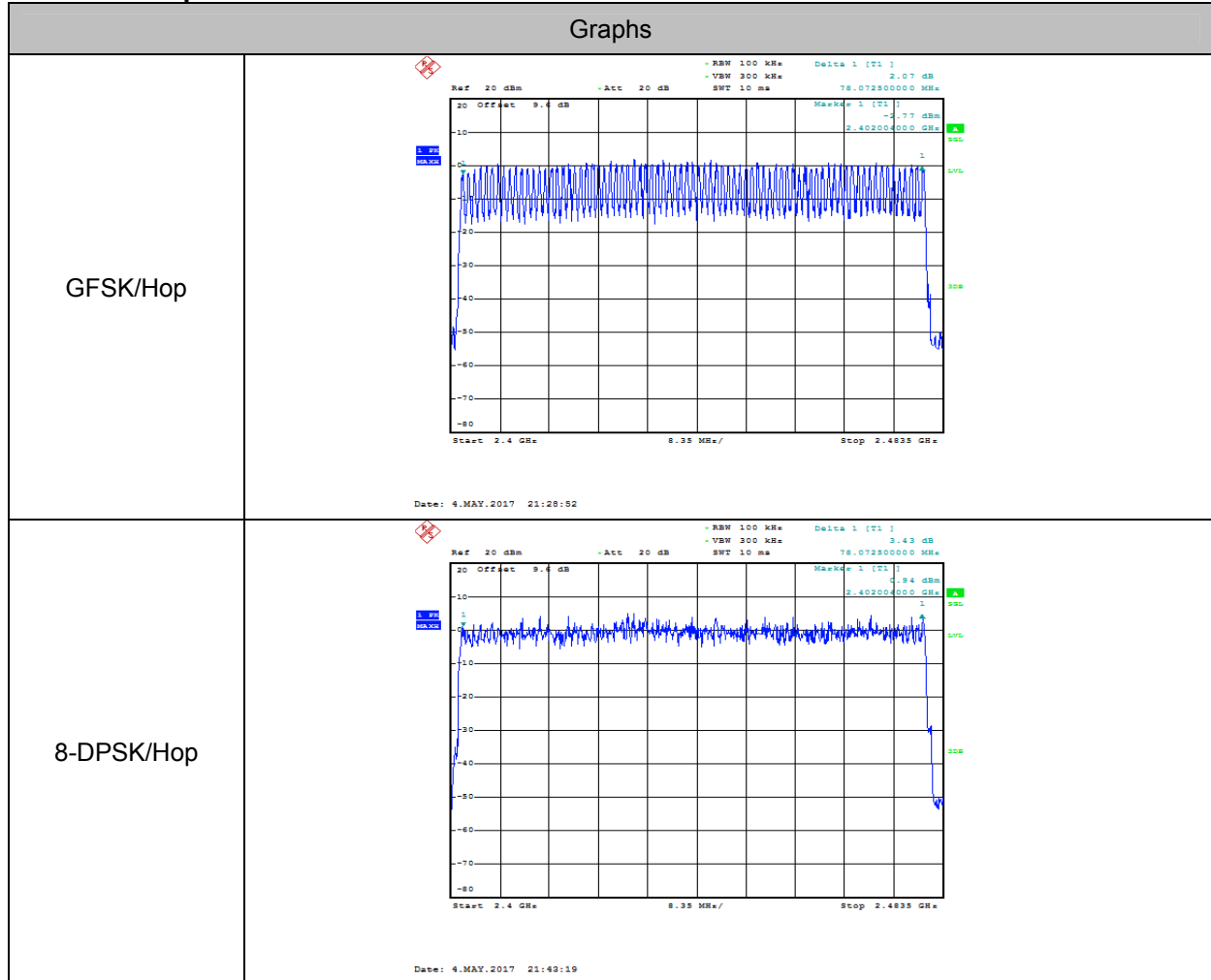
### TEST CONDITIONS

Temperature: 26.6°C  
 Relative Humidity: 58%  
 Test Voltage: AC 120V/60HZ

**RESULTS**

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	79	PASS
8-DPSK	Hop	79	PASS

**Test Graph**



## 6.5. TIME OF OCCUPANCY (DWELL TIME)

### LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2		
Section	Test Item	Limit
15.247 (a) (1) III IC RSS-247 Clause 5.1	Time of Occupancy (Dwell Time)	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed.

### TEST PROCEDURE

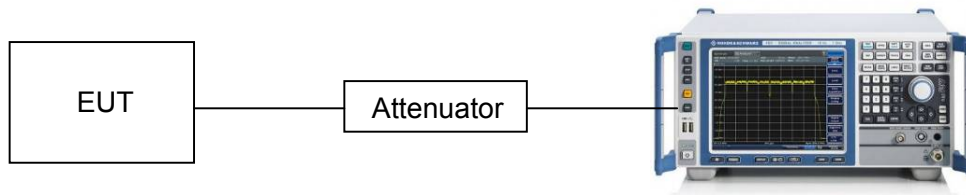
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	1 MHz
VBW	≥RBW
Span	zero span
Trace	Max hold
Sweep time	As necessary to capture the entire dwell time per hopping channel

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- 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.
- e. Set the center frequency on any frequency would be measure and set the frequency span to 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.
  - A Period Time = (channel number)\*0.4
  - DH1 Time Slot: Reading \* (1600/2)\*31.6/(channel number)
  - DH3 Time Slot: Reading \* (1600/4)\*31.6/(channel number)
  - DH5 Time Slot: Reading \* (1600/6)\*31.6/(channel number)



**TEST SETUP**



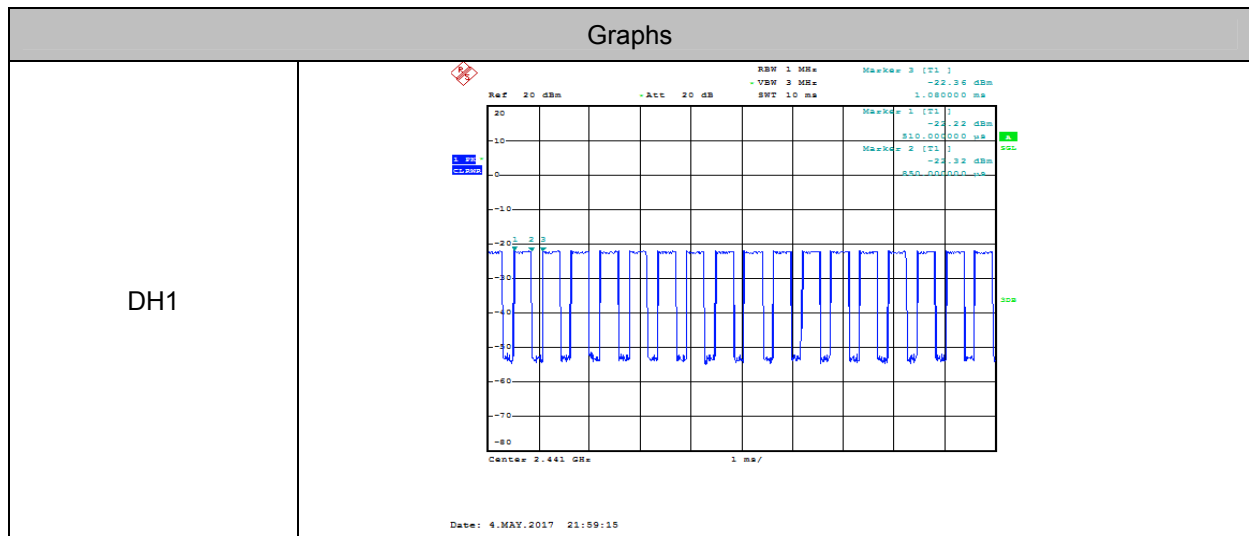
**TEST CONDITIONS**

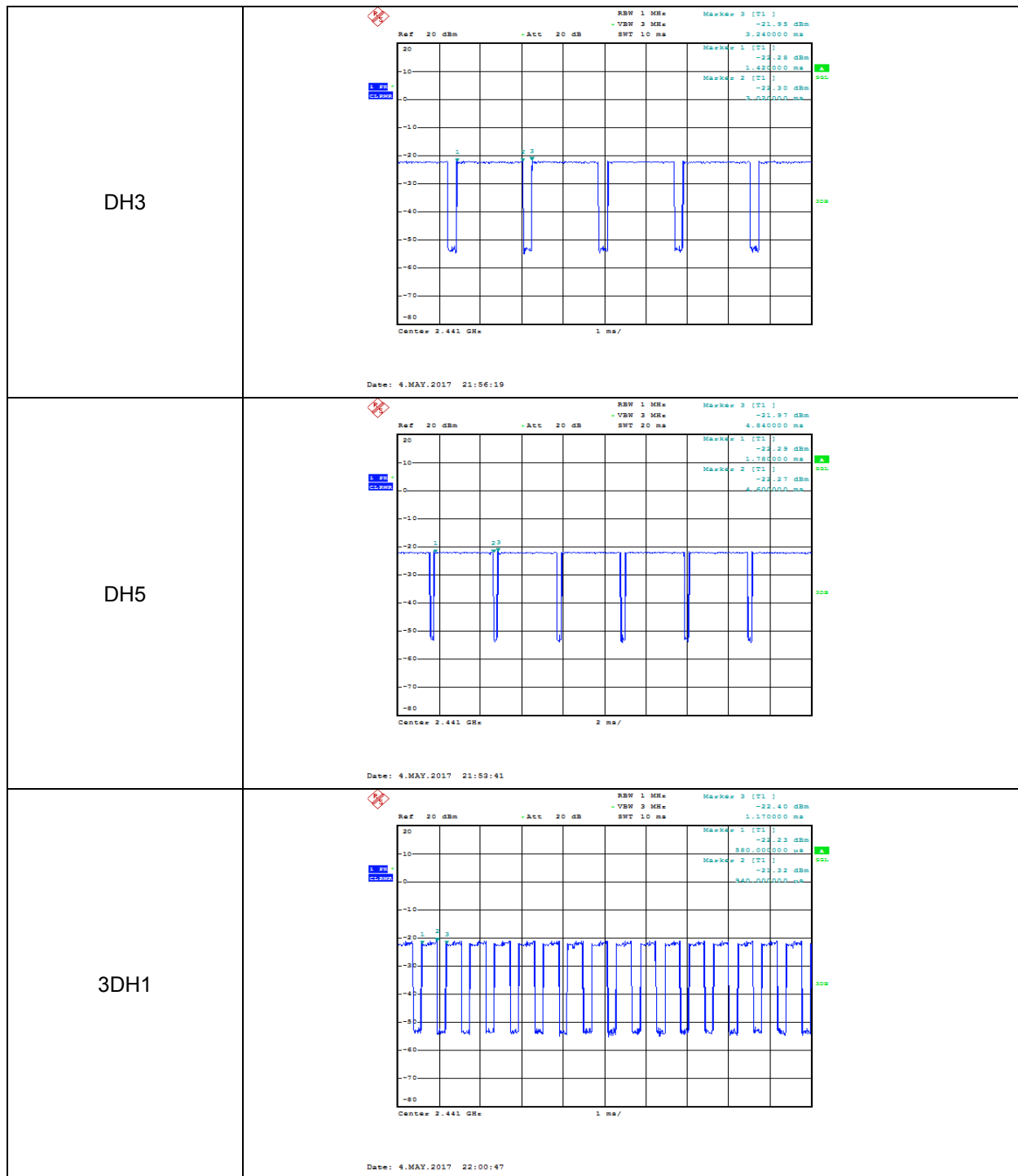
Temperature: 28°C  
 Relative Humidity: 60%  
 Test Voltage: AC 120V/60Hz

**RESULTS**

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Verdict
Tx mode	DH1	MCH	0.34	320	0.109	PASS
Tx mode	DH3	MCH	1.6	160	0.256	PASS
Tx mode	DH5	MCH	2.82	106.7	0.301	PASS
Tx mode	3DH1	MCH	0.36	320	0.115	PASS
Tx mode	3DH3	MCH	1.63	160	0.261	PASS
Tx mode	3DH5	MCH	2.84	106.7	0.303	PASS

**Test Graph**







## 6.6. CONDUCTED BANDEGE AND SPURIOUS EMISSIONS

### LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2		
Section	Test Item	Limit
FCC §15.247 (d) IC RSS-247 5.5	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

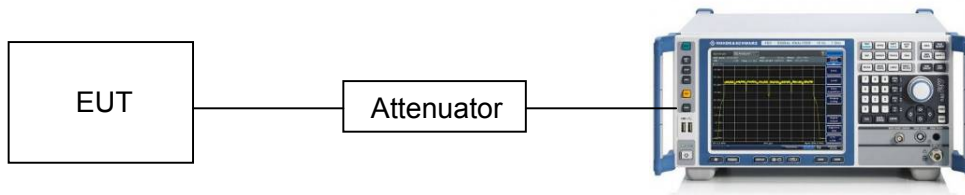
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

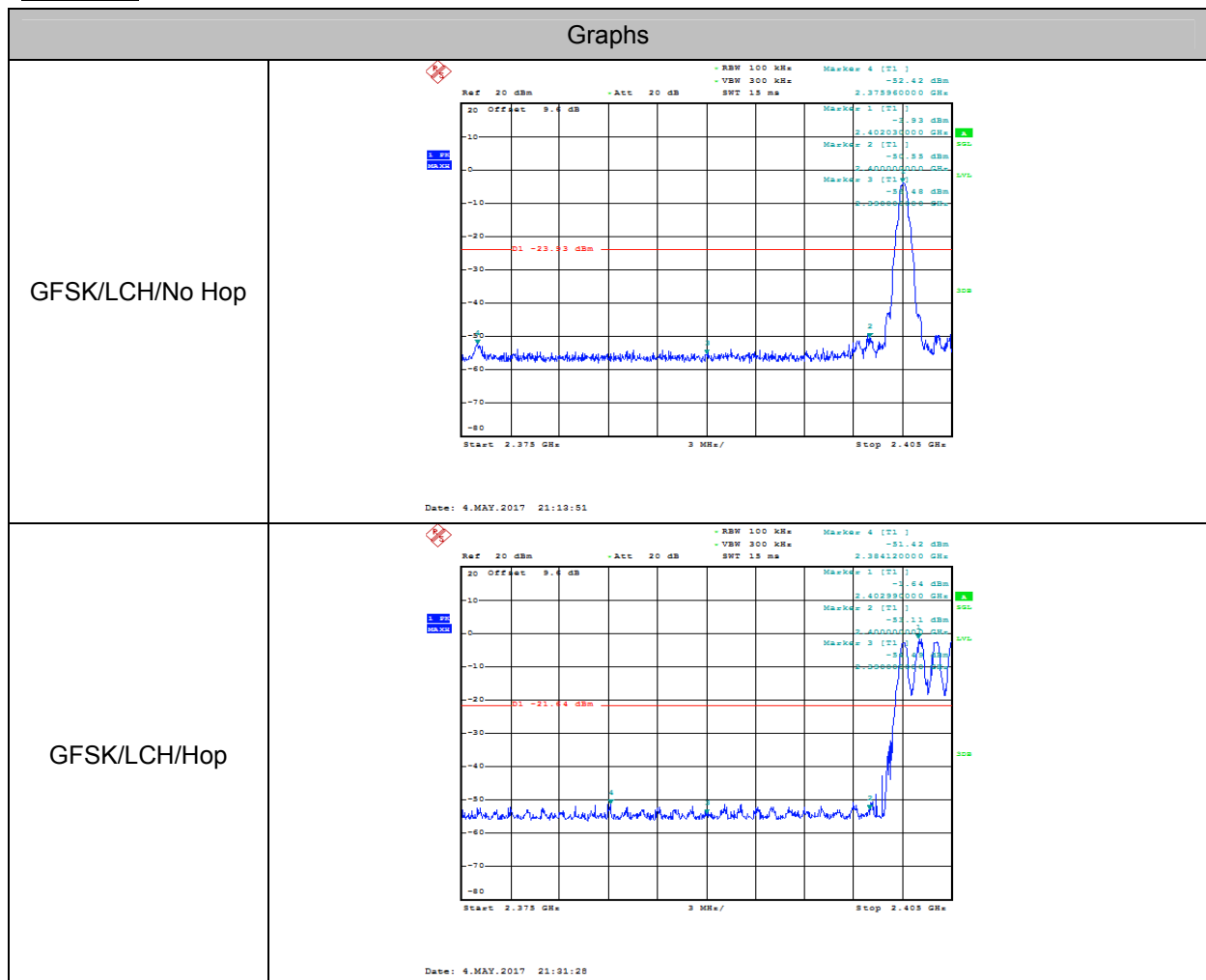
**TEST SETUP**



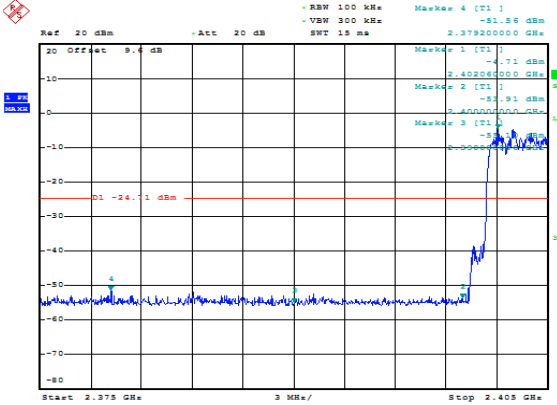
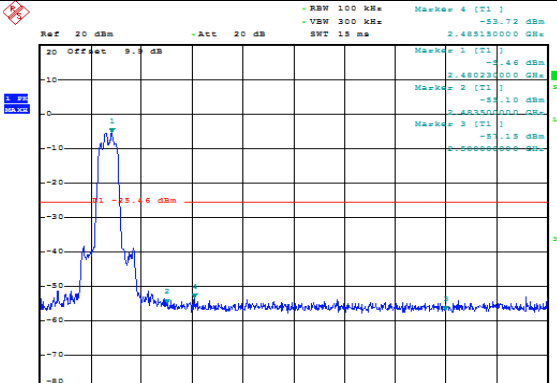
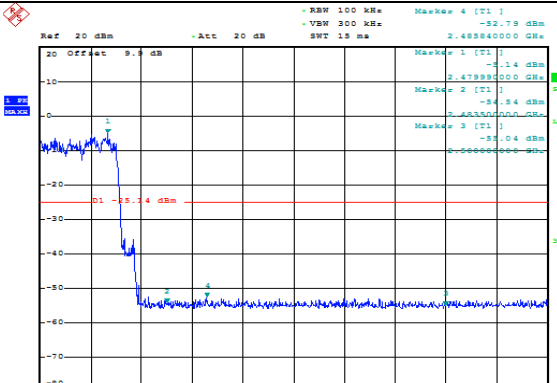
**TEST CONDITIONS**

Temperature: 26.6°C  
 Relative Humidity: 58%  
 Test Voltage: AC 120V/60Hz

**RESULTS**



<p>GFSK/HCH/No Hop</p>	<p>Date: 4.MAY.2017 21:17:58</p>
<p>GFSK/HCH/Hop</p>	<p>Date: 4.MAY.2017 21:35:16</p>
<p>8DPSK/LCH/No Hop</p>	<p>Date: 4.MAY.2017 21:19:32</p>

<p>8DPSK/LCH/Hop</p>	 <p>Ref 20 dBm - Att 20 dB          -RBW 100 kHz - VSW 300 kHz - SWT 15 ms          Marked 4 [T1] -51.56 dBm          2.37920000 GHz</p> <p>20 Offset 9.6 dB          Marked 1 [T1] -7.91 dBm          2.40200000 GHz          Marked 2 [T1] -51.91 dBm          2.40200000 GHz          Marked 3 [T1] -51.91 dBm          2.40200000 GHz</p> <p>D1 -24.71 dBm</p> <p>Start 2.375 GHz 3 MHz/ Stop 2.405 GHz</p> <p>Date: 4.MAY.2017 21:46:41</p>
<p>8DPSK/HCH/No Hop</p>	 <p>Ref 20 dBm - Att 20 dB          -RBW 100 kHz - VSW 300 kHz - SWT 15 ms          Marked 4 [T1] -53.72 dBm          2.48130000 GHz</p> <p>20 Offset 9.6 dB          Marked 1 [T1] -4.48 dBm          2.48023000 GHz          Marked 2 [T1] -51.10 dBm          2.48023000 GHz          Marked 3 [T1] -51.15 dBm          2.48023000 GHz</p> <p>D1 -25.46 dBm</p> <p>Start 2.476 GHz 3 MHz/ Stop 2.506 GHz</p> <p>Date: 4.MAY.2017 21:21:49</p>
<p>8DPSK/HCH/Hop</p>	 <p>Ref 20 dBm - Att 20 dB          -RBW 100 kHz - VSW 300 kHz - SWT 15 ms          Marked 4 [T1] -52.79 dBm          2.48864000 GHz</p> <p>20 Offset 9.6 dB          Marked 1 [T1] -1.14 dBm          2.47939000 GHz          Marked 2 [T1] -34.94 dBm          2.48023000 GHz          Marked 3 [T1] -51.04 dBm          2.48023000 GHz</p> <p>D1 -25.24 dBm</p> <p>Start 2.476 GHz 3 MHz/ Stop 2.506 GHz</p> <p>Date: 4.MAY.2017 21:50:51</p>

## 7. RADIATED TEST RESULTS

### 7.1. LIMITS AND PROCEDURE

#### LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to IC RSS-GEN Clause 8.9 (Transmitter)

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

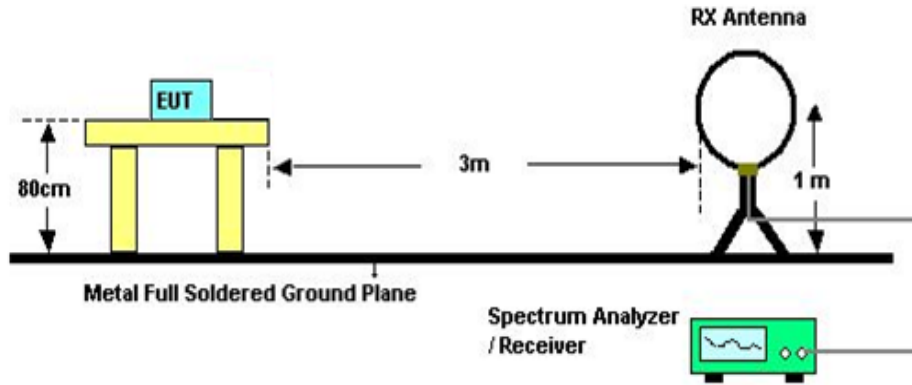
#### TEST CONDITIONS

Temperature: 22.2°C  
 Relative Humidity: 61.2%  
 Test Voltage: AC 120V/60Hz



**TEST SETUP AND PROCEDURE**

Below 30MHz

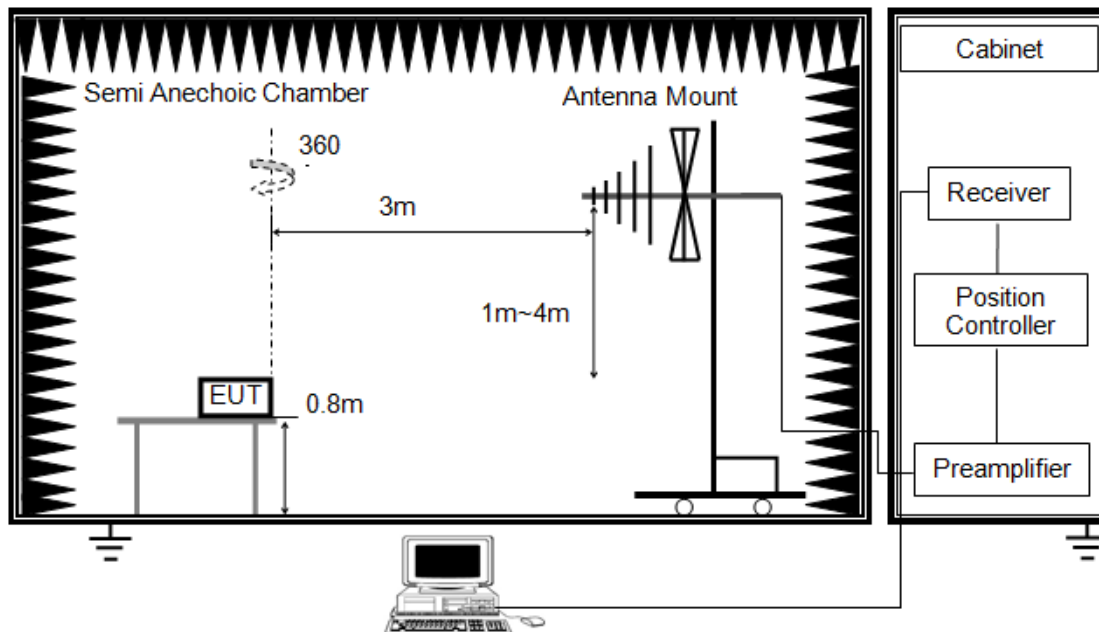


The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, 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. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Below 1G

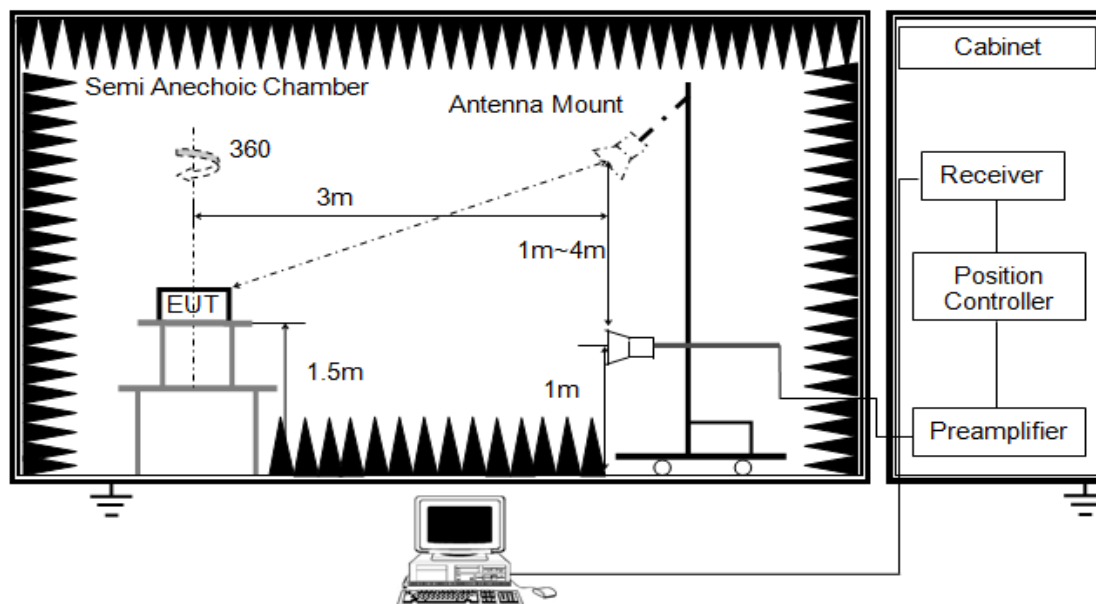


The setting of the spectrum analyser

RBW	120KHz
VBW	300KHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading:  $\text{Antenna Factor} + \text{Cable Loss} + \text{Read Level} - \text{Preamp Factor} = \text{Level}$
6. For measurement below 1GHz, 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. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration)

ABOVE 1G



The setting of the spectrum analyser

RBW	1MHz
VBW	3MHz
Sweep	Auto
Detector	Peak and CISPR Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement above 1GHz, the emission measurement will be measured by the peak detector and the AV detector.
7. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration)

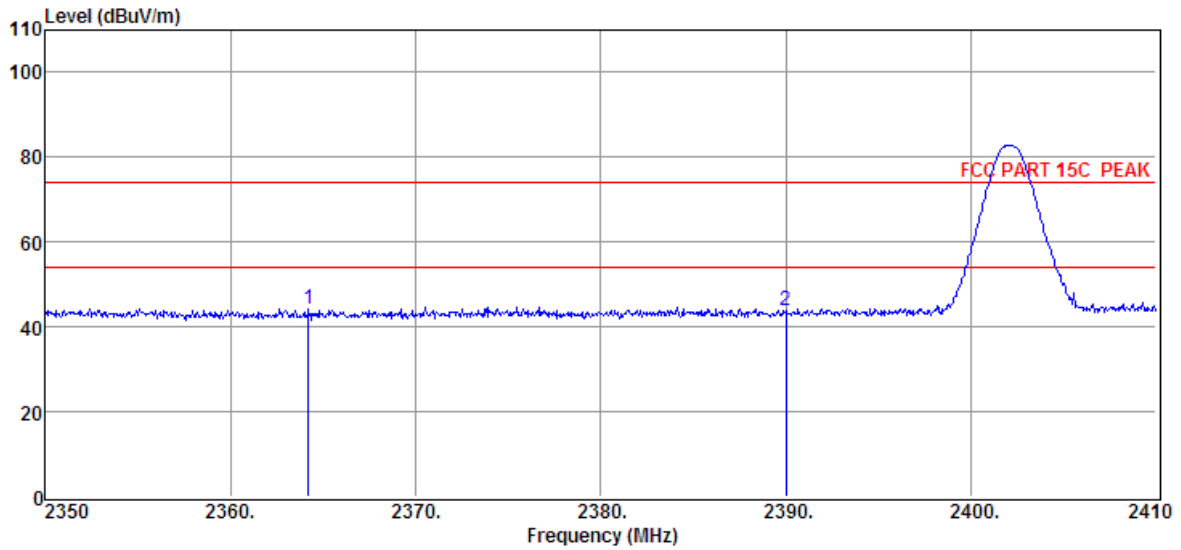
**TEST CONDITIONS**

Temperature: 22.2°C  
 Relative Humidity: 61%  
 Test Voltage: AC 120V/60Hz

## 7.2. RESTRICTED BANDEDGE

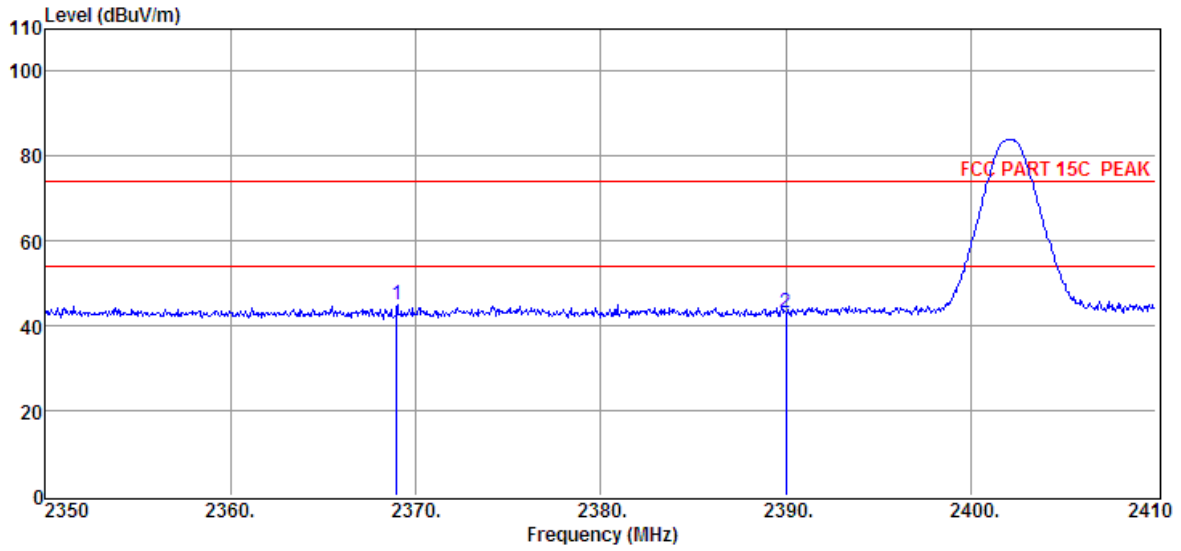
### 7.2.1. GFSK MODE

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



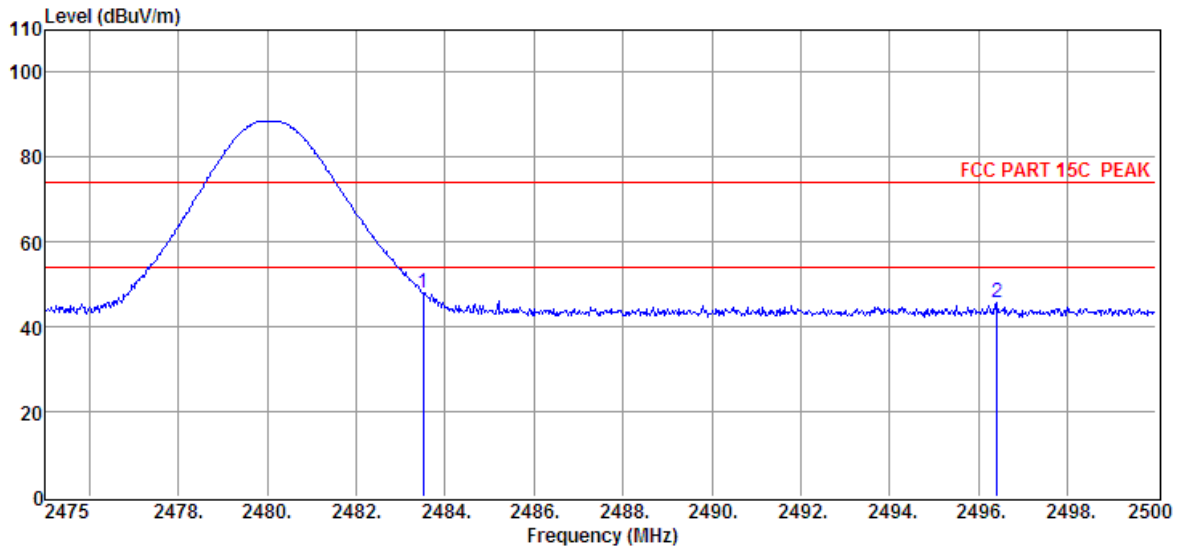
Item (Mark)	Freq. (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Over Limit (dB)	Detector	Polarization
1	2364.22	38.04	29.67	29.37	5.98	44.32	74.00	-29.68	Peak	HORIZONTAL
2	2390.00	37.53	29.78	29.41	6.01	43.91	74.00	-30.09	Peak	HORIZONTAL

**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



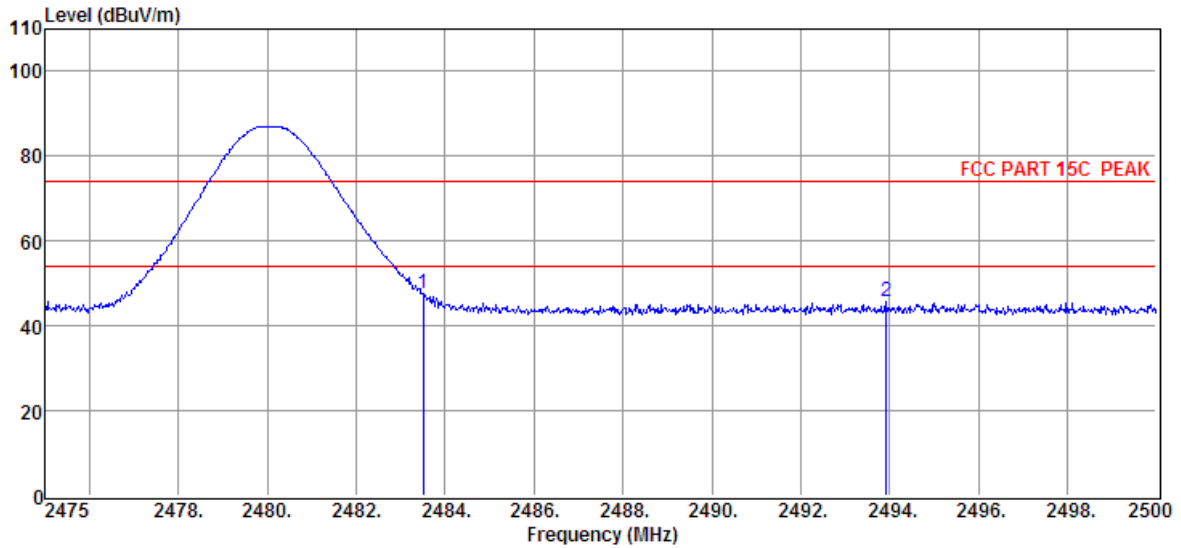
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2369.00	38.56	29.69	29.37	5.98	44.86	74.00	-29.14	Peak	VERTICAL
2	2390.00	36.75	29.78	29.41	6.01	43.13	74.00	-30.87	Peak	VERTICAL

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detecto r	Polarization
1	2483.50	41.27	30.14	29.71	6.15	47.85	74.00	-26.15	Peak	HORIZONTAL
2	2496.43	39.19	30.19	29.75	6.15	45.78	74.00	-28.22	Peak	HORIZONTAL

**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

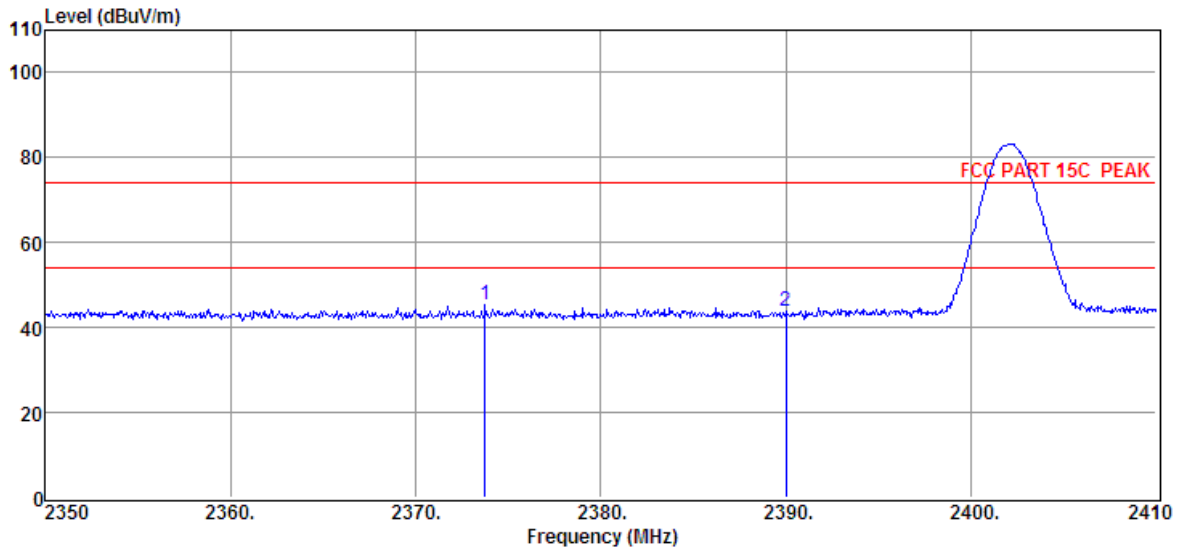


Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	41.22	30.14	29.71	6.15	47.80	74.00	-26.20	Peak	VERTICAL
2	2493.93	39.01	30.18	29.73	6.15	45.61	74.00	-28.39	Peak	VERTICAL

Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

### 7.2.2. 8-DPSK MODE

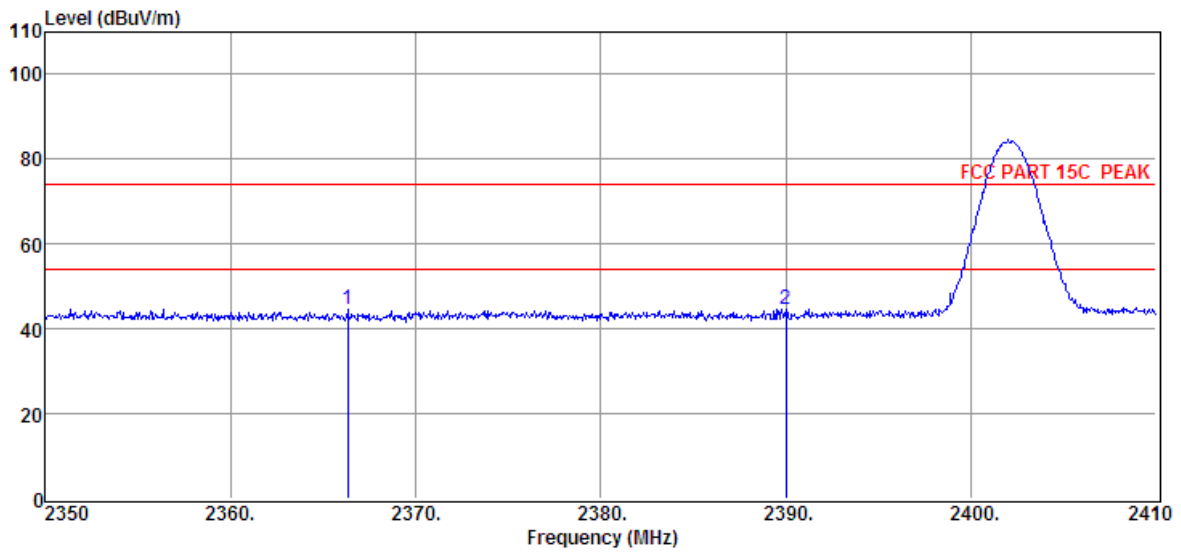
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Item (Mark)	Freq. (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Over Limit (dB)	Detector	Polarization
1	2373.76	39.04	29.71	29.38	5.98	45.35	74.00	-28.65	Peak	HORIZONTAL
2	2390.00	37.48	29.78	29.41	6.01	43.86	74.00	-30.14	Peak	HORIZONTAL

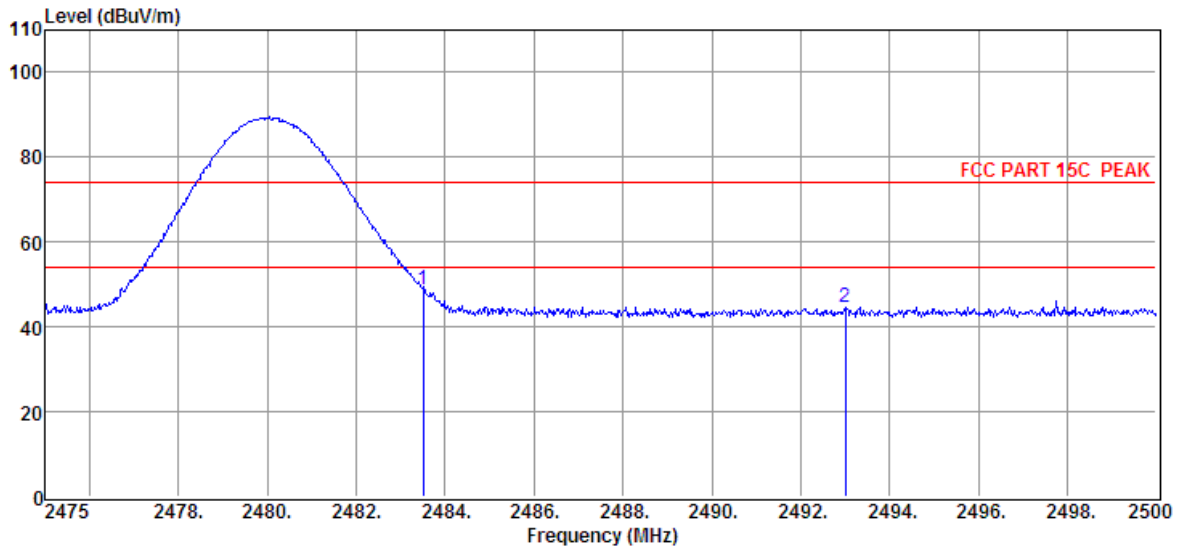


**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



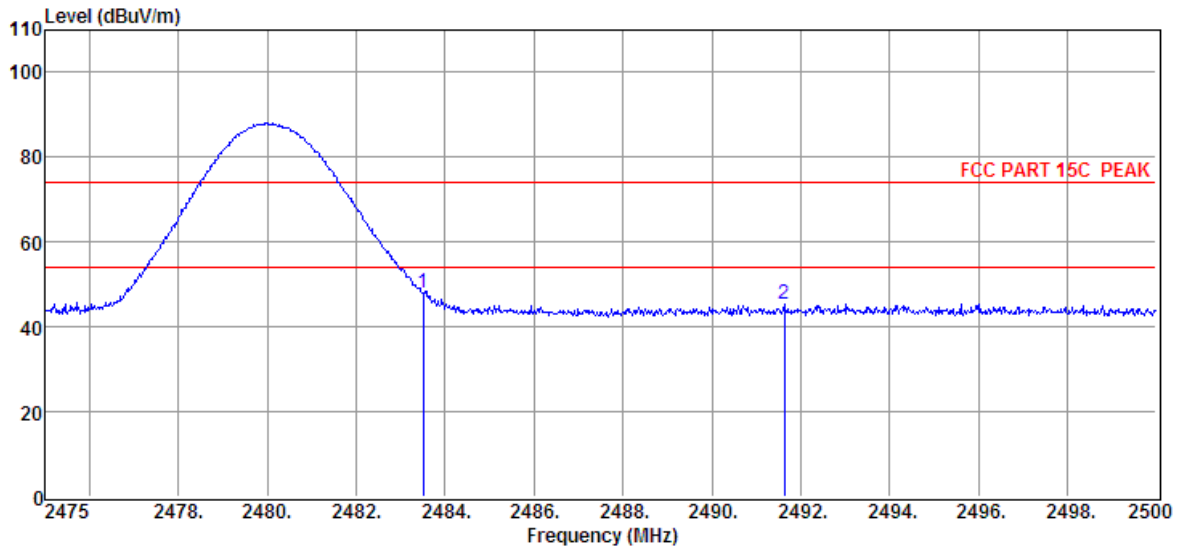
Item (Mark)	Freq. (MHz)	Read Level (dB $\mu$ V)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Over Limit (dB)	Detector	Polarization
1	2366.32	38.44	29.68	29.37	5.98	44.73	74.00	-29.27	Peak	VERTICAL
2	2390.00	38.27	29.78	29.41	6.01	44.65	74.00	-29.35	Peak	VERTICAL

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Facto r dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	42.11	30.14	29.71	6.15	48.69	74.00	-25.31	Peak	HORIZONTAL
2	2493.00	38.06	30.17	29.73	6.15	44.65	74.00	-29.35	Peak	HORIZONTAL

**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	41.37	30.14	29.71	6.15	47.95	74.00	-26.05	Peak	VERTICAL
2	2491.63	38.62	30.17	29.73	6.15	45.21	74.00	-28.79	Peak	VERTICAL

Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

### 7.3. SPURIOUS EMISSIONS (1~25GHz)

#### HARMONICS AND SPURIOUS EMISSIONS

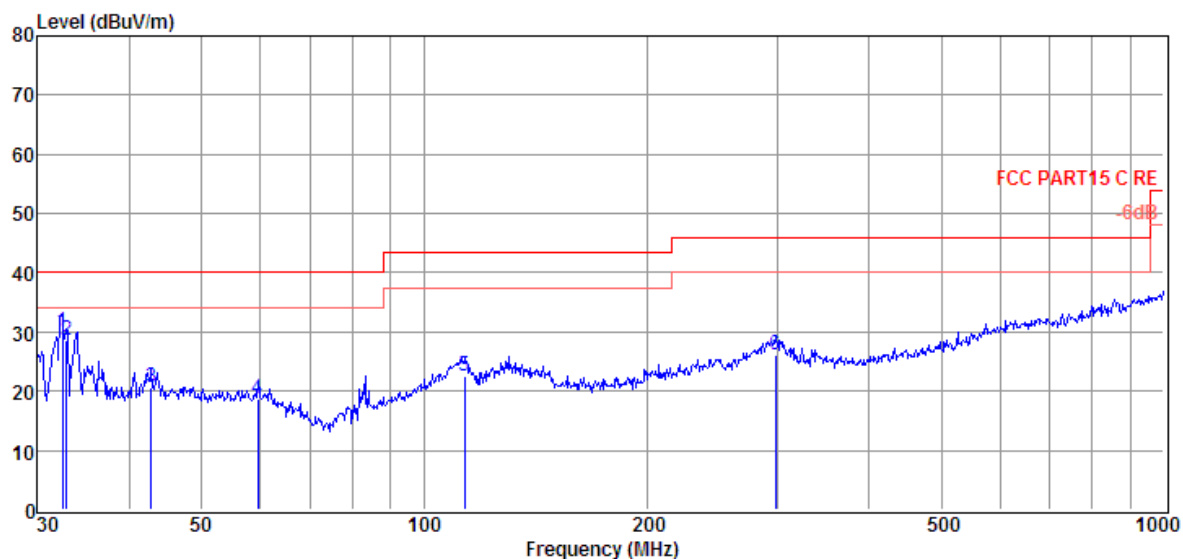
Freq (MHz)	Read level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector type	Polarization
GFSK Tx mode 2402MHz									
3569.00	35.09	32.12	29.40	7.34	45.15	74.00	-28.85	Peak	VERTICAL
4717.00	34.18	33.76	29.30	8.39	47.03	74.00	-26.97	Peak	VERTICAL
5158.00	34.04	34.03	29.33	8.84	47.58	74.00	-26.42	Peak	VERTICAL
6089.00	32.95	35.15	29.26	9.73	48.57	74.00	-25.43	Peak	VERTICAL
6929.00	33.26	36.14	30.34	10.37	49.43	74.00	-24.57	Peak	VERTICAL
7713.00	33.51	36.64	30.99	10.98	50.14	74.00	-23.86	Peak	VERTICAL
3541.00	35.96	32.03	29.45	7.32	45.86	74.00	-28.14	Peak	HORIZONTAL
3940.00	34.64	33.23	29.07	7.58	46.38	74.00	-27.62	Peak	HORIZONTAL
4654.00	33.64	33.77	29.28	8.31	46.44	74.00	-27.56	Peak	HORIZONTAL
5788.00	32.75	34.88	29.21	9.47	47.89	74.00	-26.11	Peak	HORIZONTAL
6824.00	32.95	36.06	30.25	10.26	49.02	74.00	-24.98	Peak	HORIZONTAL
7706.00	33.35	36.64	30.97	10.97	49.99	74.00	-24.01	Peak	HORIZONTAL
GFSK Tx mode 2441MHz									
3555.00	35.60	32.08	29.41	7.33	45.60	74.00	-28.40	Peak	VERTICAL
3933.00	35.60	33.21	29.07	7.57	47.31	74.00	-26.69	Peak	VERTICAL
4605.00	34.71	33.78	29.26	8.27	47.50	74.00	-26.50	Peak	VERTICAL
6103.00	33.05	35.17	29.27	9.74	48.69	74.00	-25.31	Peak	VERTICAL
6600.00	33.69	35.88	30.03	10.05	49.59	74.00	-24.41	Peak	VERTICAL
7727.00	33.41	36.65	30.99	10.98	50.05	74.00	-23.95	Peak	VERTICAL
3541.00	35.43	32.03	29.45	7.32	45.33	74.00	-28.67	Peak	HORIZONTAL
3933.00	34.76	33.21	29.07	7.57	46.47	74.00	-27.53	Peak	HORIZONTAL
5221.00	32.91	34.15	29.32	8.91	46.65	74.00	-27.35	Peak	HORIZONTAL
6047.00	33.51	35.08	29.23	9.71	49.07	74.00	-24.93	Peak	HORIZONTAL
6978.00	33.16	36.18	30.37	10.42	49.39	74.00	-24.61	Peak	HORIZONTAL
7832.00	33.05	36.67	31.06	11.04	49.70	74.00	-24.30	Peak	HORIZONTAL
GFSK Tx mode 2480MHz									
3212.00	36.71	31.79	30.03	7.00	45.47	74.00	-28.53	Peak	VERTICAL
4682.00	33.52	33.76	29.29	8.35	46.34	74.00	-27.66	Peak	VERTICAL
5333.00	33.09	34.38	29.31	9.02	47.18	74.00	-26.82	Peak	VERTICAL
6194.00	32.89	35.32	29.36	9.78	48.63	74.00	-25.37	Peak	VERTICAL
6929.00	32.76	36.14	30.34	10.37	48.93	74.00	-25.07	Peak	VERTICAL
7475.00	33.11	36.58	30.75	10.83	49.77	74.00	-24.23	Peak	VERTICAL
3380.00	36.11	31.85	29.83	7.17	45.30	74.00	-28.70	Peak	HORIZONTAL
4010.00	34.98	33.41	29.04	7.61	46.96	74.00	-27.04	Peak	HORIZONTAL
5473.00	33.31	34.65	29.27	9.16	47.85	74.00	-26.15	Peak	HORIZONTAL
6600.00	33.40	35.88	30.03	10.05	49.30	74.00	-24.70	Peak	HORIZONTAL
6978.00	34.99	36.18	30.37	10.42	51.22	74.00	-22.78	Peak	HORIZONTAL
7342.00	33.08	36.48	30.61	10.72	49.67	74.00	-24.33	Peak	HORIZONTAL
Result: Pass									
Note1: 1.30MHz~18GHz: (Scan with GFSK, π/4 QPSK, 8-DPSK, the worst case is GFSK Mode) 2. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor. Note2: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.									

## 7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

### 7.4.1. GFSK MODE

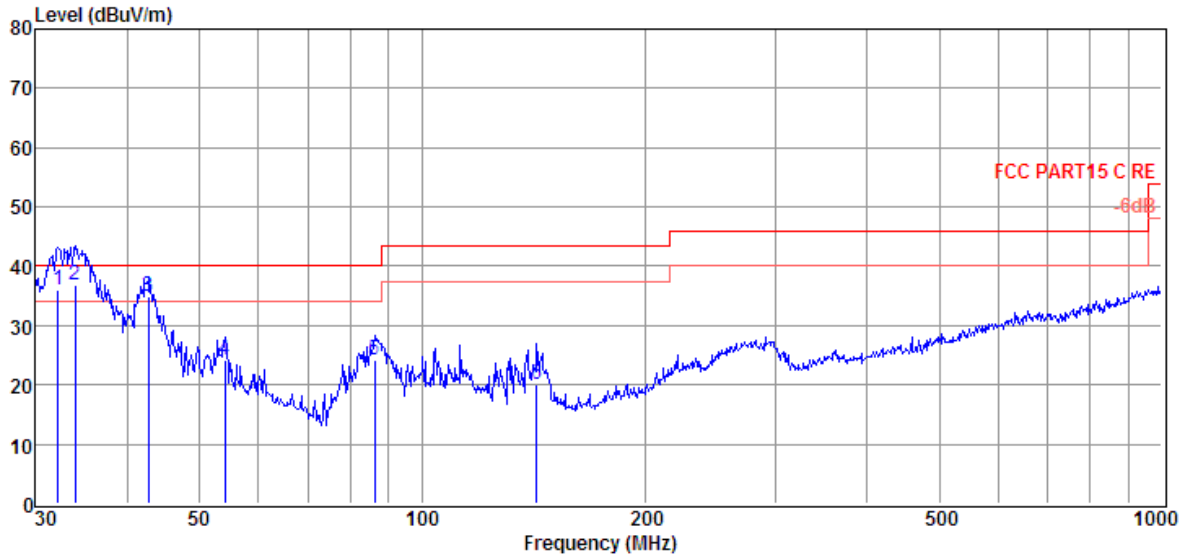
#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Polarization:	HORIZONTAL
Remark:	Adapter 1		



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	32.41	14.90	11.44	3.69	30.03	40.00	-9.97	QP	HORIZONTAL
2	32.86	13.34	11.49	3.71	28.54	40.00	-11.46	QP	HORIZONTAL
3	42.75	4.41	12.46	3.82	20.69	40.00	-19.31	QP	HORIZONTAL
4	59.65	2.95	11.70	3.98	18.63	40.00	-21.37	QP	HORIZONTAL
5	113.32	7.58	10.60	4.38	22.56	43.50	-20.94	QP	HORIZONTAL
6	298.27	7.29	13.40	5.37	26.06	46.00	-19.94	QP	HORIZONTAL

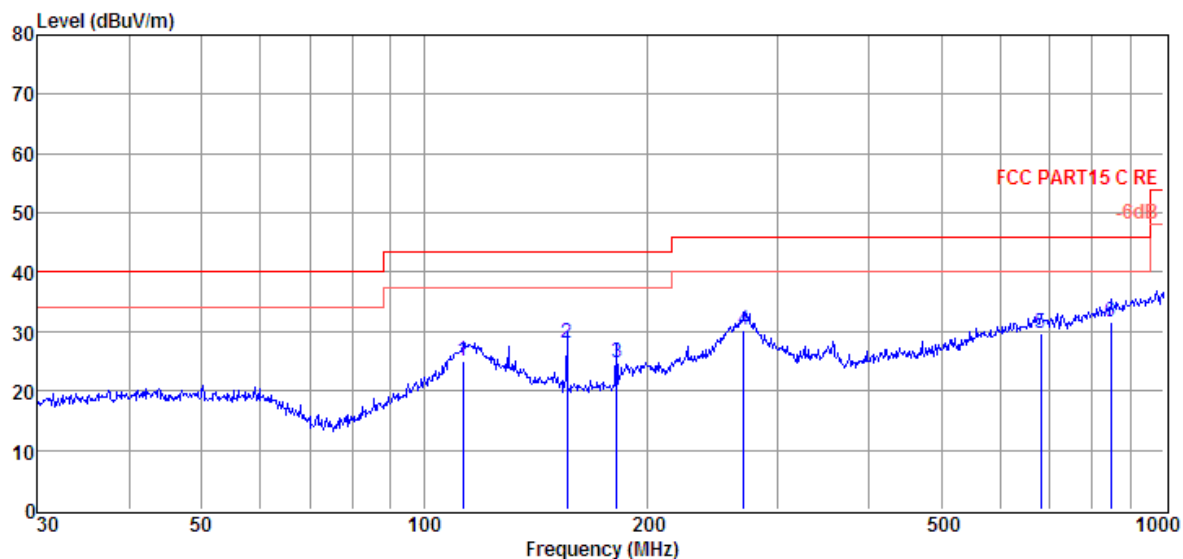
Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Polarization:	VERTICAL
Remark:	Adapter 1		



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	32.18	20.93	11.42	3.69	36.04	40.00	-3.96	QP	VERTICAL
2	33.92	21.45	11.59	3.72	36.76	40.00	-3.24	QP	VERTICAL
3	42.60	18.62	12.47	3.82	34.91	40.00	-5.09	QP	VERTICAL
4	54.07	8.45	11.70	3.93	24.08	40.00	-15.92	QP	VERTICAL
5	86.20	10.70	9.42	4.19	24.31	40.00	-15.69	QP	VERTICAL
6	142.82	8.05	7.40	4.56	20.01	43.50	-23.49	QP	VERTICAL

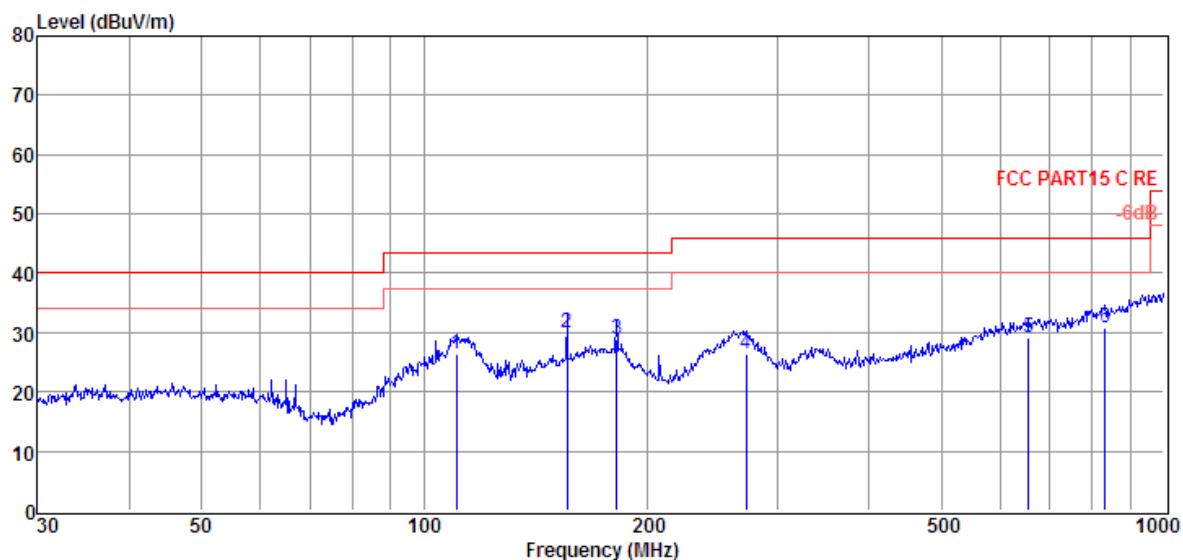
Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Polarization:	HORIZONTAL
Remark:	Adapter 2		



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	112.92	10.07	10.65	4.38	25.10	43.50	-18.40	QP	HORIZONTAL
2	155.91	15.46	7.86	4.64	27.96	43.50	-15.54	QP	HORIZONTAL
3	181.92	10.42	9.43	4.79	24.64	43.50	-18.86	QP	HORIZONTAL
4	270.38	12.06	12.87	5.24	30.17	46.00	-15.83	QP	HORIZONTAL
5	682.35	3.01	19.88	6.77	29.66	46.00	-16.34	QP	HORIZONTAL
6	848.06	2.49	21.74	7.26	31.49	46.00	-14.51	QP	HORIZONTAL

Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Polarization:	VERTICAL
Remark:	Adapter 2		



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	110.57	11.02	10.93	4.37	26.32	43.50	-17.18	QP	VERTICAL
2	155.91	17.57	7.86	4.64	30.07	43.50	-13.43	QP	VERTICAL
3	181.92	14.75	9.43	4.79	28.97	43.50	-14.53	QP	VERTICAL
4	272.28	8.30	12.72	5.25	26.27	46.00	-19.73	QP	VERTICAL
5	656.53	2.88	19.57	6.69	29.14	46.00	-16.86	QP	VERTICAL
6	833.32	1.97	21.50	7.22	30.69	46.00	-15.31	QP	VERTICAL

Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

### 7.5. SPURIOUS EMISSIONS BELOW 30M

Note 1: The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Note 2: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.



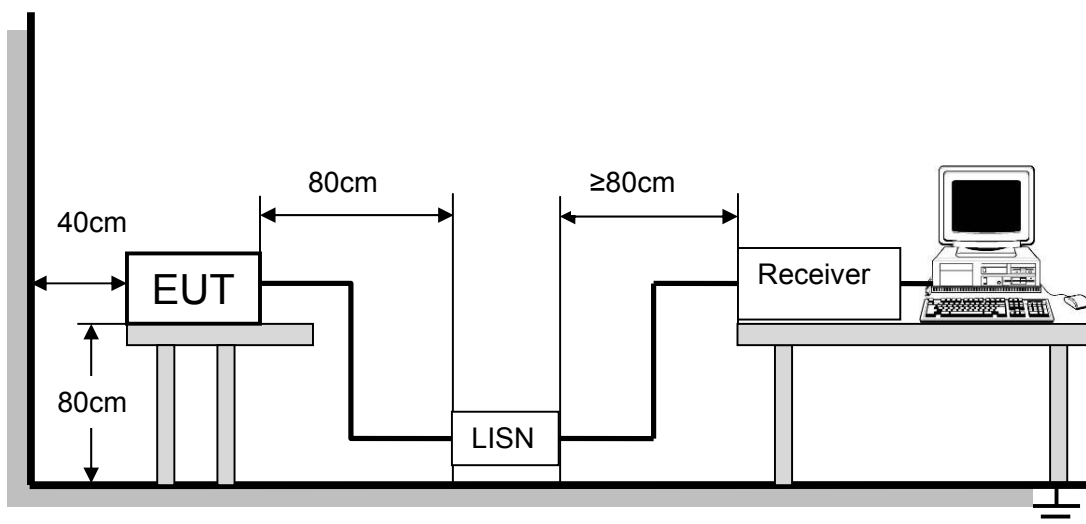
## 8. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

### TEST SETUP AND PROCEDURE

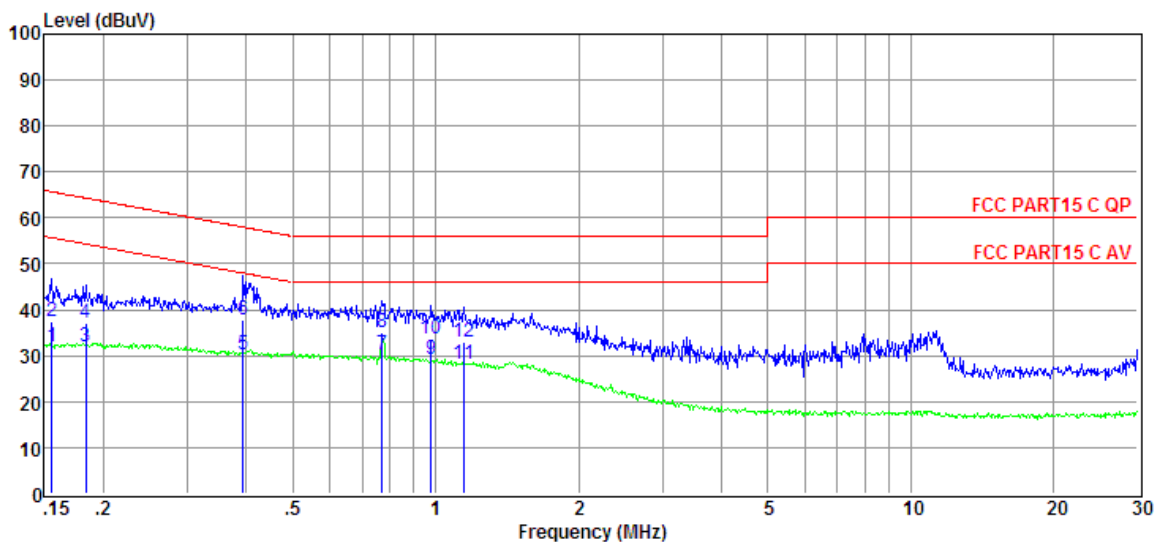


The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4-2014. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

### TEST RESULTS

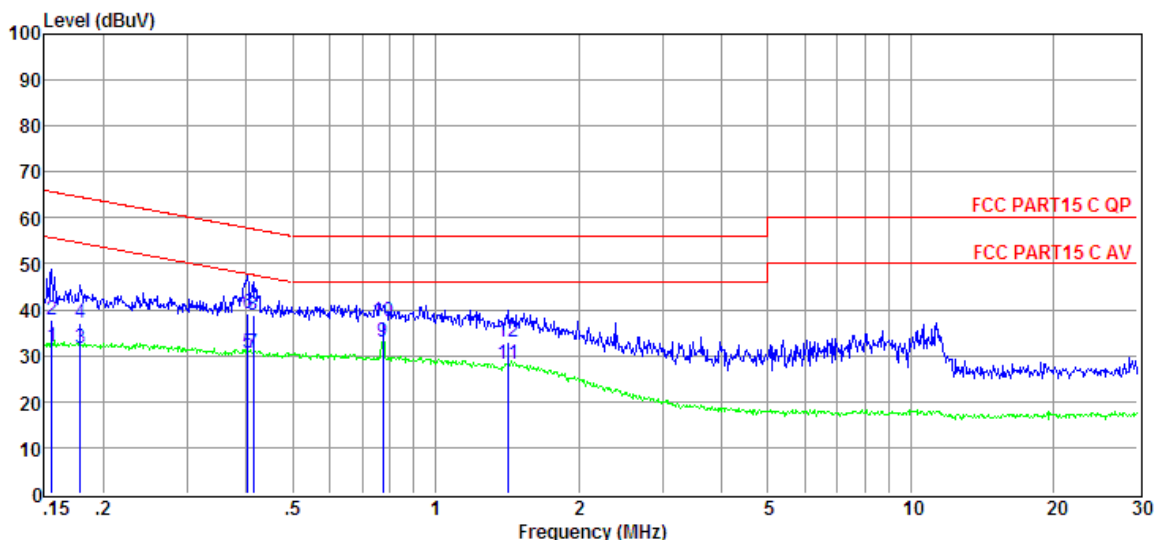
Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Phase :	L1
Remark:	Adapter 1		



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.16	12.49	9.61	0.02	9.86	31.98	55.69	-23.71	Average	LINE
2	0.16	17.80	9.61	0.02	9.86	37.29	65.69	-28.40	QP	LINE
3	0.18	12.55	9.61	0.02	9.86	32.04	54.33	-22.29	Average	LINE
4	0.18	17.71	9.61	0.02	9.86	37.20	64.33	-27.13	QP	LINE
5	0.39	10.92	9.61	0.02	9.86	30.41	47.99	-17.58	Average	LINE
6	0.39	18.48	9.61	0.02	9.86	37.97	57.99	-20.02	QP	LINE
7	0.77	10.82	9.61	0.03	9.86	30.32	46.00	-15.68	Average	LINE
8	0.77	15.40	9.61	0.03	9.86	34.90	56.00	-21.10	QP	LINE
9	0.98	9.60	9.61	0.03	9.86	29.10	46.00	-16.90	Average	LINE
10	0.98	14.31	9.61	0.03	9.86	33.81	56.00	-22.19	QP	LINE
11	1.15	8.54	9.61	0.03	9.86	28.04	46.00	-17.96	Average	LINE
12	1.15	13.52	9.61	0.03	9.86	33.02	56.00	-22.98	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.  
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

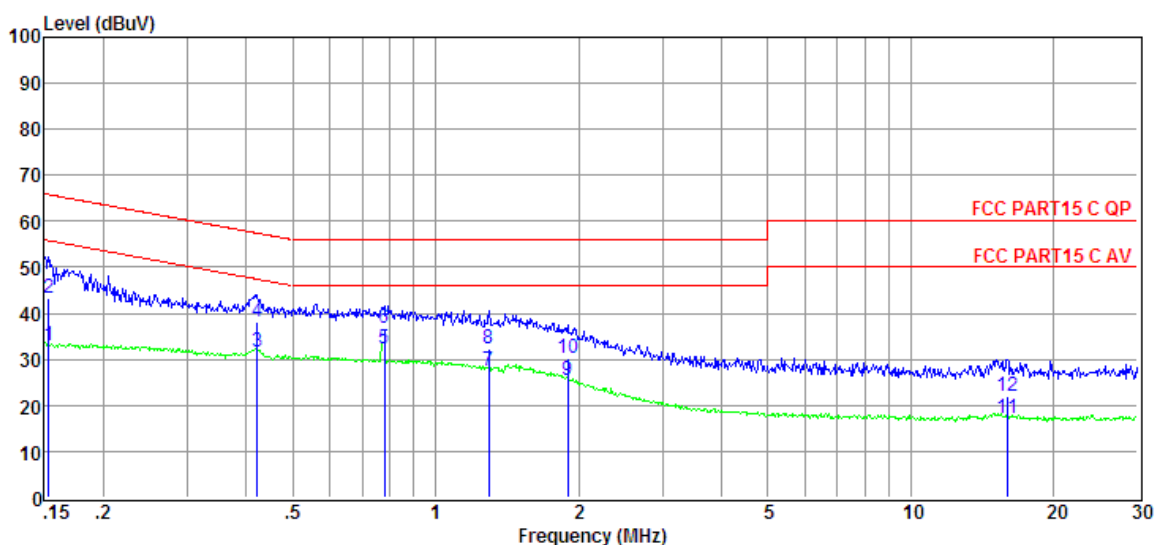
Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Phase :	N
Remark:	Adapter 1		



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.16	12.61	9.61	0.02	9.86	32.10	55.69	-23.59	Average	NEUTRAL
2	0.16	18.48	9.61	0.02	9.86	37.97	65.69	-27.72	QP	NEUTRAL
3	0.18	12.23	9.61	0.02	9.86	31.72	54.55	-22.83	Average	NEUTRAL
4	0.18	17.77	9.61	0.02	9.86	37.26	64.55	-27.29	QP	NEUTRAL
5	0.40	11.25	9.61	0.02	9.86	30.74	47.81	-17.07	Average	NEUTRAL
6	0.40	19.59	9.61	0.02	9.86	39.08	57.81	-18.73	QP	NEUTRAL
7	0.41	11.22	9.61	0.02	9.86	30.71	47.59	-16.88	Average	NEUTRAL
8	0.41	19.25	9.61	0.02	9.86	38.74	57.59	-18.85	QP	NEUTRAL
9	0.78	13.49	9.61	0.03	9.86	32.99	46.00	-13.01	Average	NEUTRAL
10	0.78	17.89	9.61	0.03	9.86	37.39	56.00	-18.61	QP	NEUTRAL
11	1.43	8.68	9.62	0.03	9.86	28.19	46.00	-17.81	Average	NEUTRAL
12	1.43	13.55	9.62	0.03	9.86	33.06	56.00	-22.94	QP	NEUTRAL

- Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.  
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

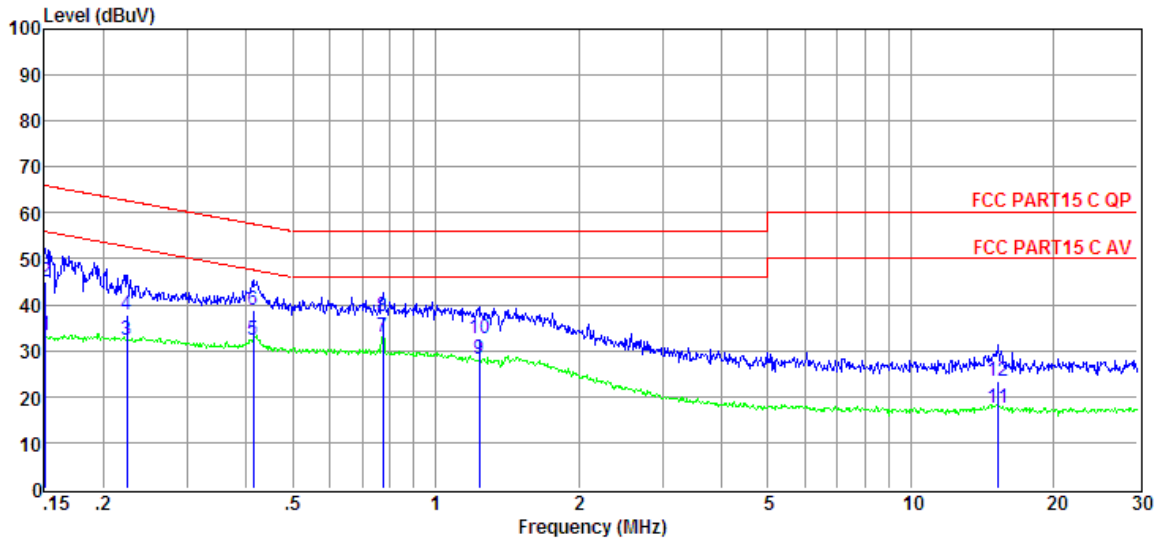
Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Phase :	L1
Remark:	Adapter 2		



Item (Mark)	Freq. (MHz)	Read Level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Detector	Phase
1	0.15	13.44	9.61	0.02	9.86	32.93	55.82	-22.89	Average	LINE
2	0.15	23.85	9.61	0.02	9.86	43.34	65.82	-22.48	QP	LINE
3	0.42	12.12	9.61	0.02	9.86	31.61	47.42	-15.81	Average	LINE
4	0.42	18.58	9.61	0.02	9.86	38.07	57.42	-19.35	QP	LINE
5	0.78	12.89	9.61	0.03	9.86	32.39	46.00	-13.61	Average	LINE
6	0.78	17.29	9.61	0.03	9.86	36.79	56.00	-19.21	QP	LINE
7	1.30	8.07	9.62	0.03	9.86	27.58	46.00	-18.42	Average	LINE
8	1.30	12.76	9.62	0.03	9.86	32.27	56.00	-23.73	QP	LINE
9	1.90	5.76	9.63	0.04	9.87	25.30	46.00	-20.70	Average	LINE
10	1.90	10.58	9.63	0.04	9.87	30.12	56.00	-25.88	QP	LINE
11	15.97	-2.61	9.85	0.13	9.93	17.30	50.00	-32.70	Average	LINE
12	15.97	2.20	9.85	0.13	9.93	22.11	60.00	-37.89	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.  
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Temperature:	24.5°C	Relative Humidity:	55%
Pressure:	1012 hPa	Test Voltage:	AC 120V/60Hz
Test Mode:	Tx Mode	Phase :	N
Remark:	Adapter 2		



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	13.72	9.61	0.02	9.86	33.21	55.96	-22.75	Average	NEUTRAL
2	0.15	25.62	9.61	0.02	9.86	45.11	65.96	-20.85	QP	NEUTRAL
3	0.22	12.65	9.61	0.02	9.86	32.14	52.66	-20.52	Average	NEUTRAL
4	0.22	18.27	9.61	0.02	9.86	37.76	62.66	-24.90	QP	NEUTRAL
5	0.41	12.64	9.61	0.02	9.86	32.13	47.59	-15.46	Average	NEUTRAL
6	0.41	19.30	9.61	0.02	9.86	38.79	57.59	-18.80	QP	NEUTRAL
7	0.78	13.64	9.61	0.03	9.86	33.14	46.00	-12.86	Average	NEUTRAL
8	0.78	18.01	9.61	0.03	9.86	37.51	56.00	-18.49	QP	NEUTRAL
9	1.24	8.65	9.61	0.03	9.86	28.15	46.00	-17.85	Average	NEUTRAL
10	1.24	13.28	9.61	0.03	9.86	32.78	56.00	-23.22	QP	NEUTRAL
11	15.31	-2.32	9.83	0.13	9.92	17.56	50.00	-32.44	Average	NEUTRAL
12	15.31	3.42	9.83	0.13	9.92	23.30	60.00	-36.70	QP	NEUTRAL

- Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.  
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

## **9. ANTENNA REQUIREMENTS**

### **APPLICABLE REQUIREMENTS**

Please refer to FCC §15.203

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **ANTENNA CONNECTOR**

EUT has a PCB antenna without antenna connector.

### **ANTENNA GAIN**

The antenna gain of EUT is less than 6 dBi.

**END OF REPORT**