# RADIO TEST REPORT

For

DongGuan Sonicway Electrical Appliance Co.,ltd.

| | |
|---|---|
| Product Name: | Dongle |
| Model : | CR9 PLUS |
| Series Model: | CR9 PLUS , CR9/S, CR8, CR6, CRM200S, CRM300 |
| FCC ID: | 2AMK3-CR9PLUS |
| Prepared By : | Shenzhen BST Technology Co., Ltd.<br>Building No.23-24, Zhiheng Industrial Park, Guankouer Road, Nantou,Nanshan District,Shenzhen,Guangdong,China |
| Test Date: | June 05-20, 2017 |
| Date of Report : | June 20, 2017 |
| Test Result | pass |
| Report No.: | BST1706814340001Y-ER-2-1 |

# TEST RESULT CERTIFICATION

| | | |
|---|---|---|
| Applicant's name ..... | : | DongGuan Sonicway Electrical Appliance Co.,ltd. |
| Address ..... | : | NO. 2 Xinghua Road, Xincheng Industrial Road, Hengli, DongGuan,Guangdong, China |
| Manufacture's Name..... | : | DongGuan Sonicway Electrical Appliance Co.,ltd. |
| Address ..... | | NO. 2 Xinghua Road, Xincheng Industrial Road, Hengli, DongGuan,Guangdong, China |
| Product name .....: | | Dongle |
| Model and/or type reference | : | CR9 PLUS |
| Series Model ..... | : | CR9 PLUS , CR9/S, CR8, CR6, CRM200S, CRM300 |
| Standards .....: | | FCC Part15.247 |
| Test procedure .....: | | ANSI C63.10-2013, ANSI C63.4-2014 |

Testing Engineer :

Technical Manager :

Authorized Signatory :

# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

**Client Information**

| | |
|---|---|
| Applicant: | DongGuan Sonicway Electrical Appliance Co.,ltd. |
| Address of applicant: | NO. 2 Xinghua Road, Xincheng Industrial Road, Hengli, DongGuan,Guangdong, China |
| Manufacturer: | DongGuan Sonicway Electrical Appliance Co.,ltd. |
| Address of manufacturer: | NO. 2 Xinghua Road, Xincheng Industrial Road, Hengli, DongGuan,Guangdong, China |

**General Description of EUT**

| | |
|---|---|
| Product Name: | Dongle |
| Trade Name: | GO Cloudnet 云网行 |
| Model No.: | CR9 PLUS |
| Adding Model(s): | CR9/S, CR8, CR6, CRM200S, CRM300 |
| Rated Voltage: | DC 5V from adapter |
| Adapter information: | Model:2WCX251-WO5025000<br>Input:100-240Vac, 50/60Hz, 0.3A<br>Output: DC 5V, 2.5A |

*Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model CR9 PLUS, but the circuit and the electronic construction do not change, declared by the manufacturer.*

**Technical Characteristics of EUT**

| | |
|---|---|
| Bluetooth Version: | V4.0 |
| Frequency Range: | 2402-2480MHz |
| RF Output Power: | 3.26 dBm (Conducted) |
| Data Rate: | 1Mbps, 2Mbps, 3Mbps |
| Modulation: | GFSK, Pi/4 QDPSK, 8DPSK |
| Quantity of Channels: | 79 |
| Channel Separation: | 1MHz |
| Type of Antenna: | integral |
| Antenna Gain: | 0.5dBi |
| Lowest Internal Frequency of EUT: | 26MHz |

## 1.2 Test Standards

The following report is prepared on behalf of the Rider best, Inc in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide DA 00-705 for frequency hopping spread spectrum systems shall be performed also.

## 1.4 Test Facility

Shenzhen Asia Test Technology Co.,Ltd..

Add. : 7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China

FCC Registration No.: 348715

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

| **Test Mode List** | | |
|---|---|---|
| Test Mode | Description | Remark |
| TM1 | Low Channel | 2402MHz |
| TM2 | Middle Channel | 2441MHz |
| TM3 | High Channel | 2480MHz |
| TM4 | Hopping | 2402-2480MHz |

| **Modulation Configure** | | | |
|---|---|---|---|
| Modulation | Packet | Packet Type | Packet Size |
| GFSK | DH1 | 4 | 27 |
| | DH3 | 11 | 183 |
| | DH5 | 15 | 339 |
| Pi/4 DQPSK | 2DH1 | 20 | 54 |
| | 2DH3 | 26 | 367 |
| | 2DH5 | 30 | 379 |
| 8DPSK | 3DH1 | 24 | 83 |
| | 3DH3 | 27 | 552 |
| | 3DH5 | 31 | 1021 |
| Normal mode: the Bluetooth has been tested on the modulation of GFSK, (Pi/4)DQPSK and 8DPSK, compliance test and record the worst case. | | | |

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| **EUT Cable List and Details** | | | |
|---|---|---|---|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| / | / | / | / |

| Special Cable List and Details | | | |
|---|---|---|---|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| / | / | / | / |

| Auxiliary Equipment List and Details | | | |
|---|---|---|---|
| Description | Manufacturer | Model | Serial Number |
| / | / | / | / |

## 1.6 Measurement Uncertainty

| Measurement uncertainty | | |
|---|---|---|
| Parameter | Conditions | Uncertainty |
| RF Output Power | Conducted | ±0.42dB |
| Occupied Bandwidth | Conducted | ±1.5% |
| Conducted Spurious Emission | Conducted | ±2.17dB |
| Conducted Emissions | Conducted | ±2.88dB |
| Transmitter Spurious Emissions | Radiated | ±5.1dB |

## 1.7 Test Equipment List and Details

| Description | Manufacturer | Model | Serial Number | Cal Date | Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4407B | US44300368 | 2017-06-04 | 2018-06-03 |
| Spectrum Analyzer | Rohde & Schwarz | FSP | 836079/035 | 2017-06-04 | 2018-06-03 |
| EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2017-06-04 | 2018-06-03 |
| Amplifier | Agilent | 8447F | 3113A06717 | 2017-06-04 | 2018-06-03 |
| Amplifier | C&D | PAP-1G8 | 2002 | 2017-06-04 | 2018-06-03 |
| Broadband Antenna | Schwarz beck | VULB9163 | 9163-333 | 2017-06-04 | 2018-06-03 |
| Horn Antenna | ETS | 3117 | 00086197 | 2017-06-04 | 2018-06-03 |
| Horn Antenna | ETS | 3116B | 00088203 | 2017-06-04 | 2018-06-03 |
| Loop Antenna | Schwarz beck | FMZB 1516 | 9773 | 2017-06-04 | 2018-06-03 |
| EMI Test Receiver | Rohde & Schwarz | ESPI | 101611 | 2017-06-04 | 2018-06-03 |
| L.I.S.N | Schwarz beck | NSLK8126 | 8126-224 | 2017-06-04 | 2018-06-03 |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100911 | 2017-06-04 | 2018-06-03 |

# 2. SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test Item | Result |
|---|---|---|
| § 2.1093 | RF Exposure | Compliant |
| § 15.203; § 15.247(b)(4)(i) | Antenna Requirement | Compliant |
| §15.205 | Restricted Band of Operation | Compliant |
| § 15.207(a) | Conducted Emission | Compliant |
| § 15.209(a) | Radiated Spurious Emissions | Compliant |
| § 15.247(a)(1)(iii) | Quantity of Hopping Channel | Compliant |
| § 15.247(a)(1) | Channel Separation | Compliant |
| § 15.247(a)(1)(iii) | Time of Occupancy (Dwell time) | Compliant |
| § 15.247(a) | 20dB Bandwidth | Compliant |
| § 15.247(b)(1) | RF Power Output | Compliant |
| § 15.247(d) | Band Edge (Out of Band Emissions) | Compliant |
| § 15.247(a)(1) | Frequency Hopping Sequence | Compliant |
| § 15.247(g), (h) | Frequency Hopping System | Compliant |

# 3. RF Exposure

## 3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

## 3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

# 4. Antenna Requirement

## 4.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section.

## 4.2 Evaluation Information

This product has an antenna attached on the PCB, fulfill the requirement of this section.

# 5. Frequency Hopping System Requirements

## 5.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

## 5.2 Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for

a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.This device was tested with an bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for DA 00-705 and FCC Part 15.247 rule.

## 5.3 EUT Pseudorandom Frequency Hopping Sequence

Pseudorandom Frequency Hopping Sequence Table as below:
Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45 etc.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

# 6. Quantity of Hopping Channels and Channel Separation

## 6.1 Standard Applicable

According to FCC 15.247(a)(1), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

## 6.2 Test Procedure

According to the DA 00-705, the number of hopping frequencies test method as follows.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Set span = the frequency band of operation (2400MHz to 2483.5MHz)

RBW ≥ 1% of the span

VBW ≥ RBW Sweep = auto

Detector function = peak Trace = max hold

Allow the trace to stabilize, observed the band of 2400MHz to 2483.5MHz, than count it out the number of channels for comparing with the FCC rules.

The channel spacing test method as follows:

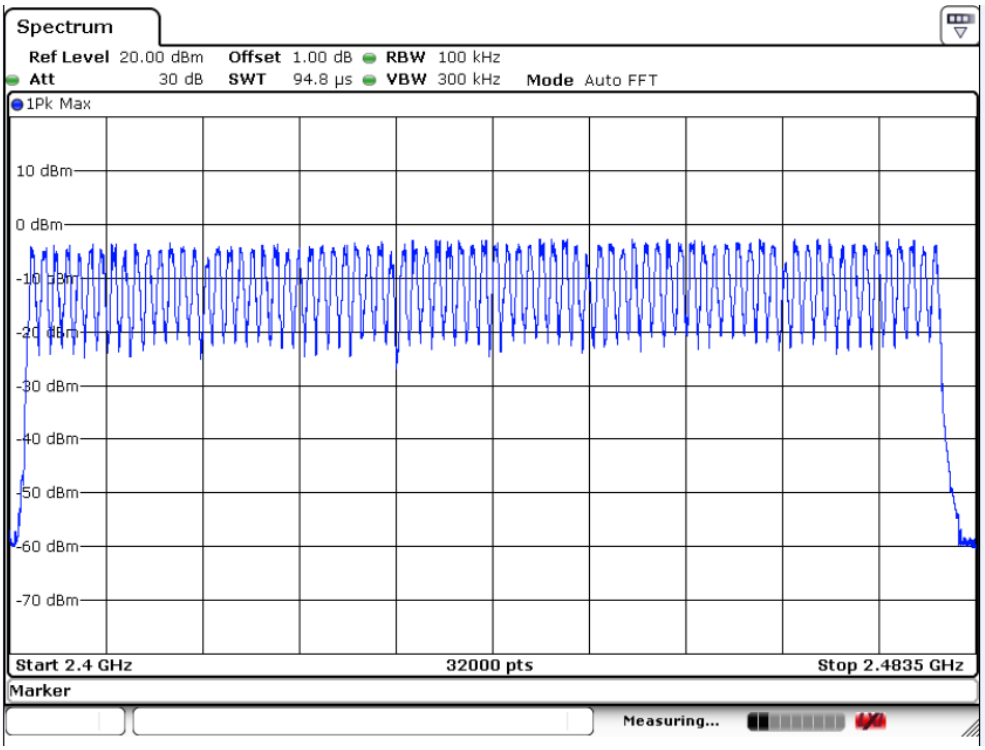
Set span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = auto; Detector function = peak; Trace = max hold
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

## 6.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

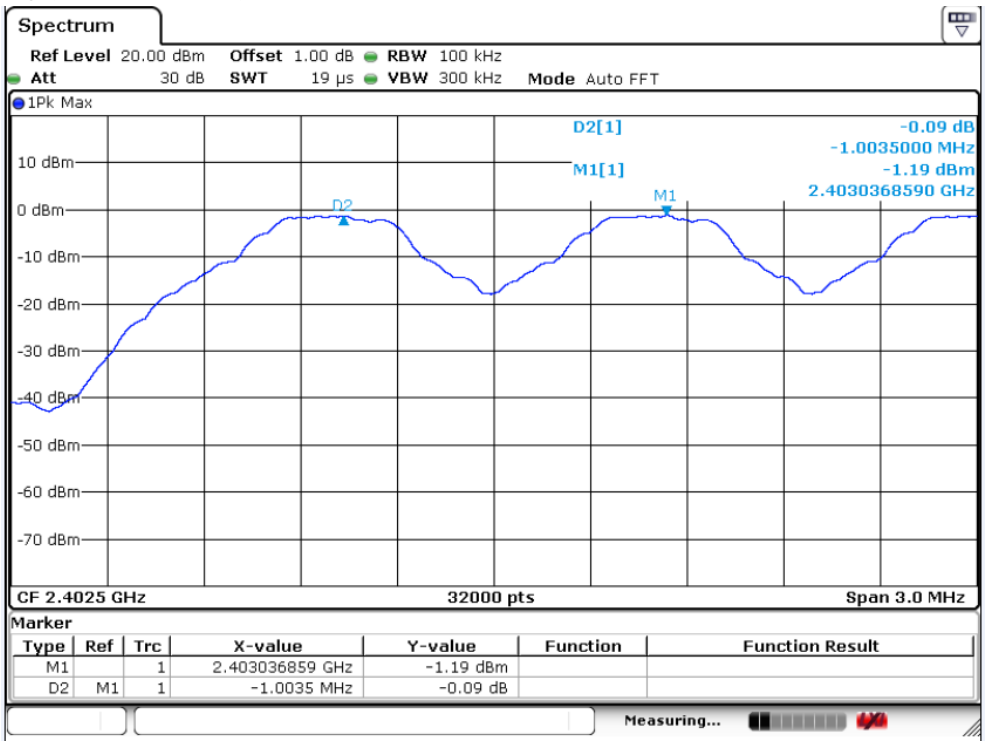
## 6.4 Summary of Test Results/Plots

No. of Channel = 79

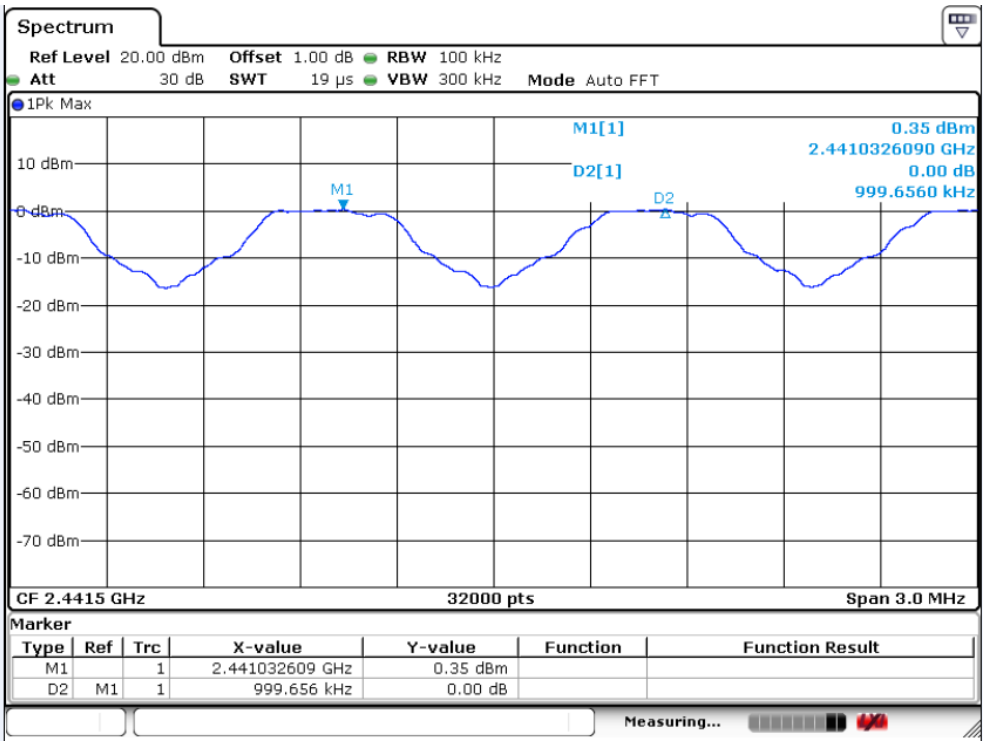



For GFSK mode

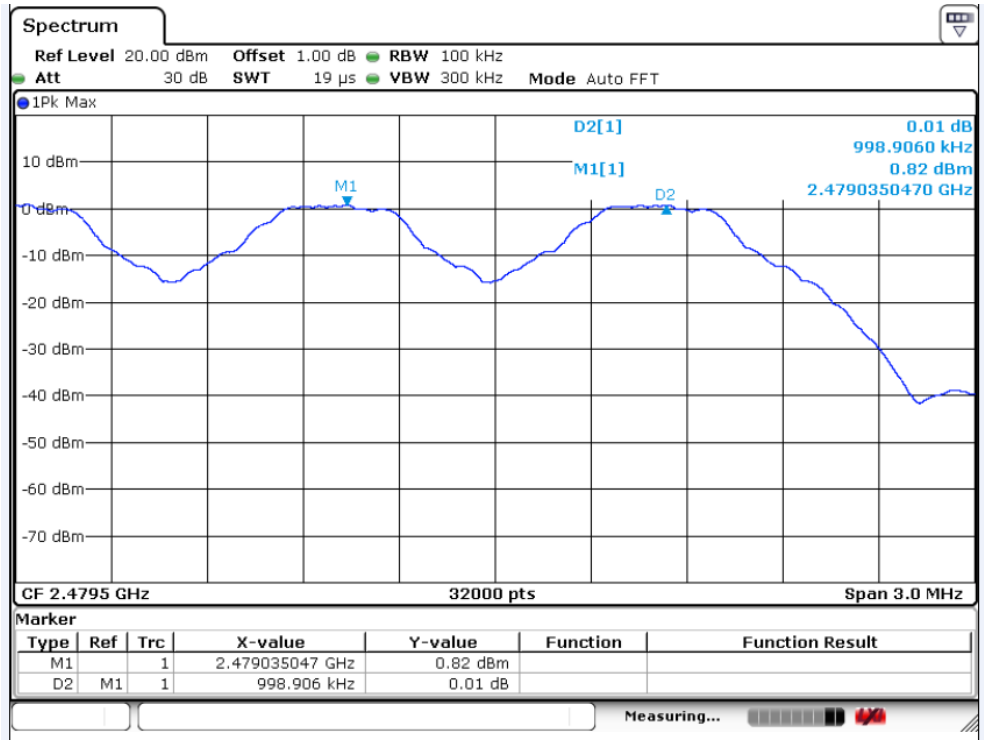
Channel Spacing (Low CH=1MHz)



Channel Spacing (Middle CH=1MHz)

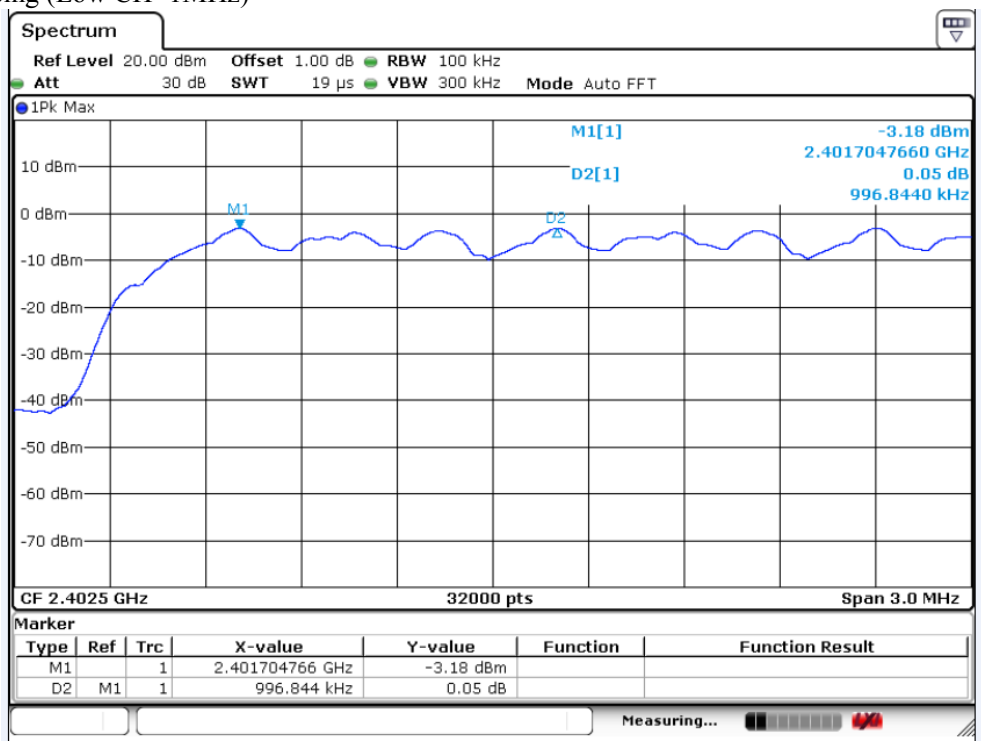



Channel Spacing (High CH=1MHz)

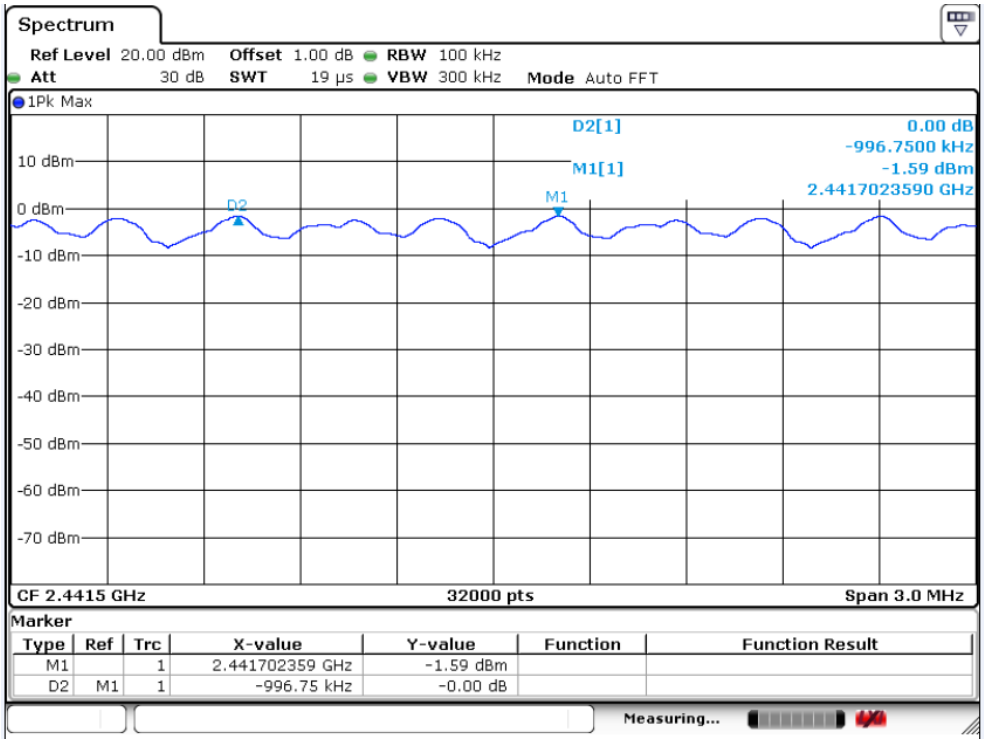


For 8DPSK mode

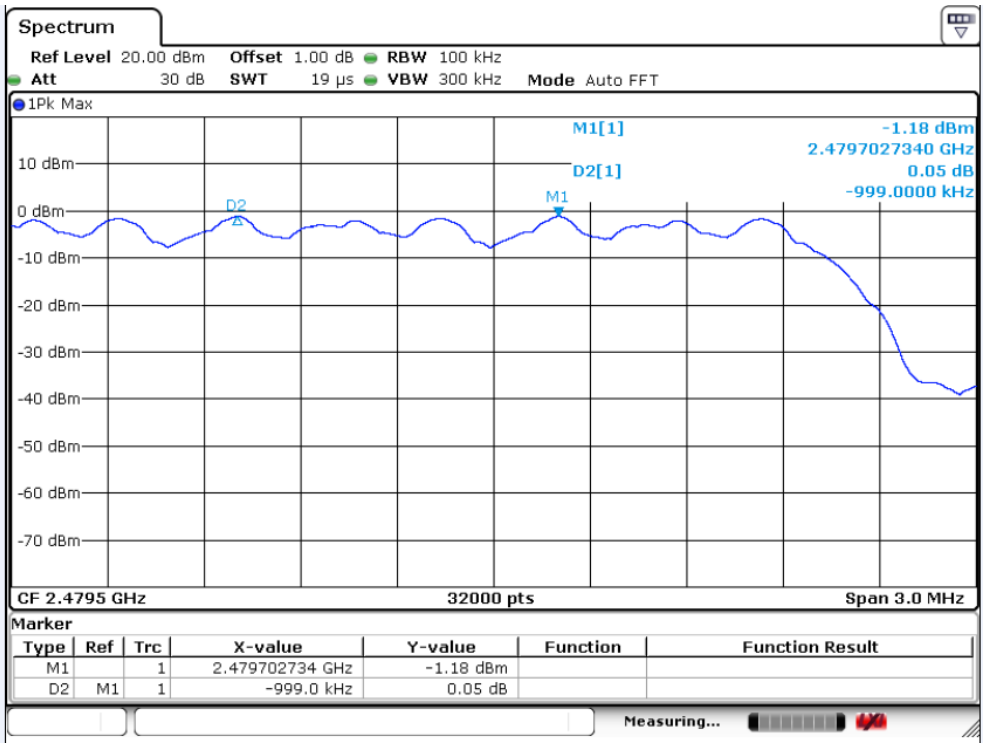
Channel Spacing (Low CH=1MHz)




Channel Spacing (Middle CH=1MHz)



Channel Spacing (High CH=1MHz)



# 7. Dwell Time of Hopping Channel

## 7.1 Standard Applicable

According to 15.247(a)(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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.

## 7.2 Test Procedure

According to the DA 00-705, the dwell time of a hopping channel test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW ≥ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold
Use the marker-delta function to determine the dwell time

## 7.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

## 7.4 Summary of Test Results/Plots

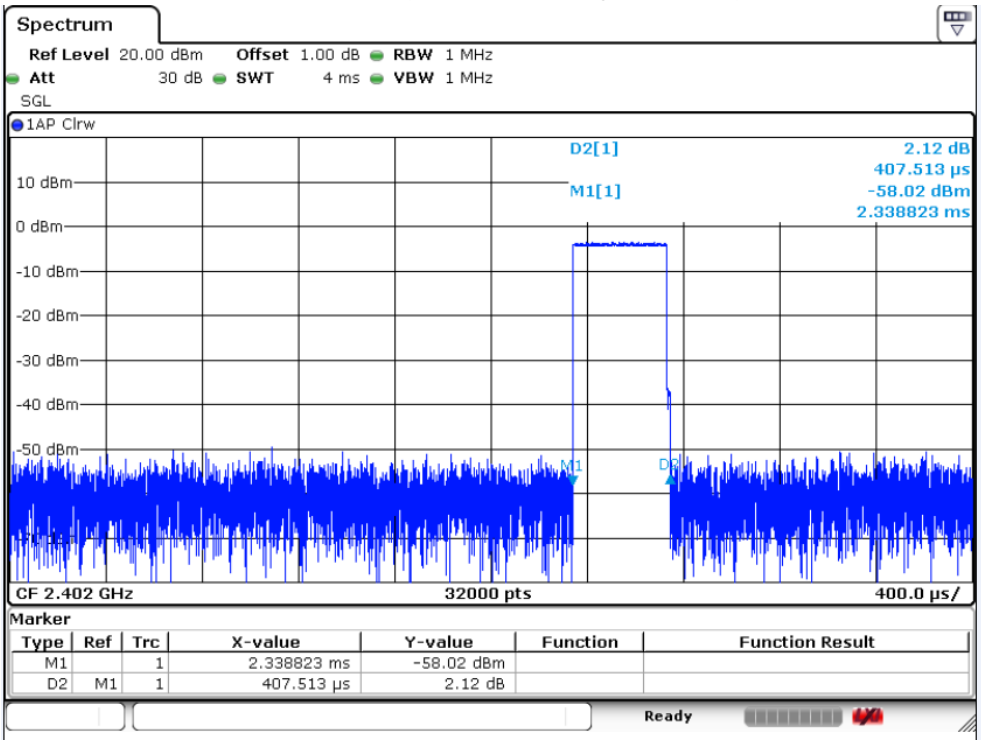
The dwell time within a period in data mode is independent from the packet type (packet length).
Test data is corrected with the worse case, which the packet length is DH1, DH3, and DH5.

The test period: T = 0.4 Second * 79 Channel = 31.6 s
Dwell time
DH1: Measured time*(1600/2/79)*31.6
DH3: Measured time*(1600/4/79)*31.6
DH5: Measured time*(1600/6/79)*31.6

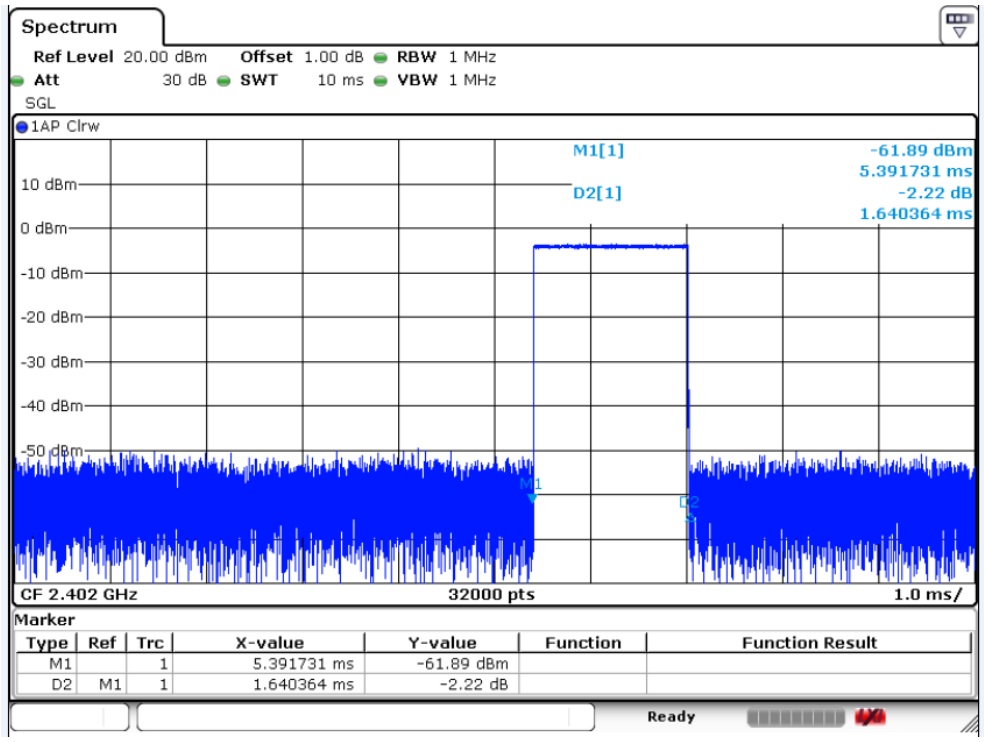
| Modulation | Test Channel | packet | Time Slot Length(ms) | Dwell Time(ms) | Limit(ms) |
|---|---|---|---|---|---|
| GFSK | 2402 | DH1 | 0.408 | 130. 56 | 400 |
| | | DH3 | 1.640 | 262. 40 | 400 |
| | | DH5 | 2.844 | 303. 36 | 400 |
| 8DPSK | 2402 | 3DH1 | 0.417 | 133. 44 | 400 |
| | | 3DH3 | 1.640 | 262. 40 | 400 |
| | | 3DH5 | 2.856 | 304. 64 | 400 |

*Please refer to the test plots as below:*

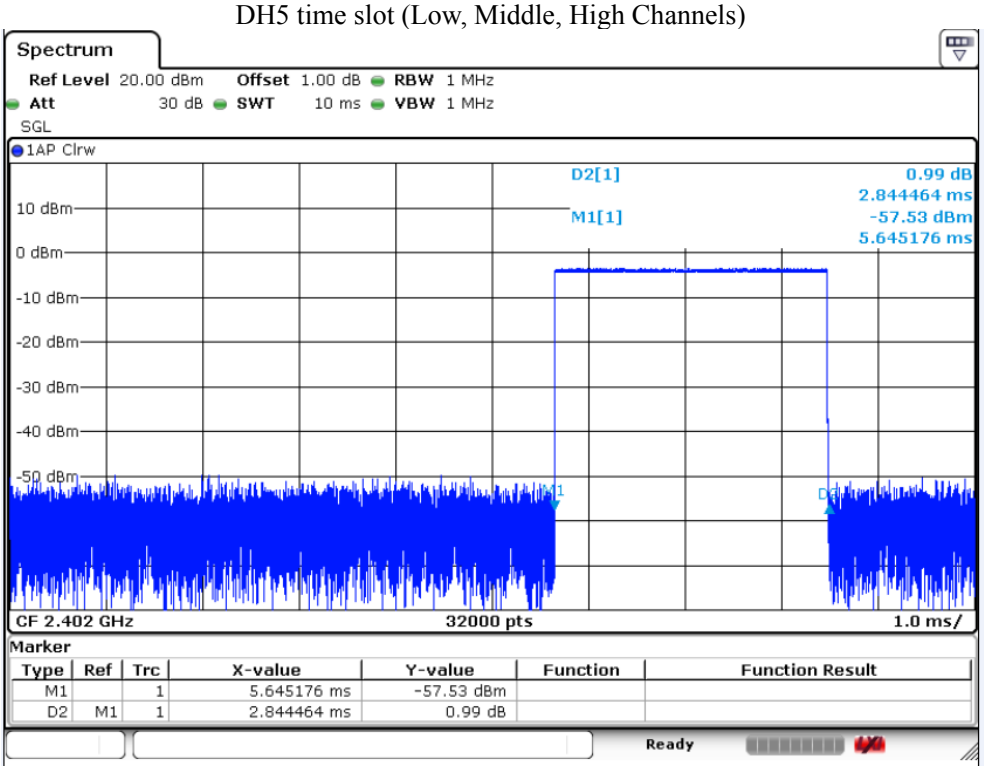
DH1 time slot (Low, Middle, High Channels)



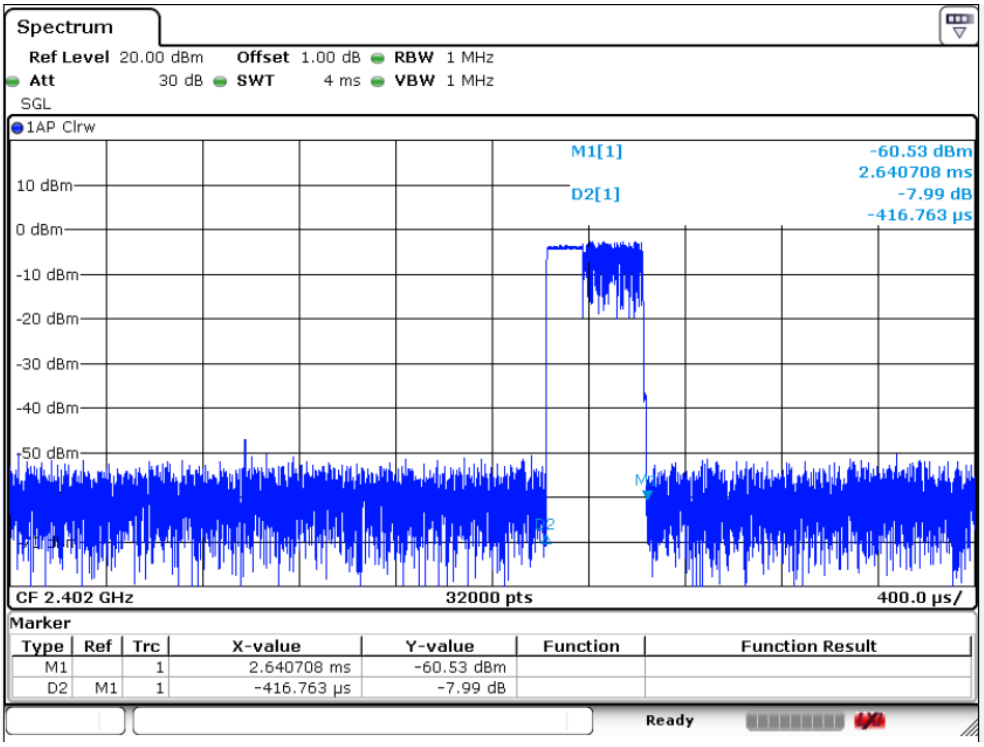
DH3 time slot (Low, Middle, High Channels)



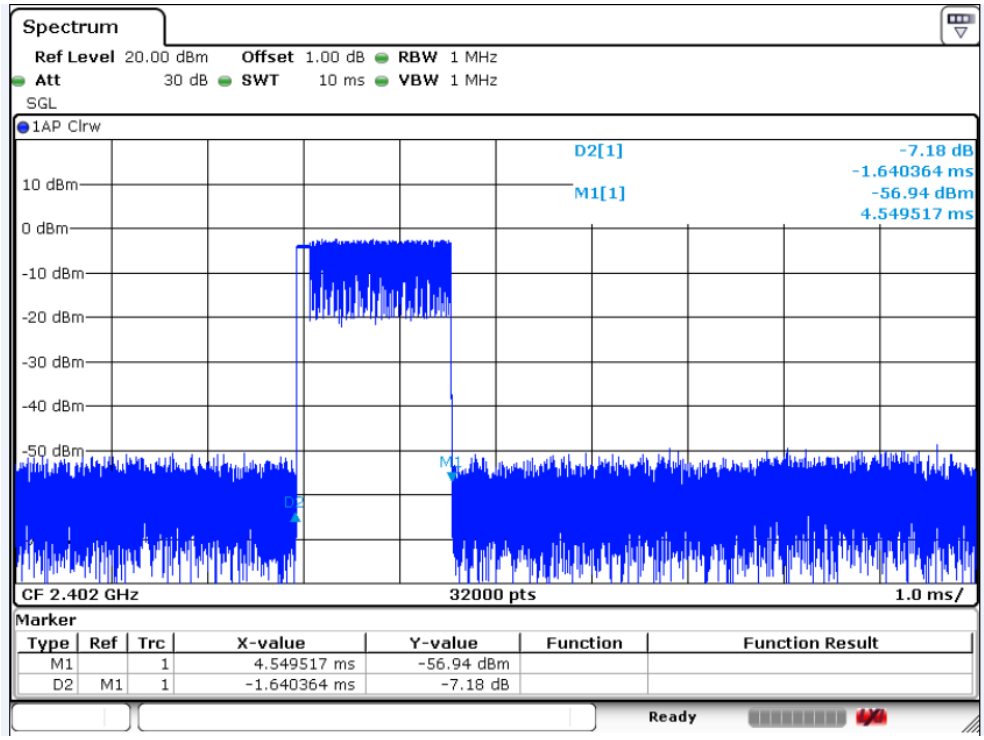

DH5 time slot (Low, Middle, High Channels)



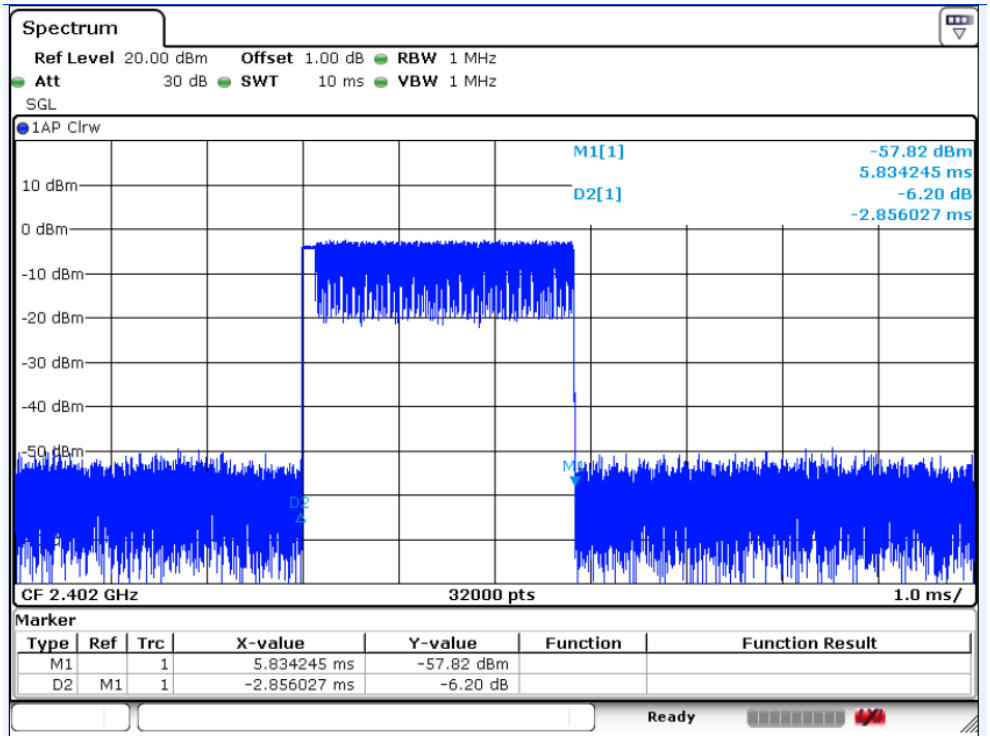
3DH1 time slot (Low, Middle, High Channels)




3DH3 time slot (Low, Middle, High Channels)



3DH5 time slot (Low, Middle, High Channels)



# 8. 20dB Bandwidth

## 8.1 Standard Applicable

According to 15.247(a) and 15.215(c). 20dB bandwidth is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## 8.2 Test Procedure

According to the DA 00-705, the 20dB bandwidth test method as follows.

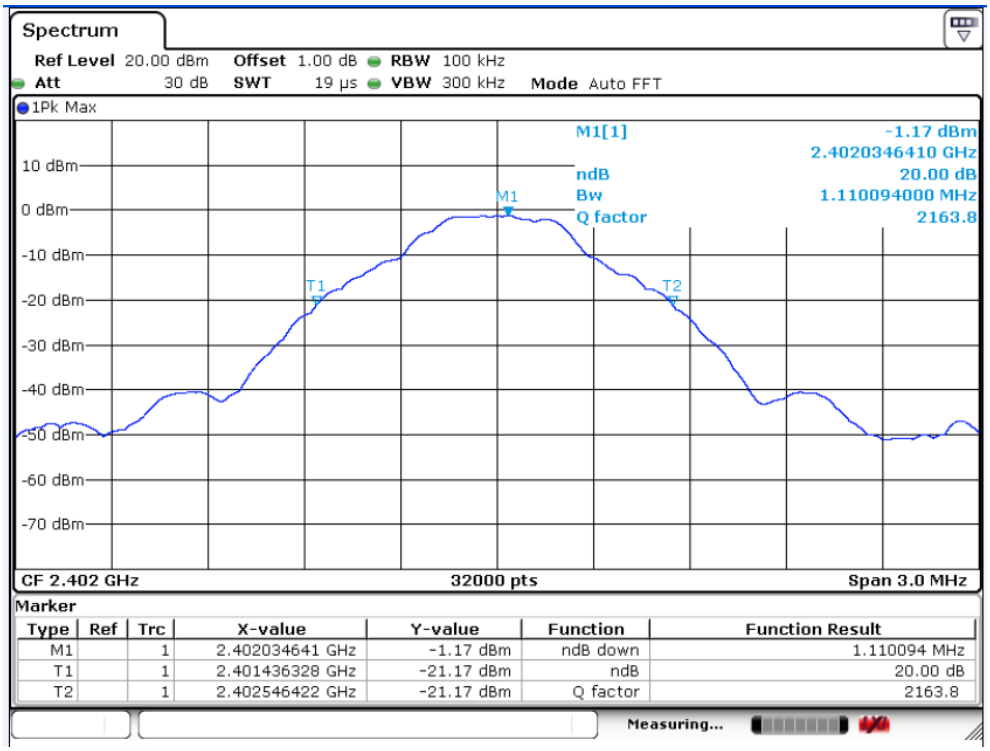
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥ 1% of the 20 dB bandwidth
VBW ≥ RBW
Sweep = auto; Detector function = peak
Trace = max hold
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down bandwidth of the emission.

## 8.3 Environmental Conditions

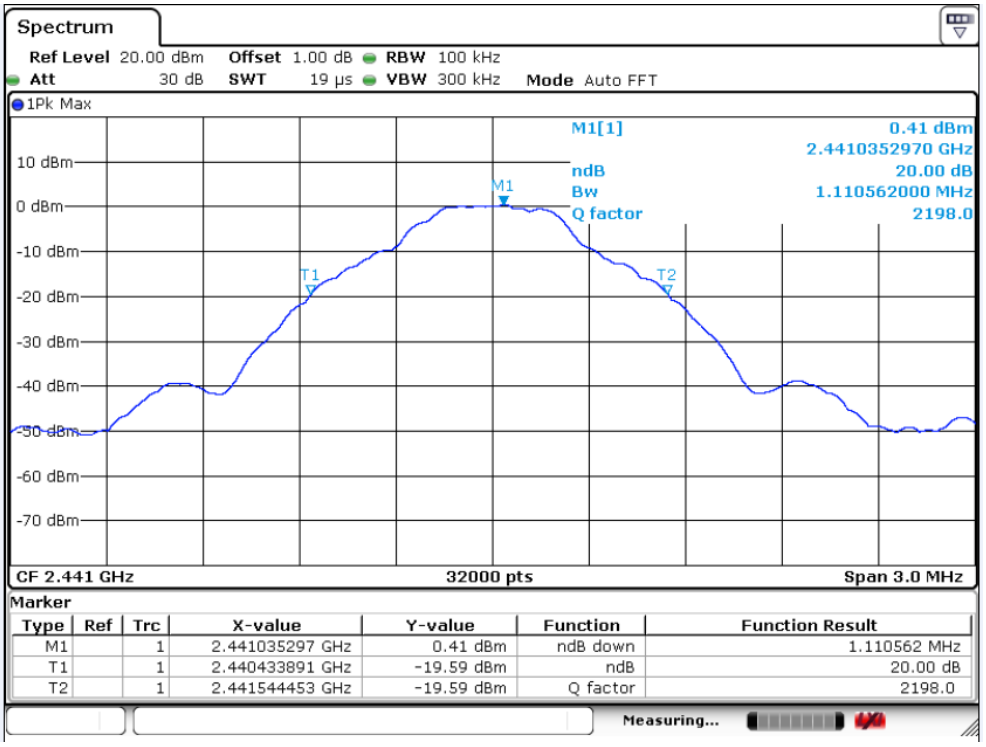
| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

For GFSK

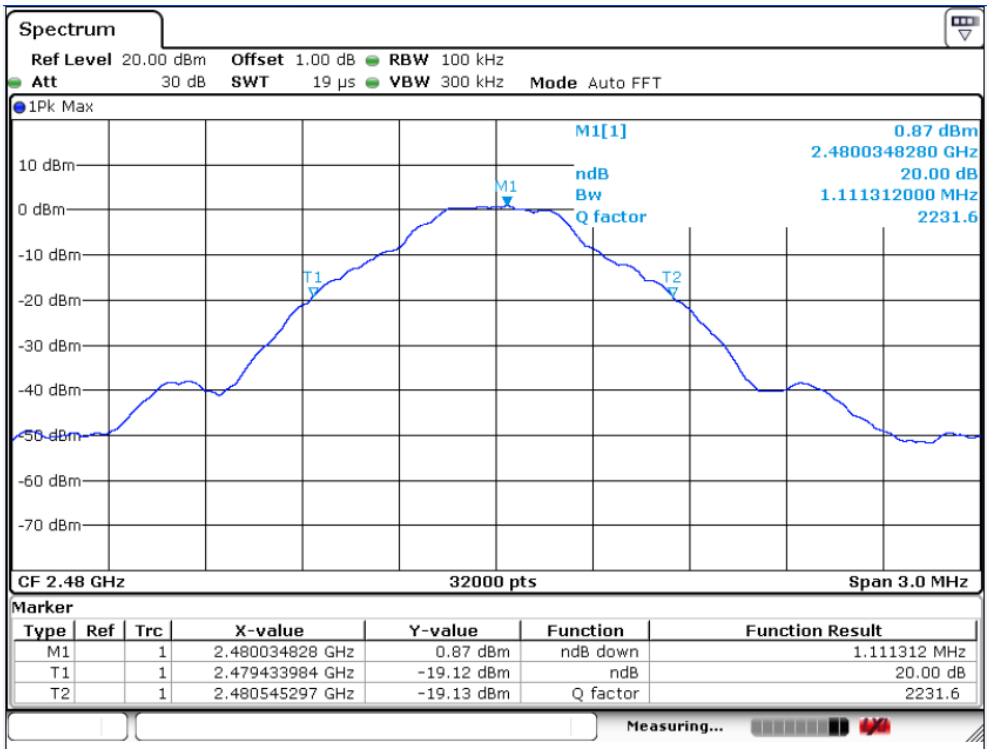
Low Channel:




Middle Channel:

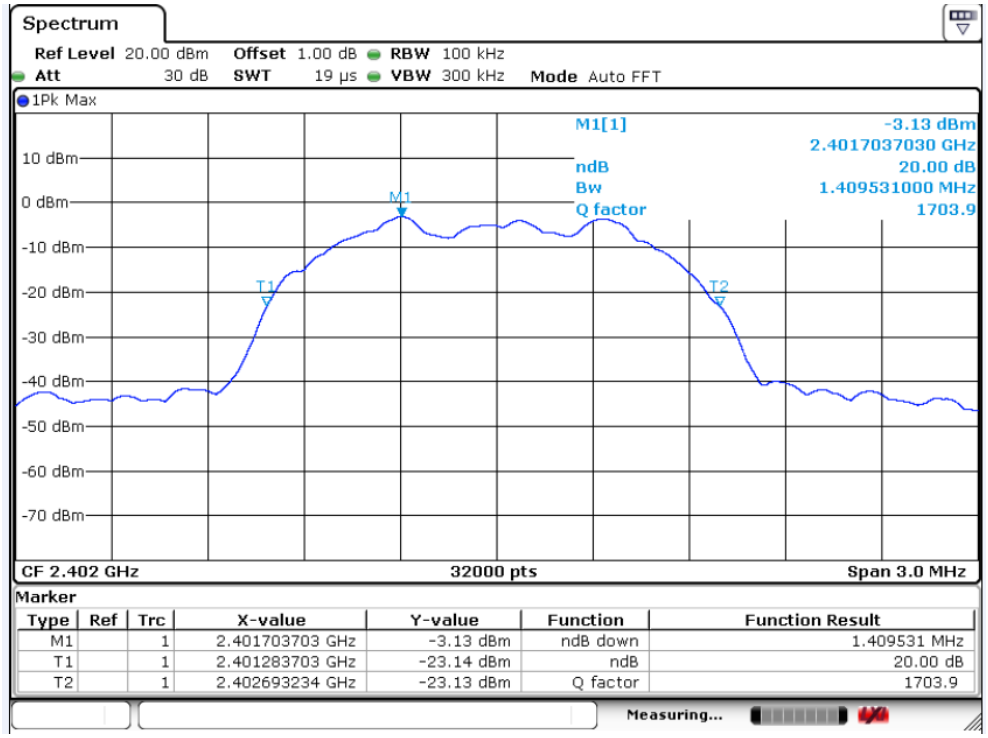


High Channel:

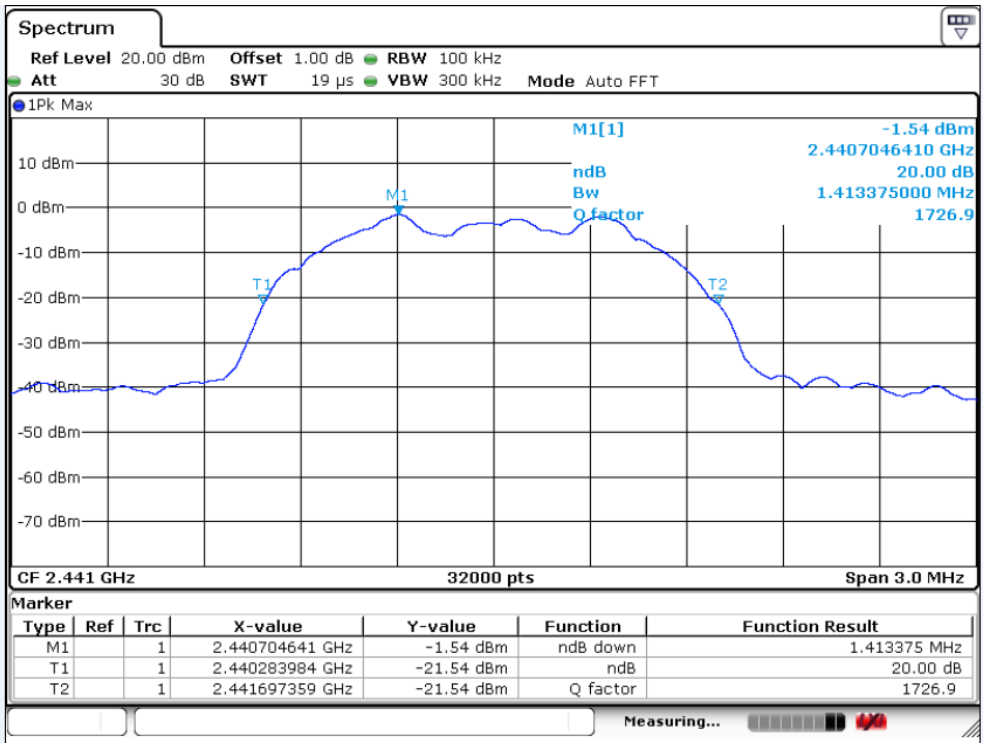



For 8DPSK

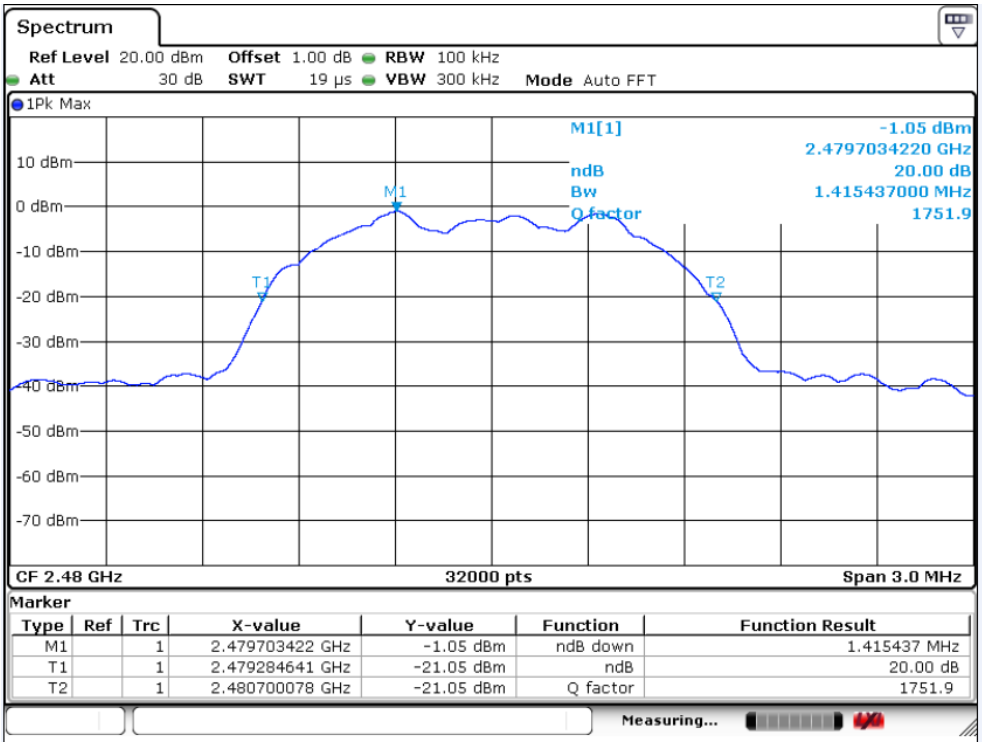
Low Channel:



Middle Channel:




High Channel:



# 9. RF Output Power

## 9.1 Standard Applicable

According to 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.

## 9.2 Test Procedure

According to the DA 00-705, the peak output power test method as follows.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured
VBW ≥ RBW Sweep = auto

Detector function = peak Trace = max hold
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, the indicated level is the peak output power (the external attenuation and cable loss shall be considered).

## 9.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

## 9.4 Summary of Test Results/Plots

For GFSK

| Channel | Frequency MHz | Measured Value dBm | Output Power mW | Limit mW |
|---|---|---|---|---|
| Low Channel | 2402 | 0 | 1.000 | 1000 |
| Middle Channel | 2441 | 1.55 | 1.429 | 1000 |
| High Channel | 2480 | 1.95 | 1.567 | 1000 |

For Pi/4 QDPSK

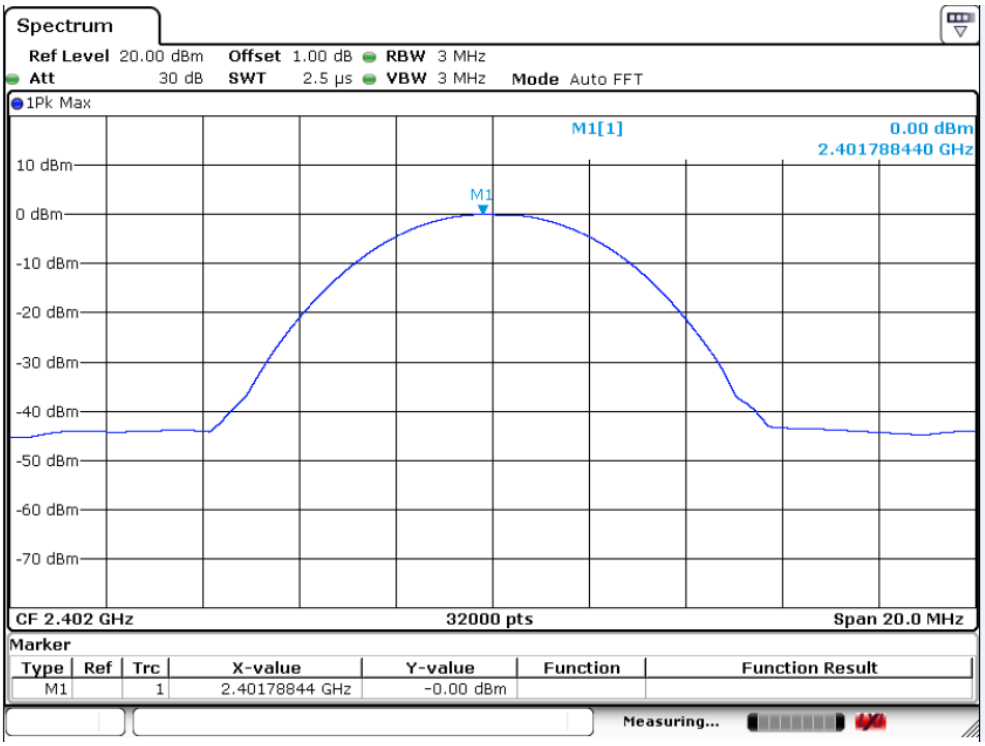
| Channel | Frequency MHz | Measured Value dBm | Output Power mW | Limit mW |
|---|---|---|---|---|
| Low Channel | 2402 | 1.15 | 1.303 | 1000 |
| Middle Channel | 2441 | 2.56 | 1.803 | 1000 |
| High Channel | 2480 | 3.00 | 1.995 | 1000 |

For 8DPSK

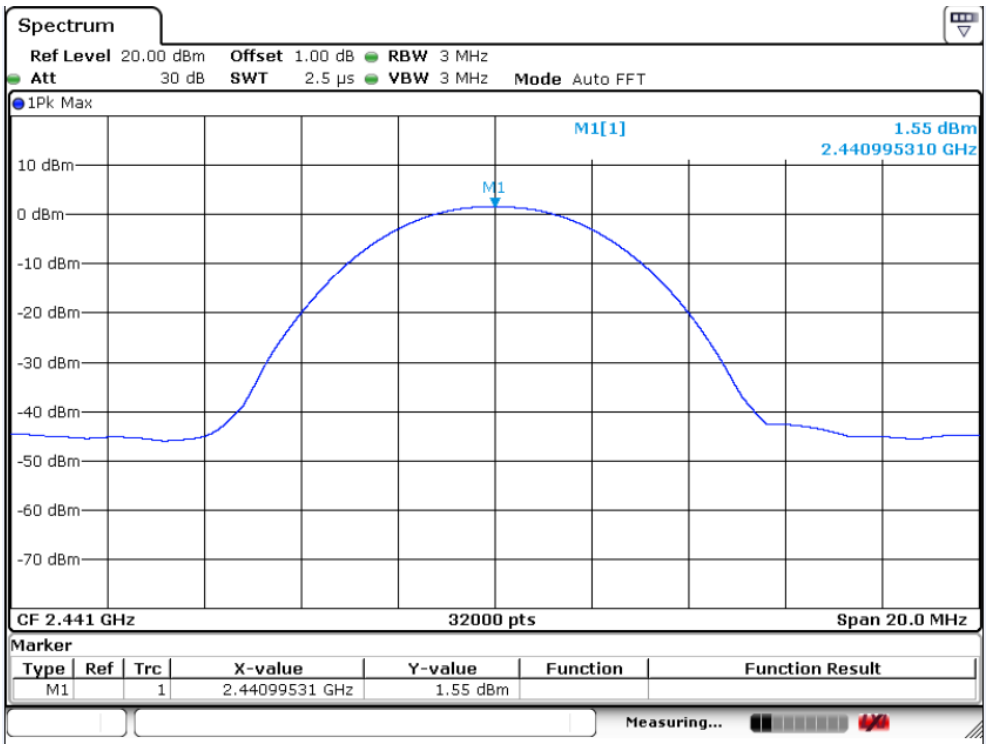
| Channel | Frequency MHz | Measured Value dBm | Output Power mW | Limit mW |
|---|---|---|---|---|
| Low Channel | 2402 | 1.66 | 1.466 | 1000 |
| Middle Channel | 2441 | 2.88 | 1.941 | 1000 |
| High Channel | 2480 | 3.26 | 2.118 | 1000 |

*Note: the antenna gain of 1dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.*

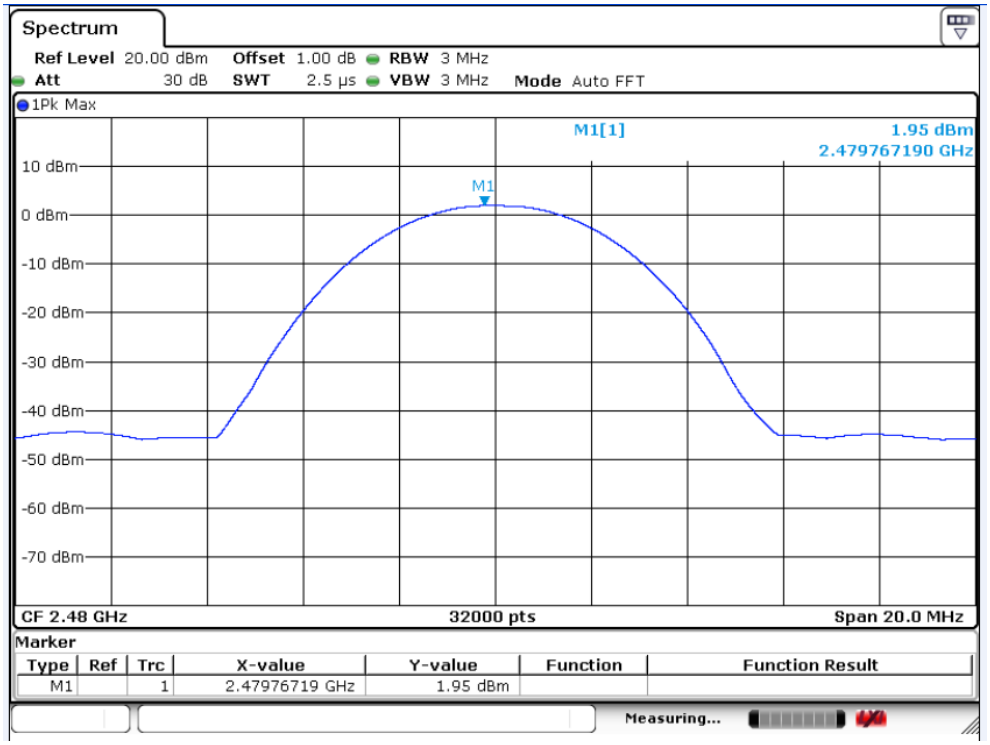
GFSK Low Channel



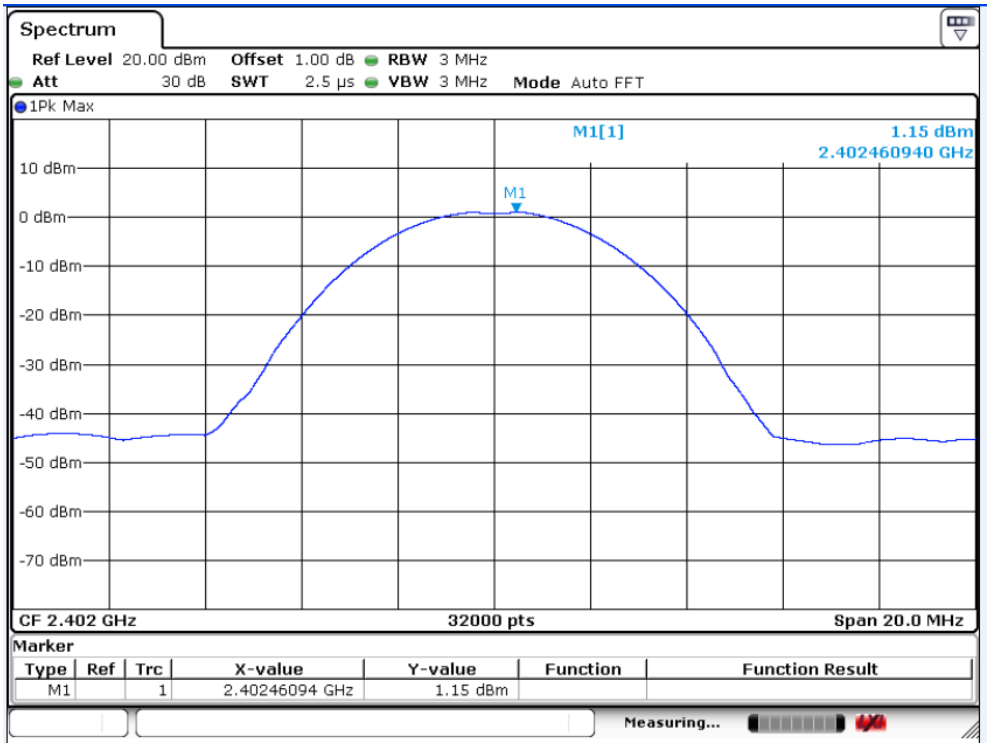

GFSK Middle Channel



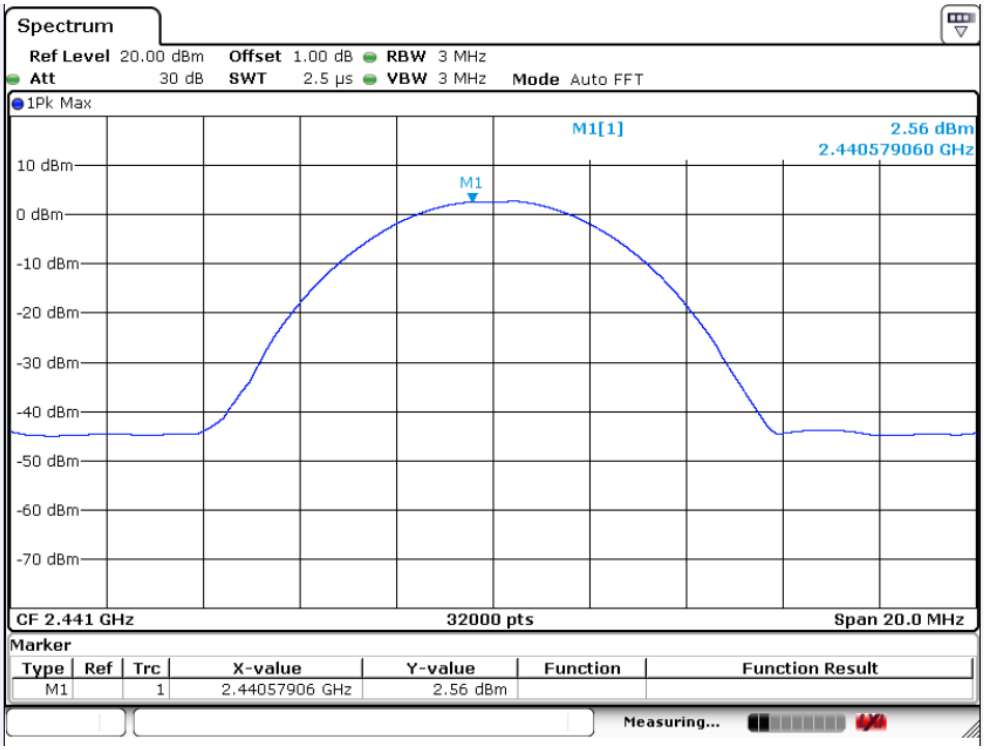
GFSK High Channel



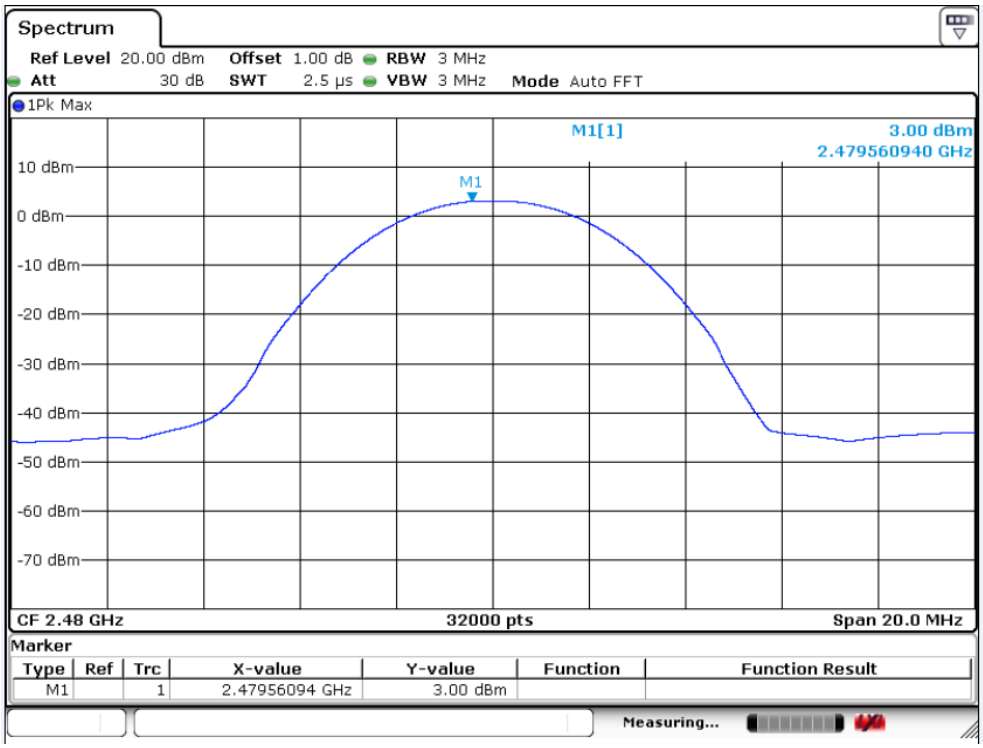

For Pi/4 QDPSK Low Channel



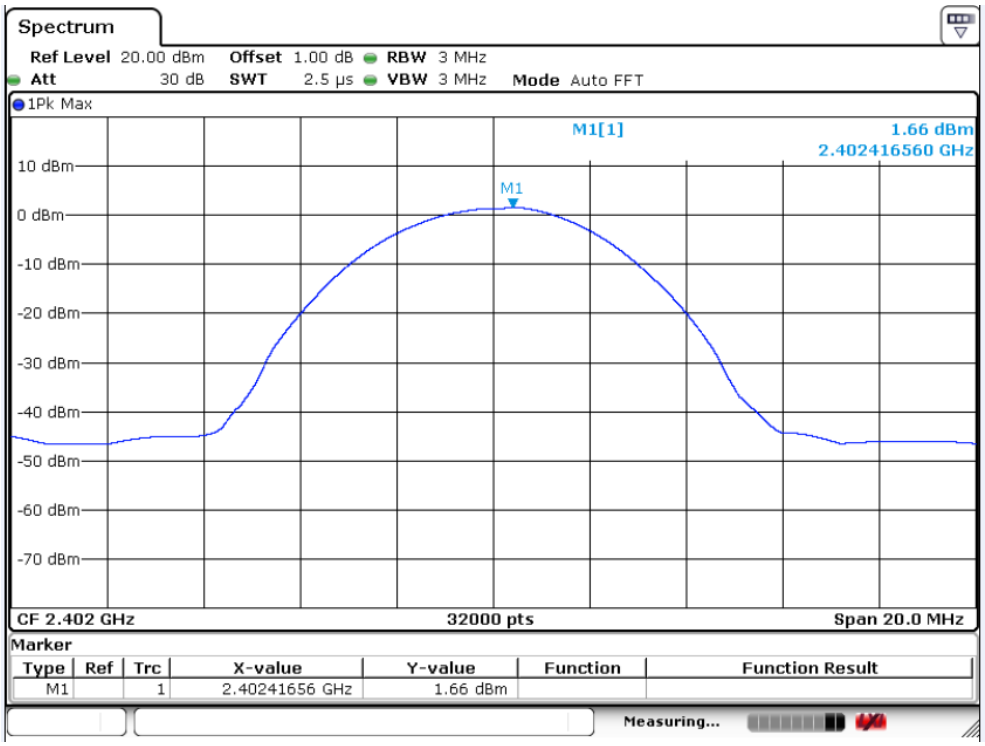
For Pi/4 QDPSK Middle Channel



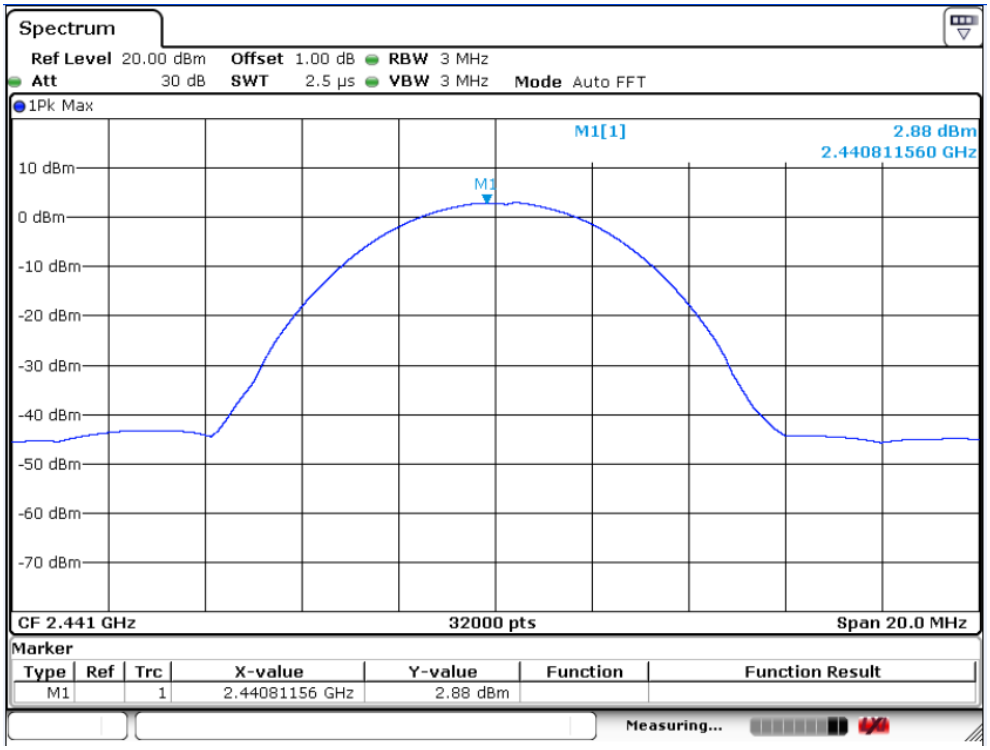

For Pi/4 QDPSK High Channel



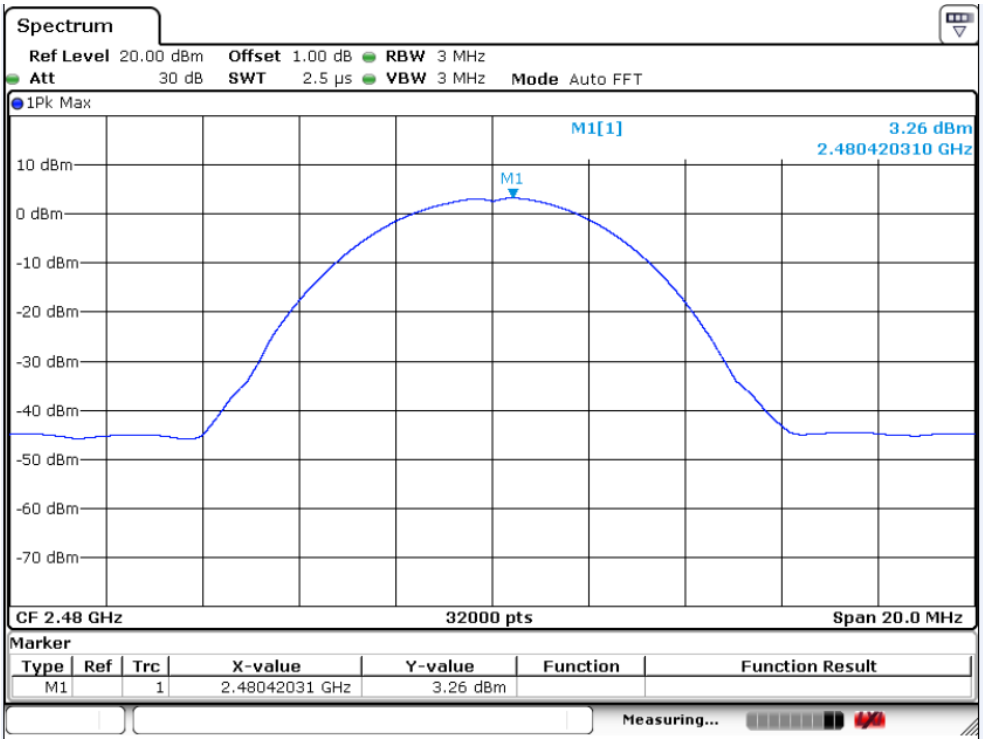
8DPSK Low Channel




8DPSK Middle Channel



8DPSK High Channel



# 10. Field Strength of Spurious Emissions

## 10.1 Standard Applicable

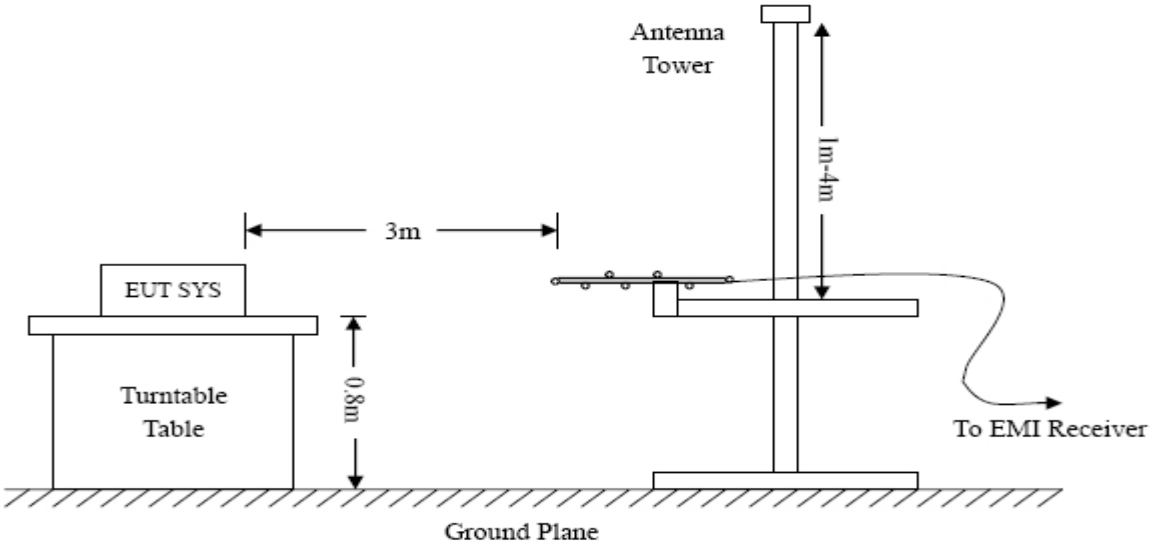
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

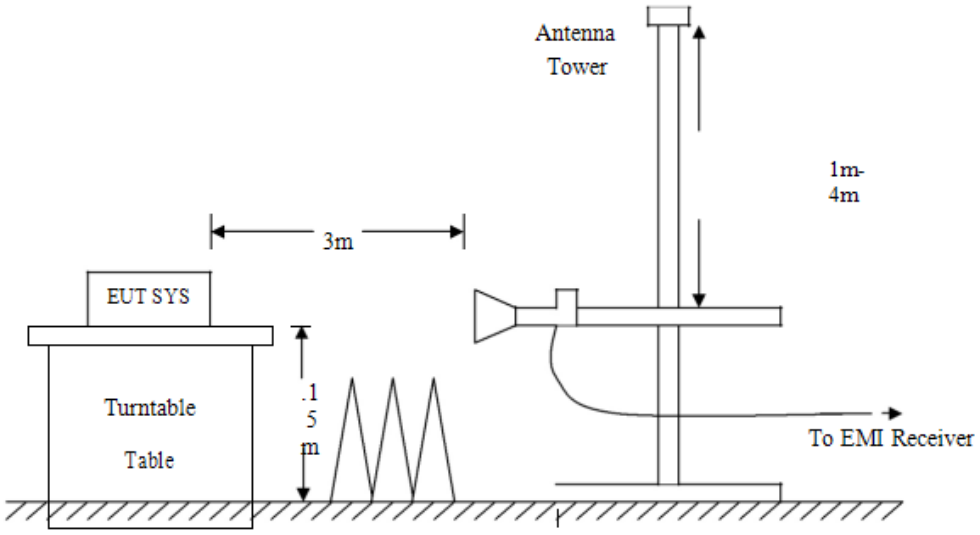
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

## 10.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.




Frequency :9kHz-30MHz
RBW=10KHz,
VBW =30KHz
Sweep time= Auto
Trace = max hold
Detector function = peak

Frequency :30MHz-1GHz
RBW=120KHz,
VBW=300KHz
Sweep time= Auto
Trace = max hold
Detector function = peak, QP

Frequency :Above 1GHz
RBW=1MHz,
VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto
Trace = max hold
Detector function = peak, AV

## 10.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

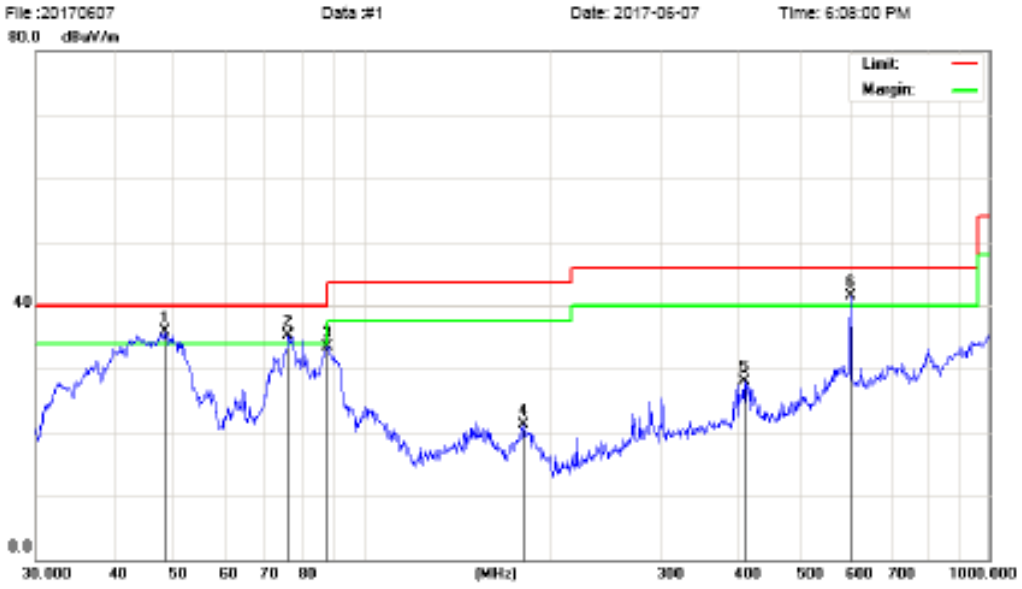
## 10.4 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

## 10.5 Summary of Test Results/Plots

*Test Specification:* *Vertical*

**Radiated Emission Measurement**




Site
Limit: FCC_PART15_B_03m_QP_
EUT:
M/N: HDMI主机
Mode: BT
Note:

Polarization: *Vertical*
Power: AC 120V/60Hz
Distance: 3m

Temperature: 25
Humidity: 50 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 48.1626 | 54.28 | -18.37 | 35.91 | 40.00 | -4.09 | QP | | | |
| 2 | ! | 75.9773 | 54.58 | -19.18 | 35.40 | 40.00 | -4.60 | QP | | | |
| 3 | | 87.7248 | 52.04 | -18.60 | 33.44 | 40.00 | -6.56 | QP | | | |
| 4 | | 180.0165 | 36.47 | -15.22 | 21.25 | 43.50 | -22.25 | QP | | | |
| 5 | | 406.0880 | 34.48 | -6.34 | 28.14 | 46.00 | -17.86 | QP | | | |
| 6 | ! | 601.4265 | 42.41 | -0.89 | 41.52 | 46.00 | -4.48 | QP | | | |

*Test Specification:* Horizontal

**Radiated Emission Measurement**


Site
Limit: FCC_PART15_B_03m_QP_
EUT:
M/N: HDMI主机
Mode: BT
Note:

Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance: 3m

Temperature: 25
Humidity: 50 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 47.1599 | 37.22 | -14.27 | 22.95 | 40.00 | -17.05 | QP | | | |
| 2 | * | 88.3421 | 53.72 | -17.13 | 36.59 | 43.50 | -6.91 | QP | | | |
| 3 | | 183.2005 | 44.92 | -11.34 | 33.58 | 43.50 | -9.92 | QP | | | |
| 4 | | 300.3672 | 44.90 | -9.59 | 35.31 | 46.00 | -10.69 | QP | | | |
| 5 | | 413.2706 | 39.03 | -6.63 | 32.40 | 46.00 | -13.60 | QP | | | |
| 6 | | 601.4265 | 38.05 | -1.74 | 36.31 | 46.00 | -9.69 | QP | | | |

***Spurious Emissions Above 1GHz***

| Frequency (MHz) | Reading (dBuV/m) | Correct dB | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Polar H/V | Detector |
|---|---|---|---|---|---|---|---|
| Low Channel-2402MHz | | | | | | | |
| 4804 | 52.61 | -3.53 | 49.08 | 74 | -24.92 | H | PK |
| 4804 | 36.54 | -3.539 | 33.001 | 54 | -20.999 | H | AV |
| 7206 | 53.09 | -0.46 | 52.63 | 74 | -21.37 | H | PK |
| 7206 | 34.7 | -0.46 | 34.24 | 54 | -19.76 | H | AV |
| 4804 | 54.8 | -3.53 | 51.27 | 74 | -22.73 | V | PK |
| 4804 | 36.93 | -3.539 | 33.391 | 54 | -20.609 | V | AV |
| 7206 | 54.26 | -0.46 | 53.8 | 74 | -20.2 | V | PK |
| 7206 | 37.12 | -0.46 | 36.66 | 54 | -17.34 | V | AV |
| Middle Channel-2441MHz | | | | | | | |
| 4882 | 53.1 | -3.36 | 49.74 | 74 | -24.26 | H | PK |
| 4882 | 42.48 | -3.36 | 39.12 | 54 | -14.88 | H | AV |
| 7323 | 55.6 | -0.38 | 55.22 | 74 | -18.78 | H | PK |
| 7323 | 42.72 | -0.38 | 42.34 | 54 | -11.66 | H | AV |
| 4882 | 54.6 | -3.36 | 51.24 | 74 | -22.76 | V | PK |
| 4882 | 41.83 | -3.36 | 38.47 | 54 | -15.53 | V | AV |
| 7323 | 54.79 | -0.38 | 54.41 | 74 | -19.59 | V | PK |
| 7323 | 43.231 | -0.38 | 42.851 | 54 | -11.149 | V | AV |
| High Channel-2480MHz | | | | | | | |
| 4960 | 55.5 | -3.34 | 52.16 | 74 | -21.84 | H | PK |
| 4960 | 41.77 | -3.34 | 38.43 | 54 | -15.57 | H | AV |
| 7440 | 52.6 | -0.35 | 52.25 | 74 | -21.75 | H | PK |
| 7440 | 43.26 | -0.35 | 42.91 | 54 | -11.09 | H | AV |
| 4960 | 57.6 | -3.34 | 54.26 | 74 | -19.74 | V | PK |
| 4960 | 42.66 | -3.34 | 39.32 | 54 | -14.68 | V | AV |
| 7440 | 53.83 | -0.35 | 53.48 | 74 | -20.52 | V | PK |
| 7440 | 44.87 | -0.35 | 44.52 | 54 | -9.48 | V | AV |

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured*

# 11. Out of Band Emissions

## 11.1 Standard Applicable

According to §15.247 (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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

## 11.2 Test Procedure

According to the DA 00-705, the band-edge radiated test method as follows.

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2410MHz for low bandedge, 2470MHz to 2500MHz for the high bandedge)
RBW = 1MHz, VBW = 1MHz for peak value measured RBW
= 1MHz, VBW = 10Hz for average value measured Sweep =
auto; Detector function = peak; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation porduct outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the DA 00-705, the band-edge conducted test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2380MHz to 2410MHz for low bandedge, 2470MHz to 2500MHz for the high bandedge)
RBW = 100kHz, VBW = 300kHz

Sweep = auto; Detector function = peak; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation porduct outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the limit specified in this section (at least 20dB attenuation).

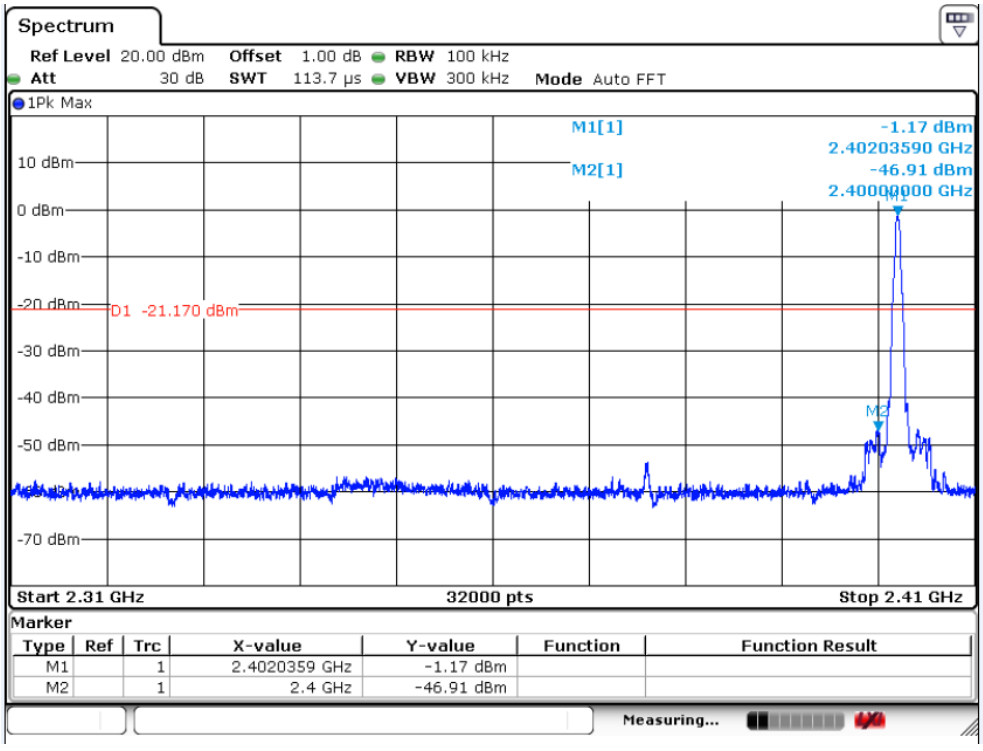
## 11.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

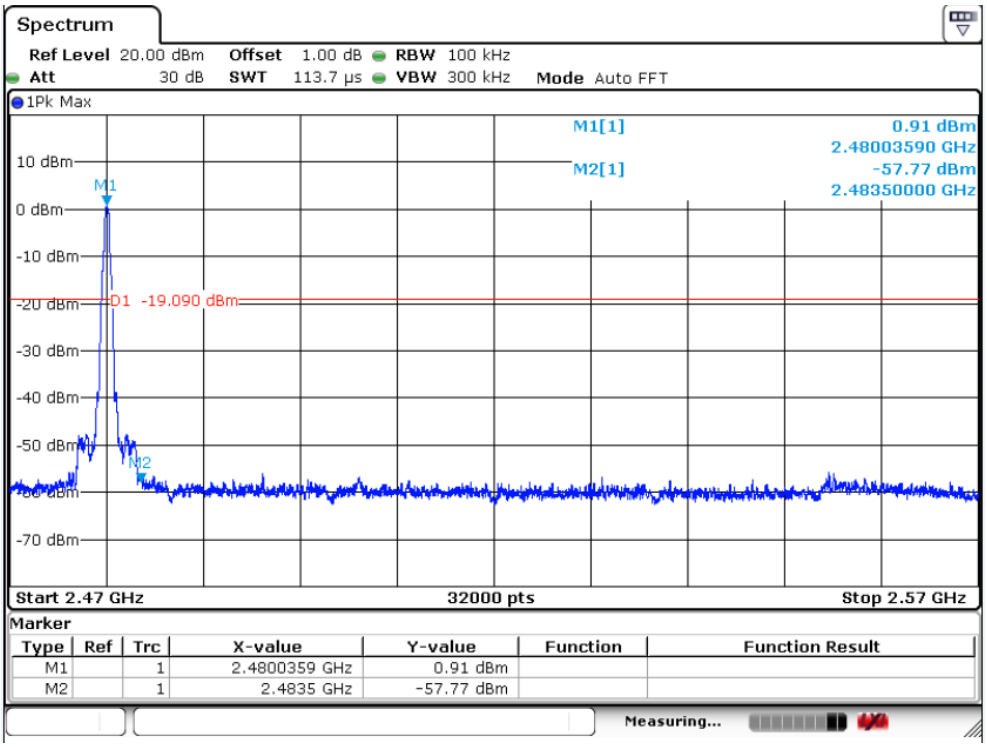
## 11.4 Summary of Test Results/Plots

**GFSK**

Bandedge (Conducted)
Lowest

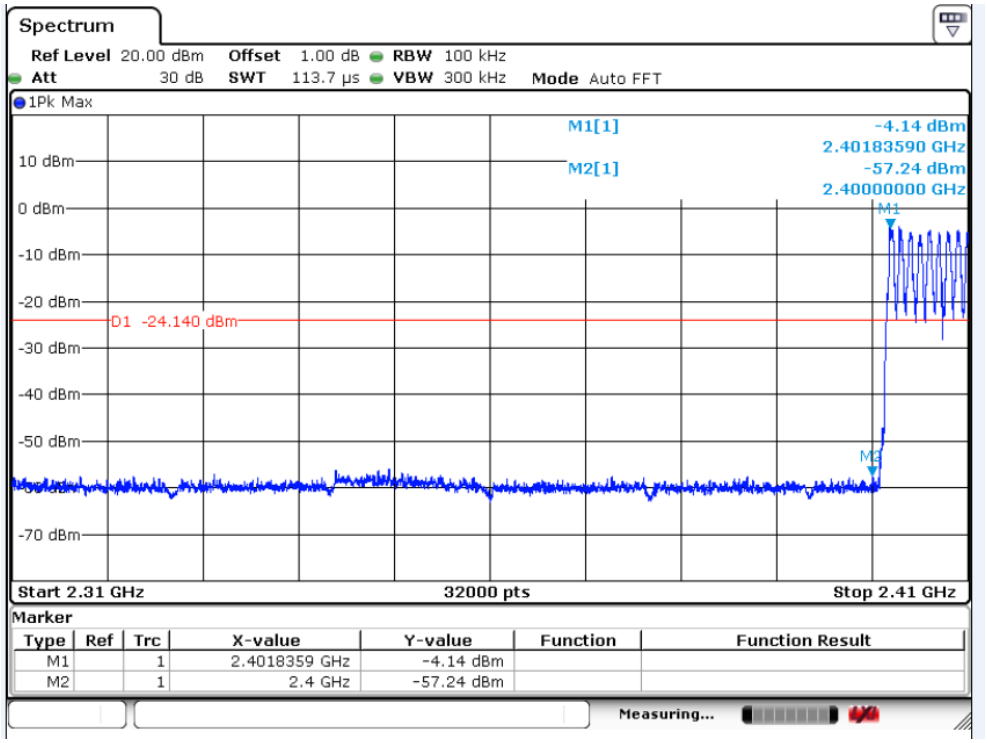


Highest

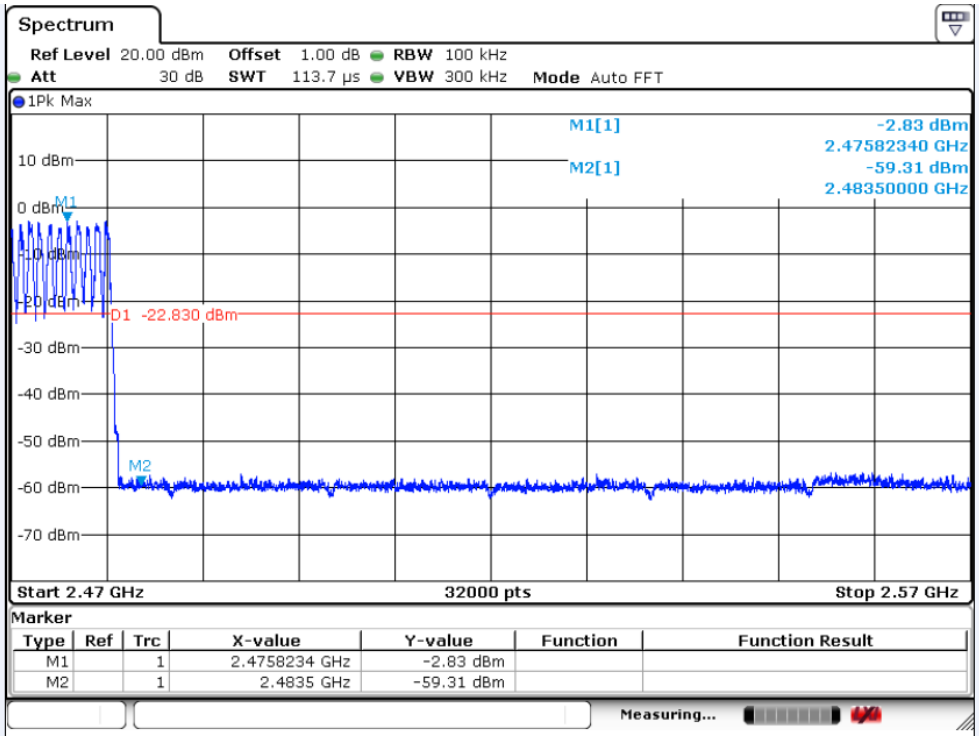



Hopping Bandedge (Conducted)

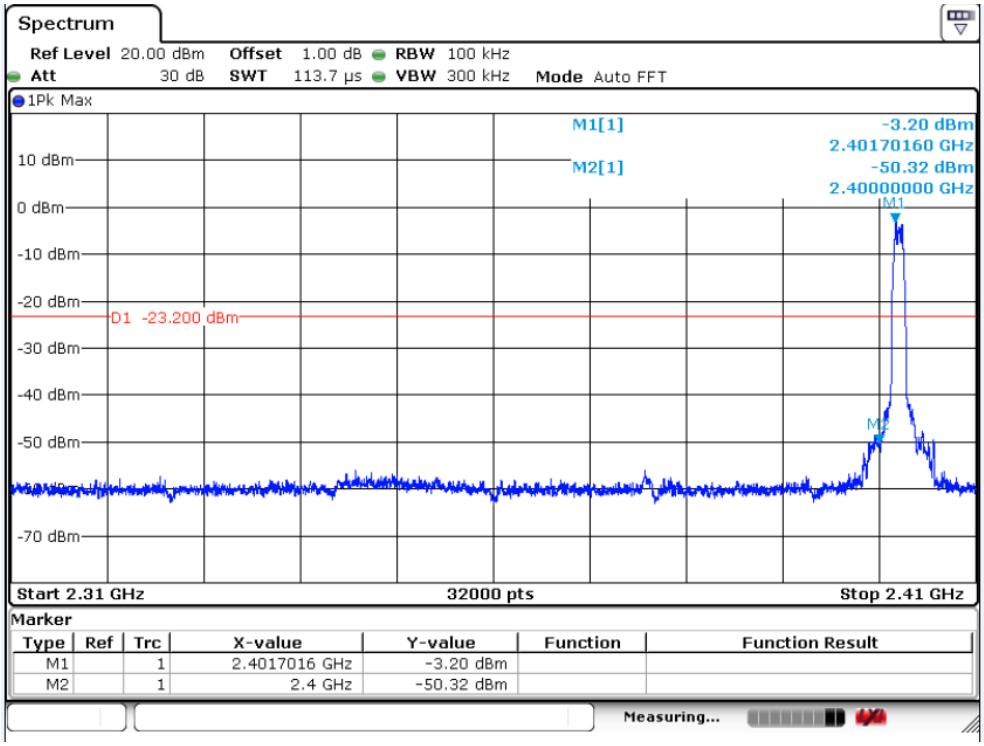
Lowest Bandedge



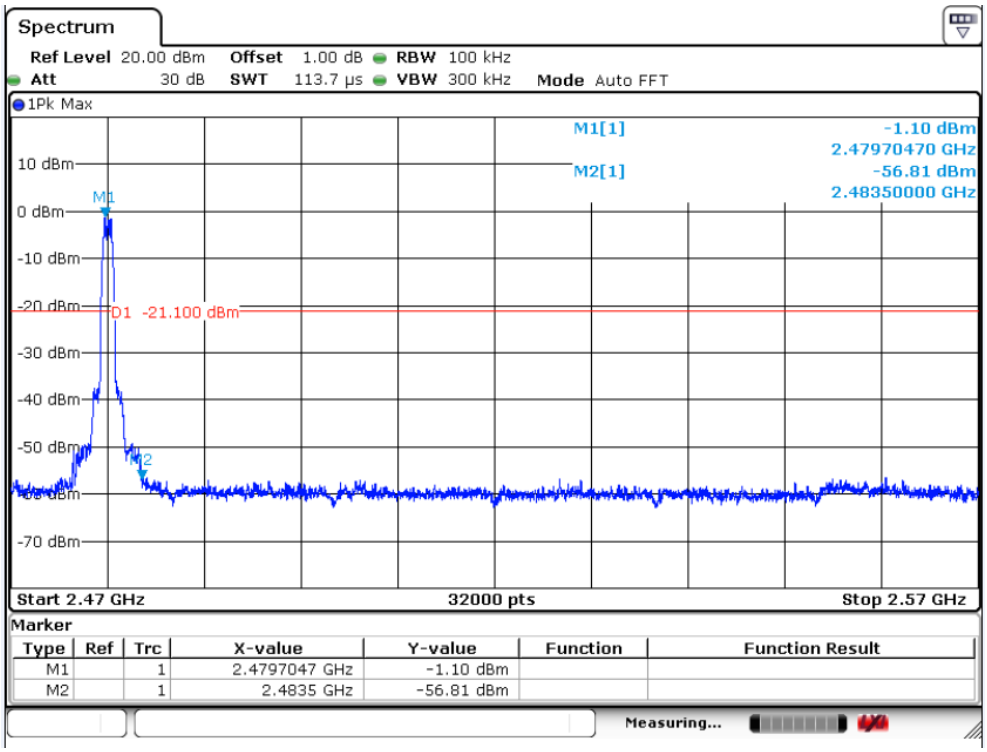
Highest Bandedge




8DPSK
Bandedge (Conducted)
Lowest

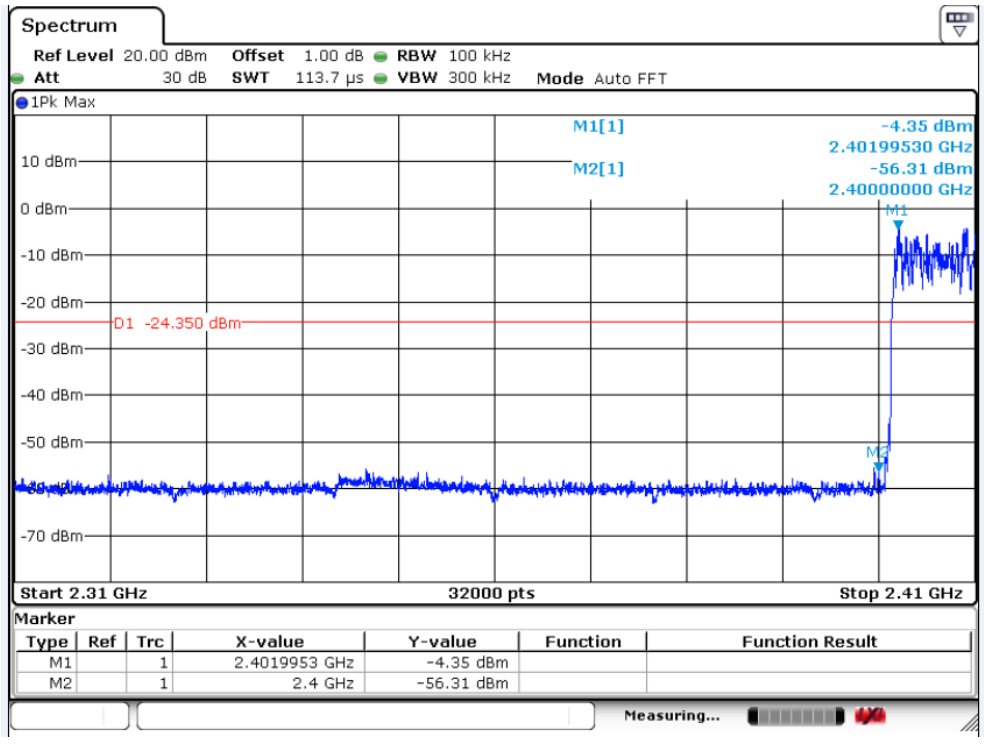


Highest

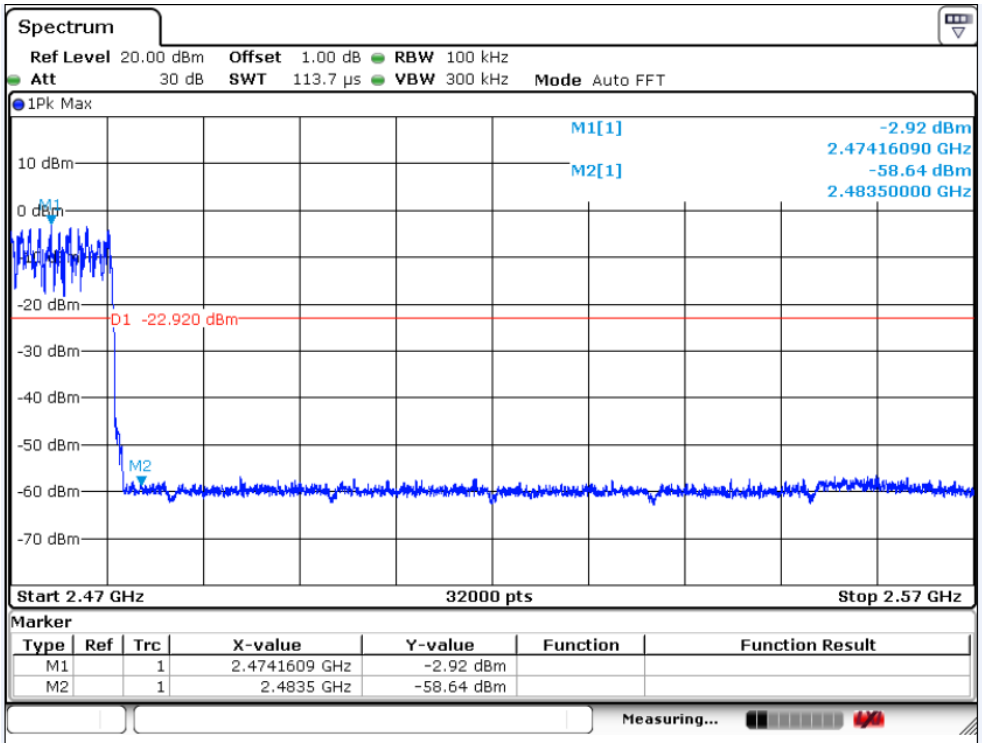



Hopping Bandedge (Conducted)

Lowest Bandedge



Highest Bandedge



# 12. Conducted Emissions

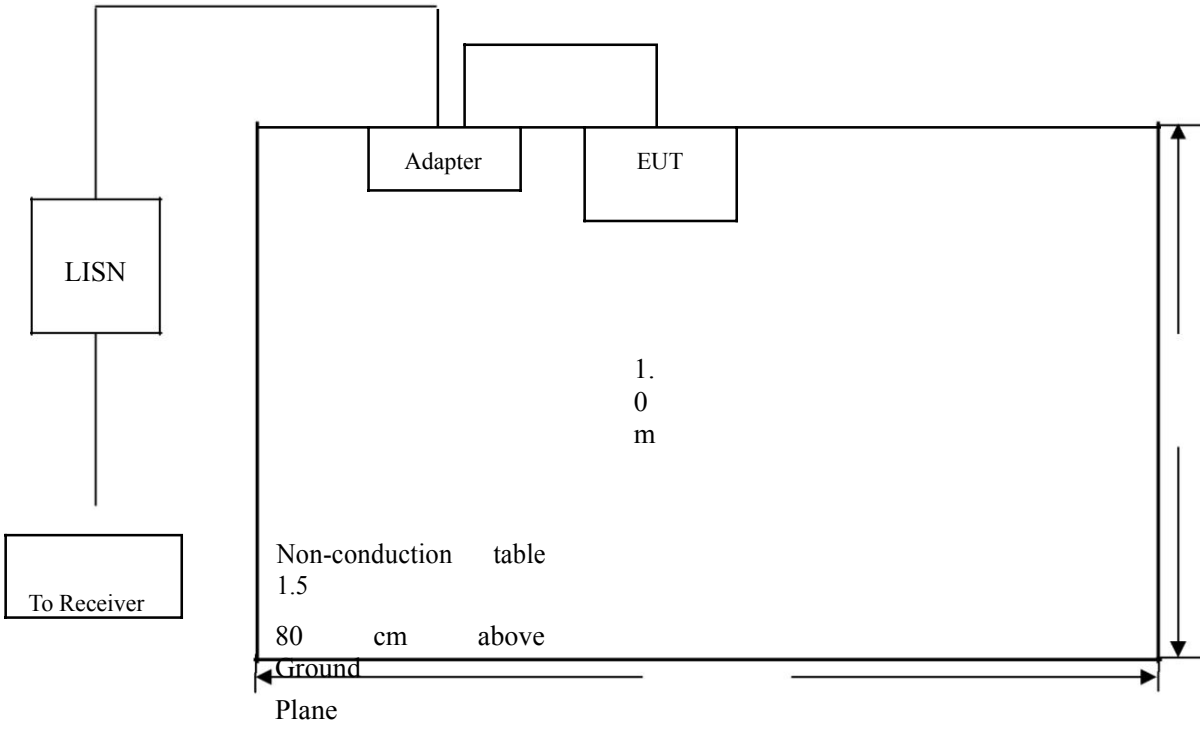
## 12.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

## 12.2 Basic Test Setup Block Diagram



## 12.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 56% |
| ATM Pressure: | 101.1 mbar |

## 12.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth ..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

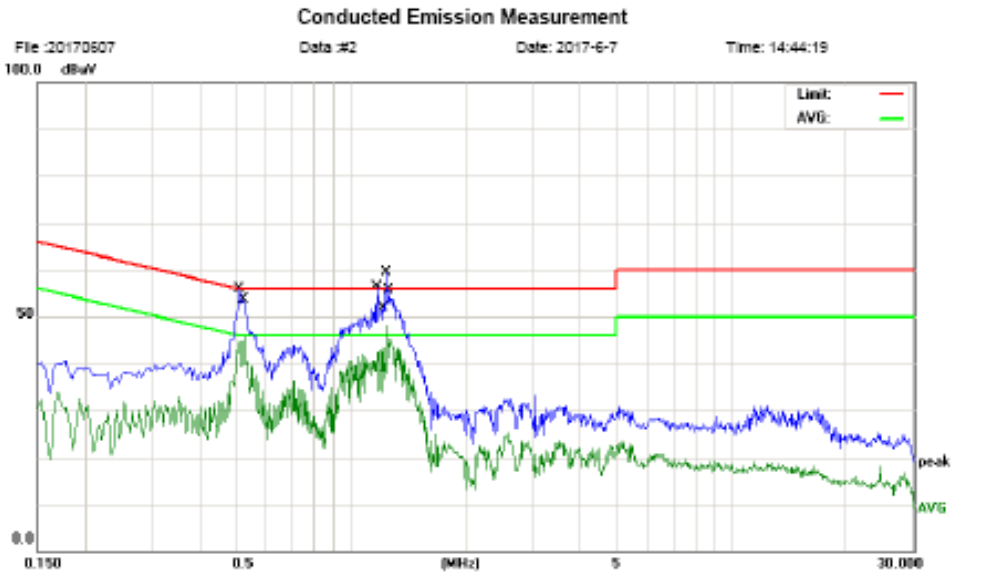
## 12.5 Summary of Test Results/Plots

According to the data in section 12.6, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

**-5.05 dB at 0.6419 MHz** in the **Neutral** mode**, peak** detector, **0.15-30MHz**

## 12.6 Conducted Emissions Test Data

N1




Site Phase: N Temperature: 26

Limit: FCC Part15 CE-Class B_QP Power: AC 120V/60Hz Humidity: 56 %

EUT:

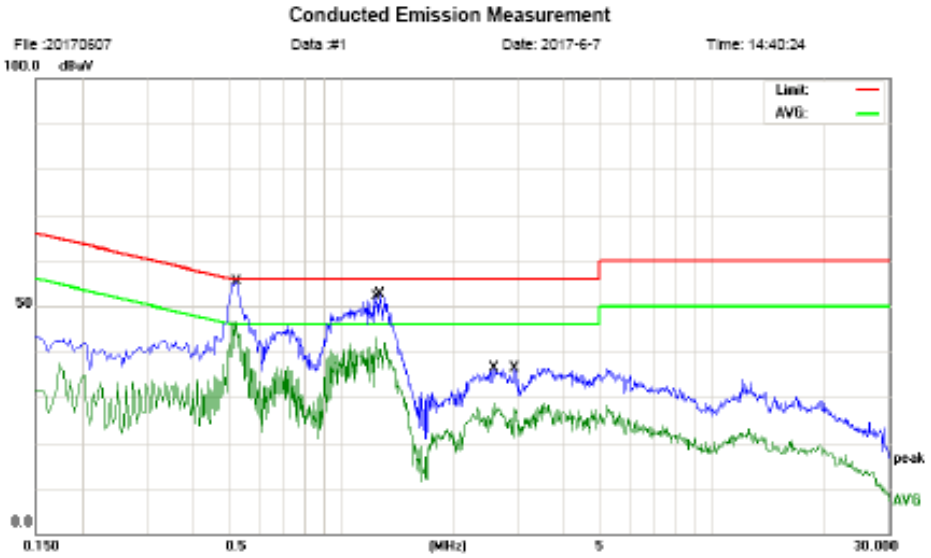
M/N: 遥控器，HDMI主机

Mode: BT

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.5100 | 41.59 | 10.01 | 51.60 | 56.00 | -4.40 | QP | |
| 2 | * | 0.5260 | 32.39 | 10.01 | 42.40 | 46.00 | -3.60 | AVG | |
| 3 | | 1.1660 | 38.66 | 9.94 | 48.60 | 56.00 | -7.40 | QP | |
| 4 | | 1.2020 | 29.45 | 9.95 | 39.40 | 46.00 | -6.60 | AVG | |
| 5 | | 1.2380 | 40.35 | 9.95 | 50.30 | 56.00 | -5.70 | QP | |
| 6 | | 1.2620 | 29.25 | 9.95 | 39.20 | 46.00 | -6.80 | AVG | |

L1




Site
Limit: FCC Part15 CE-Class B_QP
EUT:
M/N: 遥控器，HDMI主机
Mode: BT
Note:

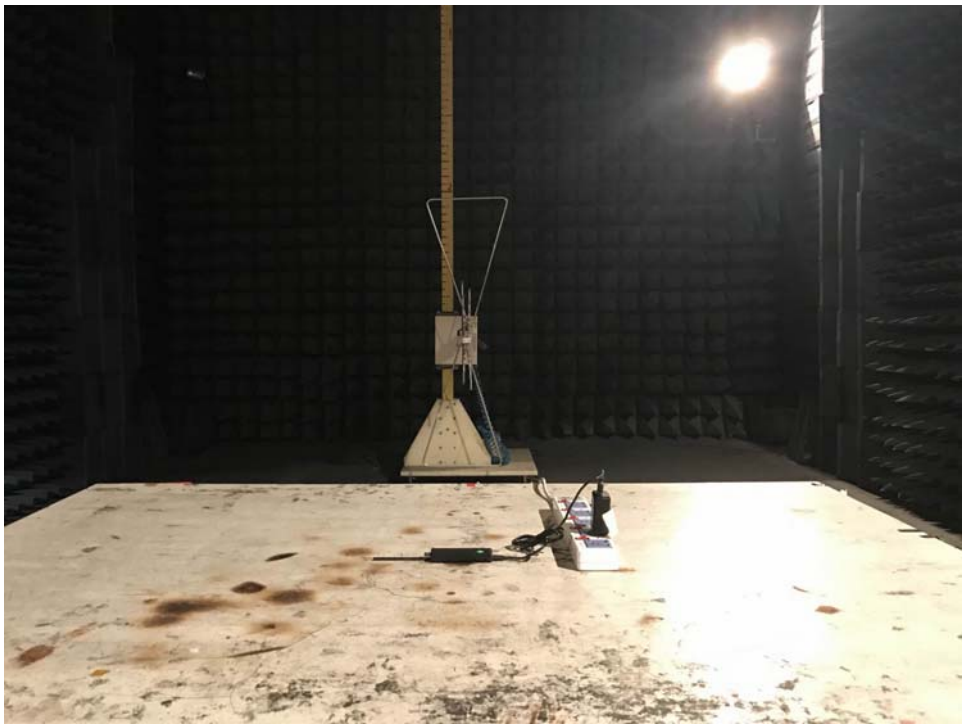
Phase: L1
Power: AC 120V/60Hz

Temperature: 26
Humidity: 56 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.5220 | 43.49 | 10.01 | 53.50 | 56.00 | -2.50 | QP | |
| 2 | * | 0.5220 | 33.79 | 10.01 | 43.80 | 46.00 | -2.20 | AVG | |
| 3 | | 1.2460 | 29.65 | 9.95 | 39.60 | 46.00 | -6.40 | AVG | |
| 4 | | 1.2700 | 42.58 | 9.96 | 52.54 | 56.00 | -3.46 | QP | |
| 5 | | 2.5780 | 18.54 | 10.01 | 28.55 | 46.00 | -17.45 | AVG | |
| 6 | | 2.9380 | 26.39 | 10.03 | 36.42 | 56.00 | -19.58 | QP | |

# 13 test photo

**Radiated Measurement Photos**



**Conducted Measurement Photos**

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