



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 1**

CERTIFICATION TEST REPORT

For

**LIFEPROOF AQ9
MODEL NUMBER: LPSAN-0005-A**

**FCC ID: UZZLPSAN0005
IC: 7633A-LPSAN0005**

REPORT NUMBER: 4787565292.3.1-2

ISSUE DATE: September 05, 2016

Prepared for

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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
| -- | 9/05/2016 | Initial Issue | |

| Summary of Test Results | | | |
|-------------------------|---|--|--------------|
| Clause | Test Items | FCC/IC Rules | Test Results |
| 1 | 20dB Bandwidth | FCC 15.247 (a) (1) IC RSS-247 Clause 5.1 (1) | Complied |
| 2 | Peak Conducted Output Power | FCC 15.247 (b) (1) IC RSS-247 Clause 5.4 (2) | Complied |
| 3 | Carrier Hopping Channel Separation | FCC 15.247 (a) (1) IC RSS-247 Clause 5.1 (2) | Complied |
| 4 | Number of Hopping Frequency | 15.247 (a) (1) III IC RSS-247 Clause 5.1 (4) | Complied |
| 5 | Time of Occupancy (Dwell Time) | 15.247 (a) (1) III IC RSS-247 Clause 5.1 (4) | 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 FCC 15.205 IC RSS-247 Clause 5.5 IC RSS-GEN Clause 8.9 | 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 |

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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

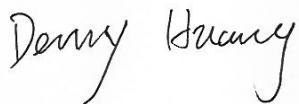
Company Name: Shenzhen Synchron Electronics Co., Ltd.
Address: No. 9 Mei Li Road, Xia Mei Lin, Fu Tian Area, Shenzhen, Guangdong, P.R. China

EUT Description

Product Name: LIFEPROOF AQ9
Brand Name: N/A
Model Name: LPSAN-0005-A
FCC ID: UZZLPSAN0005
IC: 7633A-LPSAN0005
Date Tested: August 15, 2016 ~ August 24, 2016

| APPLICABLE STANDARDS | |
|---------------------------------|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart C | PASS |
| INDUSTRY CANADA RSS-247 Issue 1 | PASS |
| INDUSTRY CANADA RSS-GEN Issue 4 | PASS |

Tested By:



Denny Huang
Engineer Project Associate
Approved By:



Shawn Wen
Laboratory Leader

Check By:



Shawn Wen
Laboratory Leader

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 1.

3. FACILITIES AND ACCREDITATION

| | |
|---------------------------|---|
| Test Location | Shenzhen Huatongwei International Inspection Co., Ltd. |
| Address | 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China Phone: 86-755-26748019 Fax: 86-755-26748089 |
| Accreditation Certificate | Shenzhen Huatongwei International Inspection 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 December 31, 2016. Shenzhen Huatongwei International Inspection 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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017. The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016. Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017. |
| Description | Radiated tests and Conducted Emission tests for AC Power Port measurement facilities use to collect the measurement data are located at 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China |

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 |
|---------------------------------------|-------------|
| Conducted Disturbance, 0.15 to 30 MHz | ± 3.39 dB |
| Radiated Disturbance, 9k to 30 MHz | ± 2.20 dB |
| Radiated Disturbance, 30 to 1000 MHz | ± 4.24 dB |
| Radiated Disturbance, 1 to 18 GHz | ± 5.16 dB |
| Radiated Disturbance, 18 to 40 GHz | ± 5.54 dB |

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

| | | | | | |
|---------------------|---------------------|---------------------|--|--|--|
| Equipment | LIFEPROOF AQ9 | | | | |
| Model Name | LPSAN-0005-A | | | | |
| Product Description | Operation Frequency | 2402 MHz ~ 2480 MHz | | | |
| | Modulation Type | Data Rate | | | |
| | GFSK | 1Mbps | | | |
| | Π/4-DQPSK | 2Mbps | | | |
| | 8-DPSK | 3Mbps | | | |
| Power Supply | DC 5V, 2A | | | | |
| Battery | 3.7V, 1000mAh | | | | |
| Bluetooth Version | BT 4.2 | | | | |

5.2. MAXIMUM OUTPUT POWER

| Frequency Range (MHz) | Number of Transmit Chains (NTX) | Bluetooth Mode | Frequency (MHz) | Channel Number | Max PK Conducted Power (dBm) | Max EIRP (dBm) |
|-----------------------|---------------------------------|----------------|-----------------|----------------|------------------------------|----------------|
| 2400-2483.5 | 1 | GFSK | 2402-2480 | 0-78[79] | 0.10 | -1.62 |
| 2400-2483.5 | 1 | 8-DPSK | 2402-2480 | 0-78[79]] | 0.47 | -1.25 |

5.3. PACKET TYPE CONFIGURATION

| Test Mode | Packet Type | Setting |
|-----------|-------------|---------|
| GFSK | DH1 | 27 |
| | DH3 | 183 |
| | DH5 | 339 |
| Π/4-DQPSK | 2-DH1 | 54 |
| | 2-DH3 | 367 |
| | 2-DH5 | 679 |
| 8-DPSK | 3-DH1 | 83 |
| | 3-DH3 | 552 |
| | 3-DH5 | 1021 |

5.4. CHANNEL LIST

| 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 | | |
| Modulation Type | Transmit Antenna Number | Test Channel | | |
| | | CH 00 | CH 039 | CH 78 |
| GFSK | 1 | N/A | N/A | N/A |
| 8-DPSK | 1 | N/A | N/A | N/A |

5.7. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|--------------|--------------------|
| 1 | 2402-2480 | PCB Antenna | -1.72 |

| 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 | FCC ID |
|------|-----------|------------|------------|--------|
| 1 | Laptop | ThinkPad | T410 | N/A |

I/O CABLES

| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|--------|----------------|------------|-----------------|---------|
| 1 | AUX In | AUX | N/A | 0.30 | N/A |
| 2 | DC In | USB | Unshielded | 0.92 | N/A |

ACCESSORY

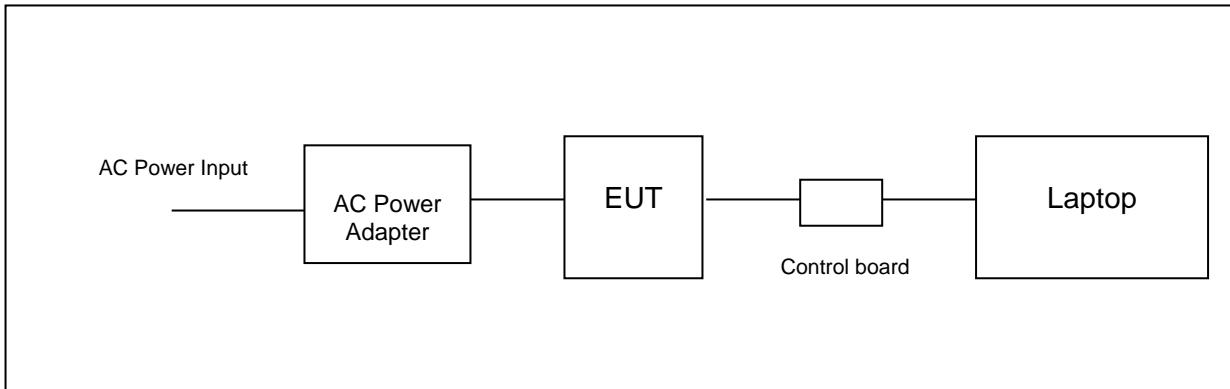
| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| 1 | N/A | N/A | | N/A |

Note: The EUT has no accessory.

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. | Expired date |
| <input checked="" type="checkbox"/> | Spectrum Analyzer | R&S | FSV40 | 100048 | Nov.3,2015 | Nov.3,2016 |
| Instrument (Line Conducted Emission (AC Main)) | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Expired date |
| <input checked="" type="checkbox"/> | EMI Test Receiver | R&S | ESCI | 101247 | Nov.3,2015 | Nov.3,2016 |
| <input checked="" type="checkbox"/> | Artificial Mains | SCHWARZB ECK | NNLK 8121 | 573 | Nov.3,2015 | Nov.3,2016 |
| <input checked="" type="checkbox"/> | Pulse Limiter | R&S | ESH3-Z2 | 101488 | Nov.3,2015 | Nov.3,2016 |
| <input checked="" type="checkbox"/> | Test Software | R&S | ES-K1 | N/A | N/A | N/A |
| <input checked="" type="checkbox"/> | Adapter (see note) | HUNTKEY | HW- 050100C2W | HWHKAPE5 1309936 | - | - |
| Instrument (Radiated Tests) | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Expired date |
| <input checked="" type="checkbox"/> | EMI Test Receiver | R&S | ESI 26 | 100009 | Nov.2,2015 | Nov.2,2016 |
| <input checked="" type="checkbox"/> | RF Test Panel | R&S | TS / RSP | 335015/ 0017 | N/A | N/A |
| <input checked="" type="checkbox"/> | EMI Test Software | R&S | ESK1 | N/A | N/A | N/A |
| <input checked="" type="checkbox"/> | Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 538 | Nov.8,2015 | Nov.8,2016 |
| <input checked="" type="checkbox"/> | Horn Antenna | ShwarzBeck | 9120D | 1011 | Nov.8,2015 | Nov.8,2016 |
| <input checked="" type="checkbox"/> | Loop Antenna | R&S | HZ-9 | 838622\013 | Nov.8,2015 | Nov.8,2016 |
| <input checked="" type="checkbox"/> | Broadband Horn Antenna | ShwarzBeck | BBHA9170 | BBHA9170 472 | Nov.8,2015 | Nov.8,2016 |
| <input checked="" type="checkbox"/> | Broadband Preamplifier | ShwarzBeck | BBV 9718 | 9718-247 | Nov.2,2015 | Nov.2,2016 |
| <input checked="" type="checkbox"/> | Broadband Preamplifier | ShwarzBeck | BBV 9721 | 9721-102 | Nov.2,2015 | Nov.2,2016 |
| <input checked="" type="checkbox"/> | Turn Table | MATURO | TT2.0 | ---- | N/A | N/A |
| <input checked="" type="checkbox"/> | Antenna Mast | MATURO | TAM-4.0-P | ---- | N/A | N/A |
| <input checked="" type="checkbox"/> | EMI Test Software | Audix | E3 | N/A | N/A | N/A |
| <input checked="" type="checkbox"/> | Test cable | Siva Cables Italy | RG 58A/U | W14.02 | Nov.5,2015 | Nov.5,2016 |

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 |

7. ANTENNA PORT TEST RESULTS

7.1. 20 dB BANDWIDTH

LIMITS

| FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 1 | | | |
|---|----------------|-------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| FCC 15.247 (a) (1) IC RSS-247 Clause 5.1 (1) | 20dB Bandwidth | / | 2400-2483.5 |

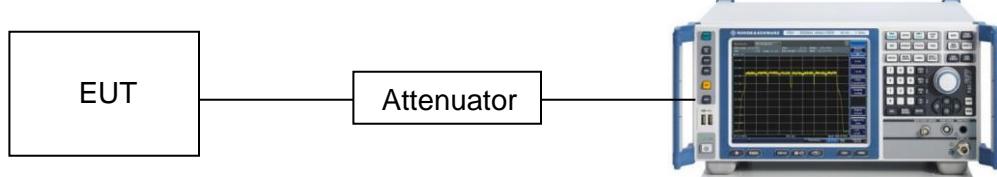
TEST PROCEDURE

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



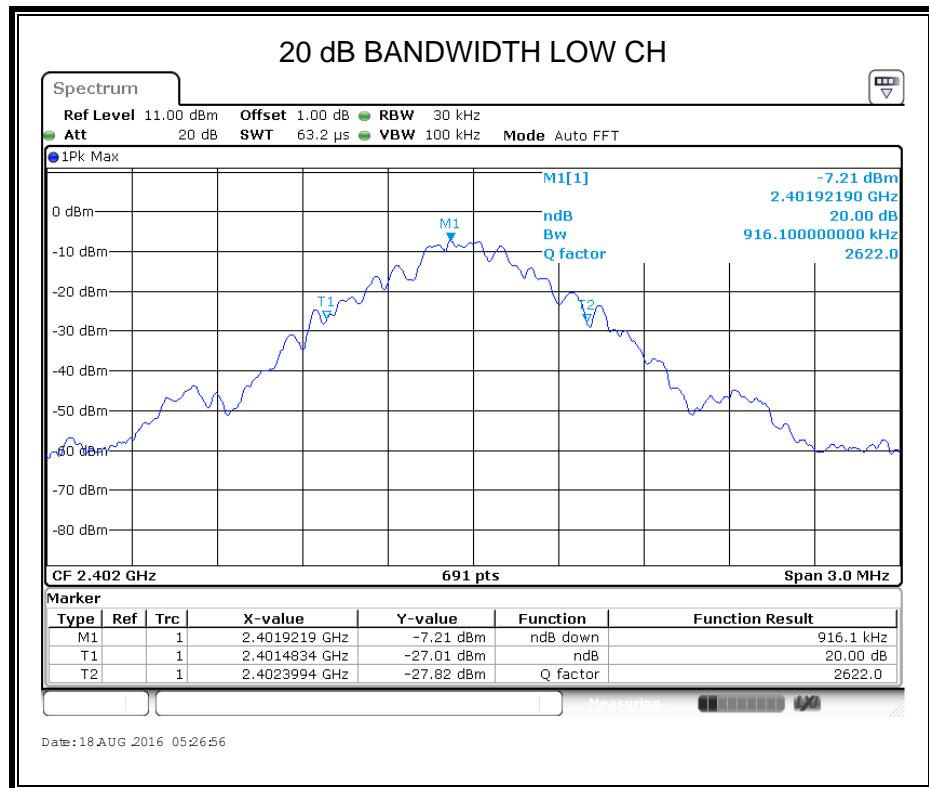
TEST CONDITIONS

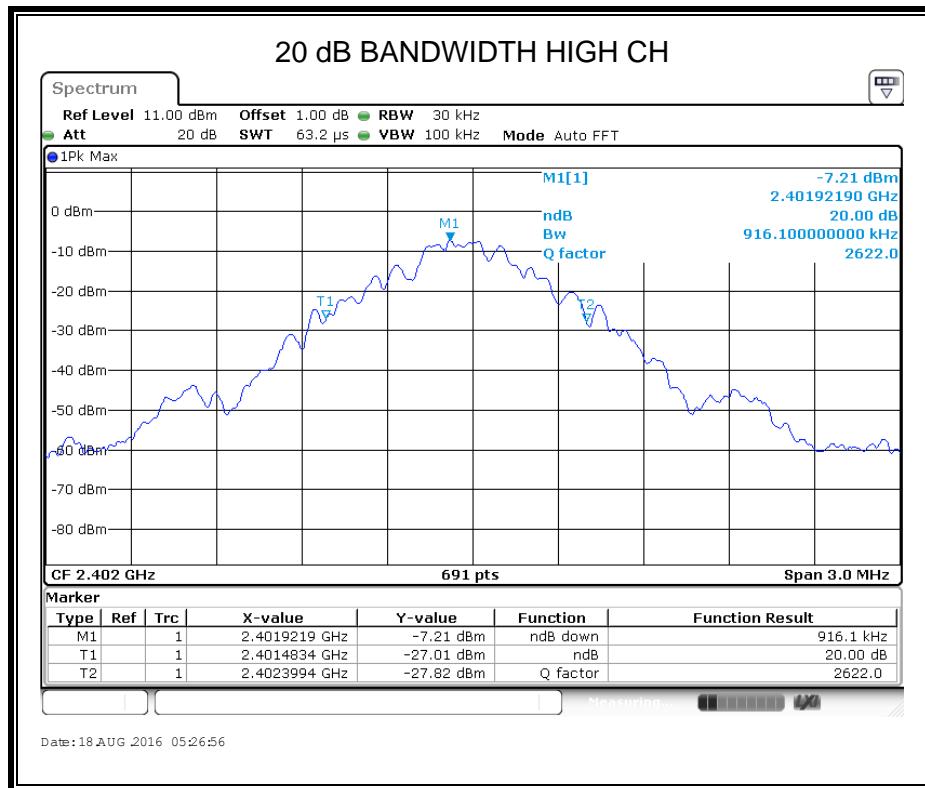
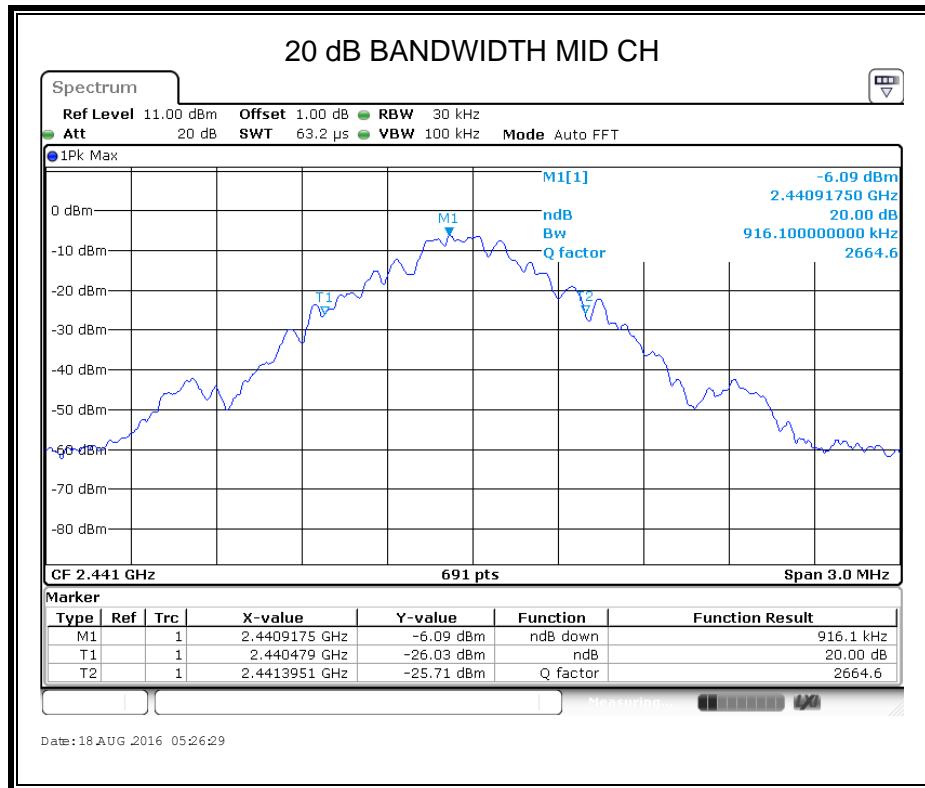
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

RESULTS

7.1.1. GFSK MODE

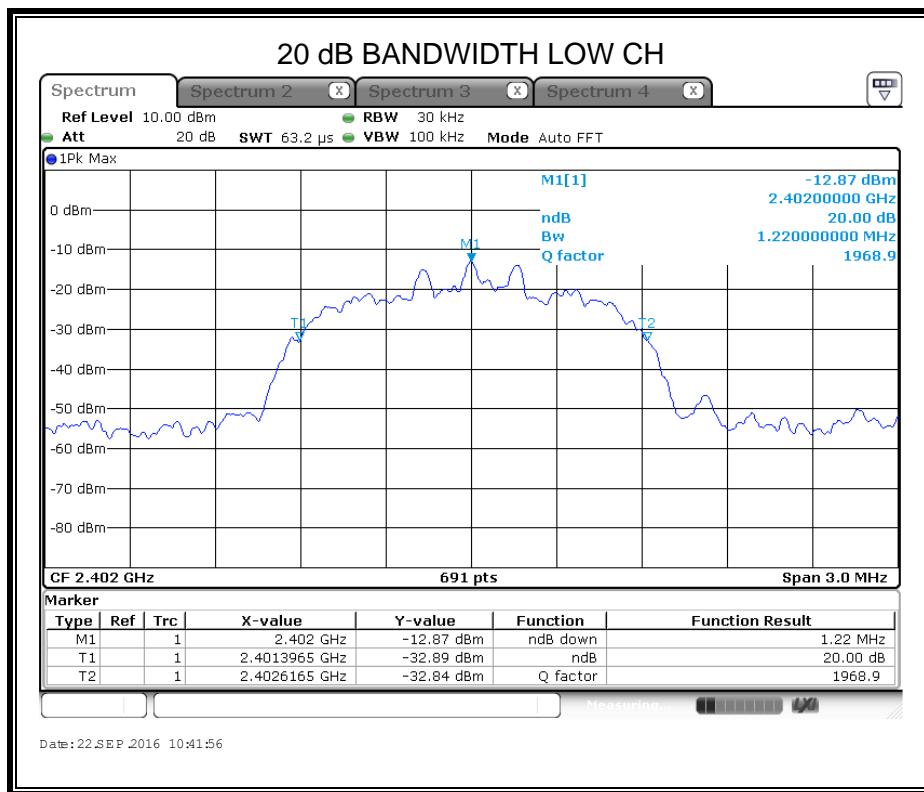
| Channel | Frequency (MHz) | 20dB bandwidth (kHz) | Limit (kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| Low | 2402 | 916.1 | 500 | Pass |
| Middle | 2441 | 916.1 | 500 | Pass |
| High | 2480 | 916.1 | 500 | Pass |

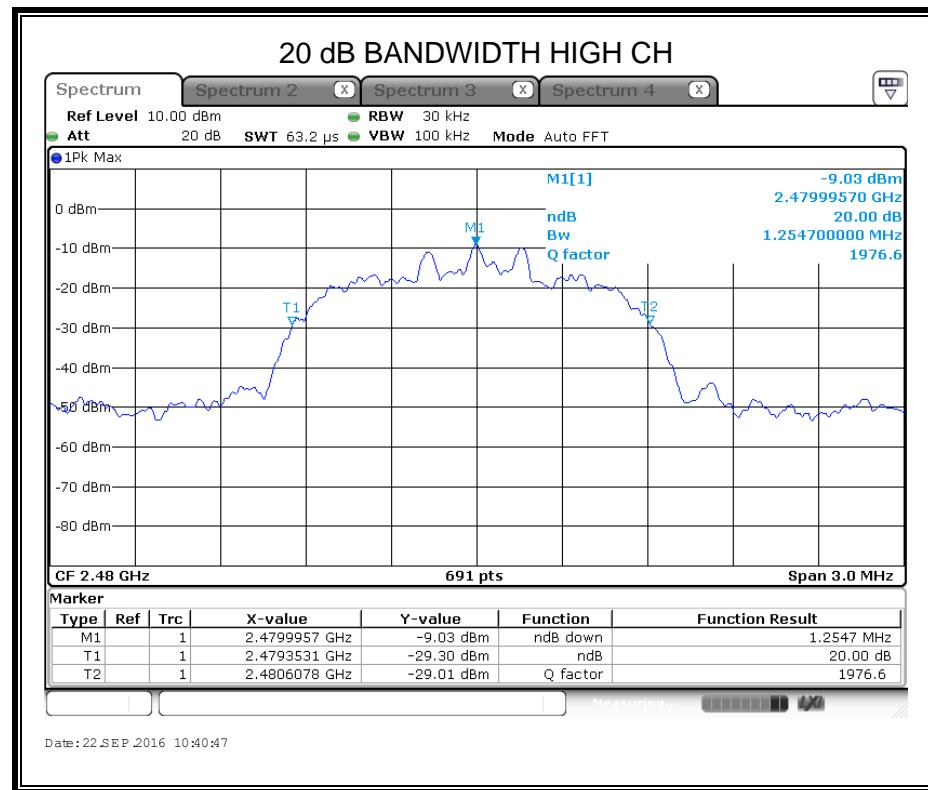
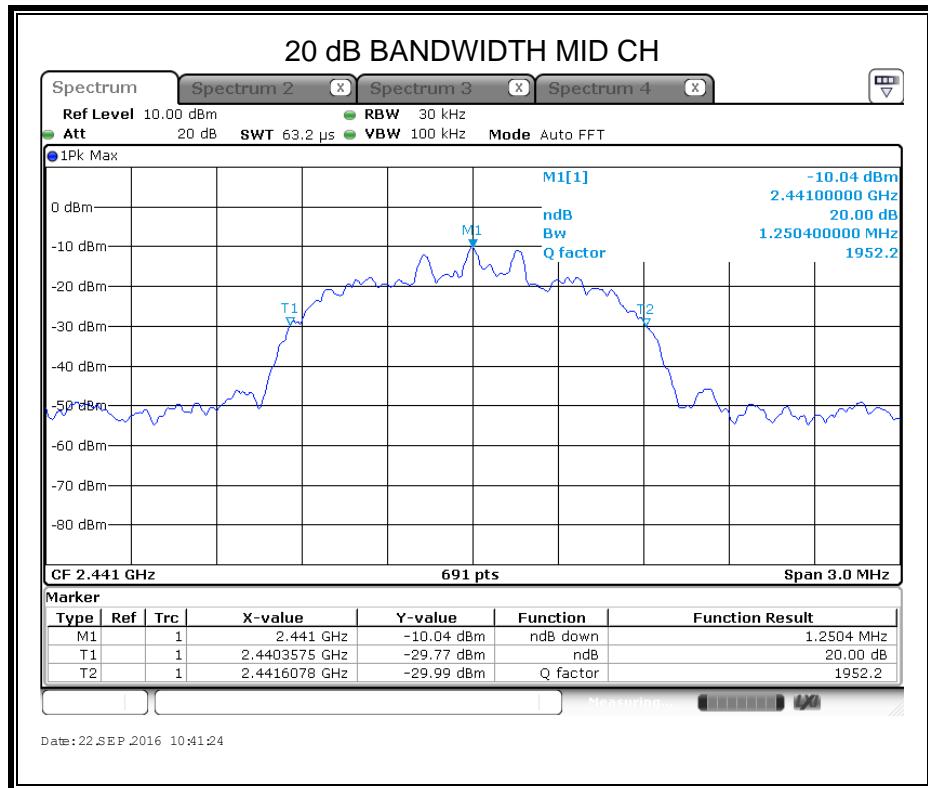




7.1.2. 8-DPSK MODE

| Channel | Frequency (MHz) | 20dB bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| Low | 2402 | 1.220 | 500 | Pass |
| Middle | 2441 | 1.250 | 500 | Pass |
| High | 2480 | 1.255 | 500 | Pass |





7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

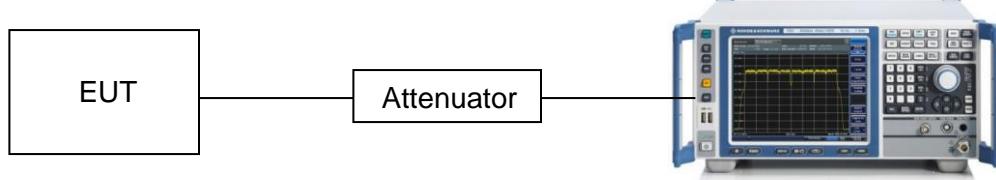
TEST PROCEDURE

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 (e.g. 30K for BT) |
| VBW | \geq RBW |
| Trace | Max hold |
| Sweep | Auto couple |

Use the 99% bandwidth function in the spectrum analyser and allow the trace to stabilize, then recorded the measurement data.

TEST SETUP



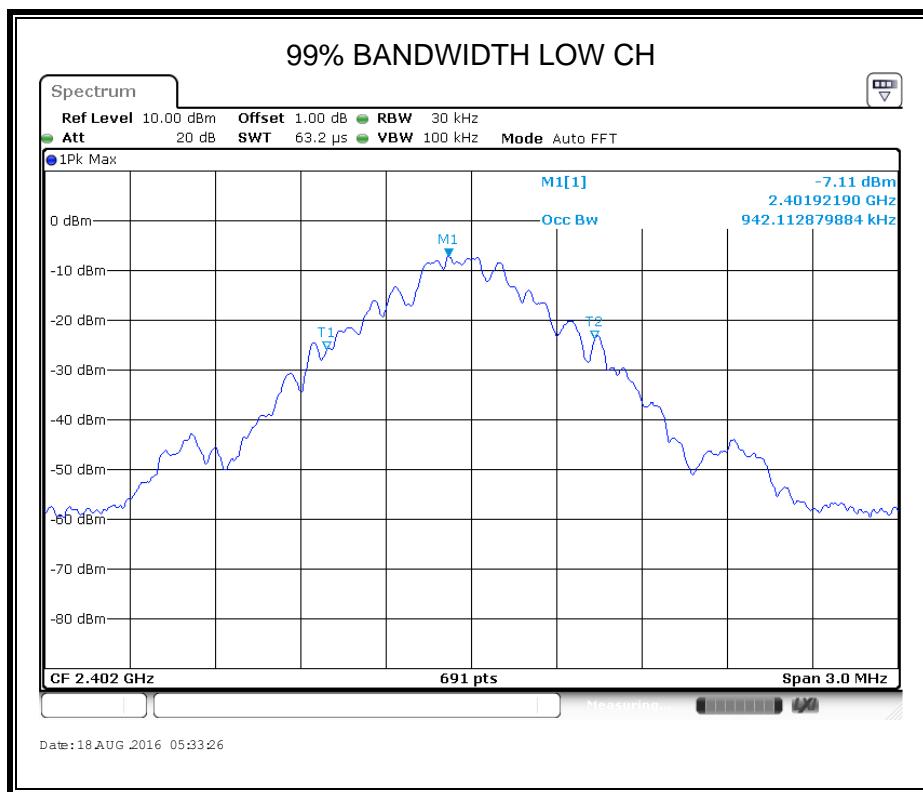
TEST CONDITIONS

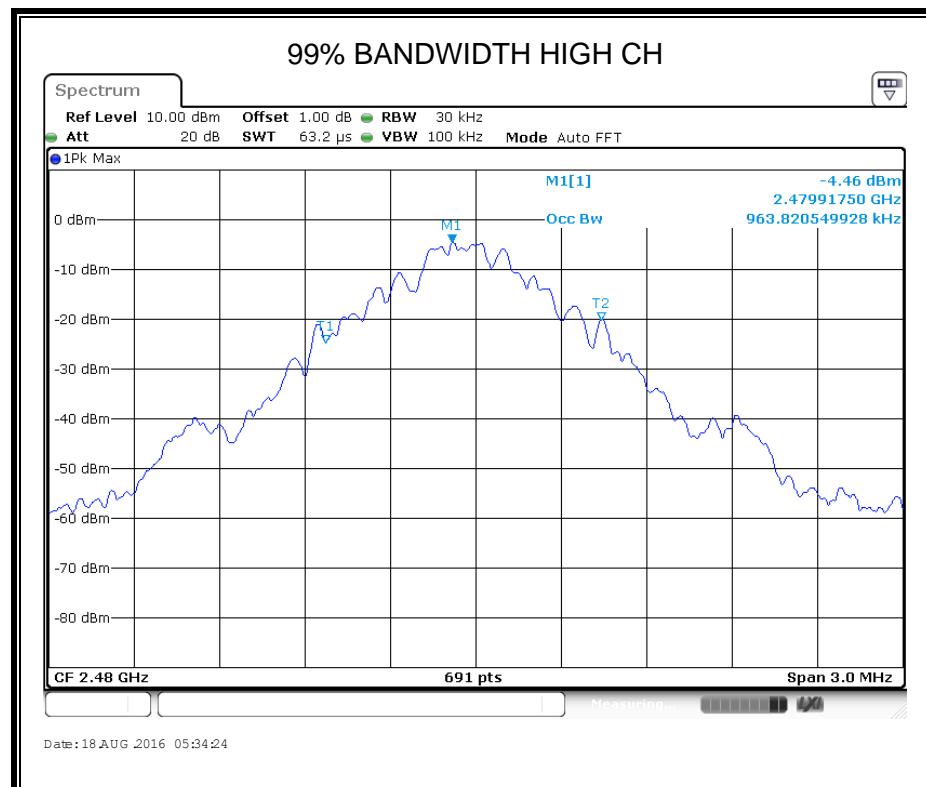
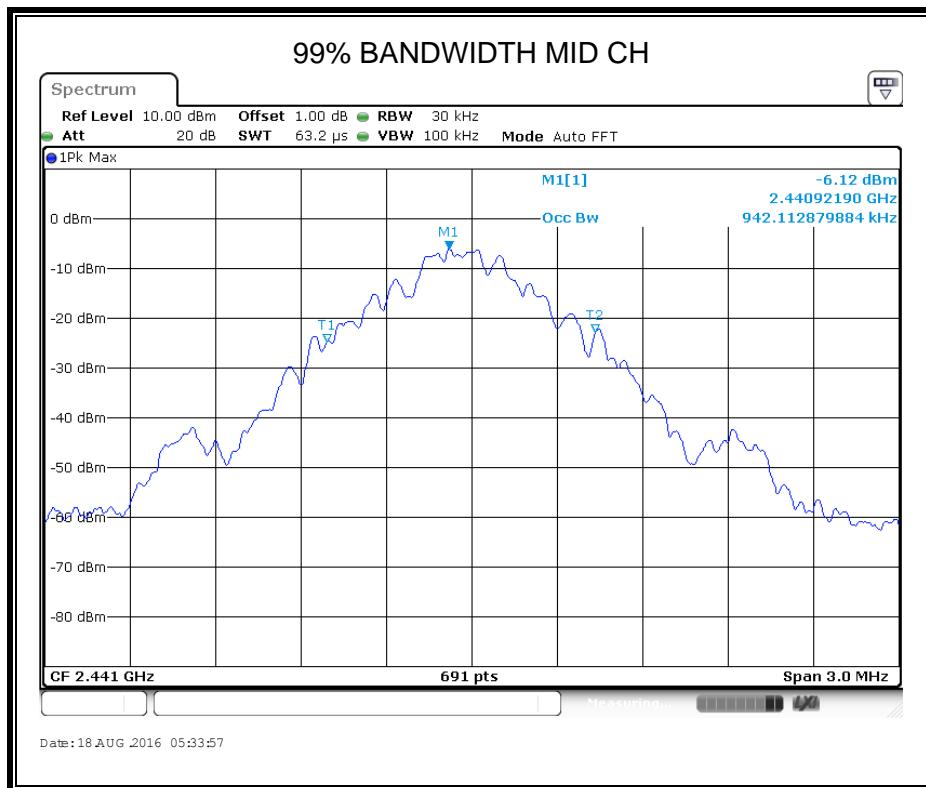
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

RESULTS

7.2.1. GFSK MODE

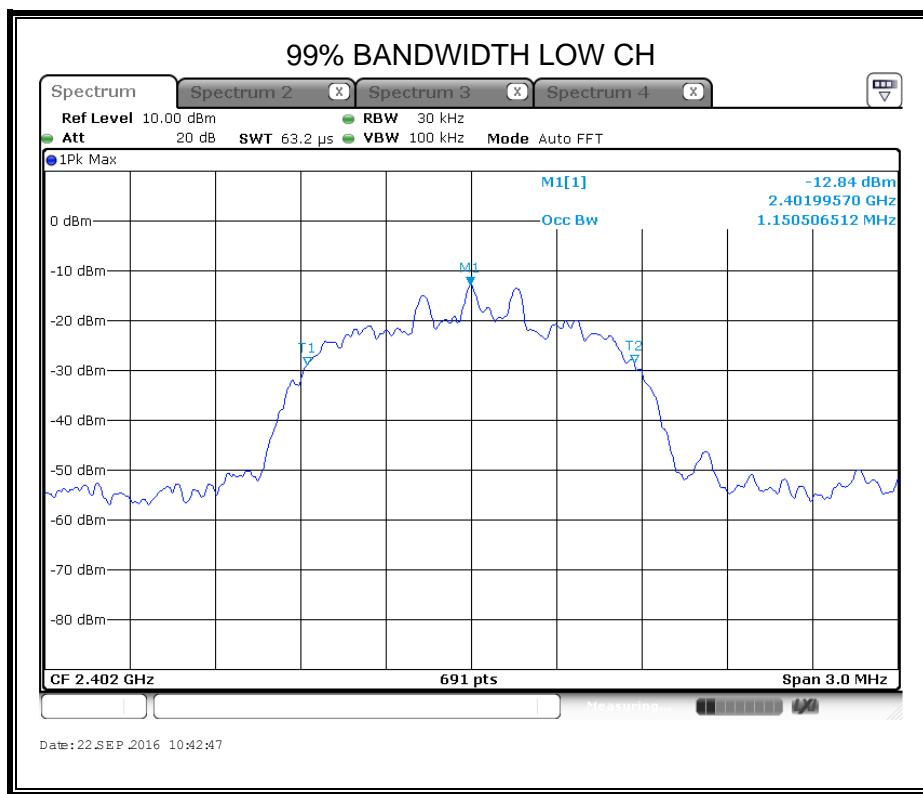
| Channel | Frequency (MHz) | 99% Bandwidth (kHz) | Limit (kHz) | Result |
|---------|-----------------|---------------------|-------------|--------|
| Low | 2402 | 942.113 | 500 | Pass |
| Middle | 2441 | 942.113 | 500 | Pass |
| High | 2480 | 963.821 | 500 | Pass |

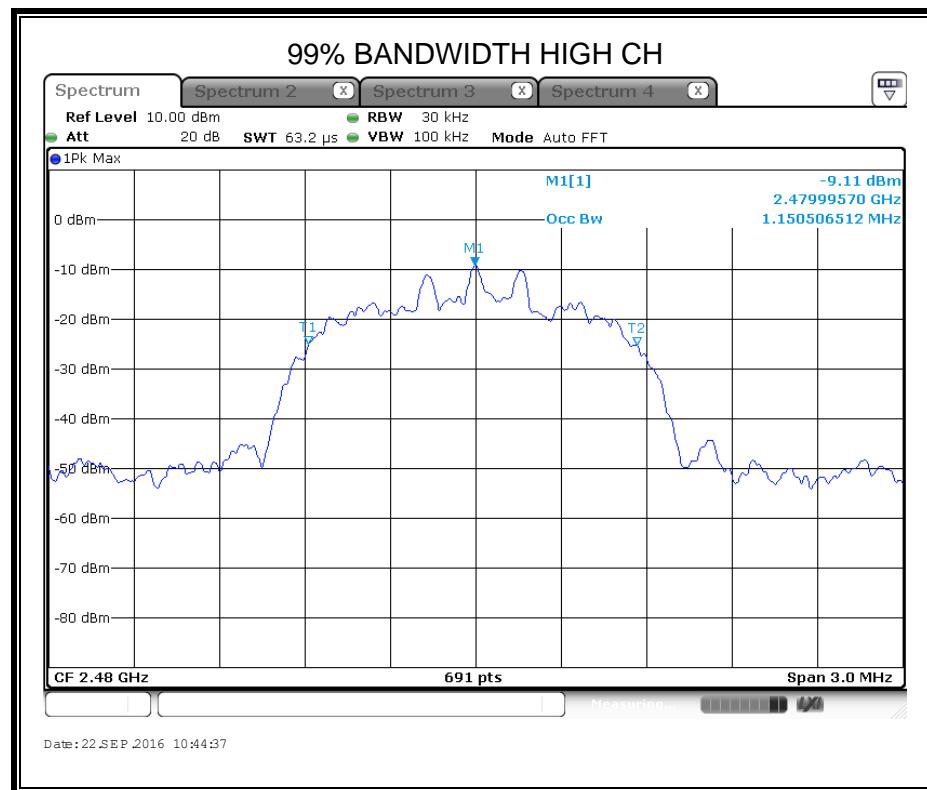
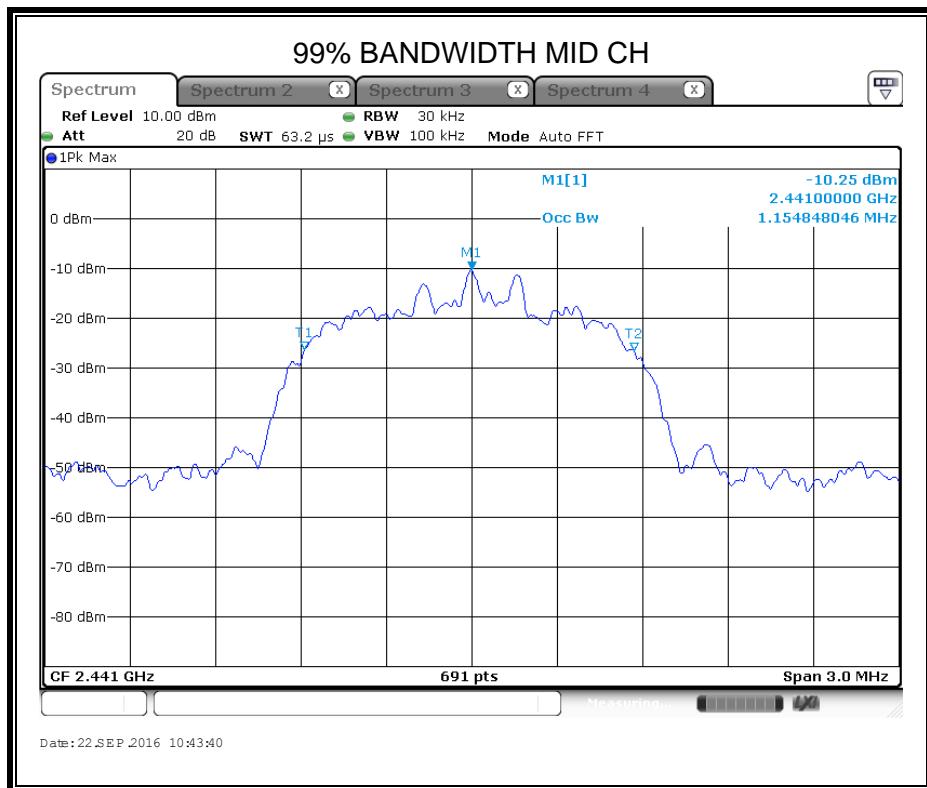




7.2.2. 8-DQPSK MODE

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|---------------------|-------------|--------|
| Low | 2402 | 1.151 | 500 | Pass |
| Middle | 2441 | 1.155 | 500 | Pass |
| High | 2480 | 1.151 | 500 | Pass |





7.3. PEAK CONDUCTED OUTPUT POWER

LIMITS

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

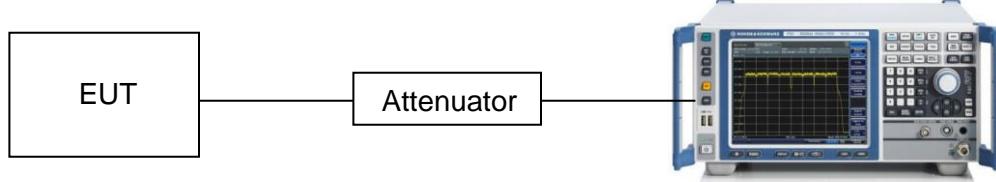
TEST PROCEDURE

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 | \geq 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

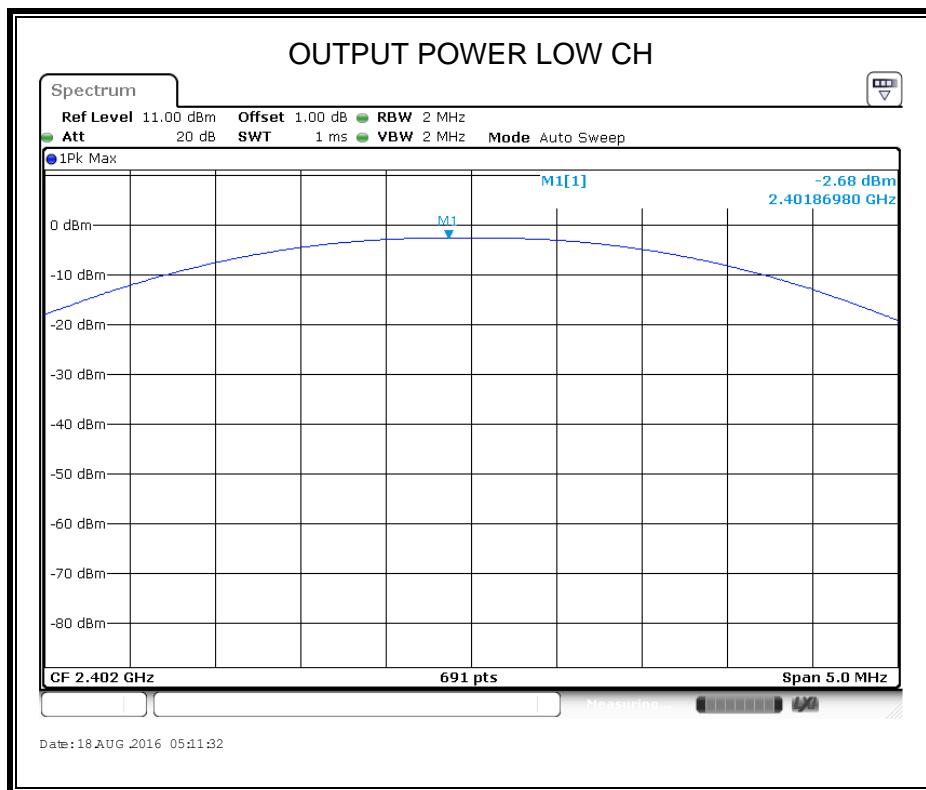
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

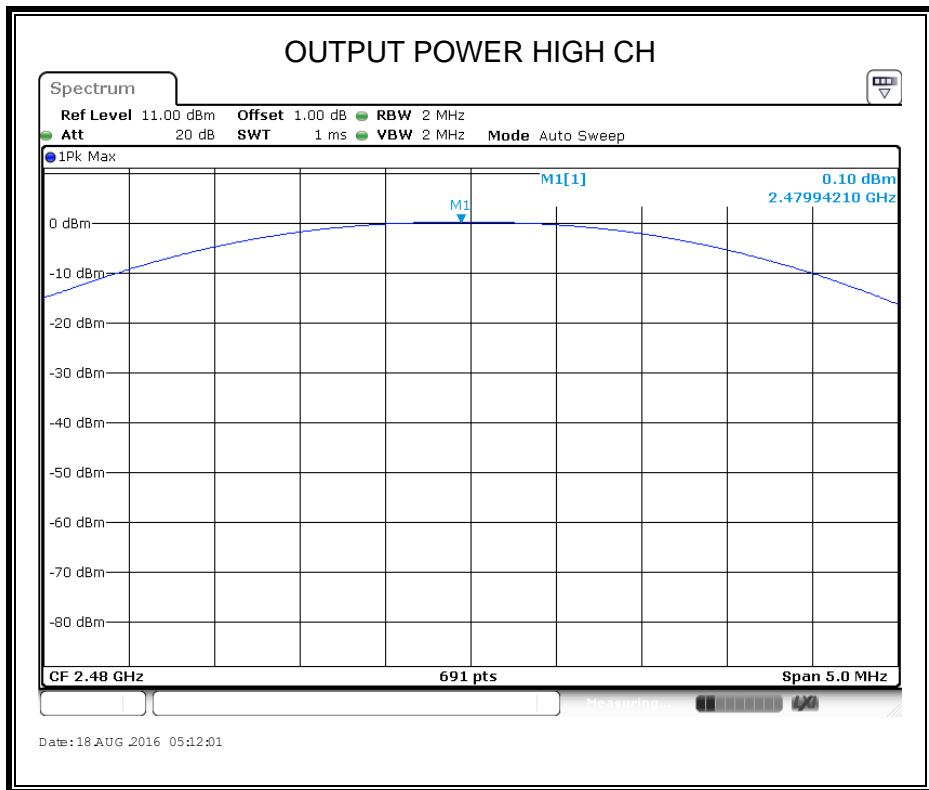
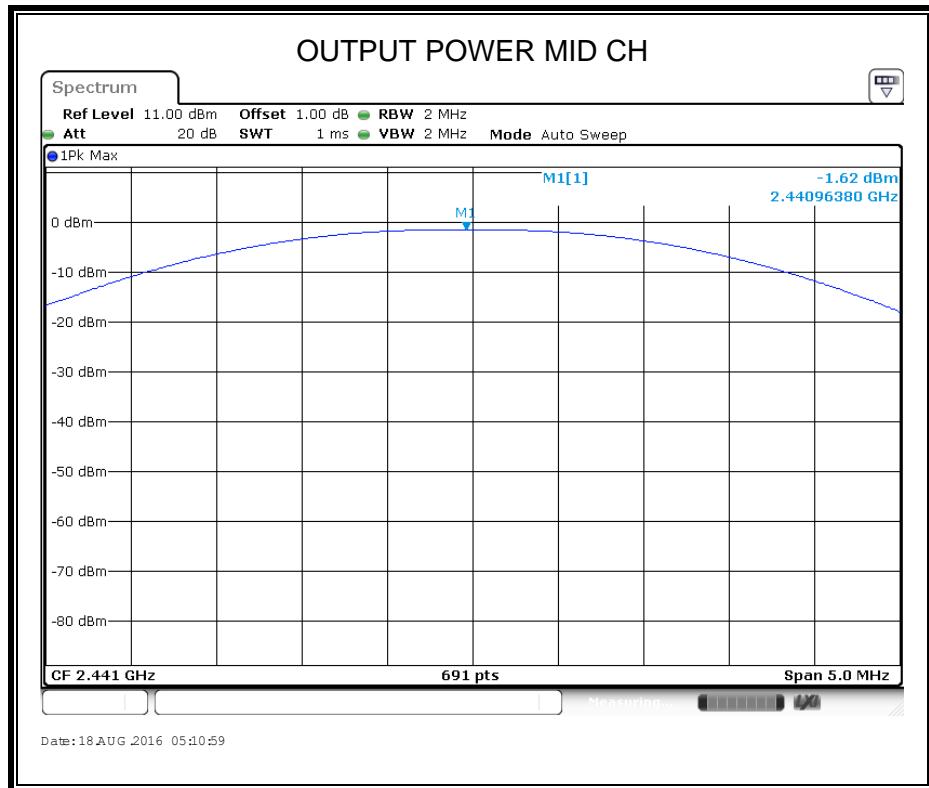
RESULTS

7.3.1. GFSK MODE

| Channel | Frequency (MHz) | Maximum Conducted Output(PK) | EIRP (dBm) | Result |
|---------|--------------------|---------------------------------|---------------|--------|
| | | (dBm) | | |
| Low | 2402 | -2.68 | -4.40 | Pass |
| Middle | 2441 | -1.62 | -3.34 | Pass |
| High | 2480 | 0.10 | -1.62 | Pass |

Note: EIRP = Maximum Conducted Output Power (PK) + Antenna Gain

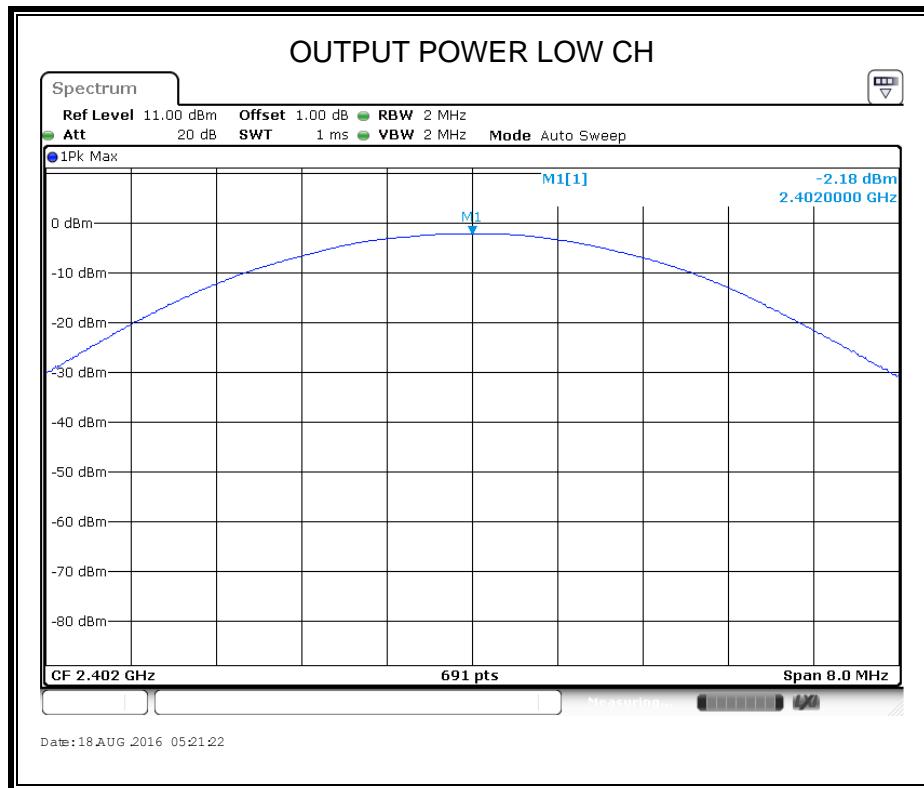


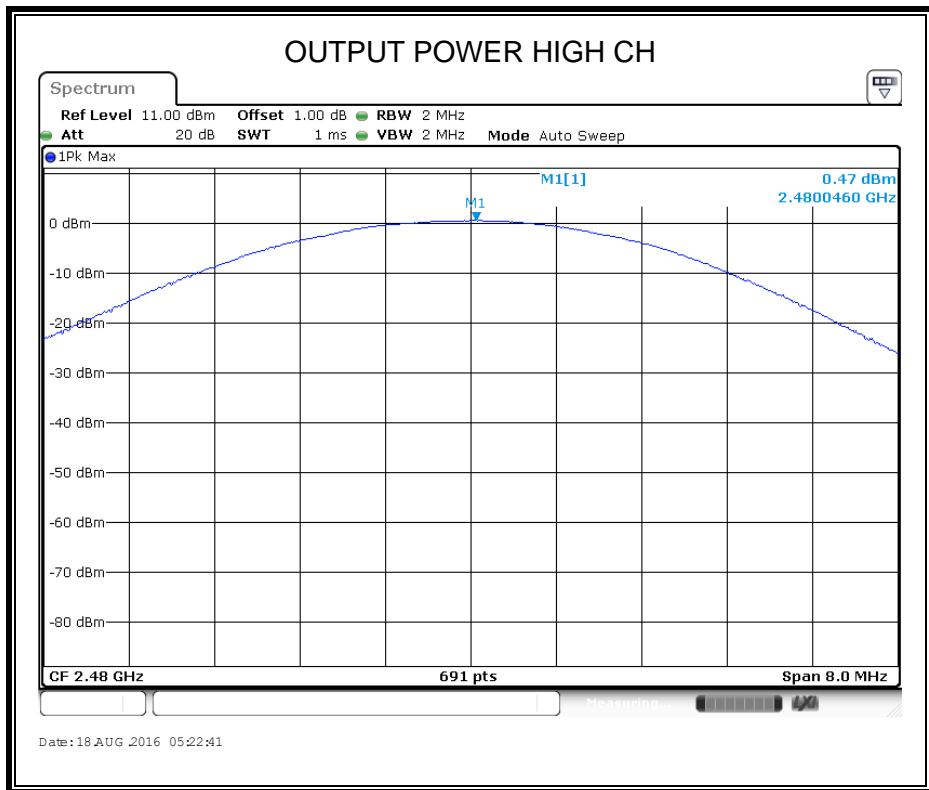
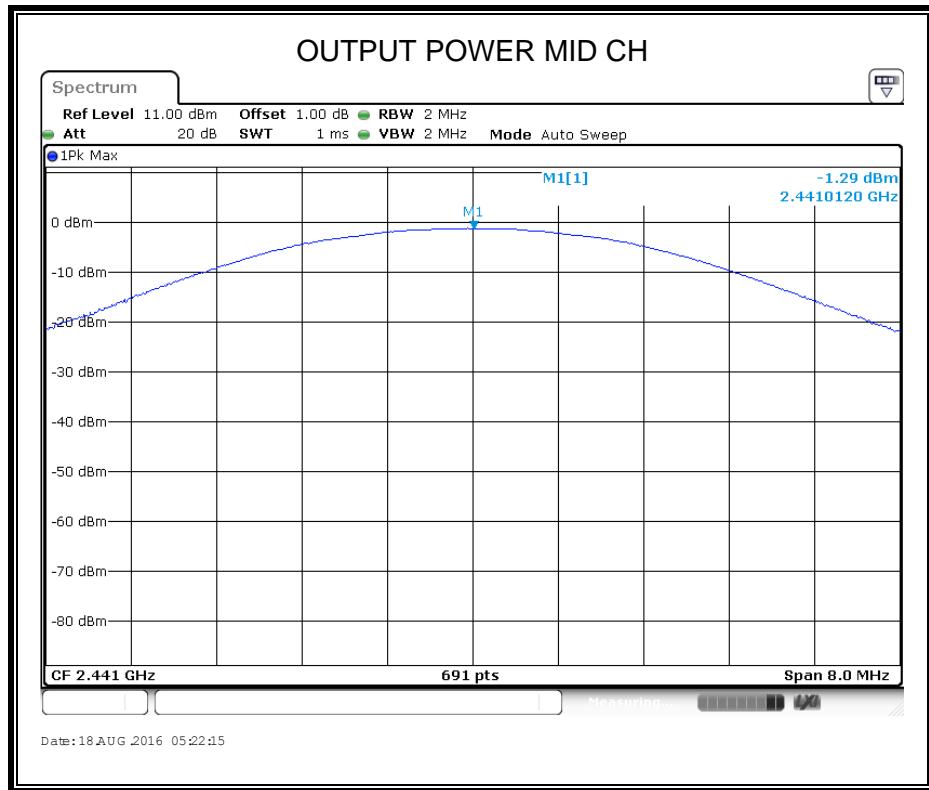


7.3.2. 8-DPSK MODE

| Channel | Frequency | Maximum Conducted Output Power(PK) | EIRP (dBm) | Result |
|---------|-----------|------------------------------------|---------------|--------|
| | (MHz) | (dBm) | | |
| Low | 2402 | -2.18 | -3.90 | Pass |
| Middle | 2441 | -1.29 | -3.01 | Pass |
| High | 2480 | 0.47 | -1.25 | Pass |

Note: EIRP = Maximum Conducted Output Power (PK) + Antenna Gain





7.4. CARRIER HOPPING CHANNEL SEPARATION

LIMITS

| FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 1 | | | |
|---|------------------------------------|---|-----------------------|
| 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 |

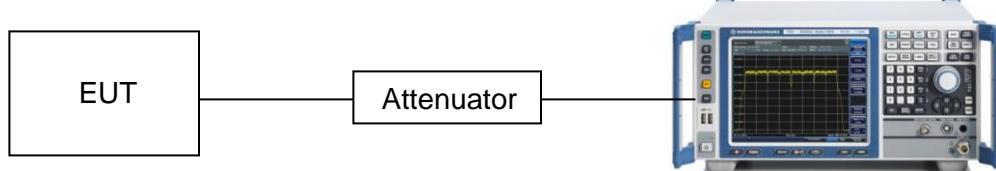
TEST PROCEDURE

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



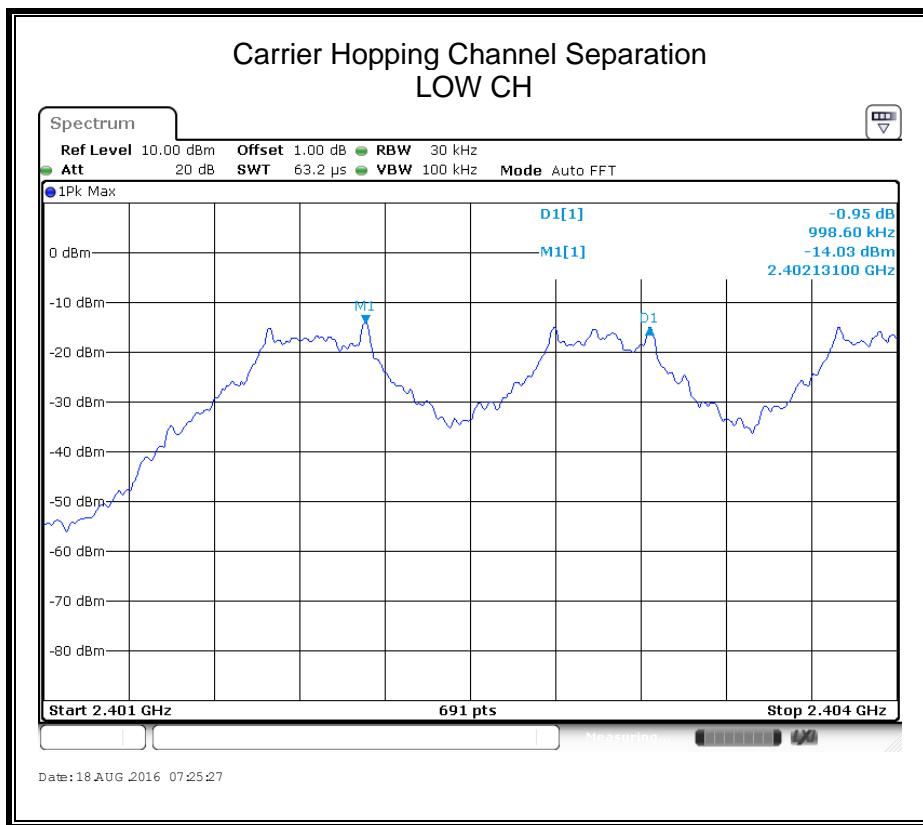
TEST CONDITIONS

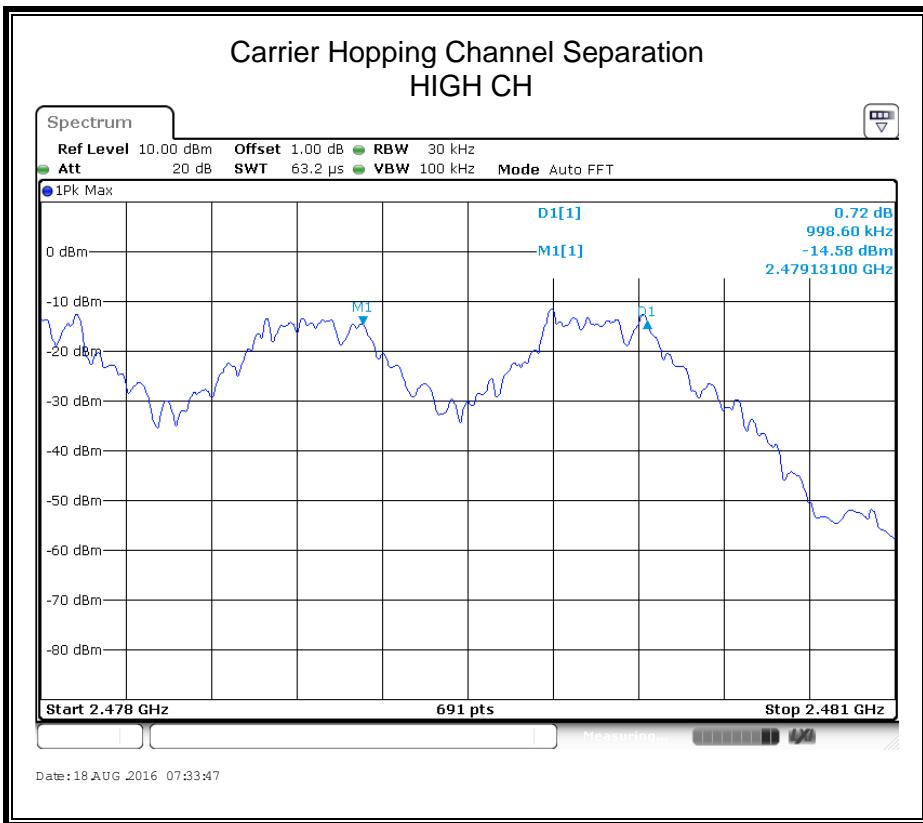
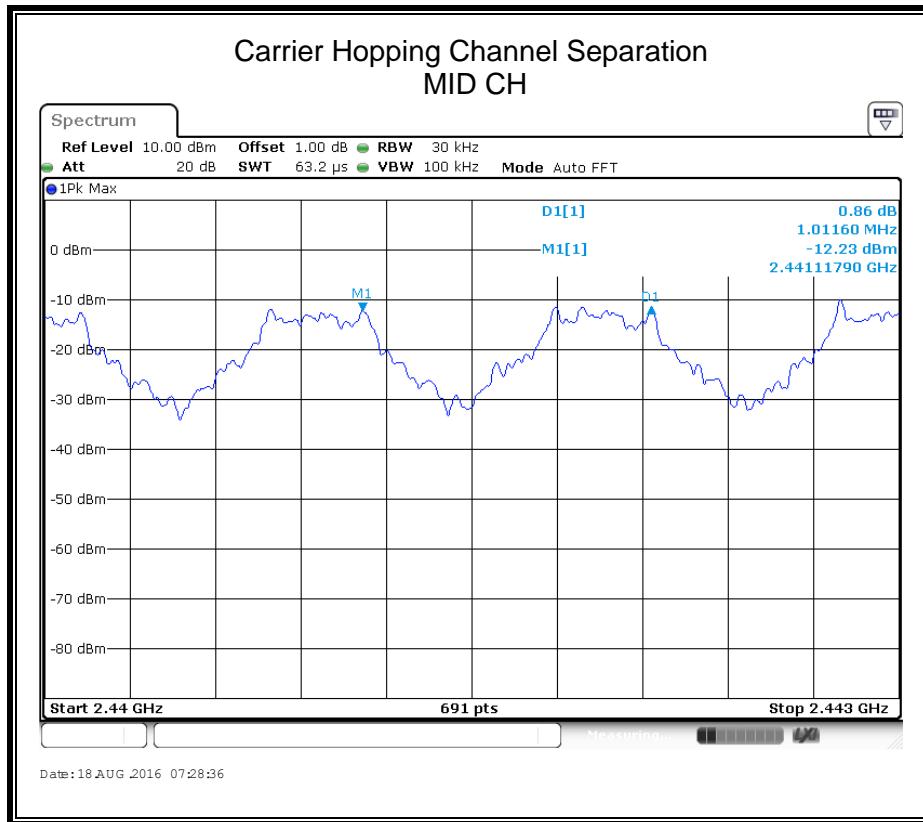
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

RESULTS

7.4.1. GFSK MODE

| Channel | Carrier Hopping Channel Separation (MHz) | Limit (MHz) | Result |
|---------|--|--|--------|
| Low | 0.998 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |
| Middle | 1.012 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |
| High | 0.998 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |



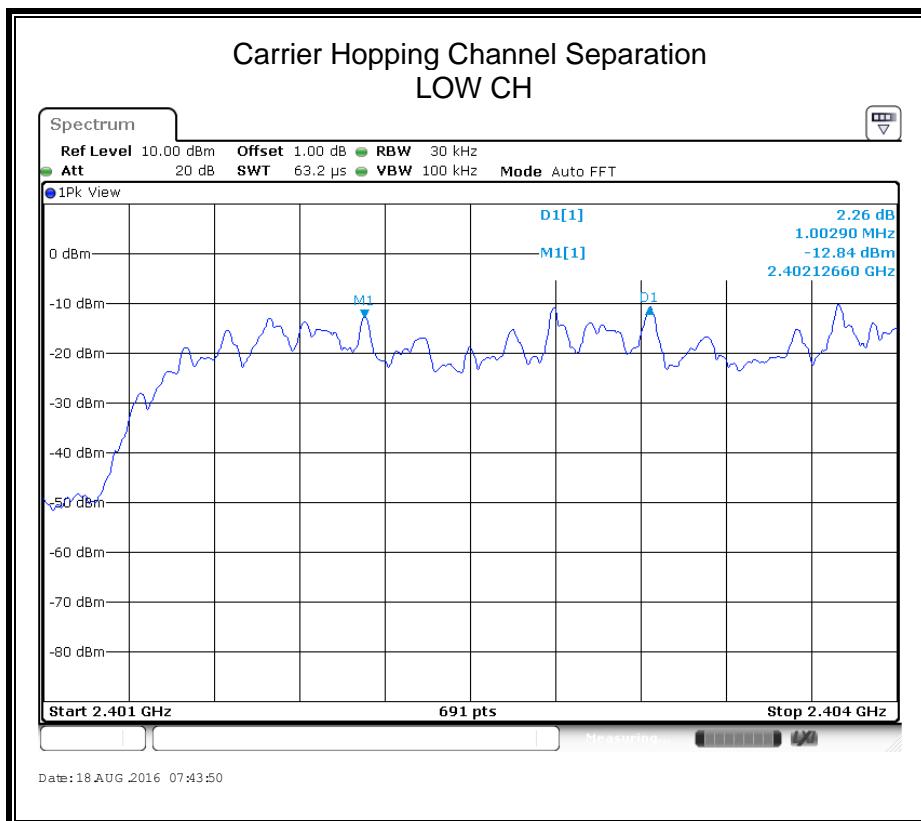


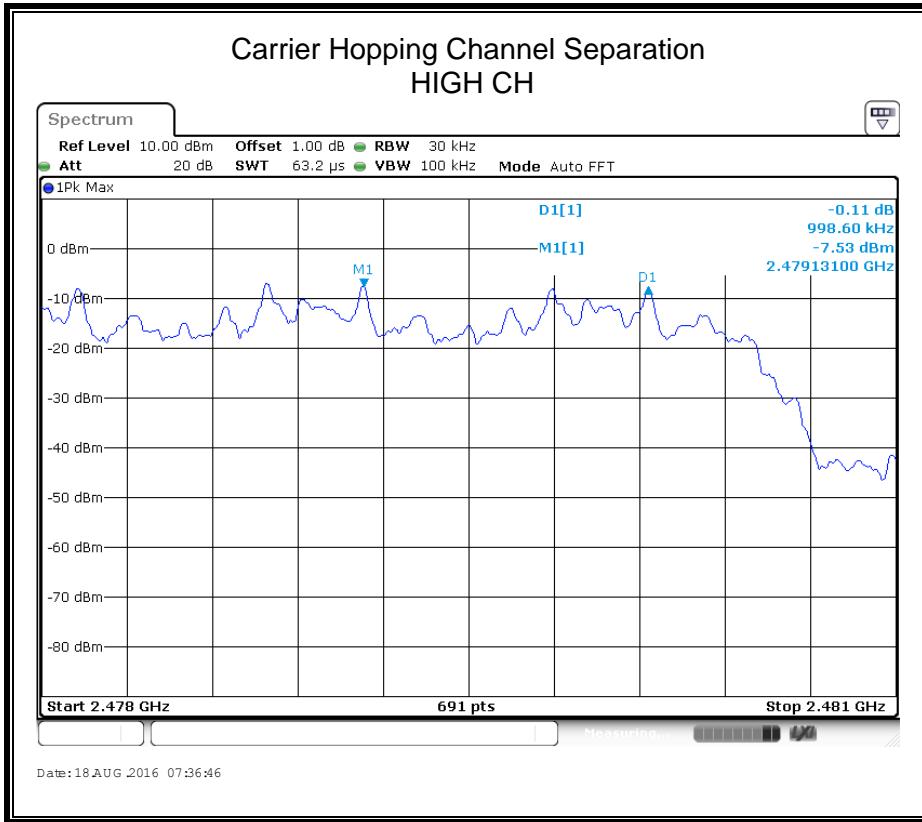
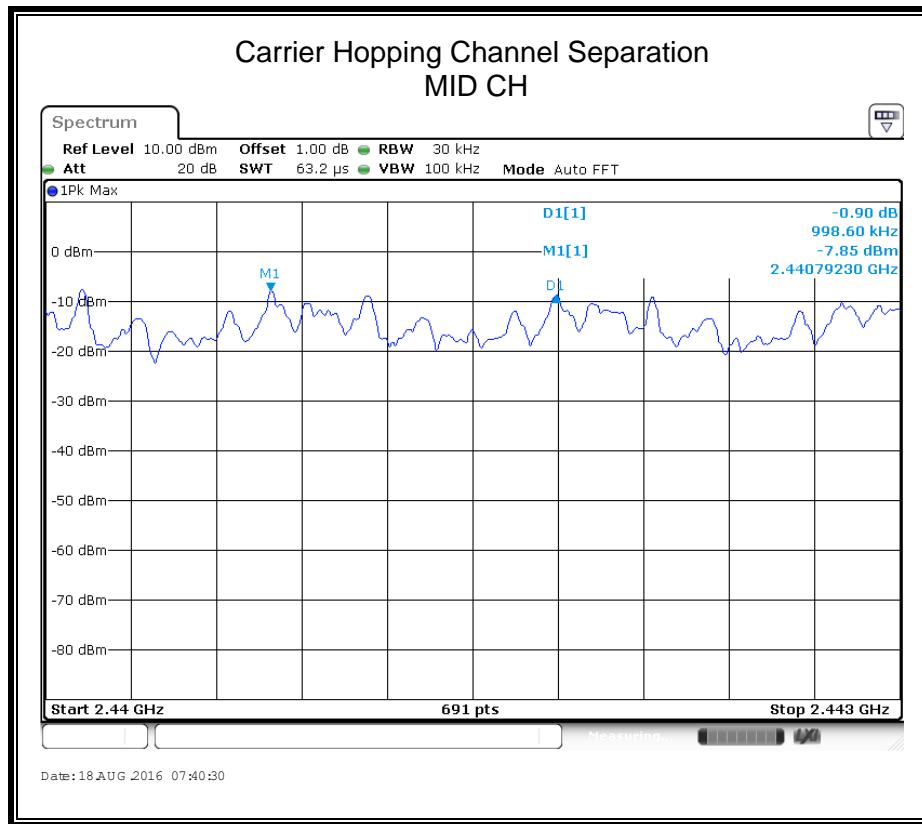
Note: For 20 dB Bandwidth of The Hopping Channel, please refer to clause 7.1.1.

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7.4.2. 8-DPSK MODE

| Channel | Carrier Hopping Channel Separation (MHz) | Limit (MHz) | Result |
|---------|--|--|--------|
| Low | 1.003 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |
| Middle | 0.998 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |
| High | 0.998 | ≥ two-thirds of the 20 dB Bandwidth Of The Hopping Channel | PASS |





Note: For 20 dB Bandwidth of The Hopping Channel, please refer to clause 7.1.2.

7.5. NUMBER OF HOPPING FREQUENCY

LIMITS

| FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 1 | | |
|---|-----------------------------|------------------------------|
| Section | Test Item | Limit |
| 15.247 (a) (1) III IC RSS-247 Clause 5.1 (4) | Number of Hopping Frequency | at least 15 hopping channels |

TEST PROCEDURE

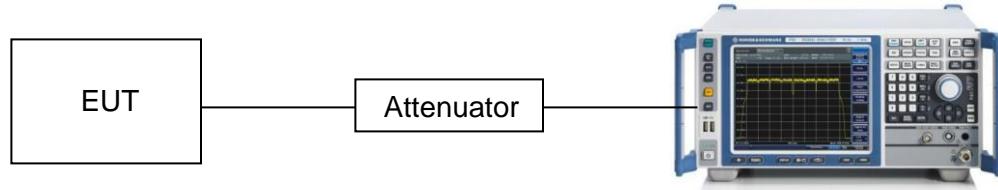
Connect the EUT to the spectrum analyser and use the following settings:

| | |
|------------|---------------------------------|
| 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: 28°C

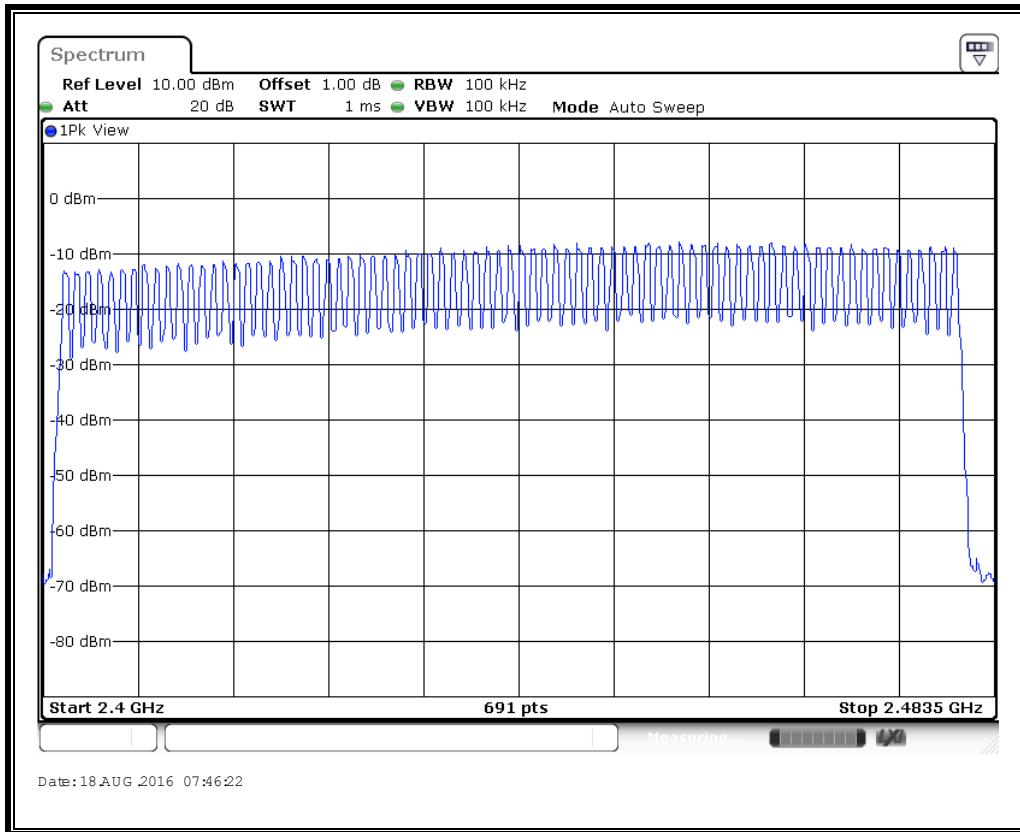
Relative Humidity: 60%

Test Voltage: AC 120V/60Hz

RESULTS

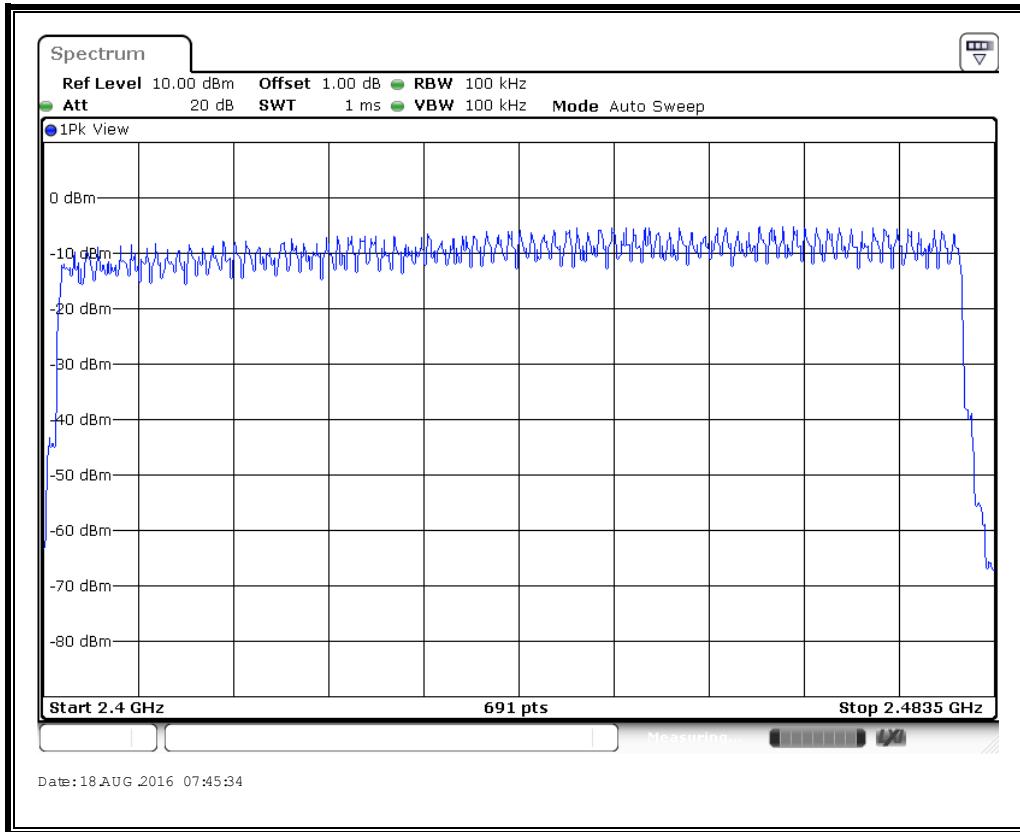
7.5.1. GFSK MODE

| Hopping numbers | Limit | Results |
|-----------------|-------|---------|
| 79 | >15 | Pass |



7.5.2. 8-DPSK MODE

| Hopping numbers | Limit | Results |
|-----------------|-------|---------|
| 79 | >15 | Pass |



7.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

| FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 1 | | |
|---|--------------------------------------|---|
| Section | Test Item | Limit |
| 15.247 (a) (1) III IC RSS-247 Clause 5.1 (4) | 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. |

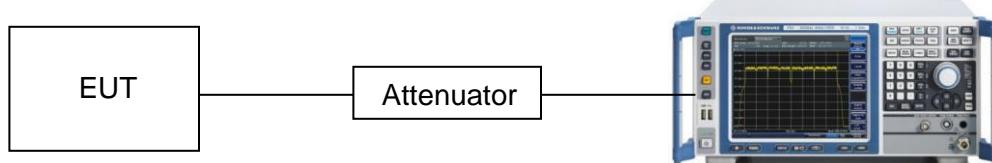
TEST PROCEDURE

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 | \geq 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



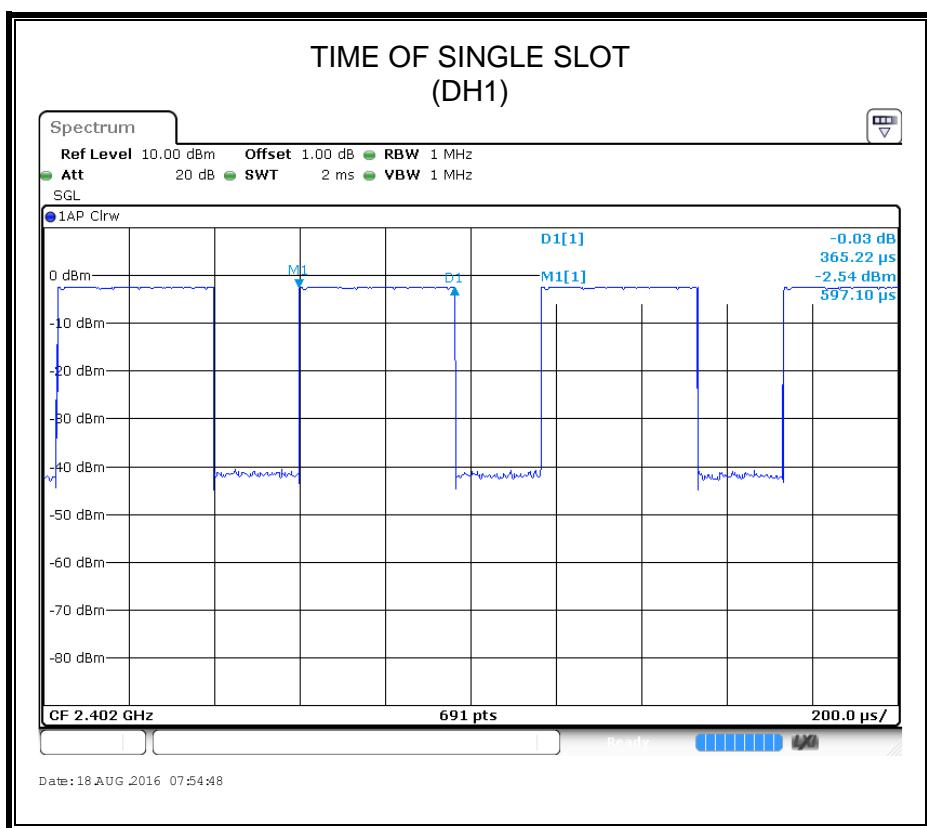
TEST CONDITIONS

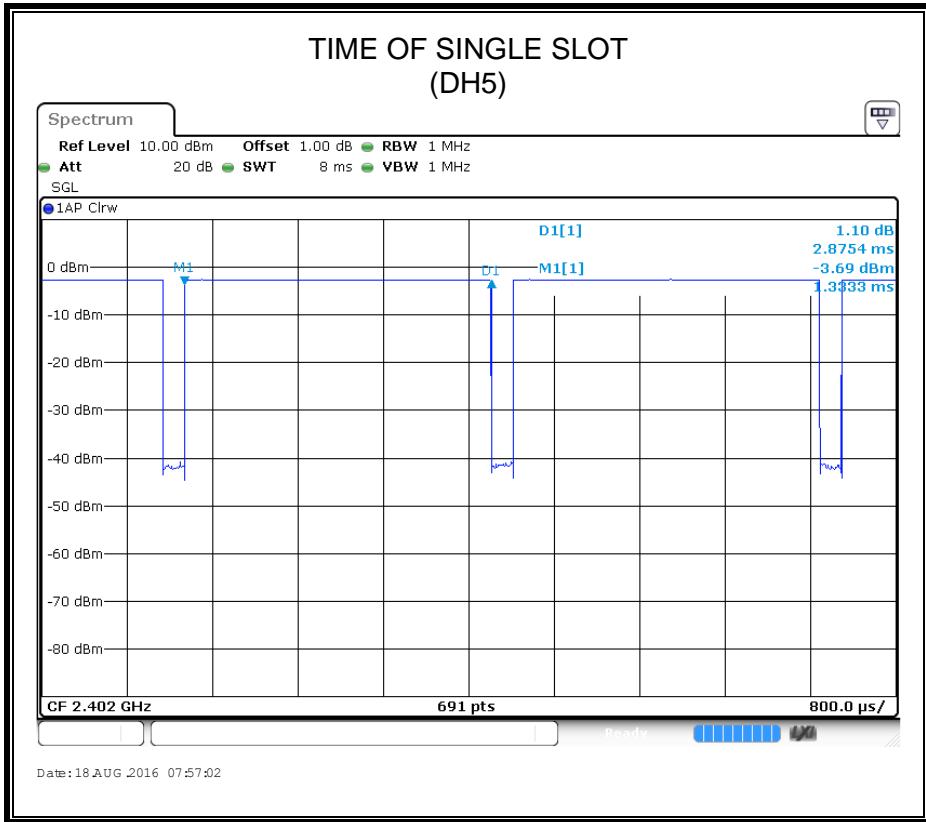
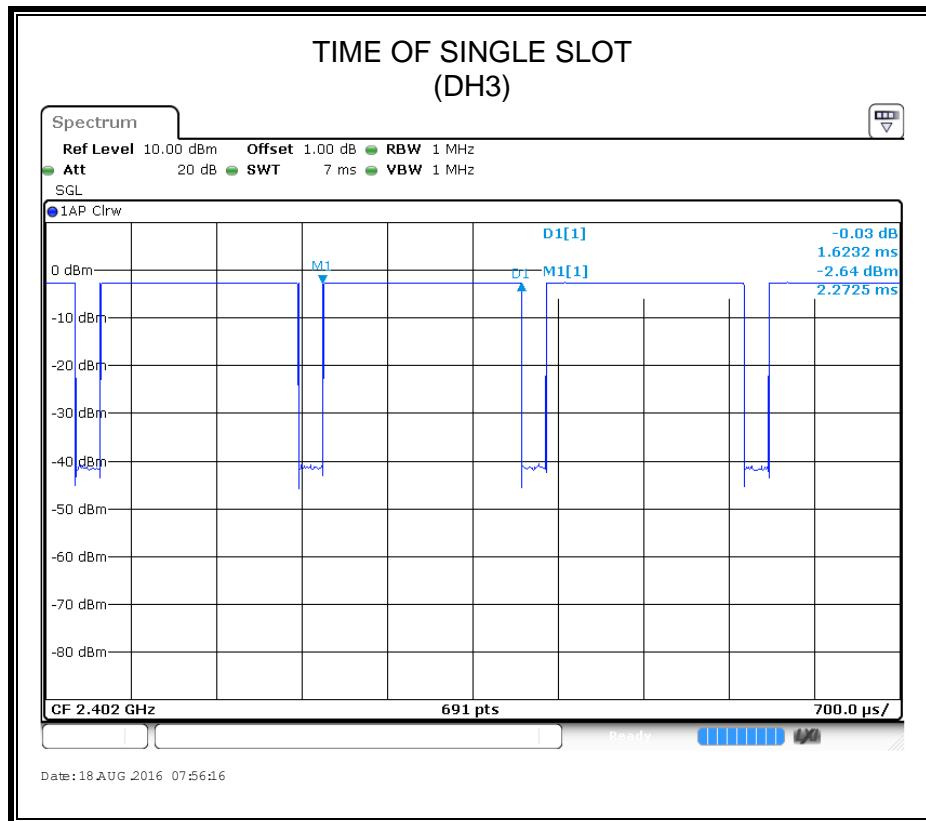
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

RESULTS

7.6.1. GFSK MODE

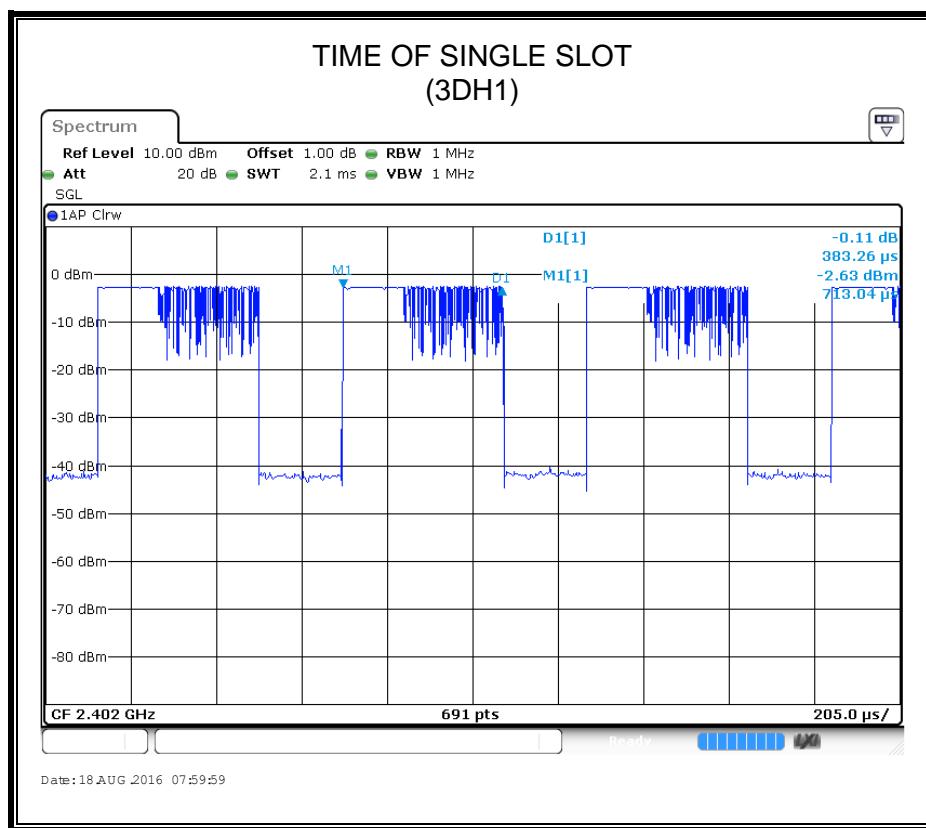
| packet type | Time of Single Slot | Time of occupied in a period | Limit | Result |
|-------------|---------------------|------------------------------|-------|--------|
| | [ms] | [s] | [s] | |
| DH1 | 0.365 | 0.117 | ≤ 0.4 | Pass |
| DH3 | 1.623 | 0.260 | ≤ 0.4 | Pass |
| DH5 | 2.875 | 0.307 | ≤ 0.4 | Pass |

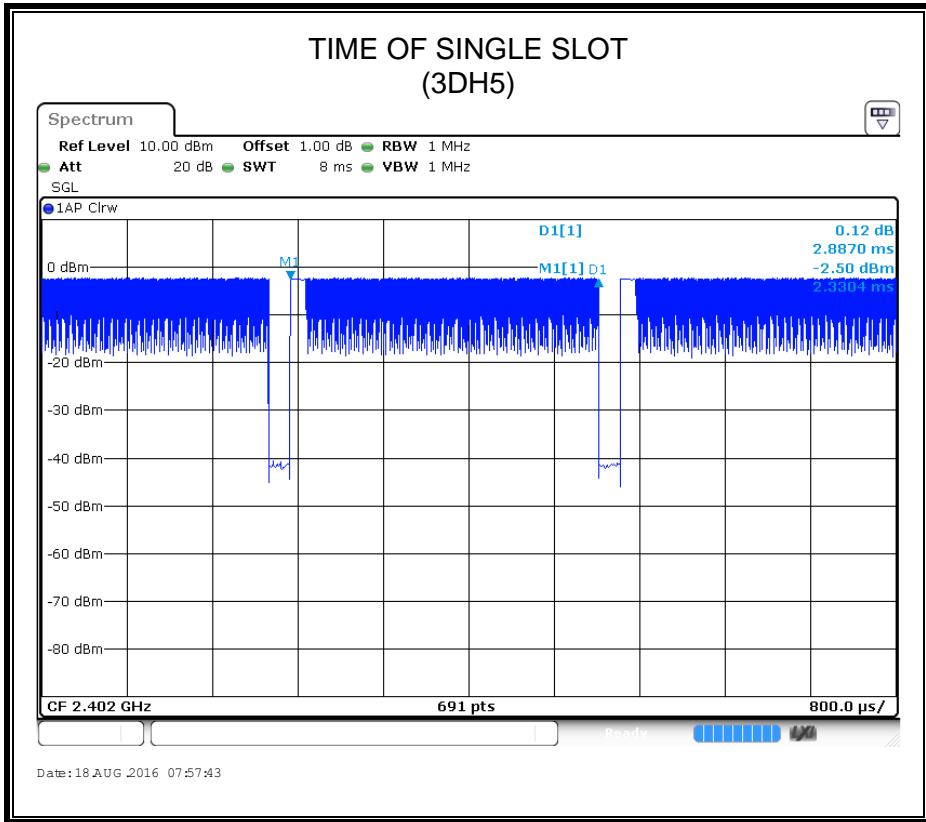
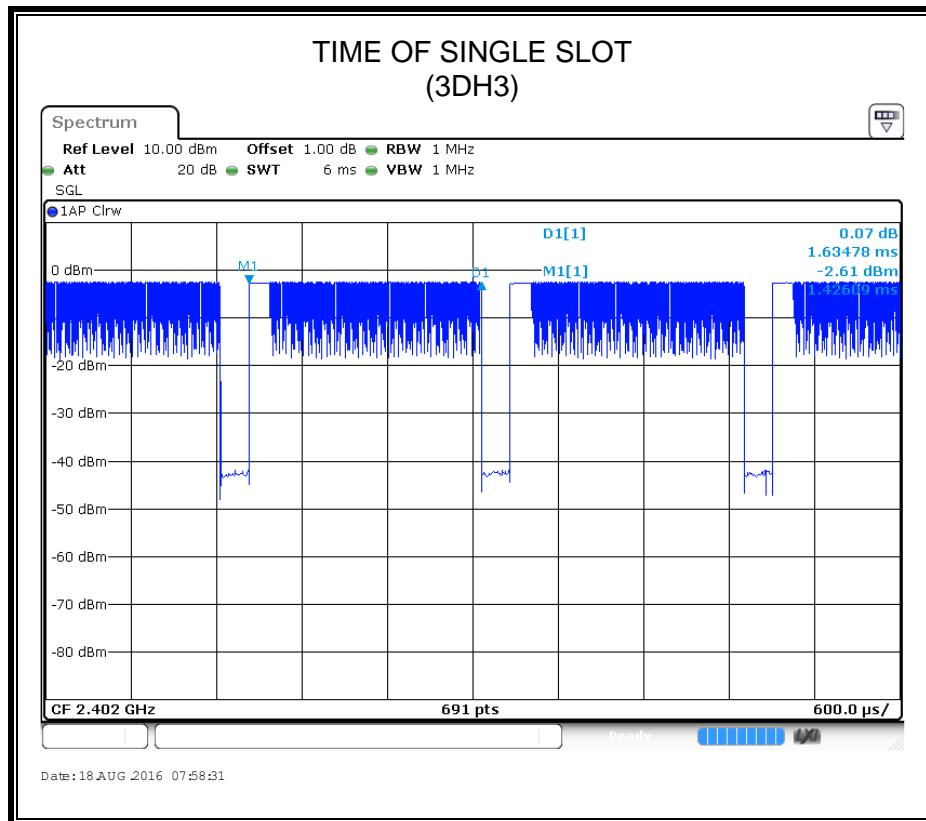




7.6.2. 8-DPSK MODE

| packet type | Time of Single Slot | Time of occupied in a period | Limit | Result |
|-------------|---------------------|------------------------------|-------|--------|
| | [ms] | [s] | | |
| DH1 | 0.383 | 0.123 | ≤ 0.4 | Pass |
| DH3 | 1.635 | 0.262 | ≤ 0.4 | Pass |
| DH5 | 2.887 | 0.308 | ≤ 0.4 | Pass |





7.7. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

| FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 1 | | |
|---|---|---|
| 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:

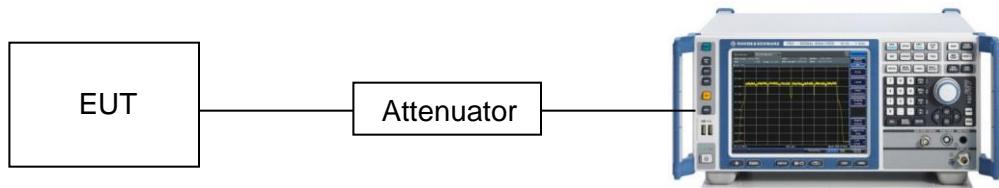
| | |
|------------------|--|
| Center Frequency | The centre frequency of the channel under test |
| Detector | Peak |
| RBW | 100K |
| VBW | $\geq 3 \times$ RBW |
| Span | 1.5 x DTS bandwidth |
| Trace | Max hold |
| Sweep time | Auto couple |

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 | 100K |
| VBW | $\geq 3 \times$ RBW |
| measurement points | \geq span/RBW |
| Trace | Max hold |
| Sweep time | Auto couple. |

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

TEST SETUP

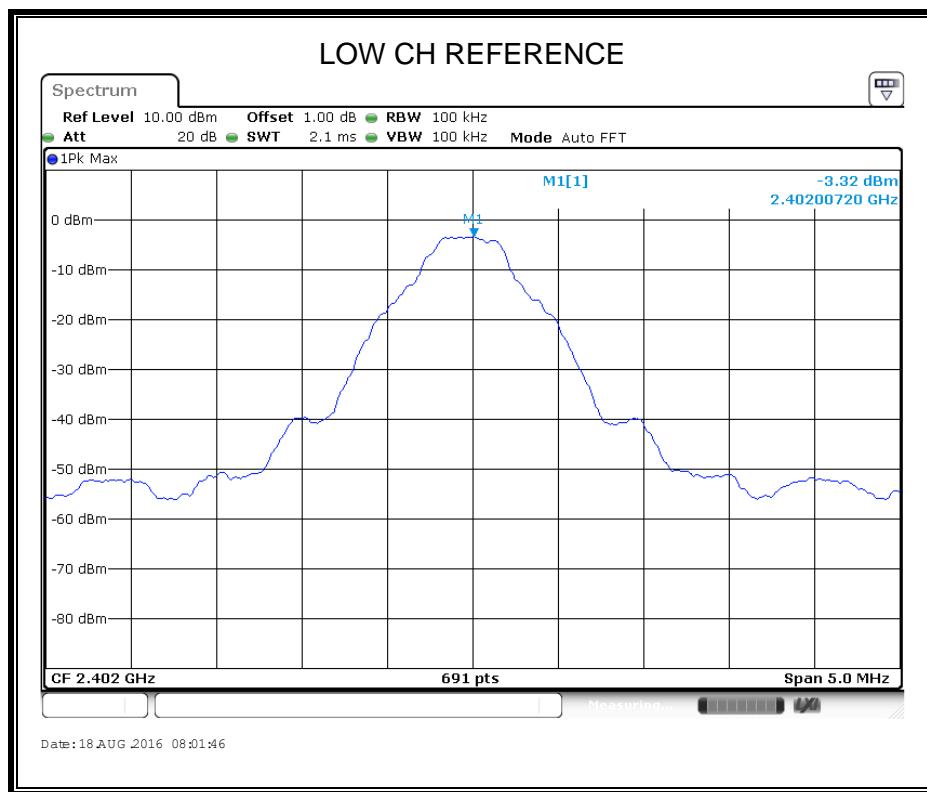


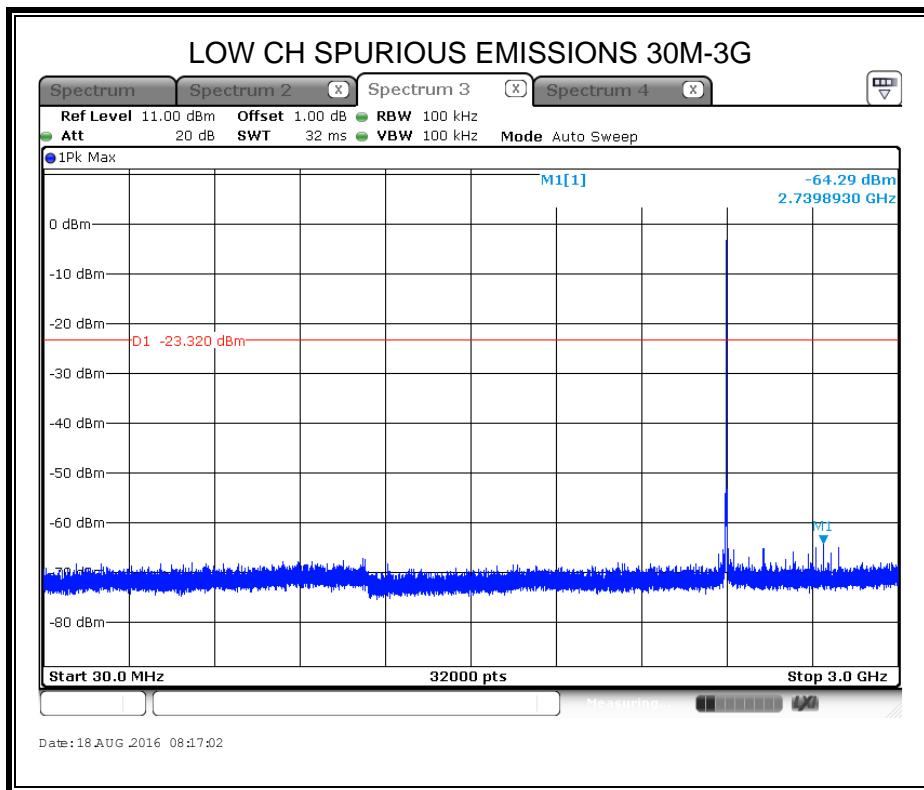
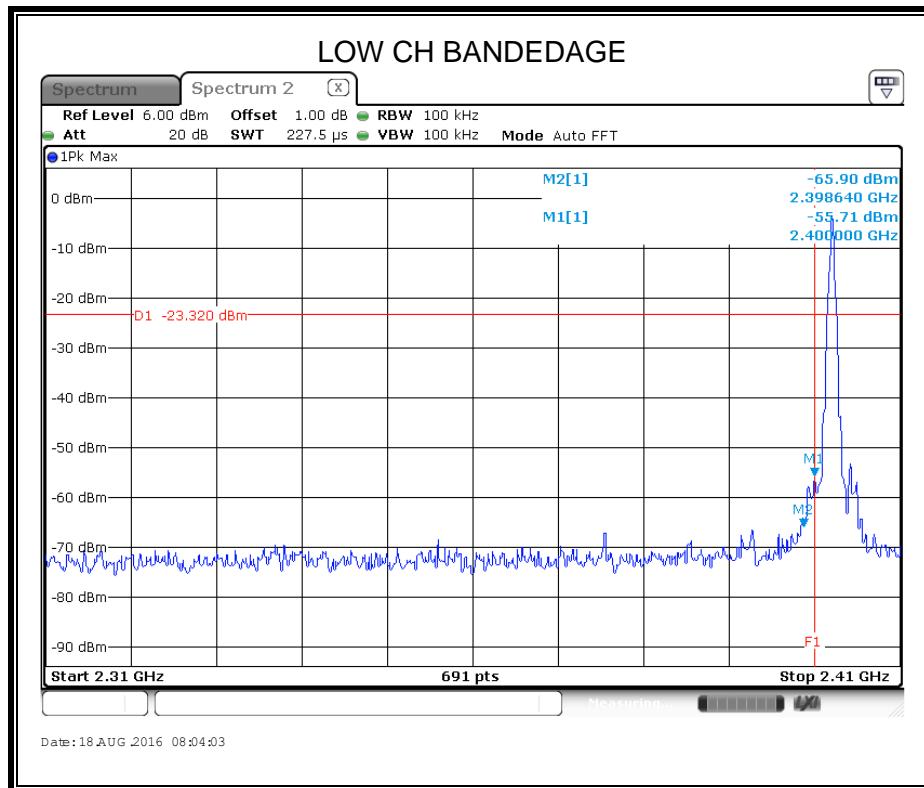
TEST CONDITIONS

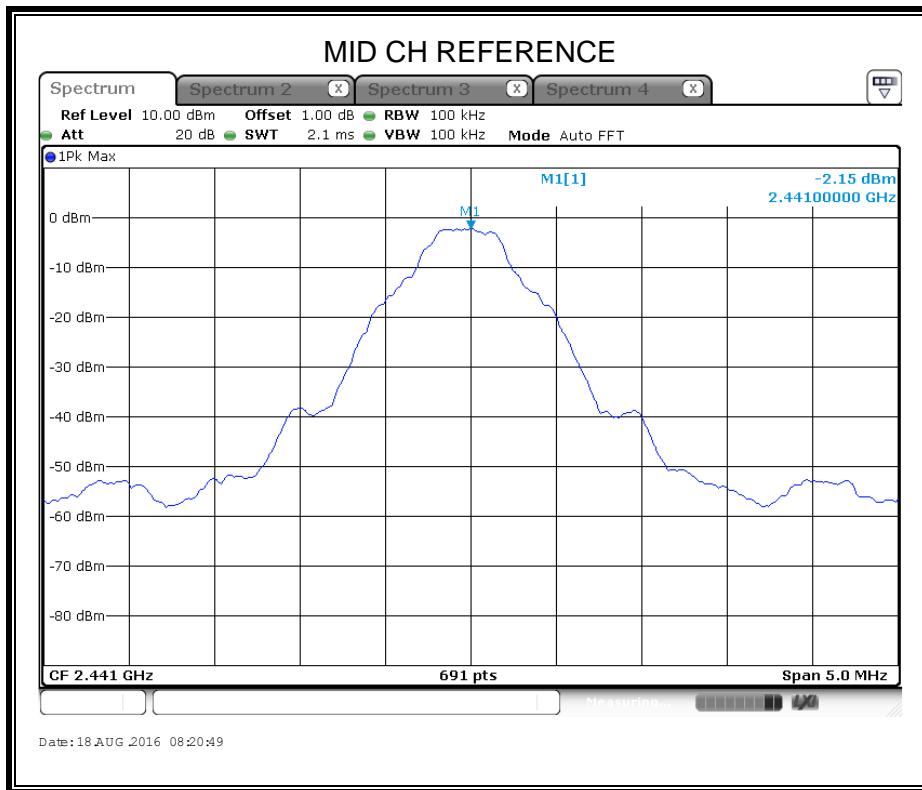
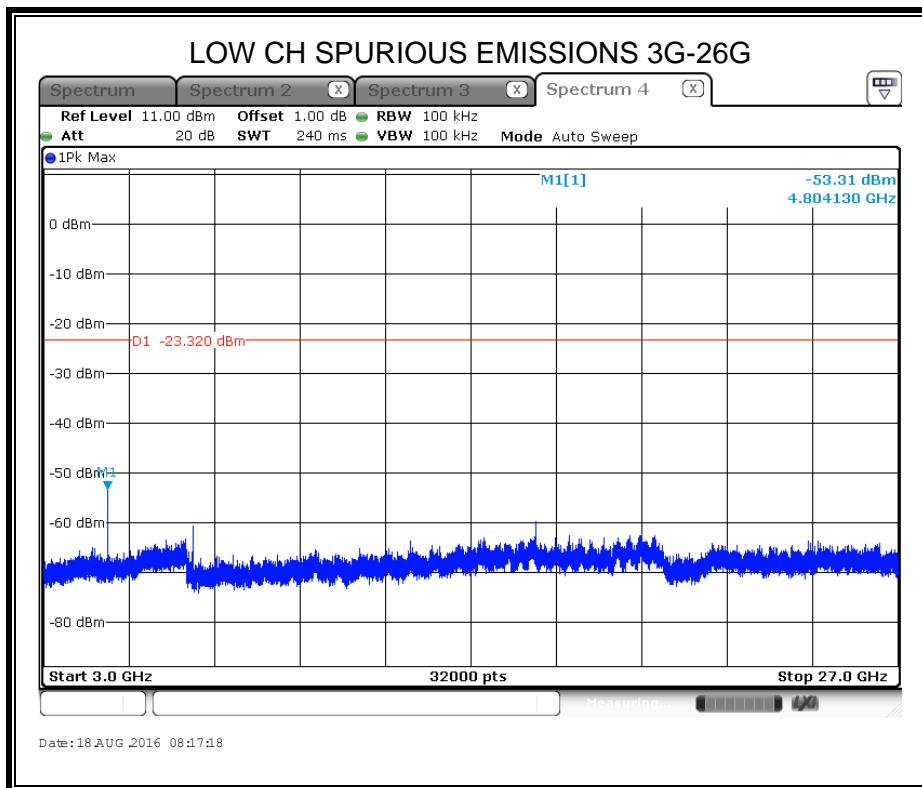
Temperature: 28°C
Relative Humidity: 60%
Test Voltage: AC 120V/60Hz

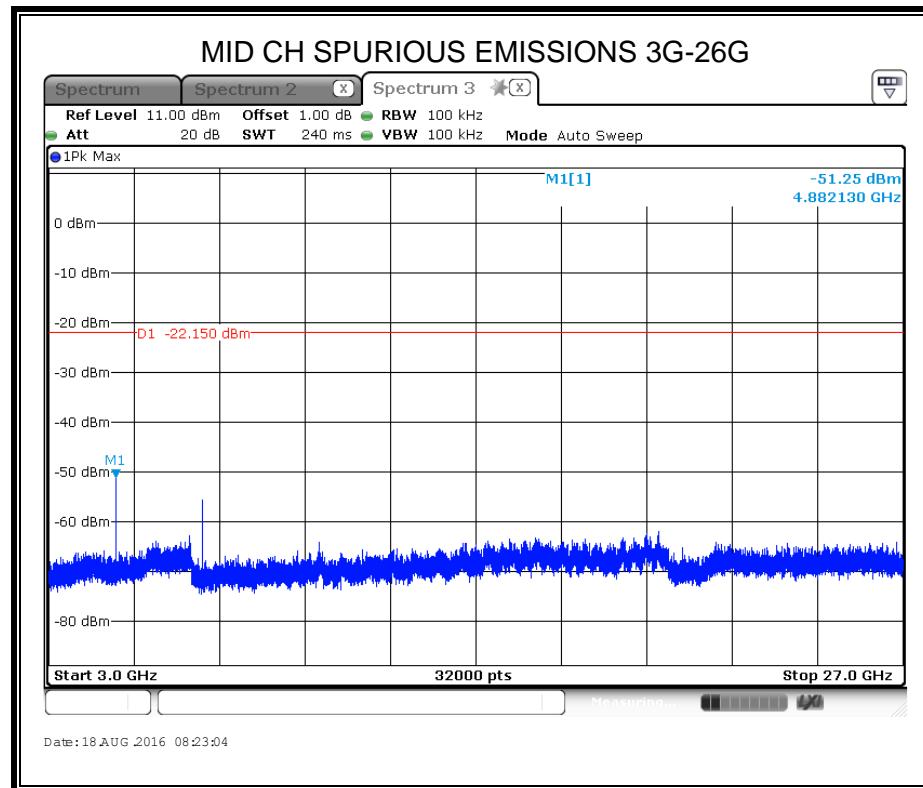
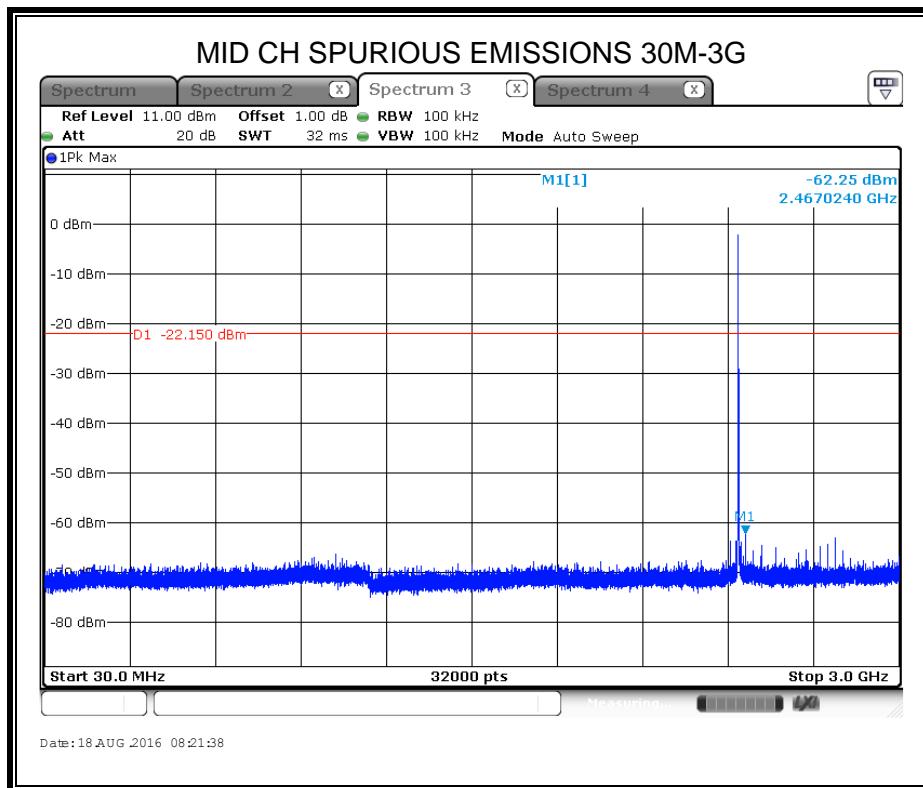
RESULTS

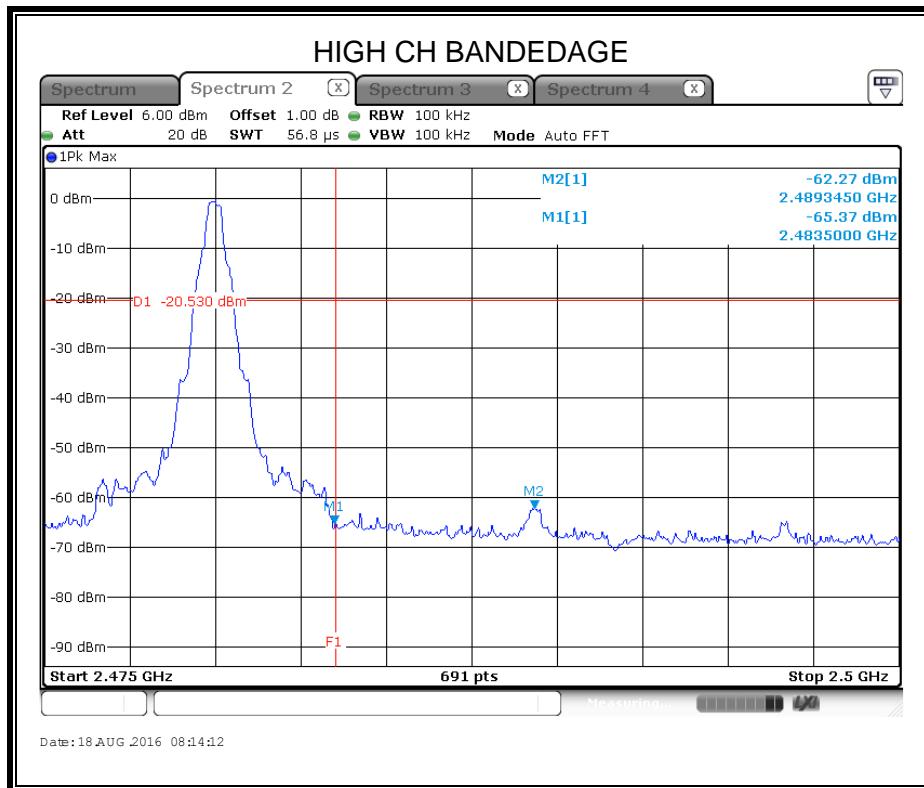
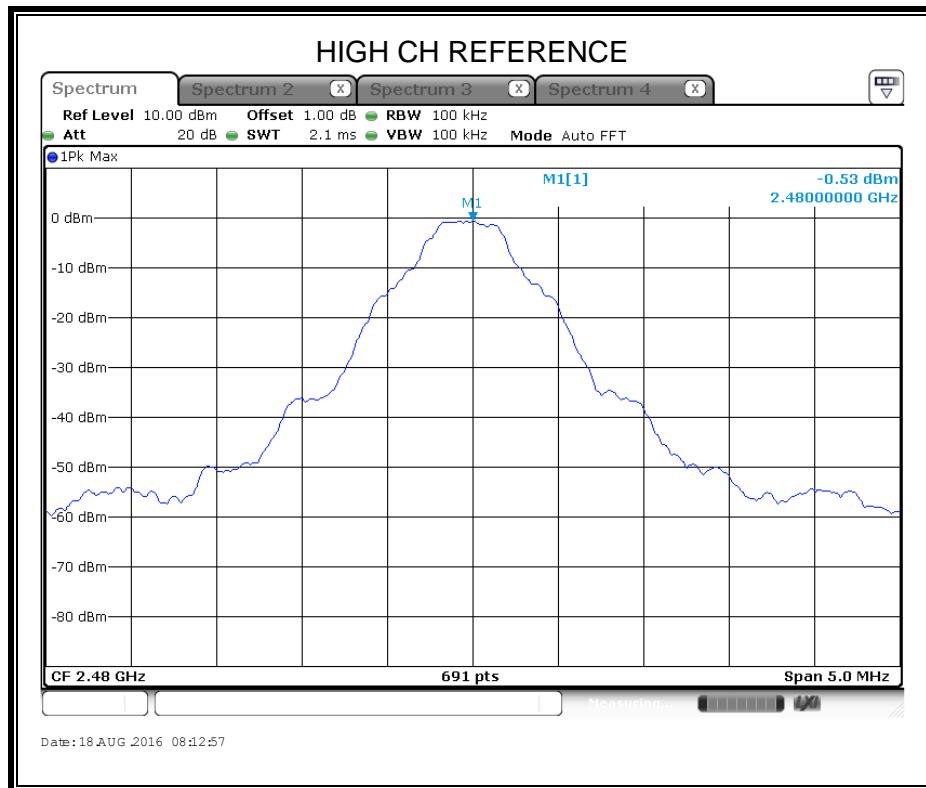
7.7.1. GFSK MODE

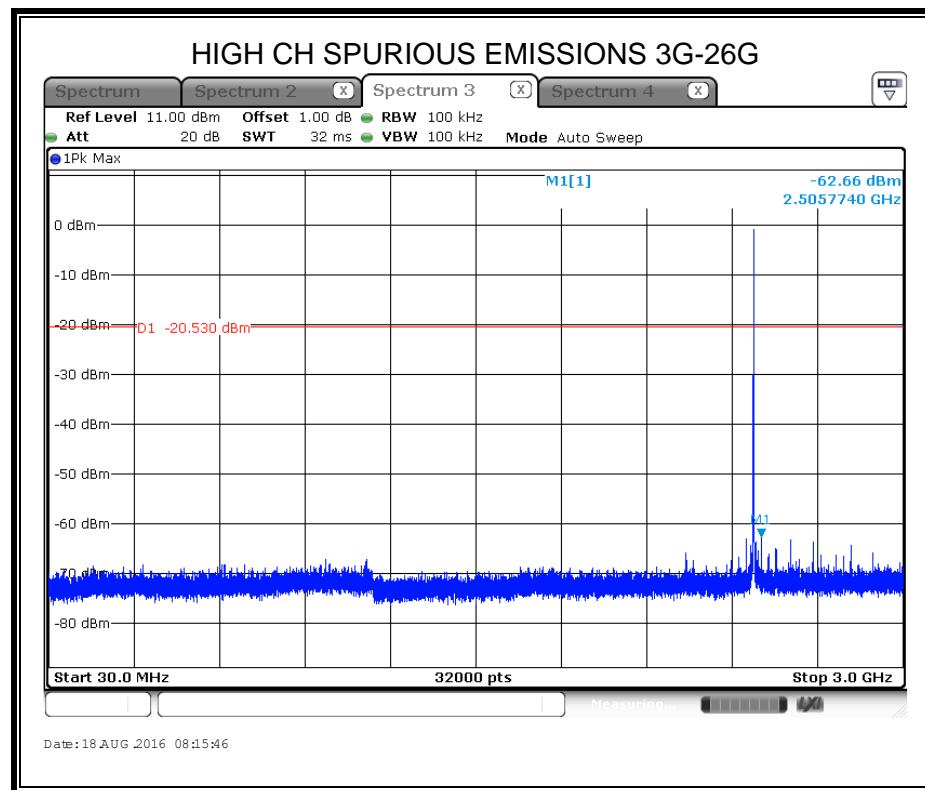
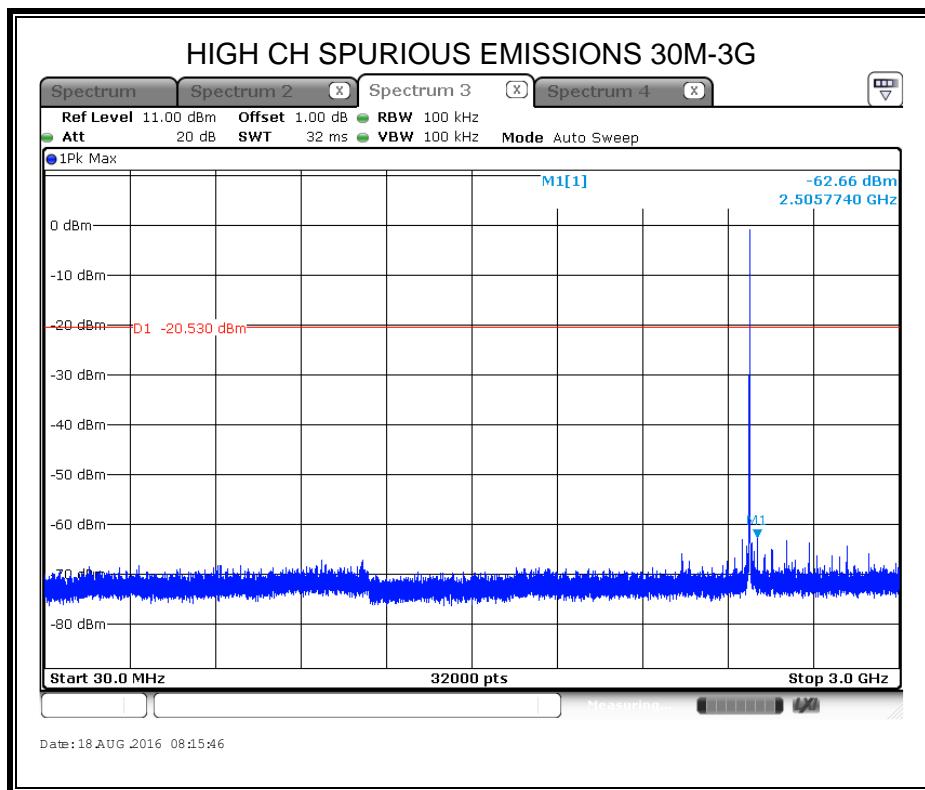




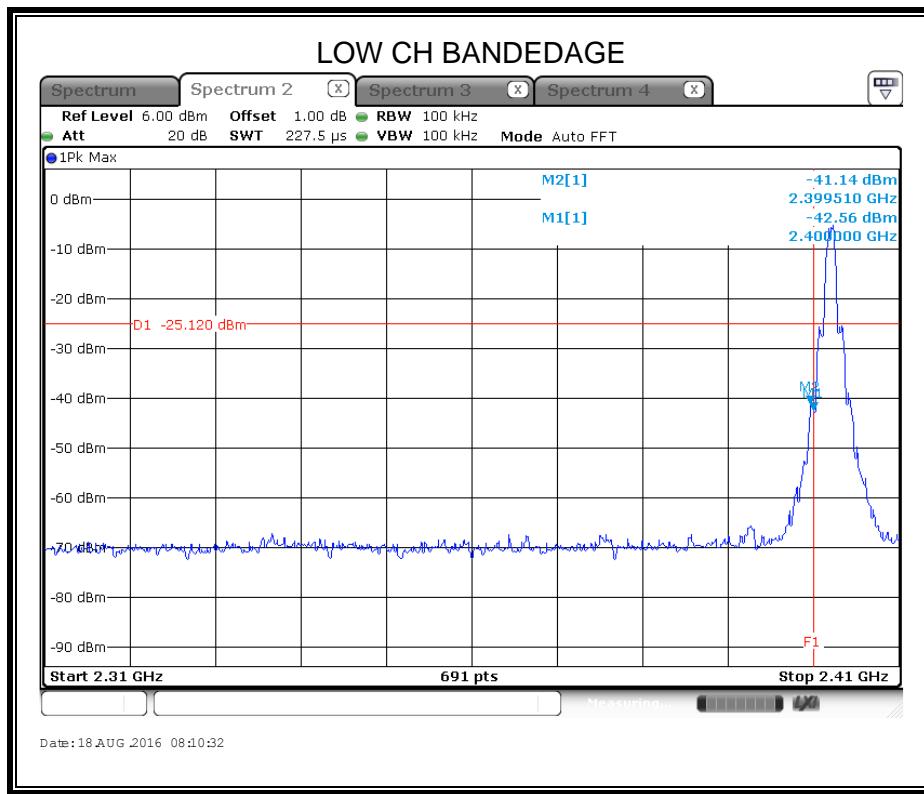
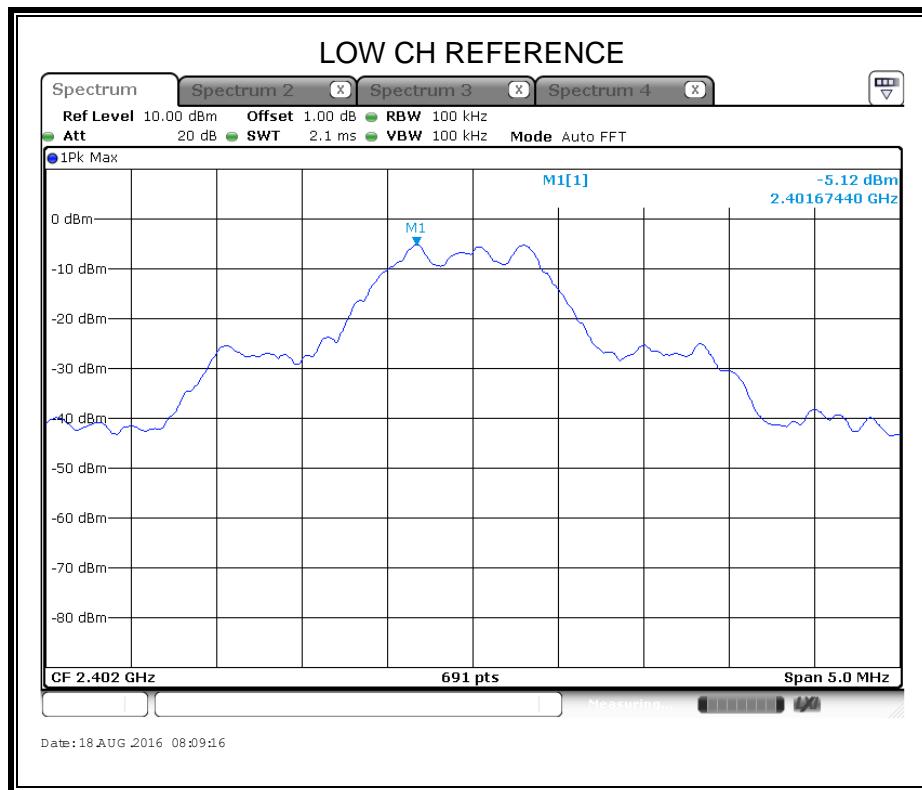


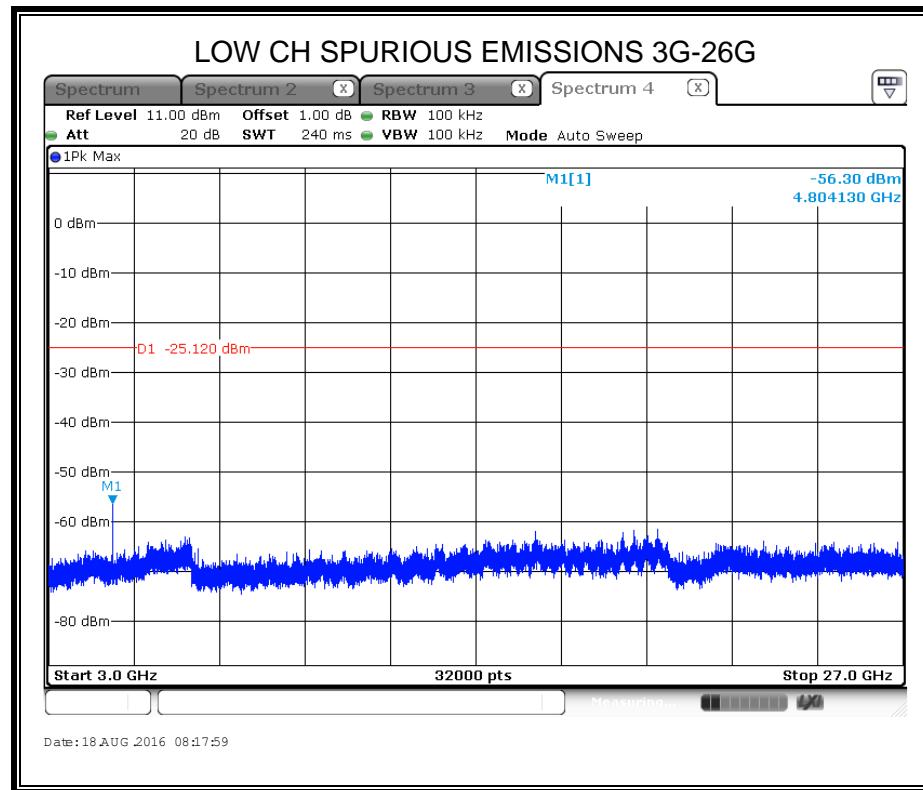
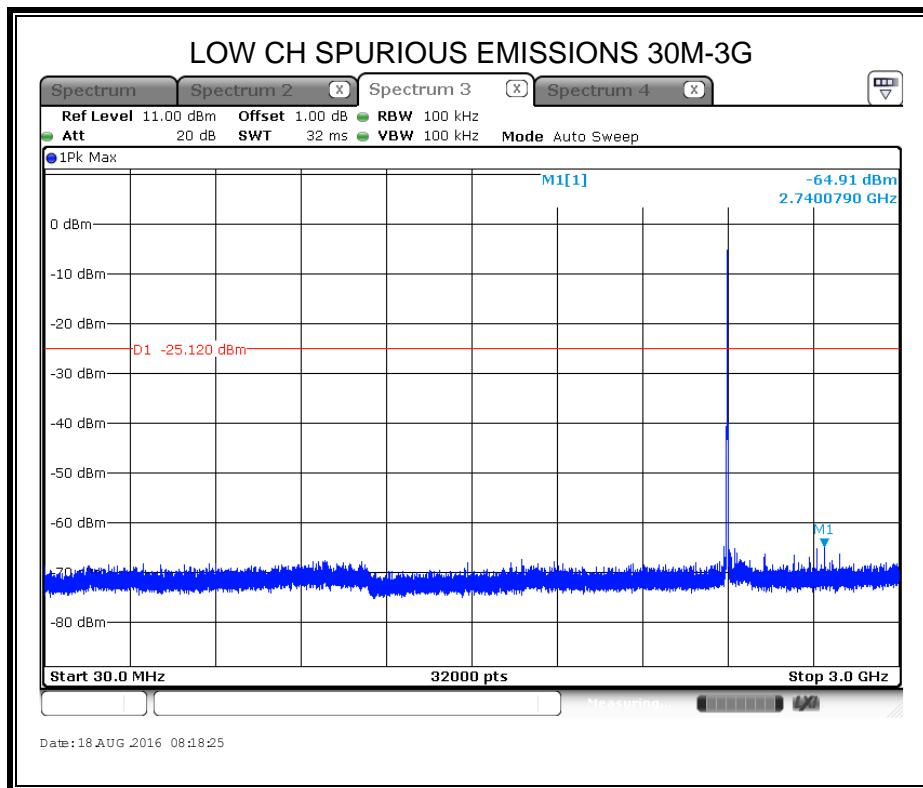


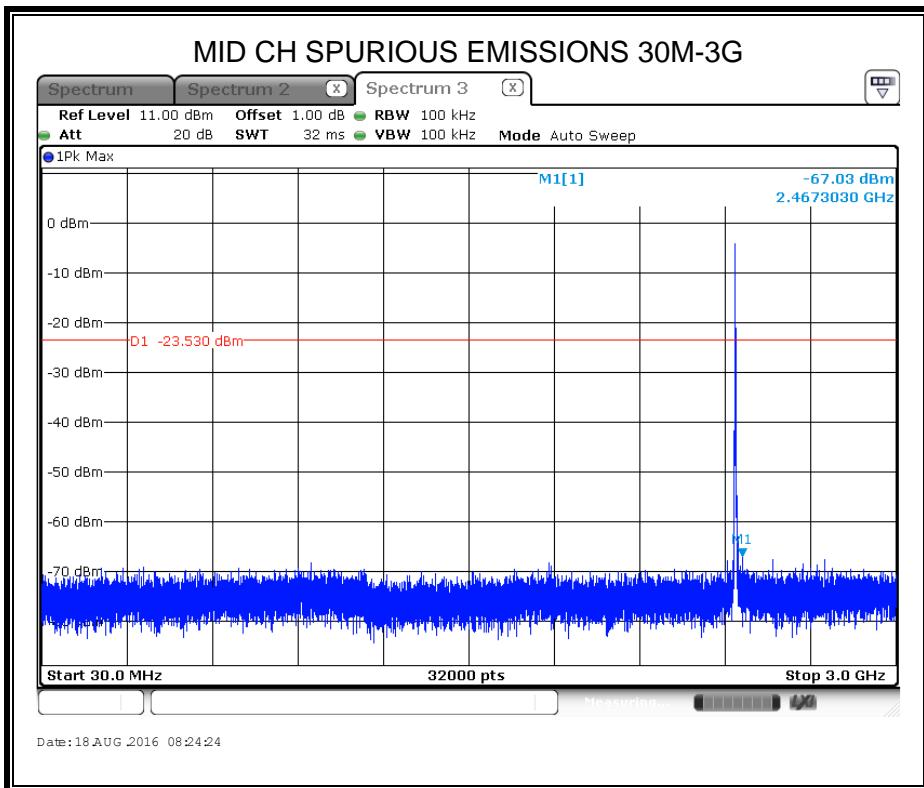
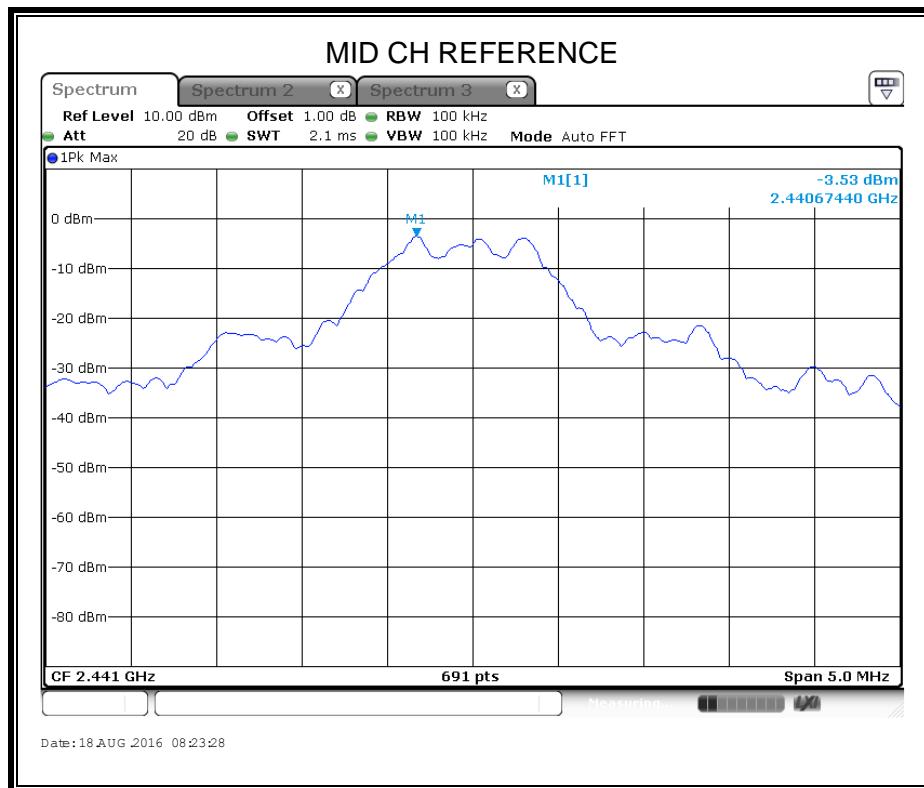


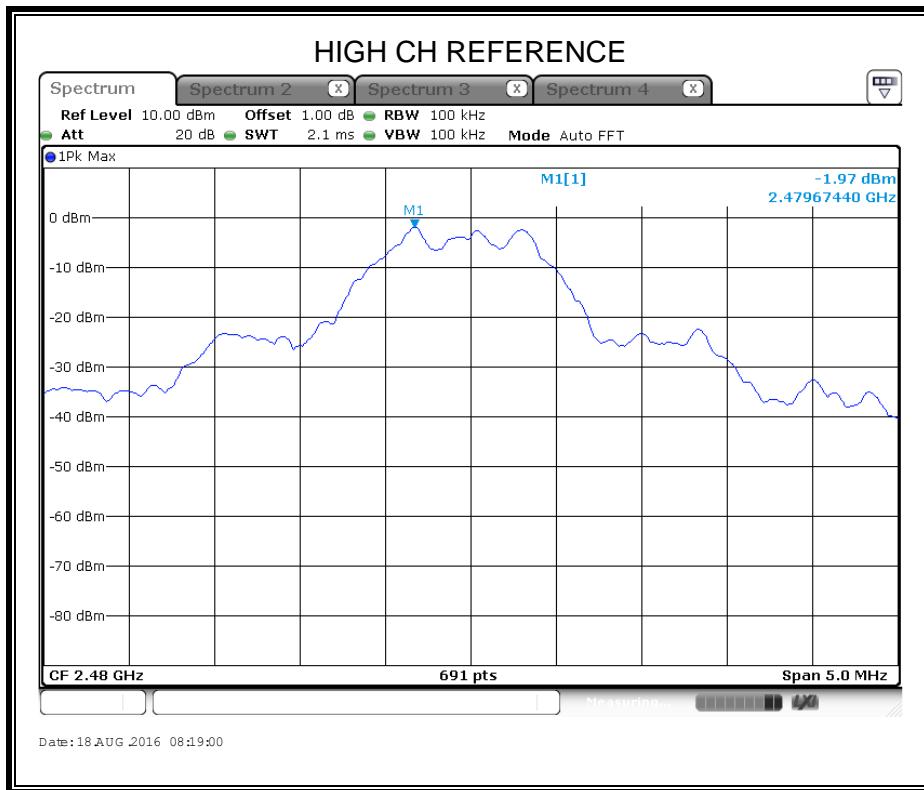
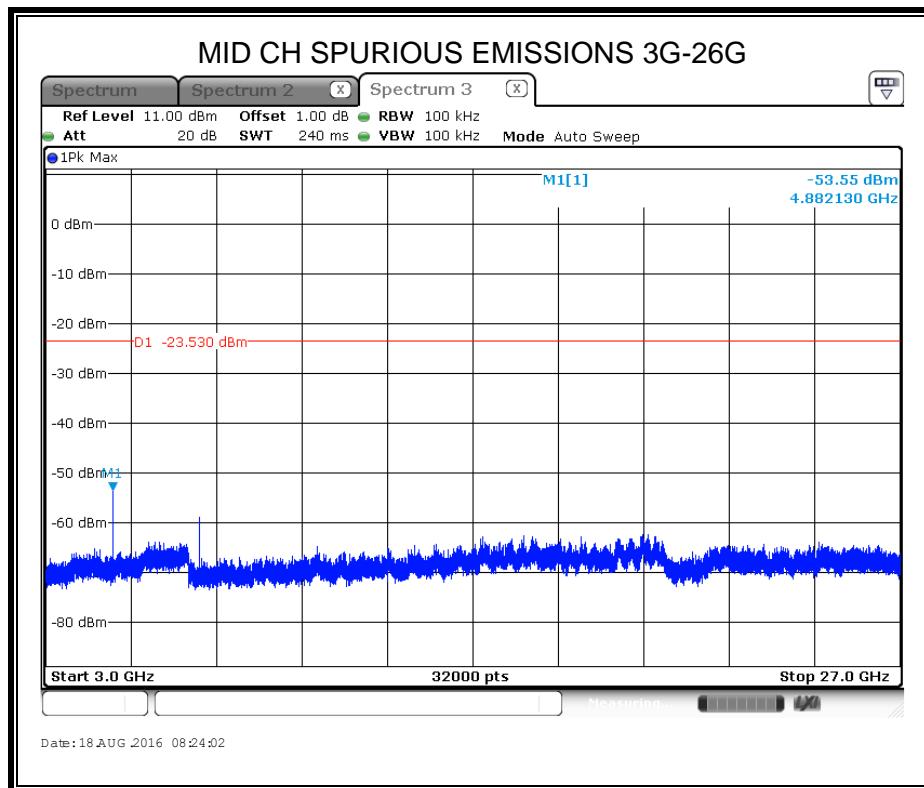


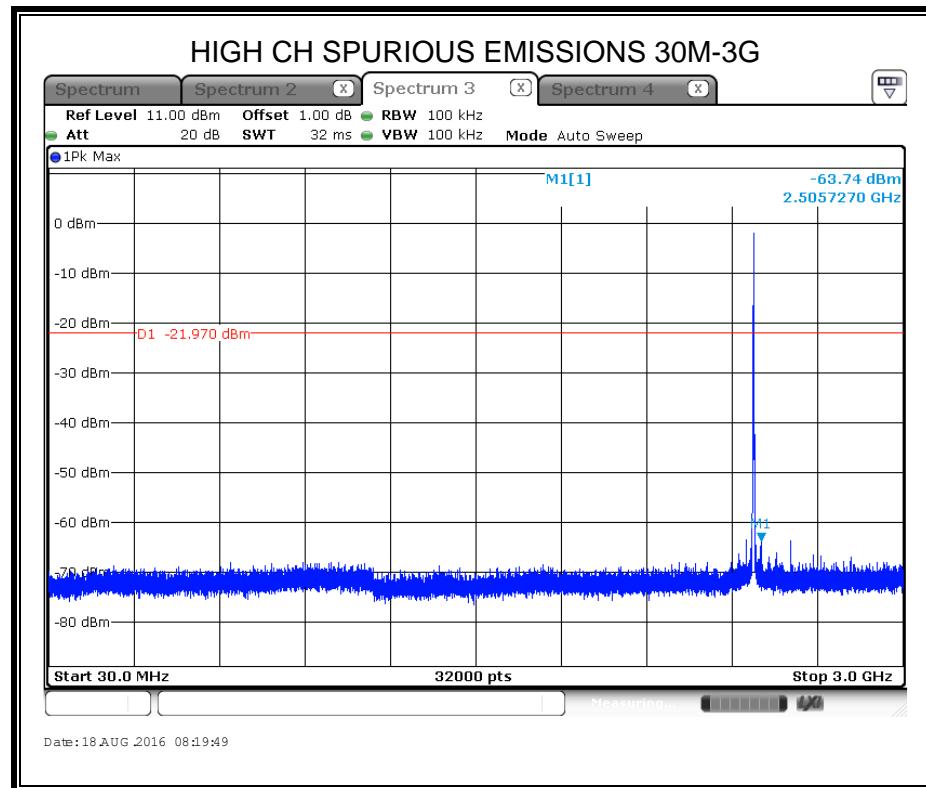
7.7.2. 8-DPSK MODE

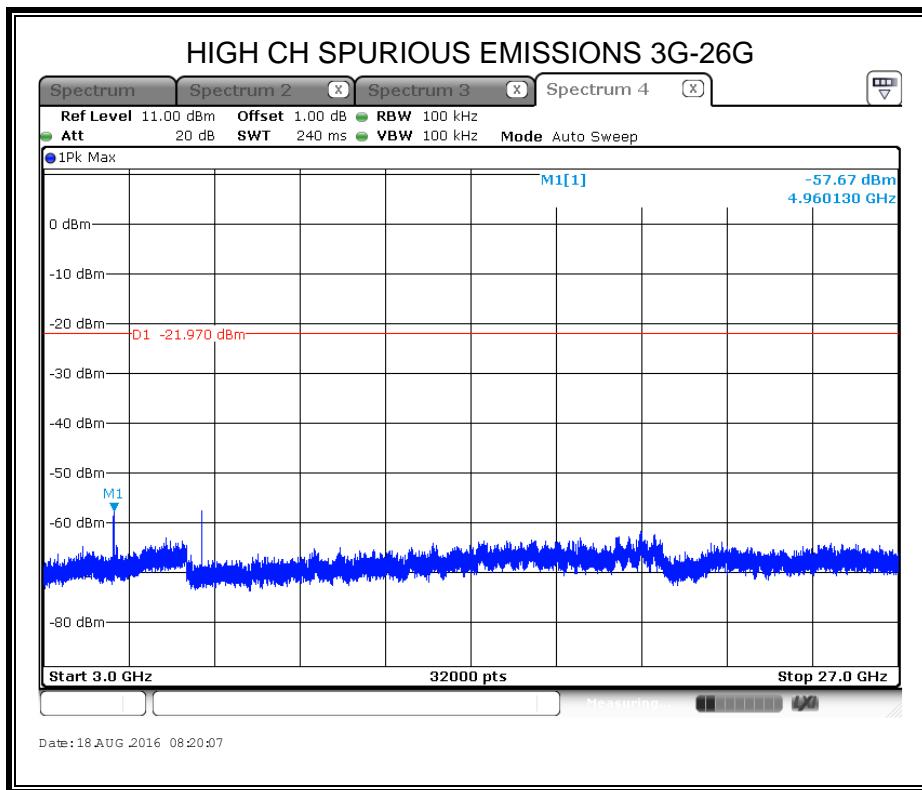












8. RADIATED TEST RESULTS

8.1. 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

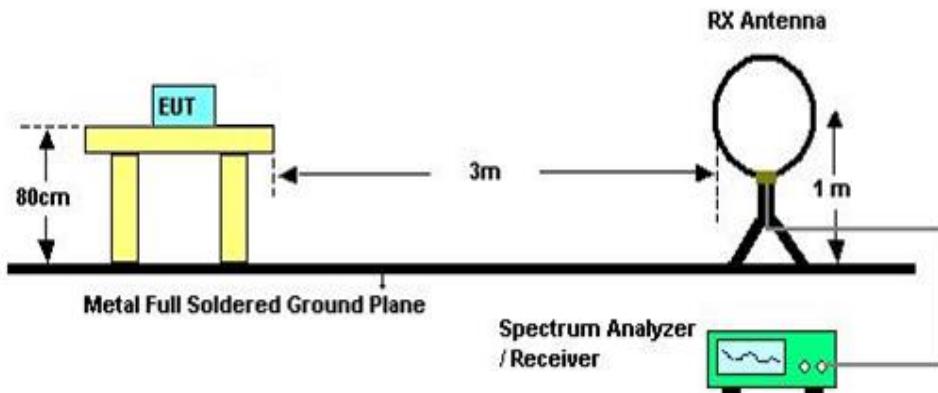
Temperature: 22.2°C

Relative Humidity: 61.2%

Test Voltage: AC 120V/60Hz

TEST SETUP AND PROCEDURE

Below 30MHz

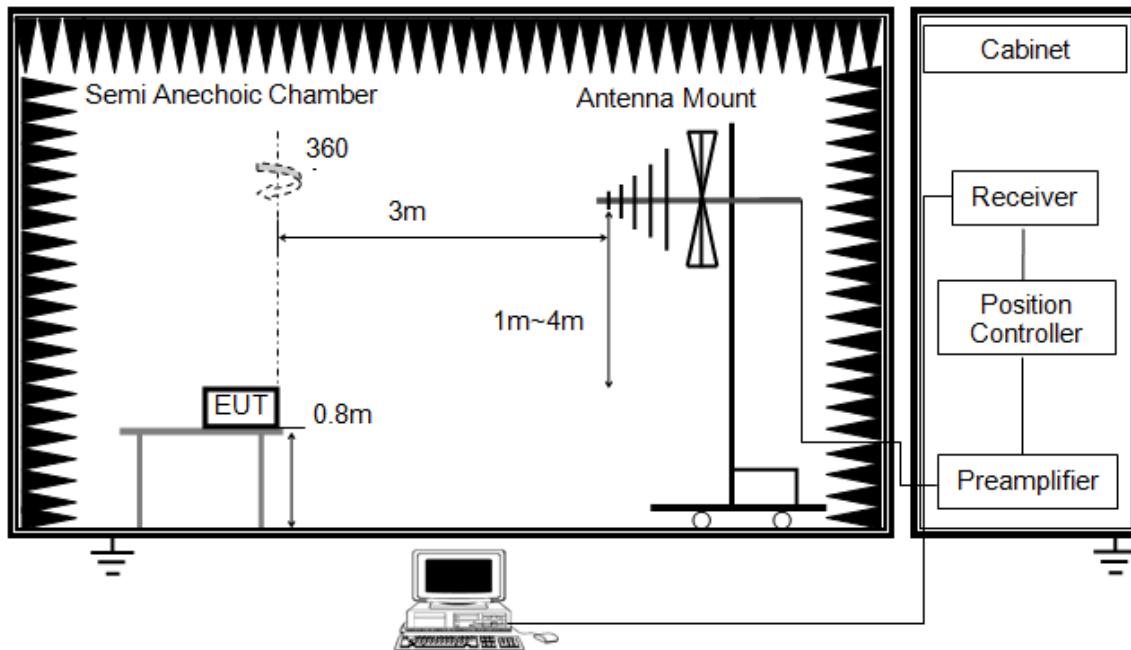


The setting of the spectrum analyser

| | |
|----------|--|
| 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

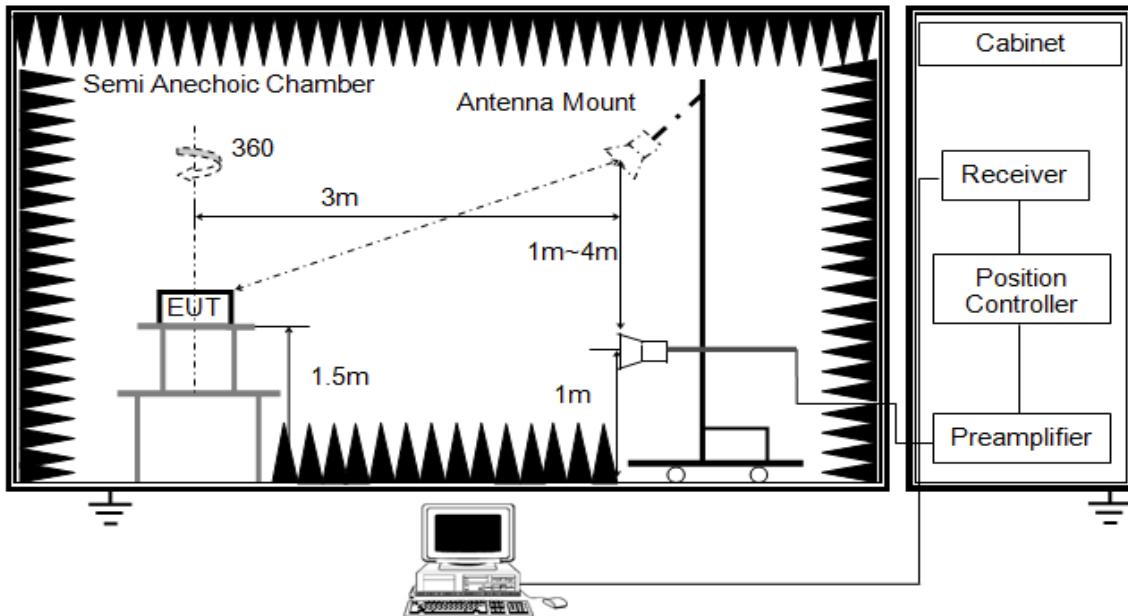


The setting of the spectrum analyser

| | |
|----------|----------|
| RBW | 120K |
| VBW | 300K |
| 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: Antenna Factor + Cable Loss + Read Level - Preampl 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)

ABOVE 1G



The setting of the spectrum analyser

| | |
|----------|------------------------|
| RBW | 1M |
| VBW | 3M |
| 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

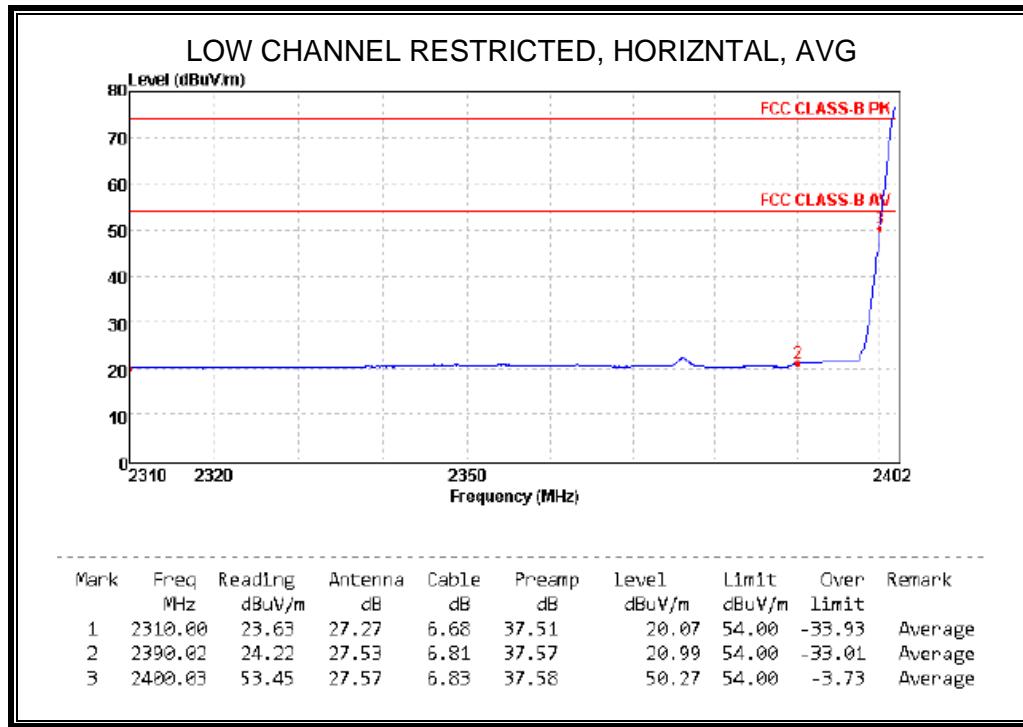
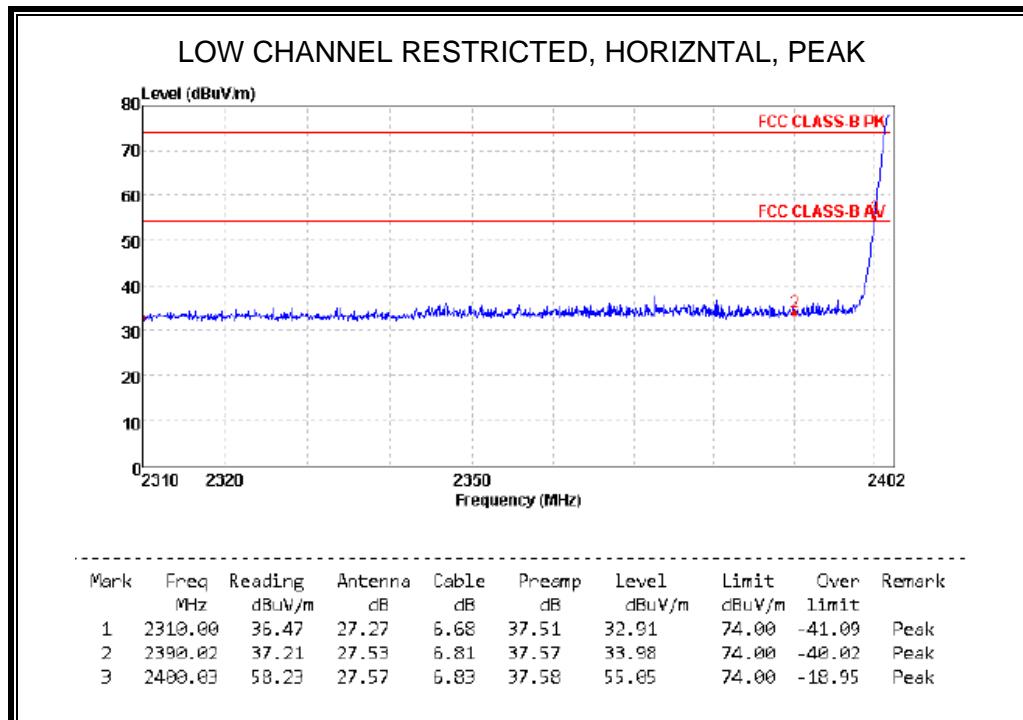
Relative Humidity: 61%

Test Voltage: AC 120V/60Hz

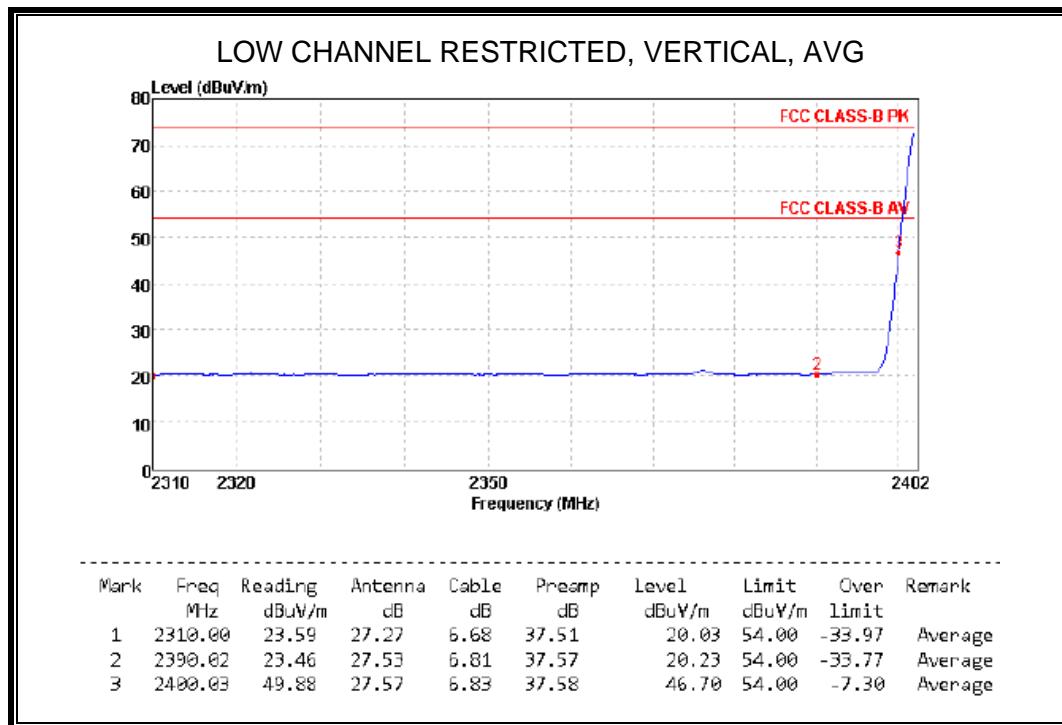
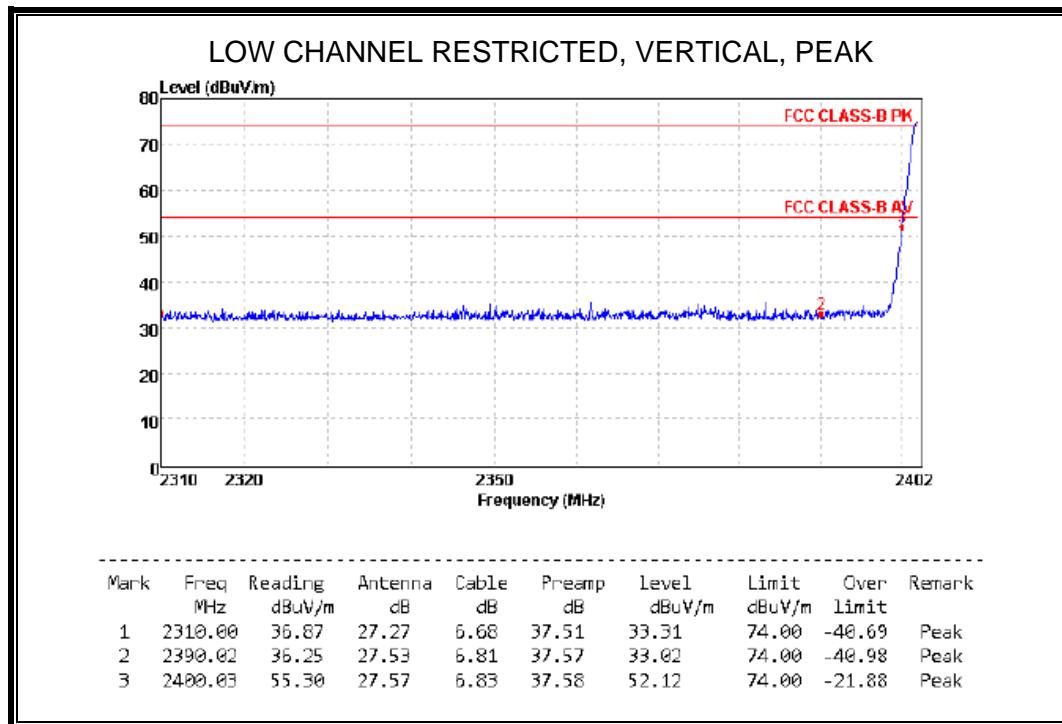
8.2. RESTRICTED BANDEDGE

8.2.1. GFSK MODE

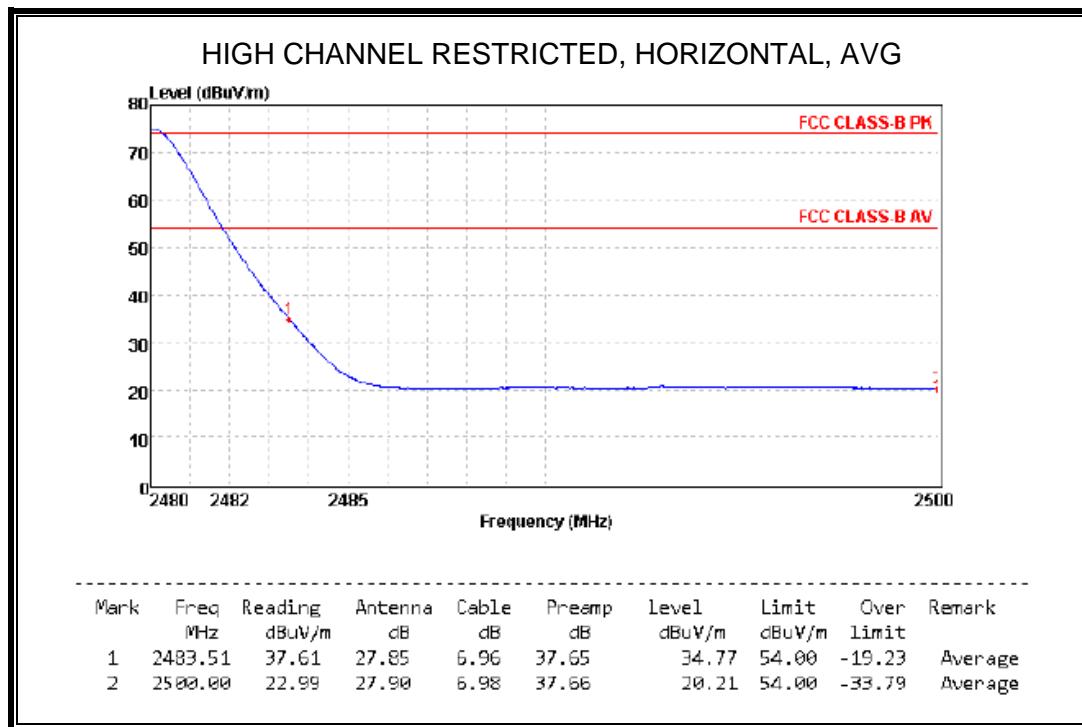
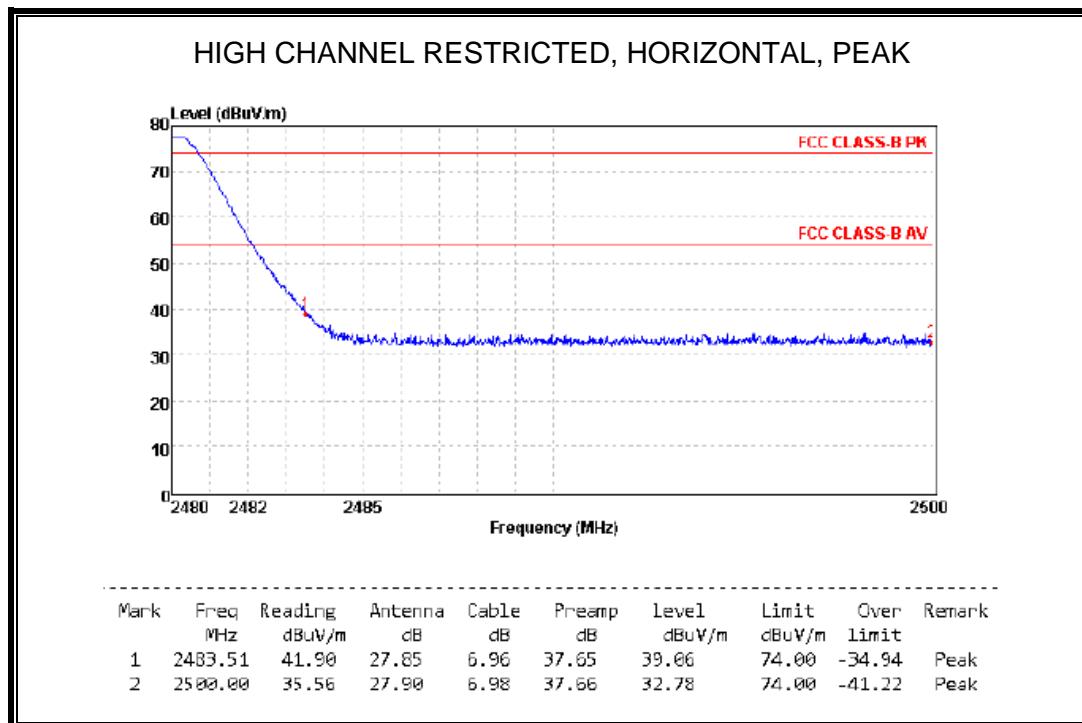
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



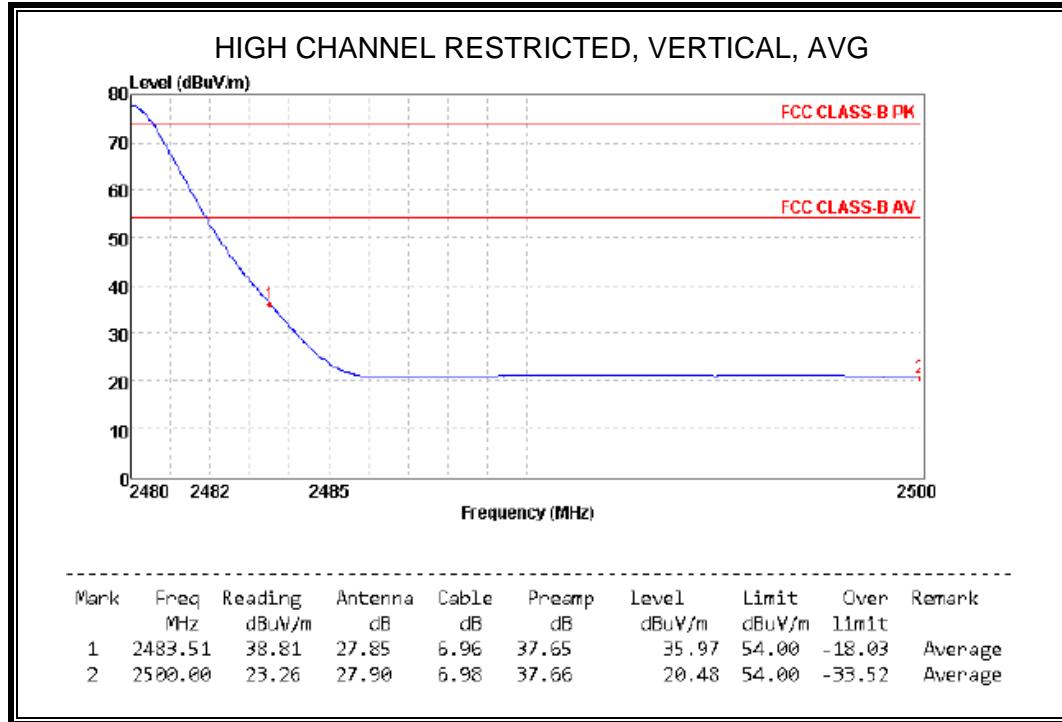
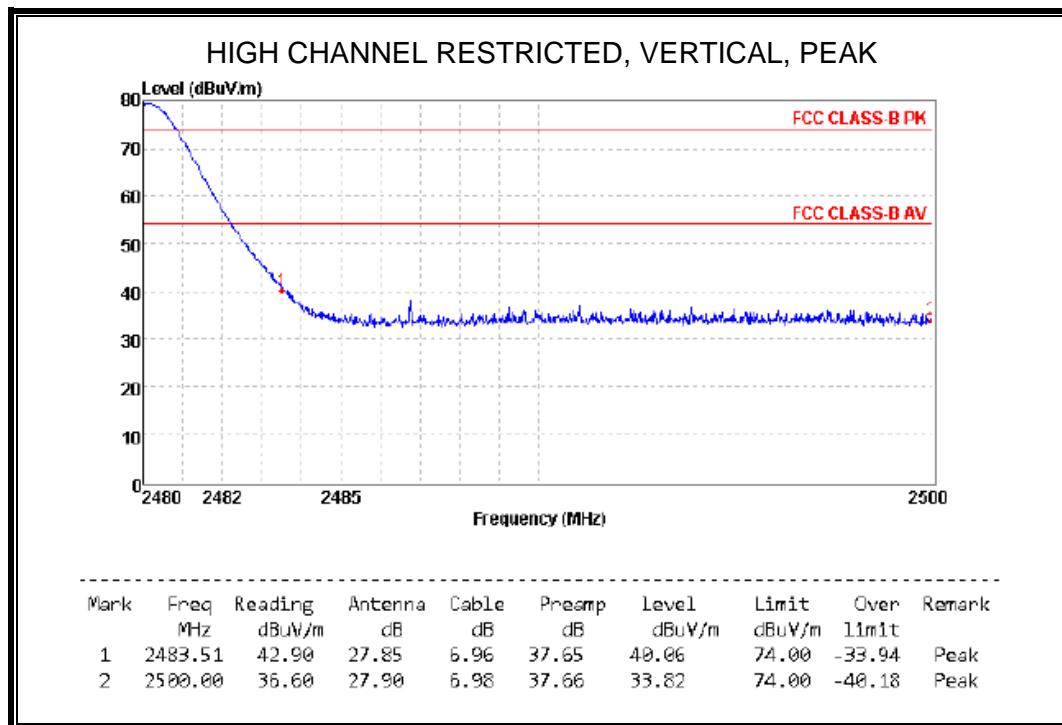
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

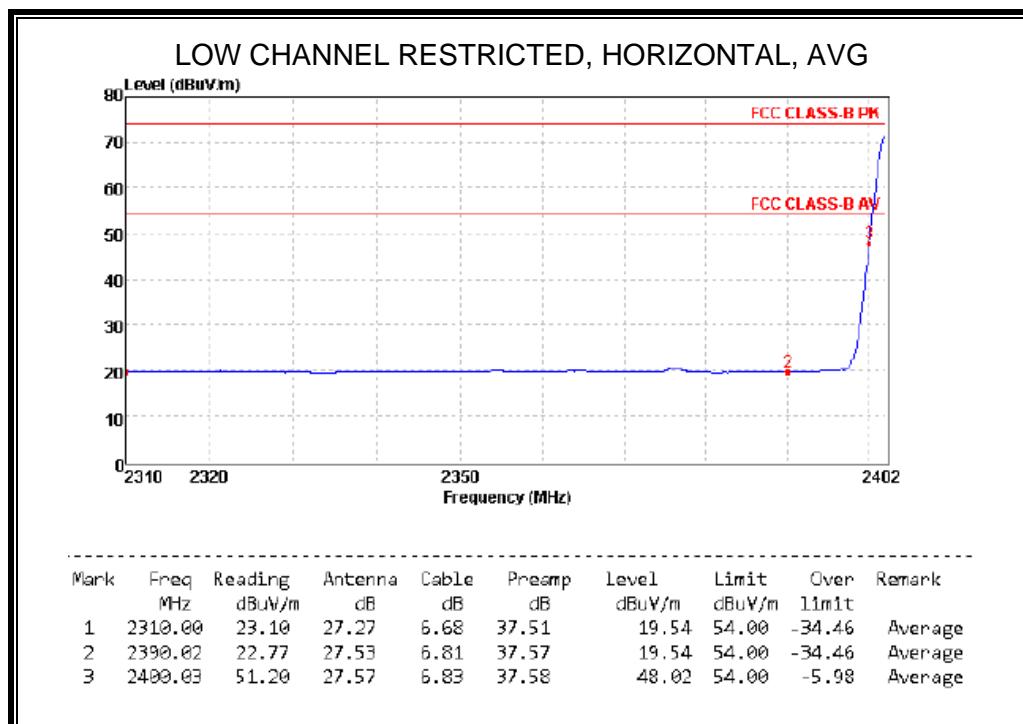
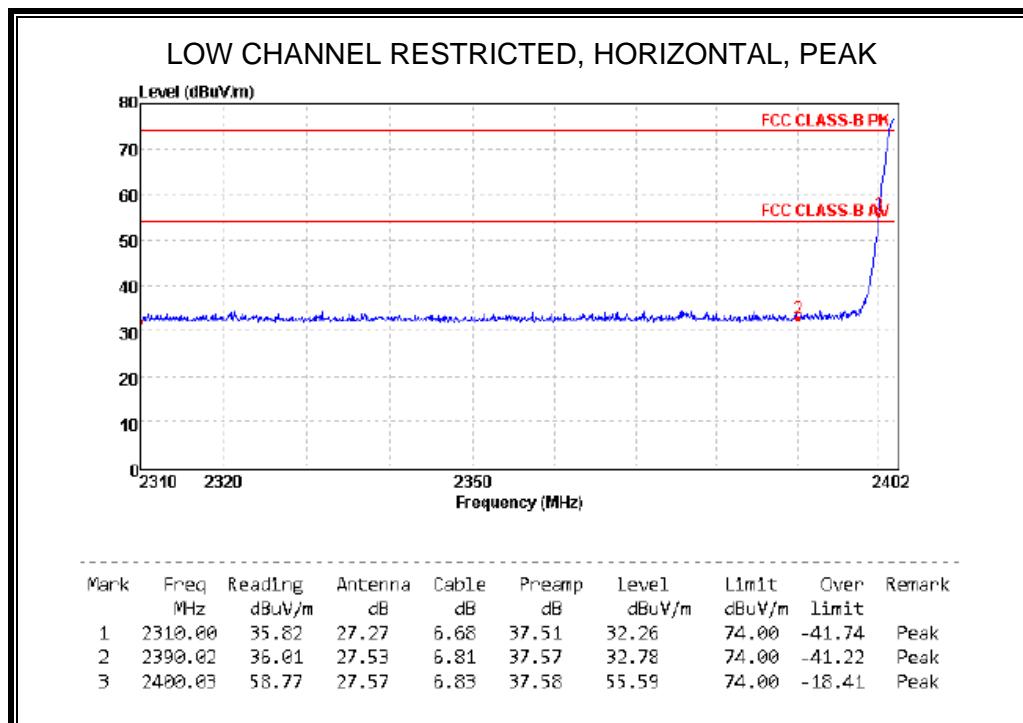


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

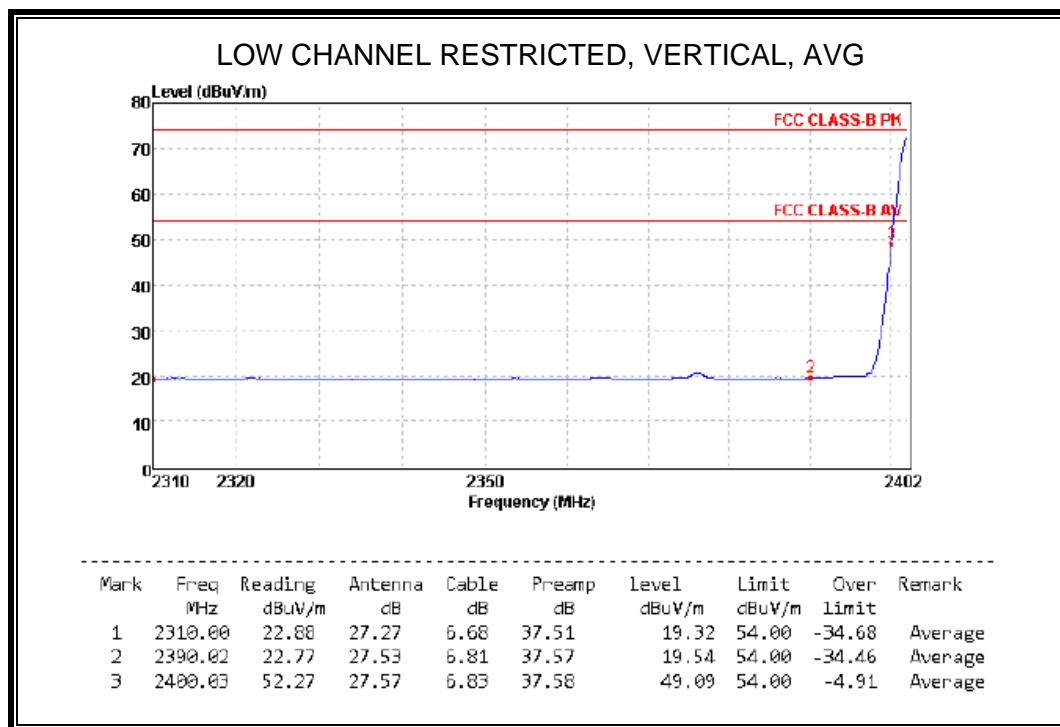
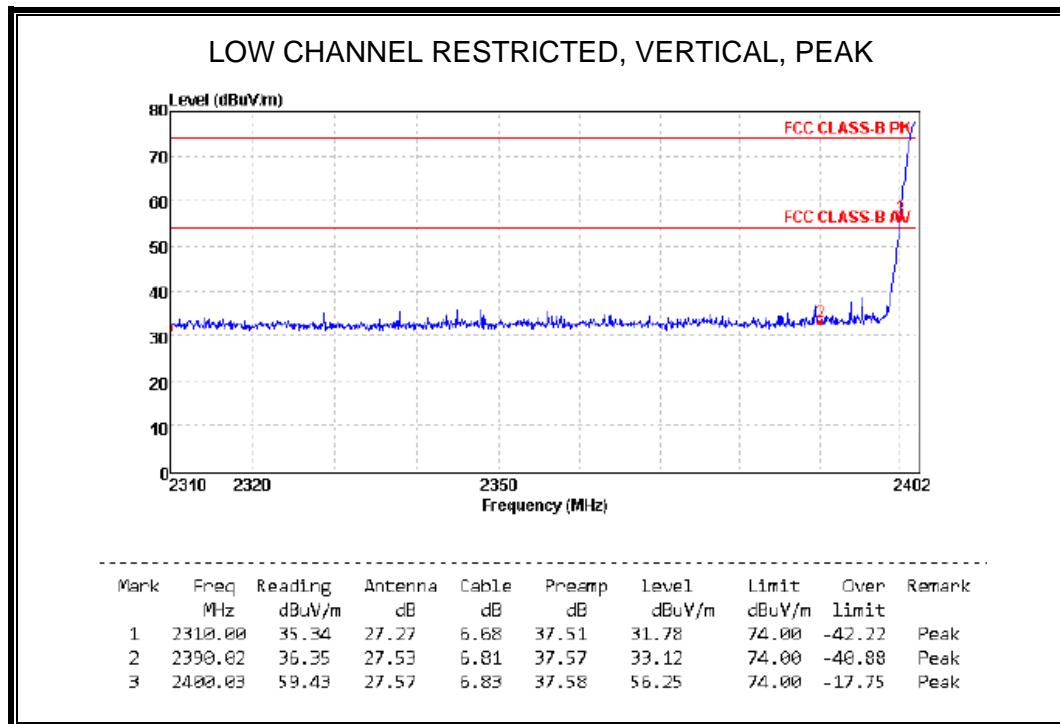


8.2.2. 8-DPSK MODE

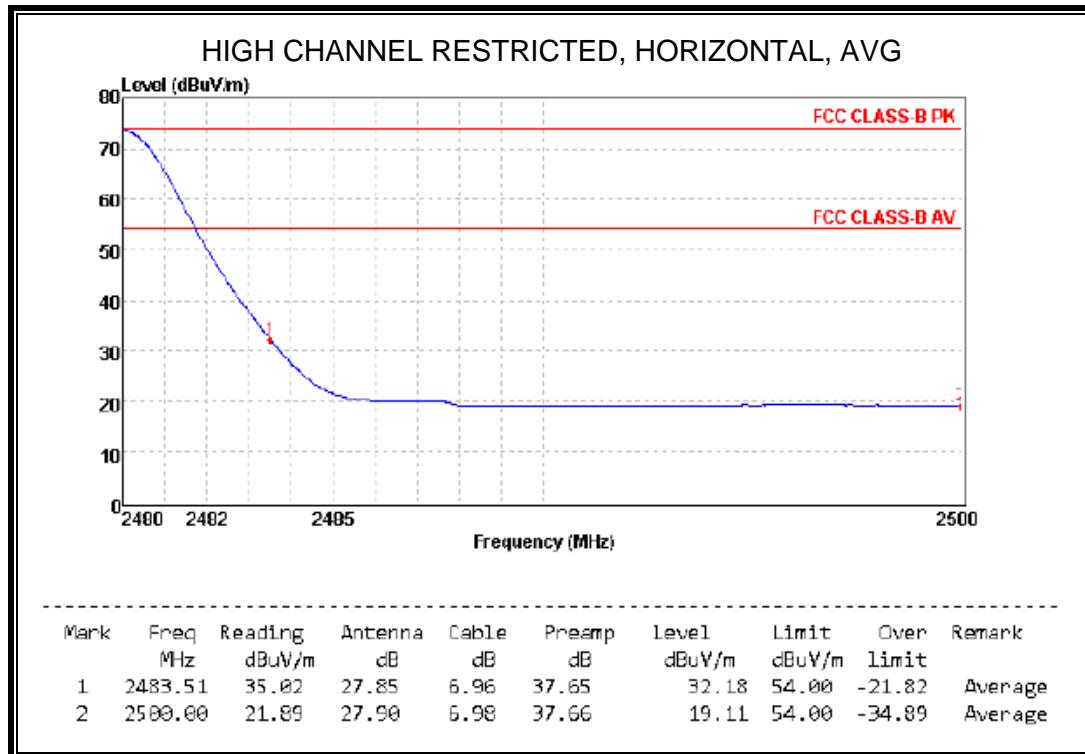
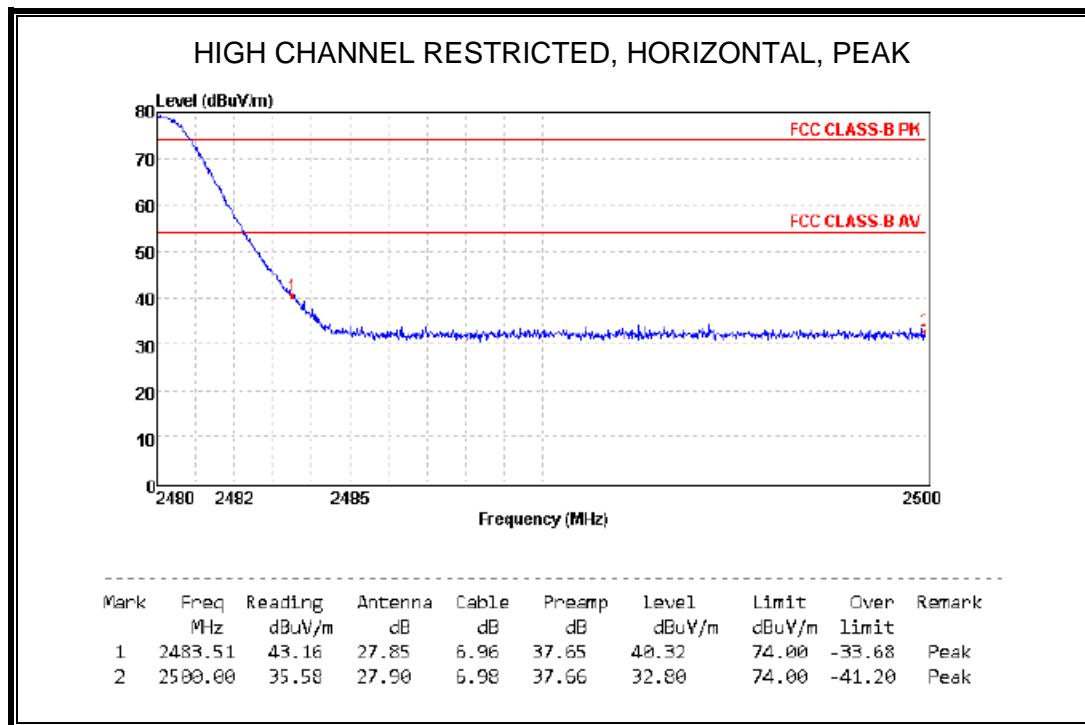
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



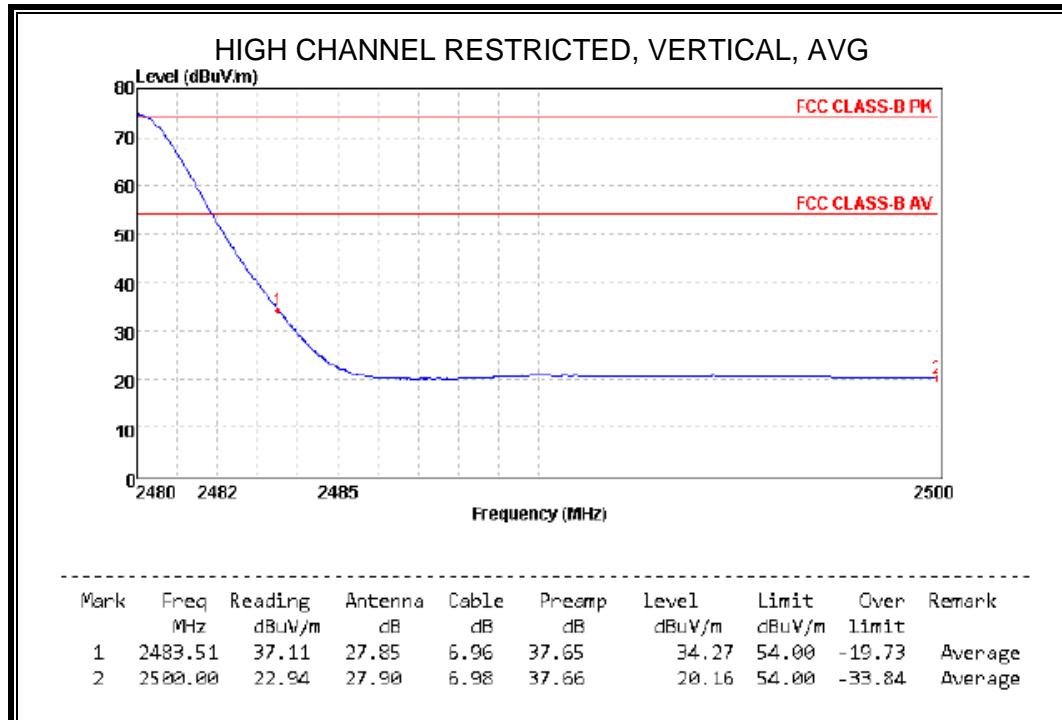
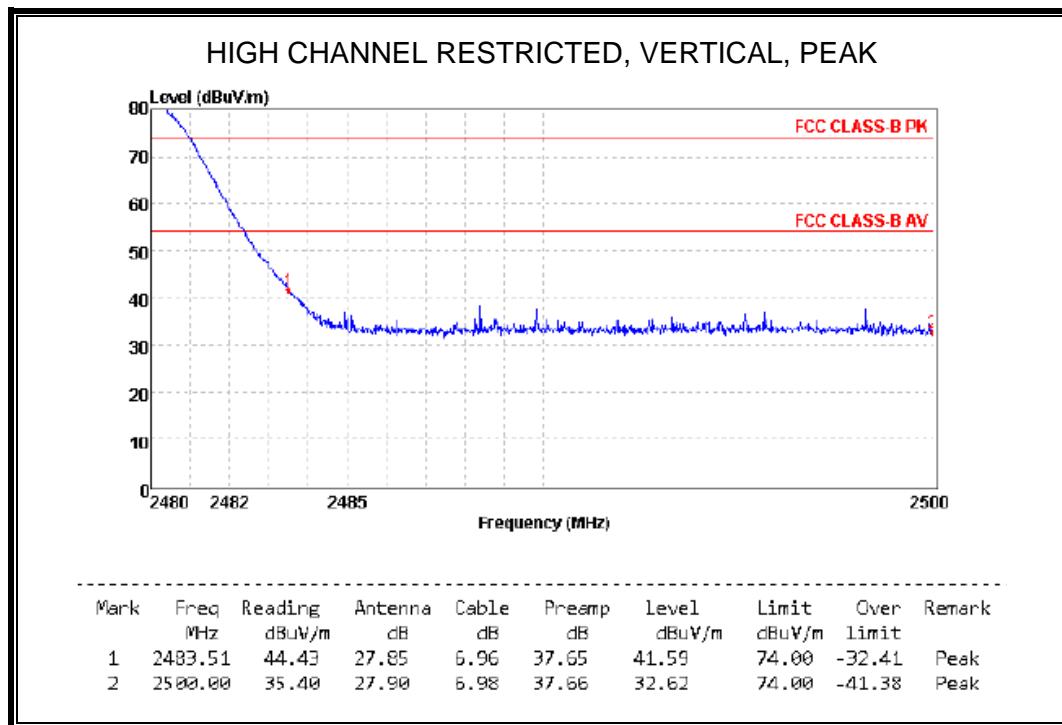
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

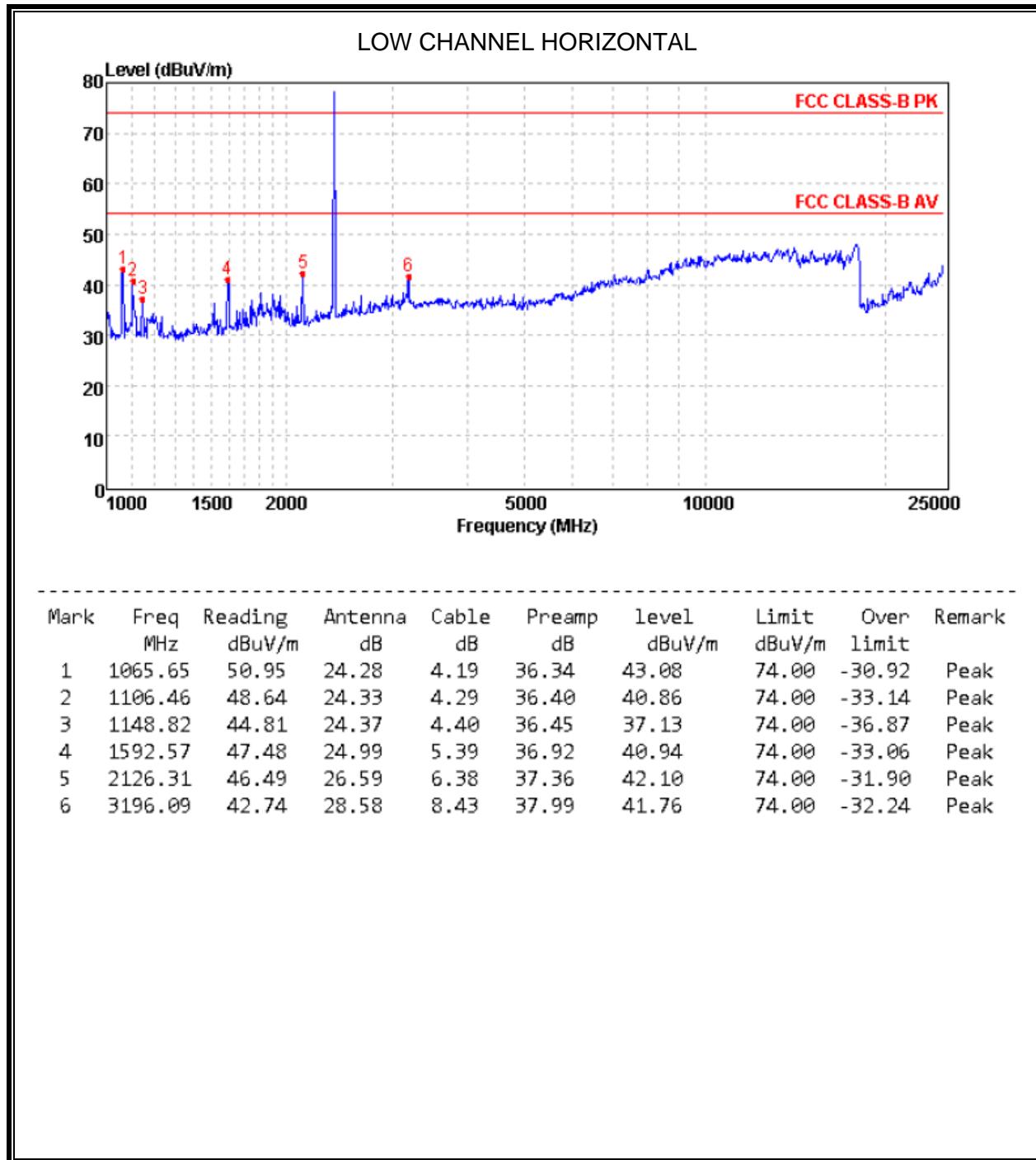


Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case (Z axis) data recorded in the report.

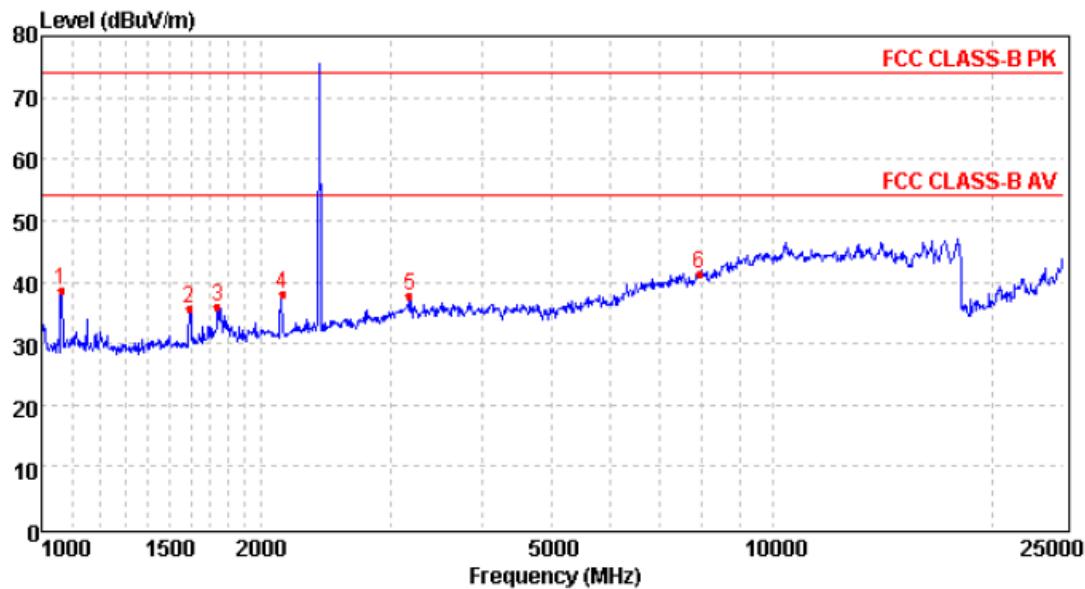
8.3. SPURIOUS EMISSIONS (1~25GHz)

8.3.1. GFSK MODE

HARMONICS AND SPURIOUS EMISSIONS

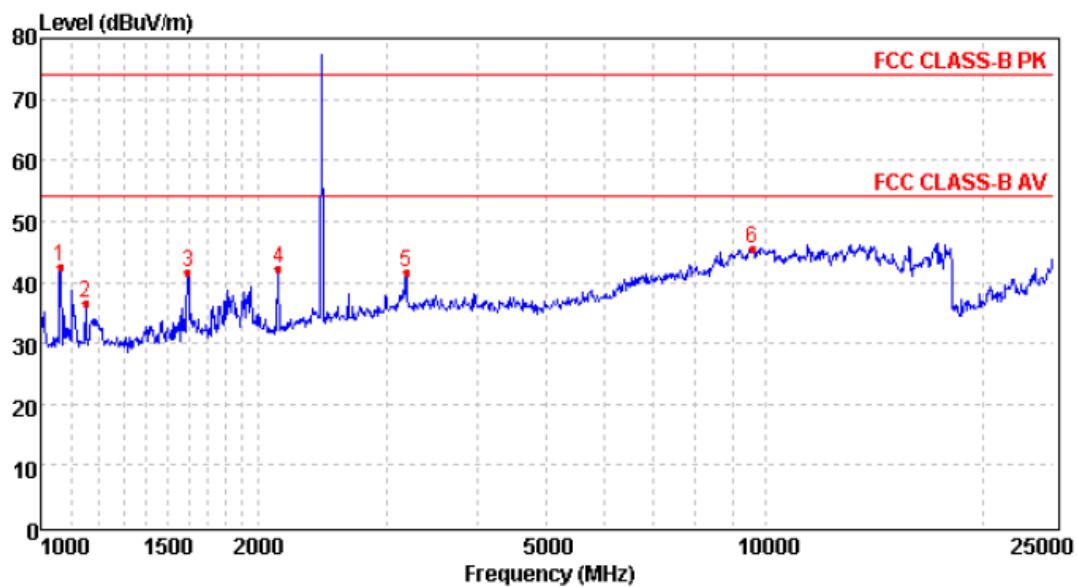


LOW CHANNEL VERTICAL



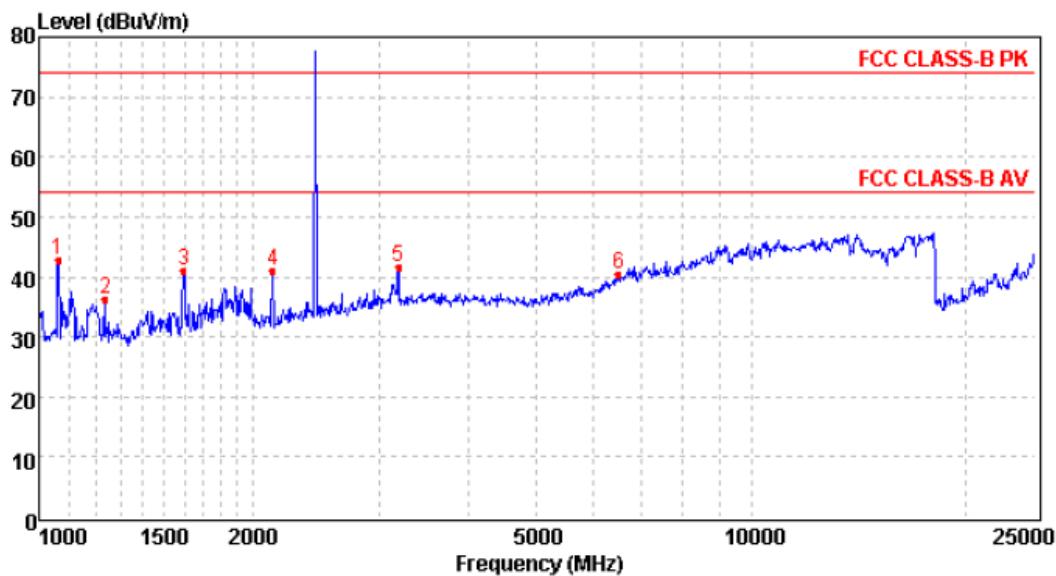
| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 46.68 | 24.28 | 4.18 | 36.34 | 38.80 | 74.00 | -35.20 | Peak |
| 2 | 1592.57 | 42.31 | 24.99 | 5.39 | 36.92 | 35.77 | 74.00 | -38.23 | Peak |
| 3 | 1741.86 | 42.05 | 25.43 | 5.68 | 37.05 | 36.11 | 74.00 | -37.89 | Peak |
| 4 | 2132.46 | 42.30 | 26.61 | 6.39 | 37.37 | 37.93 | 74.00 | -36.07 | Peak |
| 5 | 3186.87 | 38.79 | 28.58 | 8.42 | 37.99 | 37.80 | 74.00 | -36.20 | Peak |
| 6 | 7943.84 | 31.72 | 36.65 | 11.21 | 38.24 | 41.34 | 74.00 | -32.66 | Peak |

MID CHANNEL HORIZONTAL



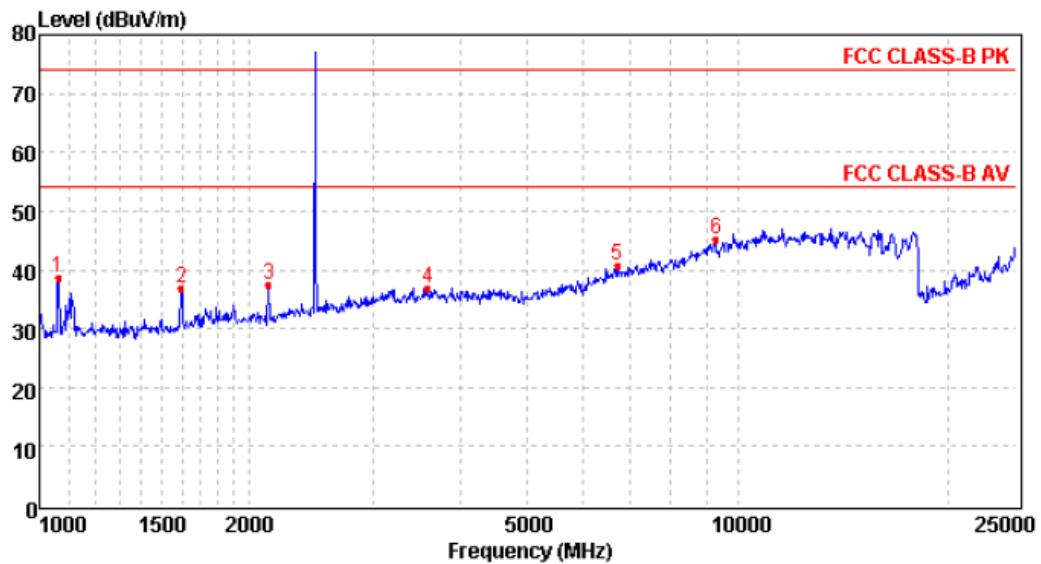
| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 50.43 | 24.28 | 4.18 | 36.34 | 42.55 | 74.00 | -31.45 | Peak |
| 2 | 1152.15 | 44.13 | 24.38 | 4.41 | 36.45 | 36.47 | 74.00 | -37.53 | Peak |
| 3 | 1597.18 | 48.03 | 25.01 | 5.39 | 36.92 | 41.51 | 74.00 | -32.49 | Peak |
| 4 | 2126.31 | 46.53 | 26.59 | 6.38 | 37.36 | 42.14 | 74.00 | -31.86 | Peak |
| 5 | 3196.09 | 42.69 | 28.58 | 8.43 | 37.99 | 41.71 | 74.00 | -32.29 | Peak |
| 6 | 9585.68 | 33.26 | 38.15 | 12.08 | 38.06 | 45.43 | 74.00 | -28.57 | Peak |

MID CHANNEL VERTICAL



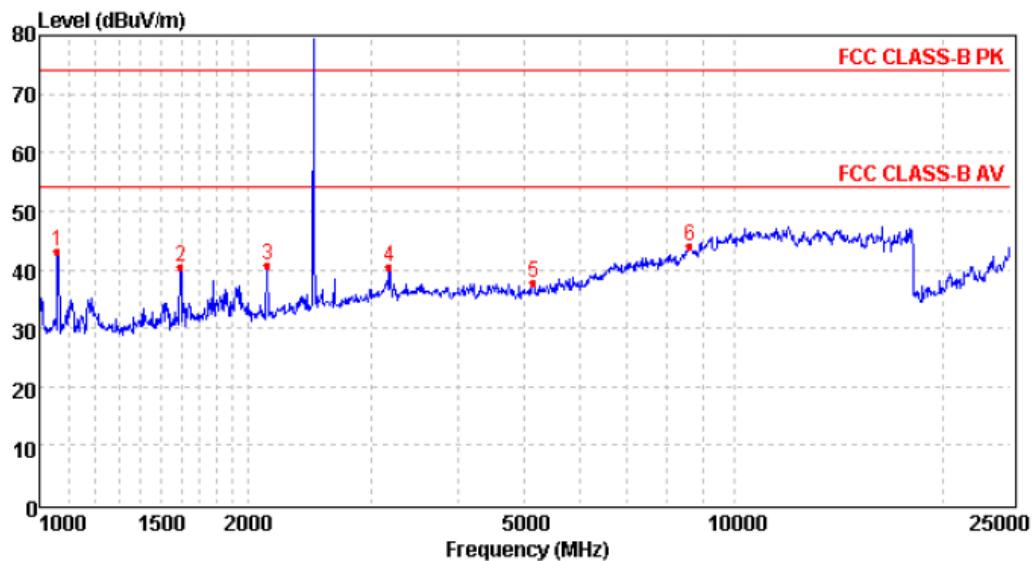
| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 50.59 | 24.28 | 4.18 | 36.34 | 42.71 | 74.00 | -31.29 | Peak |
| 2 | 1238.48 | 43.69 | 24.46 | 4.62 | 36.56 | 36.21 | 74.00 | -37.79 | Peak |
| 3 | 1597.18 | 47.52 | 25.01 | 5.39 | 36.92 | 41.00 | 74.00 | -33.00 | Peak |
| 4 | 2126.31 | 45.29 | 26.59 | 6.38 | 37.36 | 40.90 | 74.00 | -33.10 | Peak |
| 5 | 3196.09 | 42.61 | 28.58 | 8.43 | 37.99 | 41.63 | 74.00 | -32.37 | Peak |
| 6 | 6507.54 | 32.97 | 35.10 | 10.35 | 37.98 | 40.44 | 74.00 | -33.56 | Peak |

HIGH CHANNEL HORIZONTAL



| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 46.46 | 24.28 | 4.18 | 36.34 | 38.58 | 74.00 | -35.42 | Peak |
| 2 | 1597.18 | 43.52 | 25.01 | 5.39 | 36.92 | 37.00 | 74.00 | -37.00 | Peak |
| 3 | 2126.31 | 41.73 | 26.59 | 6.38 | 37.36 | 37.34 | 74.00 | -36.66 | Peak |
| 4 | 3598.20 | 37.33 | 28.87 | 8.76 | 37.99 | 36.97 | 74.00 | -37.03 | Peak |
| 5 | 6717.76 | 32.95 | 35.41 | 10.53 | 38.02 | 40.87 | 74.00 | -33.13 | Peak |
| 6 | 9285.71 | 33.30 | 38.02 | 11.86 | 38.01 | 45.17 | 74.00 | -28.83 | Peak |

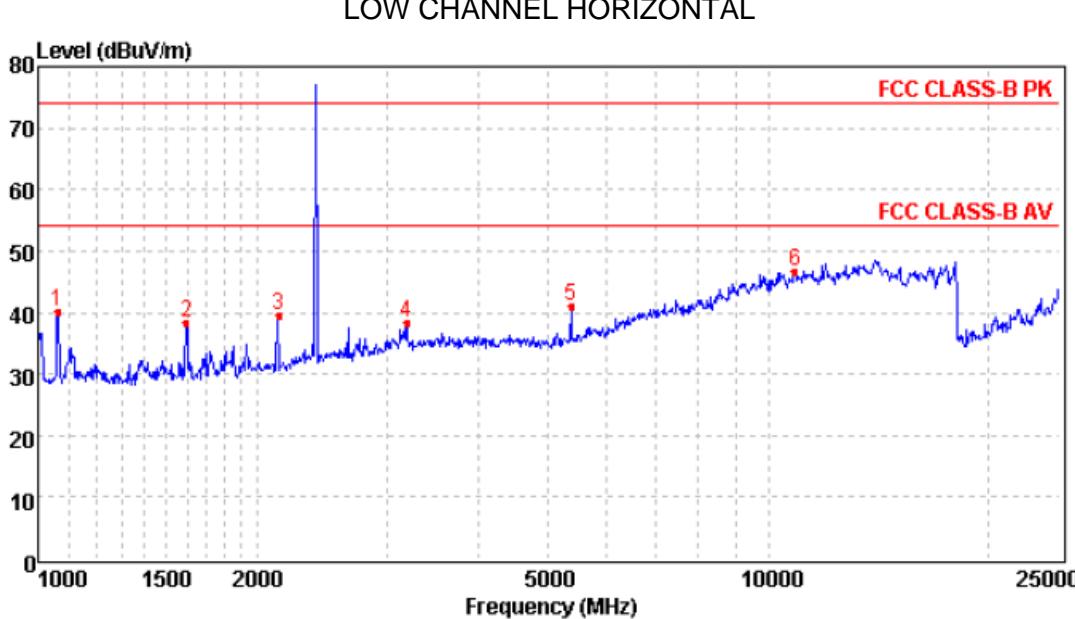
HIGH CHANNEL VERTICAL



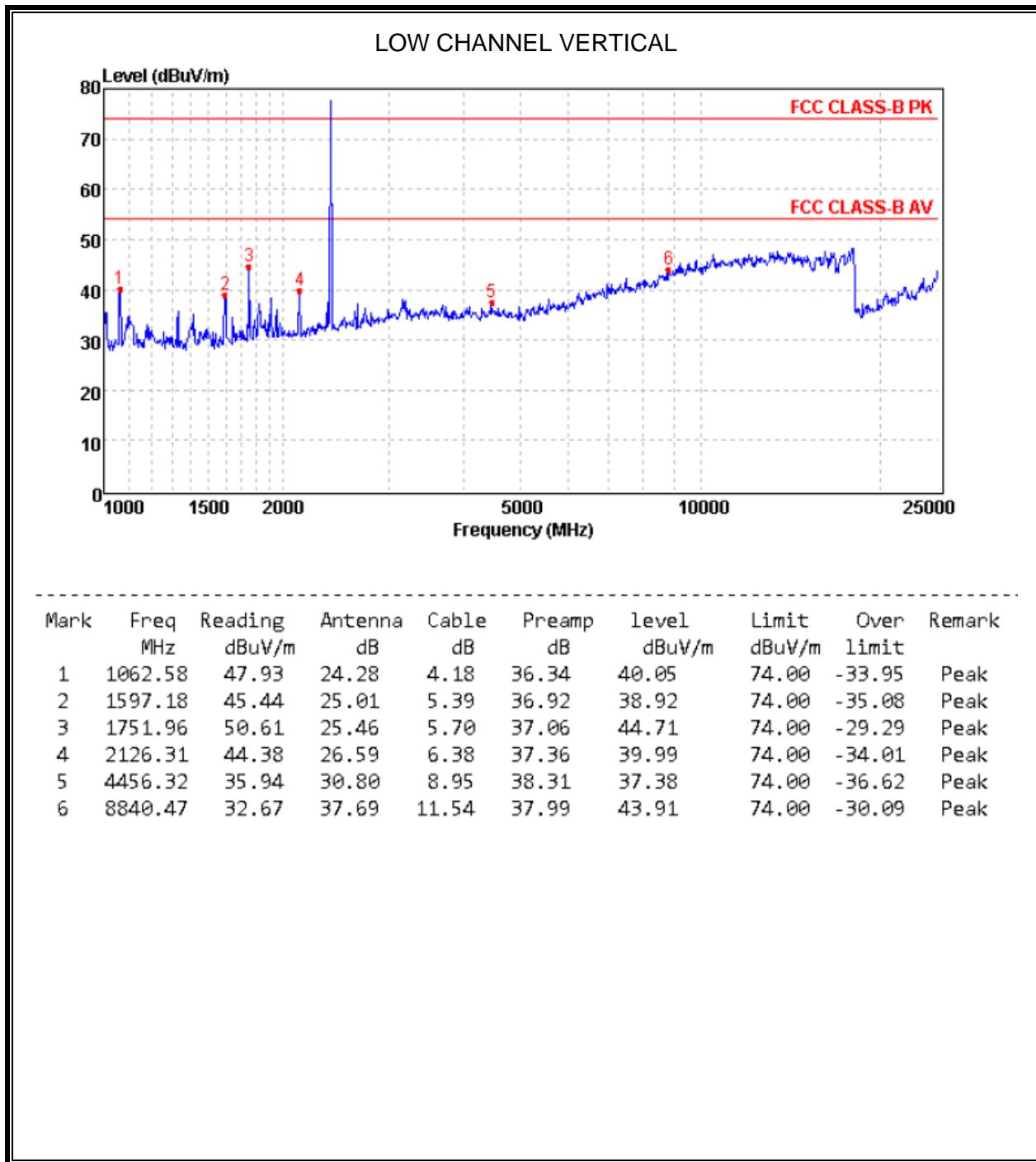
| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1059.51 | 51.06 | 24.27 | 4.17 | 36.33 | 43.17 | 74.00 | -30.83 | Peak |
| 2 | 1597.18 | 47.07 | 25.01 | 5.39 | 36.92 | 40.55 | 74.00 | -33.45 | Peak |
| 3 | 2126.31 | 45.15 | 26.59 | 6.38 | 37.36 | 40.76 | 74.00 | -33.24 | Peak |
| 4 | 3186.87 | 41.37 | 28.58 | 8.42 | 37.99 | 40.38 | 74.00 | -33.62 | Peak |
| 5 | 5134.34 | 35.36 | 31.53 | 9.42 | 38.54 | 37.77 | 74.00 | -36.23 | Peak |
| 6 | 8638.40 | 33.25 | 37.41 | 11.37 | 38.05 | 43.98 | 74.00 | -30.02 | Peak |

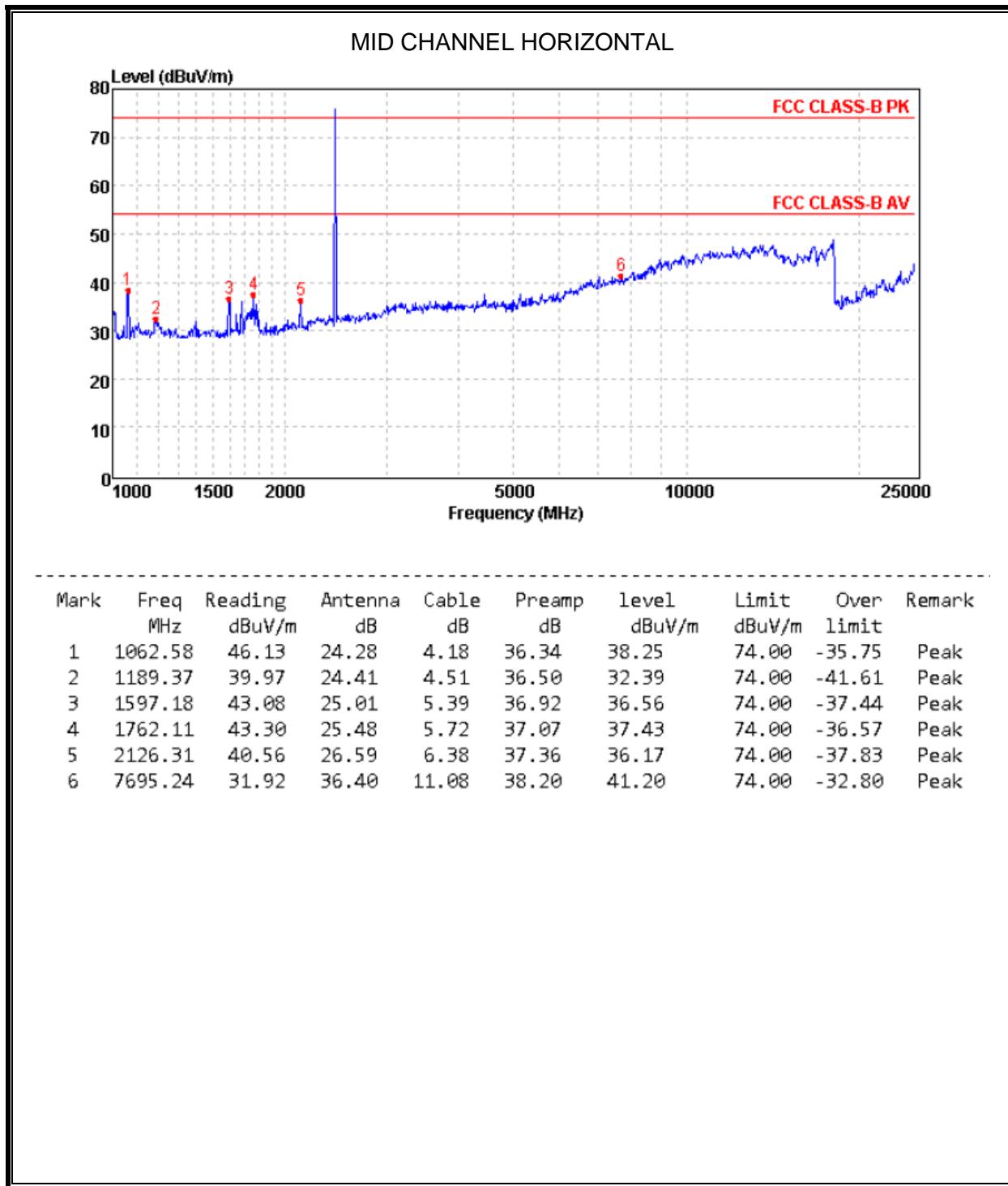
8.3.2. 8DPSK MODE

HARMONICS AND SPURIOUS EMISSIONS

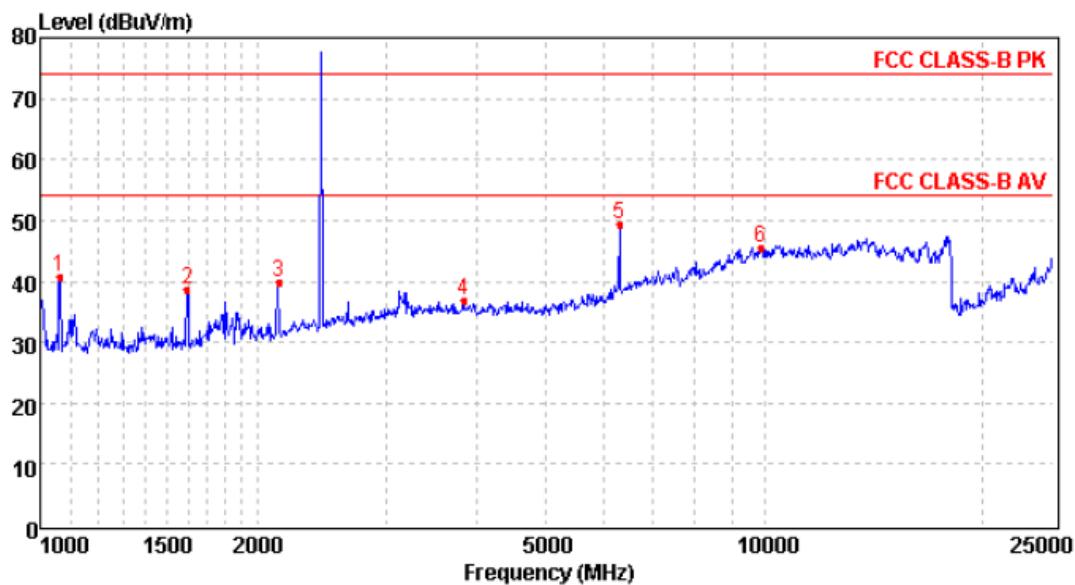


| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 48.01 | 24.28 | 4.18 | 36.34 | 40.13 | 74.00 | -33.87 | Peak |
| 2 | 1597.18 | 44.80 | 25.01 | 5.39 | 36.92 | 38.28 | 74.00 | -35.72 | Peak |
| 3 | 2132.46 | 43.85 | 26.61 | 6.39 | 37.37 | 39.48 | 74.00 | -34.52 | Peak |
| 4 | 3196.09 | 39.23 | 28.58 | 8.43 | 37.99 | 38.25 | 74.00 | -35.75 | Peak |
| 5 | 5361.83 | 37.67 | 32.07 | 9.55 | 38.36 | 40.93 | 74.00 | -33.07 | Peak |
| 6 | 10854.25 | 32.71 | 39.04 | 13.14 | 38.14 | 46.75 | 74.00 | -27.25 | Peak |

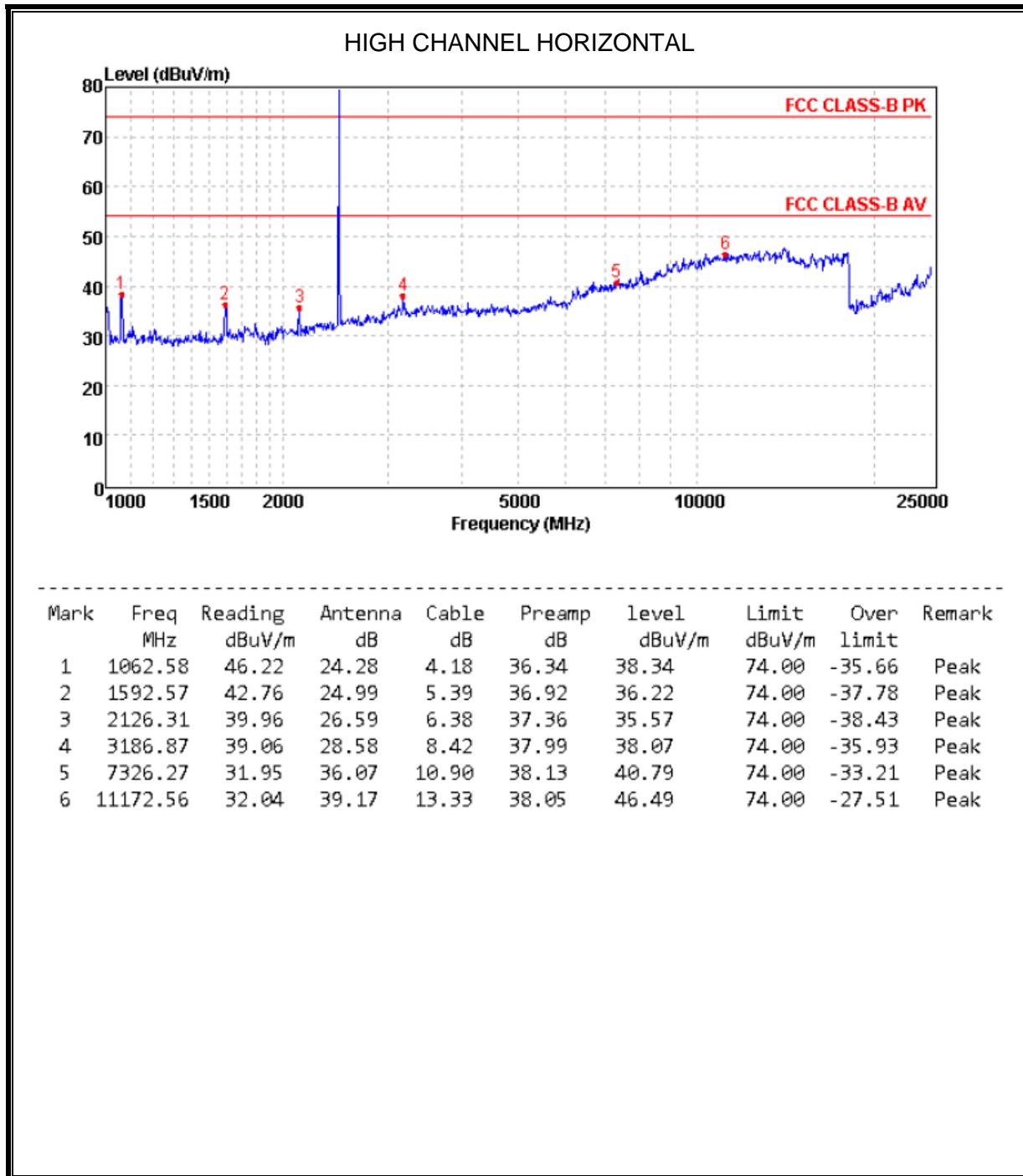


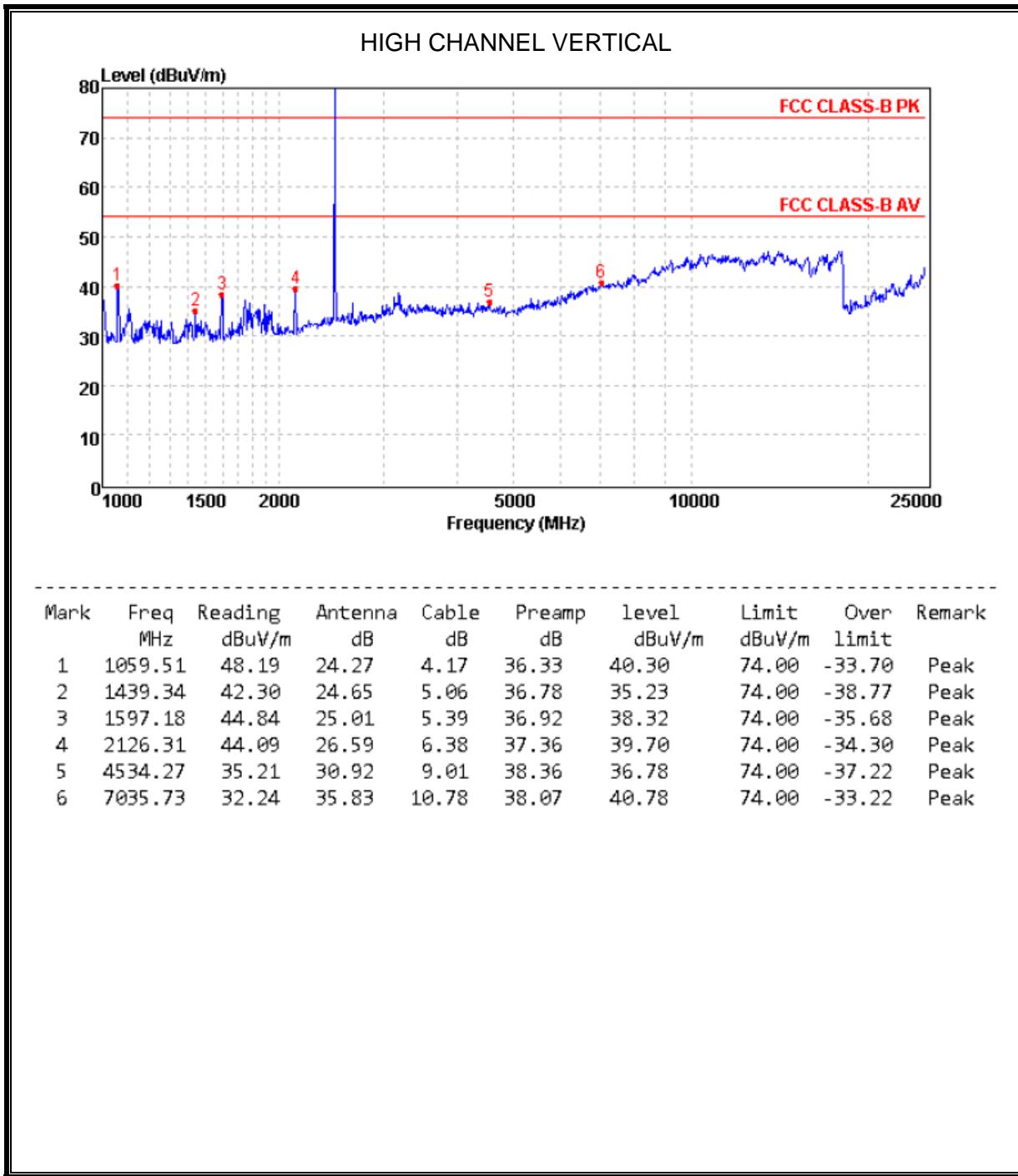


MID CHANNEL VERTICAL



| Mark | Freq MHz | Reading dBuV/m | Antenna dB | Cable dB | Preamp dB | level dBuV/m | Limit dBuV/m | Over limit | Remark |
|------|-------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| 1 | 1062.58 | 48.52 | 24.28 | 4.18 | 36.34 | 40.64 | 74.00 | -33.36 | Peak |
| 2 | 1597.18 | 45.07 | 25.01 | 5.39 | 36.92 | 38.55 | 74.00 | -35.45 | Peak |
| 3 | 2132.46 | 44.15 | 26.61 | 6.39 | 37.37 | 39.78 | 74.00 | -34.22 | Peak |
| 4 | 3845.54 | 36.84 | 29.26 | 8.67 | 37.99 | 36.78 | 74.00 | -37.22 | Peak |
| 5 | 6303.89 | 42.89 | 34.35 | 10.11 | 37.95 | 49.40 | 74.00 | -24.60 | Peak |
| 6 | 9866.79 | 33.01 | 38.32 | 12.36 | 38.11 | 45.58 | 74.00 | -28.42 | Peak |



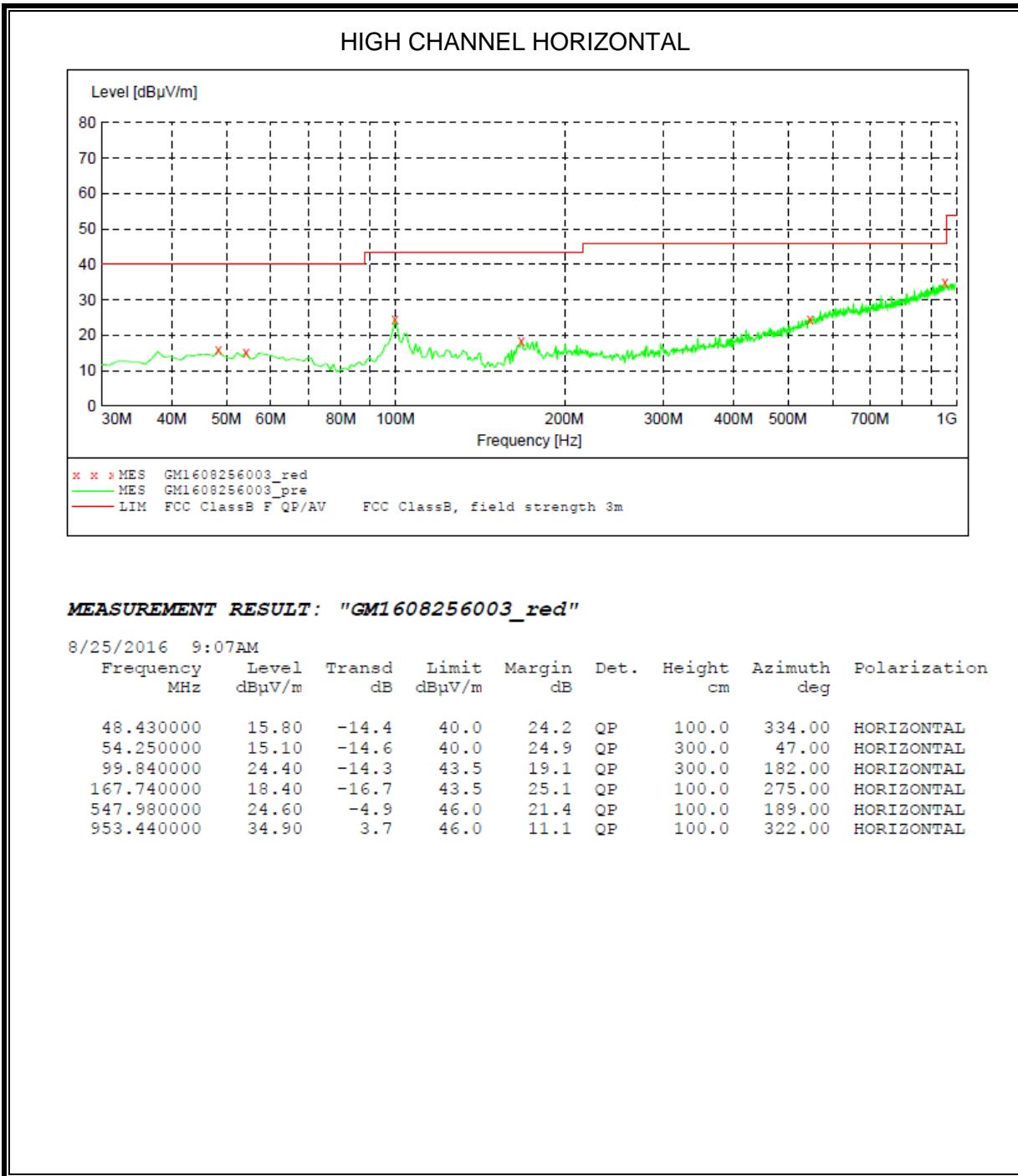


Note: EUT in each of three orthogonal axis emissions had been tested, but only the worst case(Z axis) data recorded in the report.

8.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

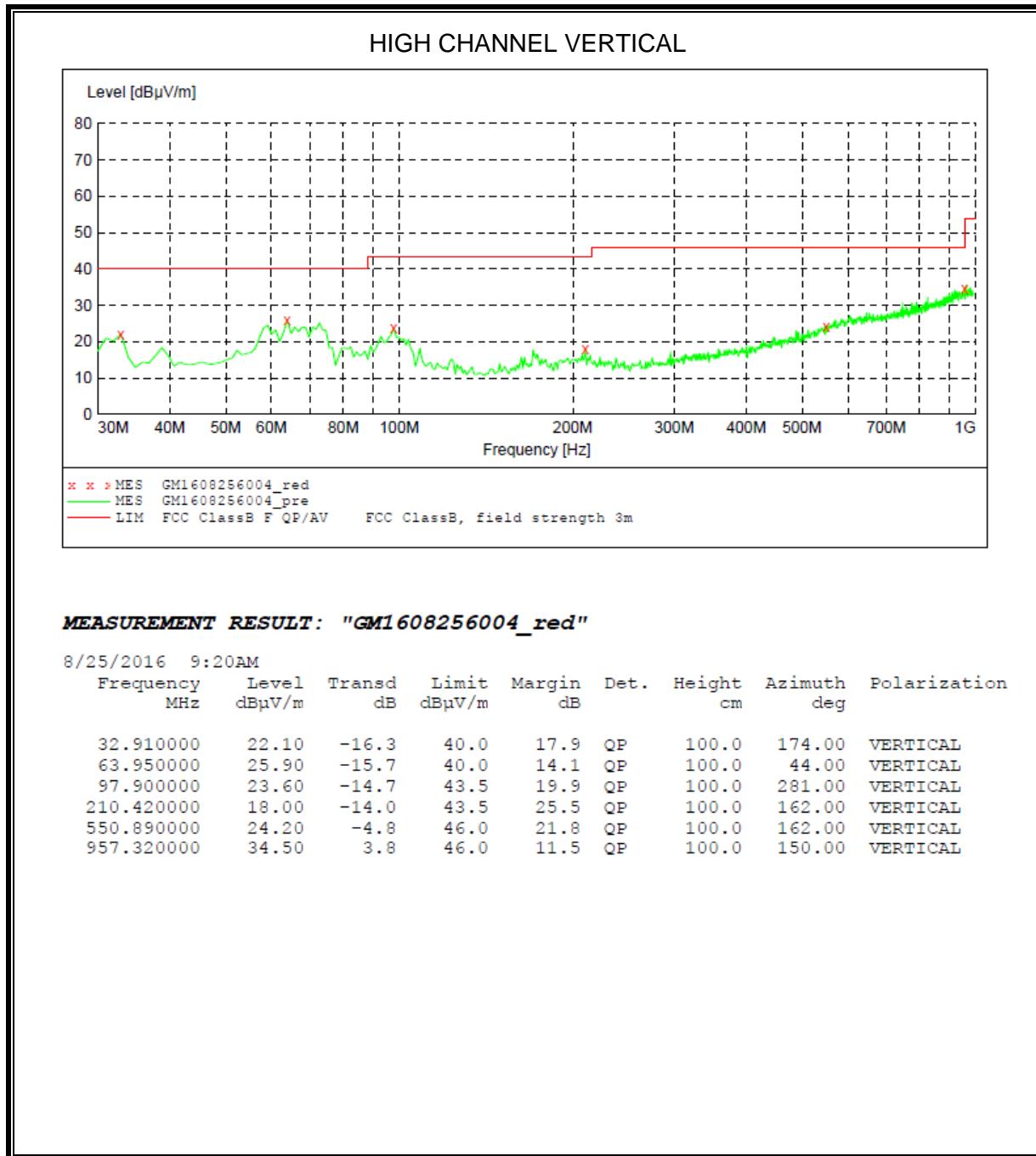
8.4.1. GFSK MODE

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



MEASUREMENT RESULT: "GM1608256003_red"

| Frequency MHz | Level dB μ V/m | Transd dB | Limit dB μ V/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|------|--------------|----------------|--------------|
| 48.430000 | 15.80 | -14.4 | 40.0 | 24.2 | QP | 100.0 | 334.00 | HORIZONTAL |
| 54.250000 | 15.10 | -14.6 | 40.0 | 24.9 | QP | 300.0 | 47.00 | HORIZONTAL |
| 99.840000 | 24.40 | -14.3 | 43.5 | 19.1 | QP | 300.0 | 182.00 | HORIZONTAL |
| 167.740000 | 18.40 | -16.7 | 43.5 | 25.1 | QP | 100.0 | 275.00 | HORIZONTAL |
| 547.980000 | 24.60 | -4.9 | 46.0 | 21.4 | QP | 100.0 | 189.00 | HORIZONTAL |
| 953.440000 | 34.90 | 3.7 | 46.0 | 11.1 | QP | 100.0 | 322.00 | HORIZONTAL |



MEASUREMENT RESULT: "GM1608256004_red"

8/25/2016 9:20AM

| Frequency MHz | Level dB μ V/m | Transd dB | Limit dB μ V/m | Margin dB | Det. QP | Height cm | Azimuth deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|------------|--------------|----------------|--------------|
| 32.910000 | 22.10 | -16.3 | 40.0 | 17.9 | QP | 100.0 | 174.00 | VERTICAL |
| 63.950000 | 25.90 | -15.7 | 40.0 | 14.1 | QP | 100.0 | 44.00 | VERTICAL |
| 97.900000 | 23.60 | -14.7 | 43.5 | 19.9 | QP | 100.0 | 281.00 | VERTICAL |
| 210.420000 | 18.00 | -14.0 | 43.5 | 25.5 | QP | 100.0 | 162.00 | VERTICAL |
| 550.890000 | 24.20 | -4.8 | 46.0 | 21.8 | QP | 100.0 | 162.00 | VERTICAL |
| 957.320000 | 34.50 | 3.8 | 46.0 | 11.5 | QP | 100.0 | 150.00 | 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.

8.5. 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.

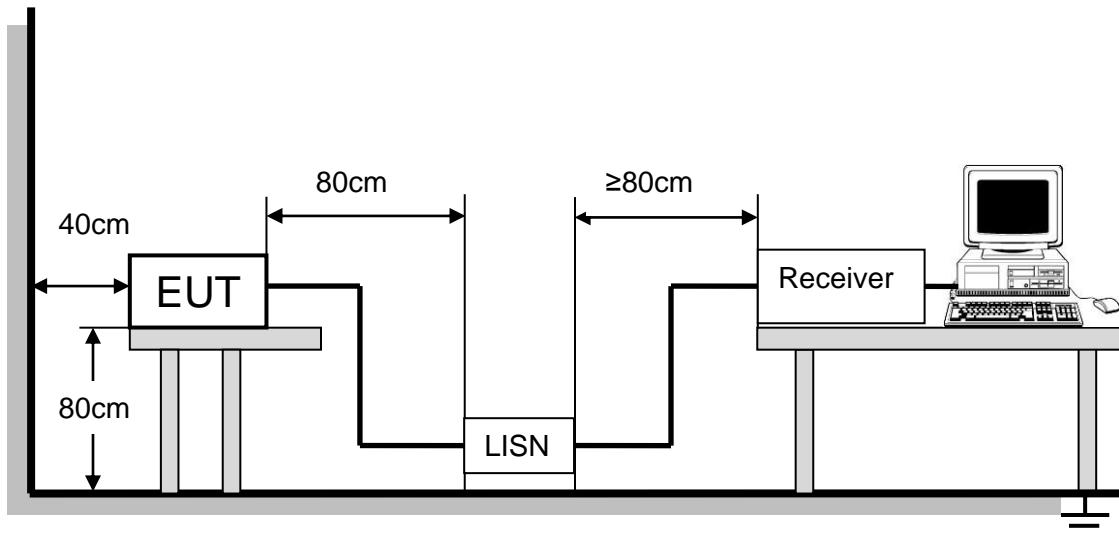
9. AC POWER LINE CONDUCTED EMISSIONS

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

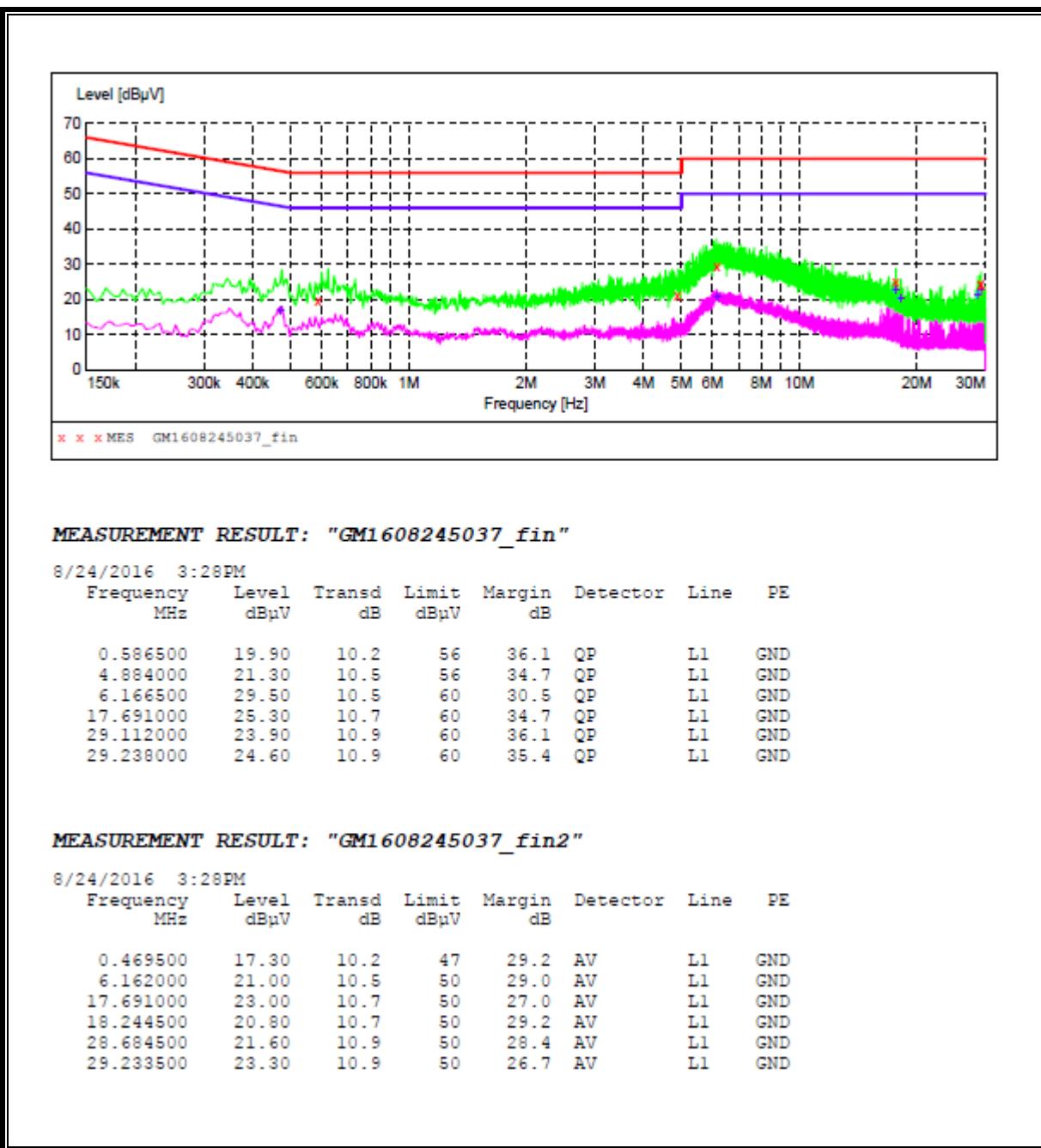


The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) 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.

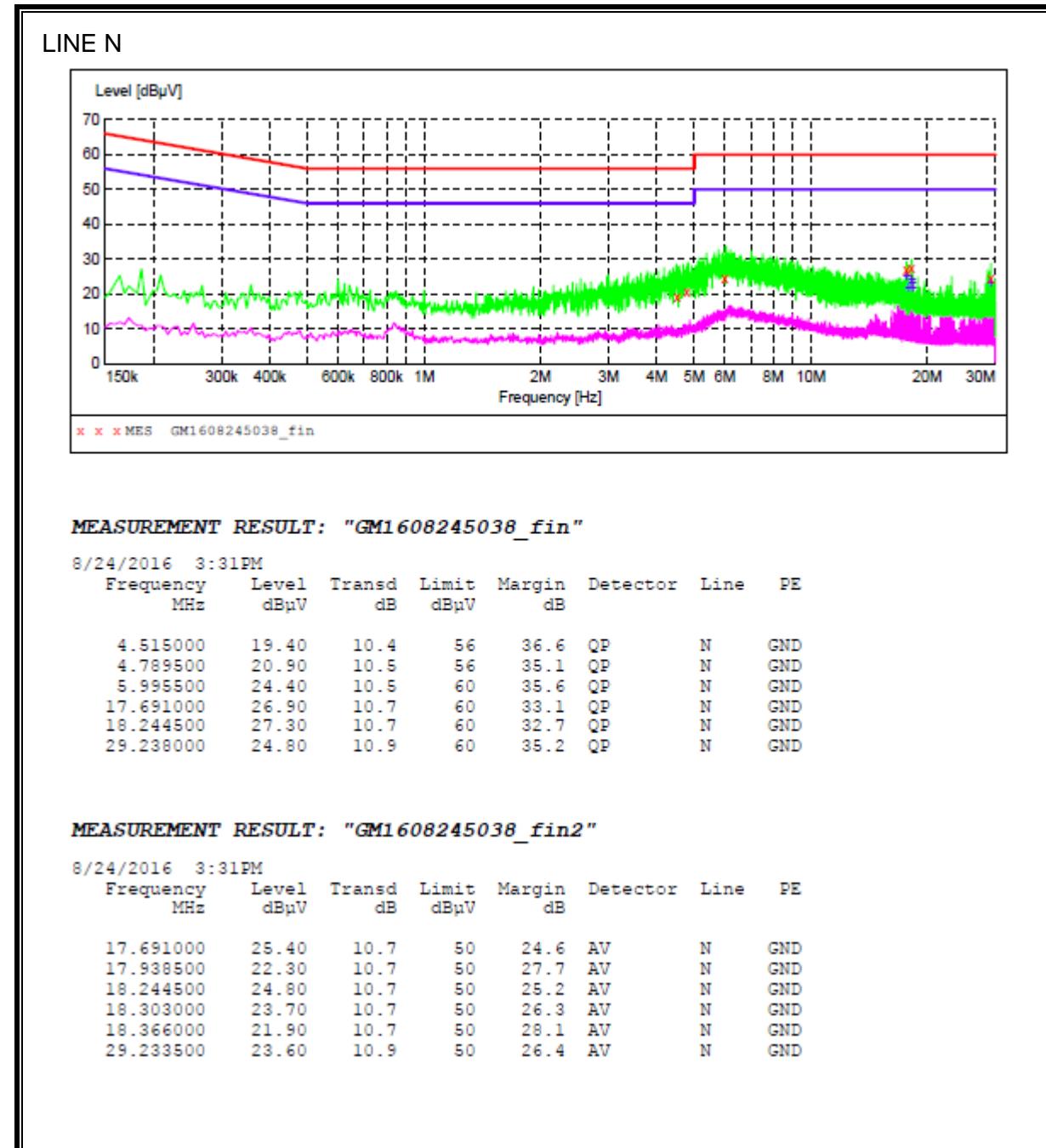
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST RESULTS (WORST-CASE CONFIGURATION)

| | | | |
|--------------|---------------|--------------------|--------------|
| EUT: | LIFEPROOF AQ9 | Model Name: | LPSAN-0005-A |
| Temperature: | 26.0°C | Relative Humidity: | 43.0 % |
| Pressure: | 1012 hPa | Test Voltage: | AC 120V/60Hz |
| Test Mode: | GFSK Mode | Phase : | L1 |



| | | | |
|--------------|---------------|--------------------|--------------|
| EUT: | LIFEPROOF AQ9 | Model Name: | LPSAN-0005-A |
| Temperature: | 26.0°C | Relative Humidity: | 43.0 % |
| Pressure: | 1012 hPa | Test Voltage: | AC 120V/60Hz |
| Test Mode: | GFSK Mode | Phase : | N |



10. 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