

**Maximum peak Conducted Output Power - GFSK**





**Maximum peak Conducted Output Power - DQPSK**





CTK Co., Ltd.  
The Power Leader of Global Regulatory Certification

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## 2.1.6 Band-edge

### Test Location

RF Test Room

### Test Procedures

The bandwidth at 20 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:

Center frequency = the highest, middle, and the lowest channels

RBW = 100 kHz

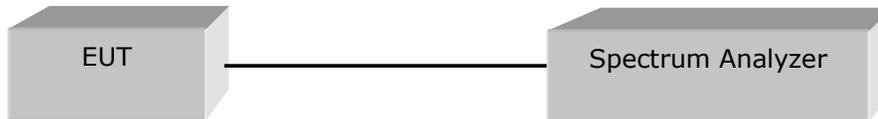
VBW = 100 kHz ( $\geq$  RBW)

Span = 10 MHz

Trace = max hold

Detector function = peak

Sweep = auto



### Limit

> 20 dBc

### Test Results

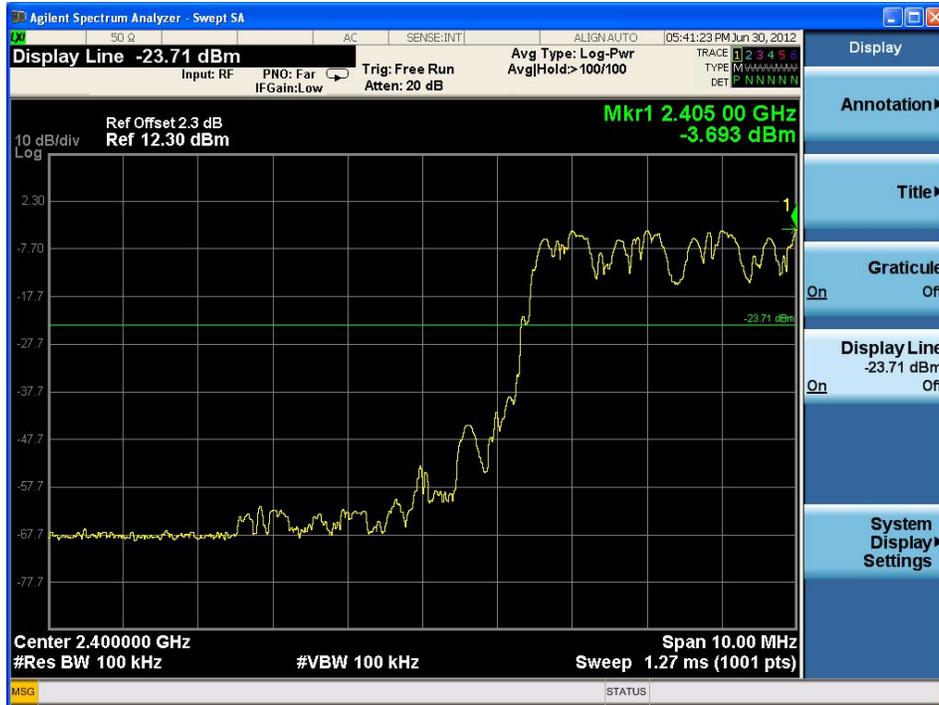
All conducted emission in any 100 kHz bandwidth outside of the spectrum band was at least 20 dB lower than the highest level of the inband spectral density. Therefore the applying equipment meets the requirement.

See next pages for actual measured spectrum plots.

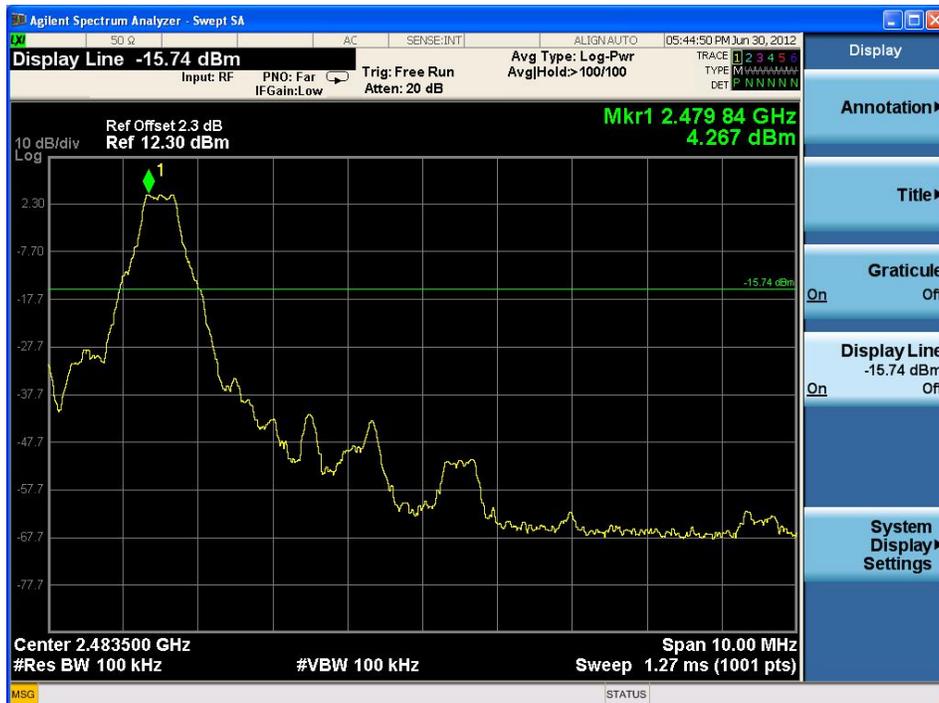
**Band - edge (with Hopping) - GFSK**



**Band – edge (with Hopping) - DQPSK**



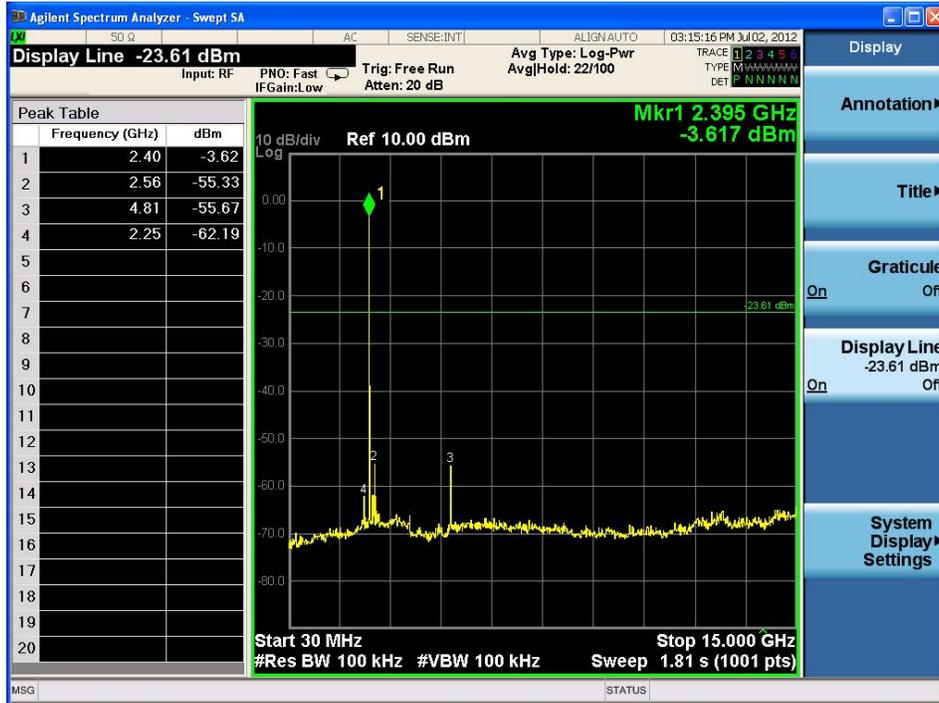
**Band – edge (without Hopping) - GFSK**



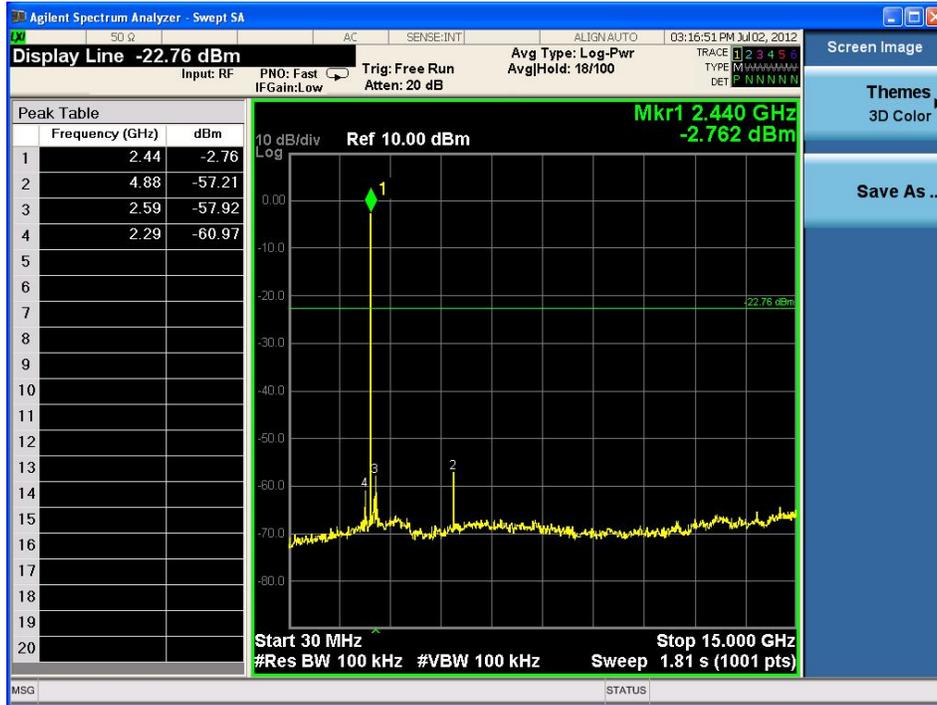
**Band - edge (without Hopping) - DQPSK**



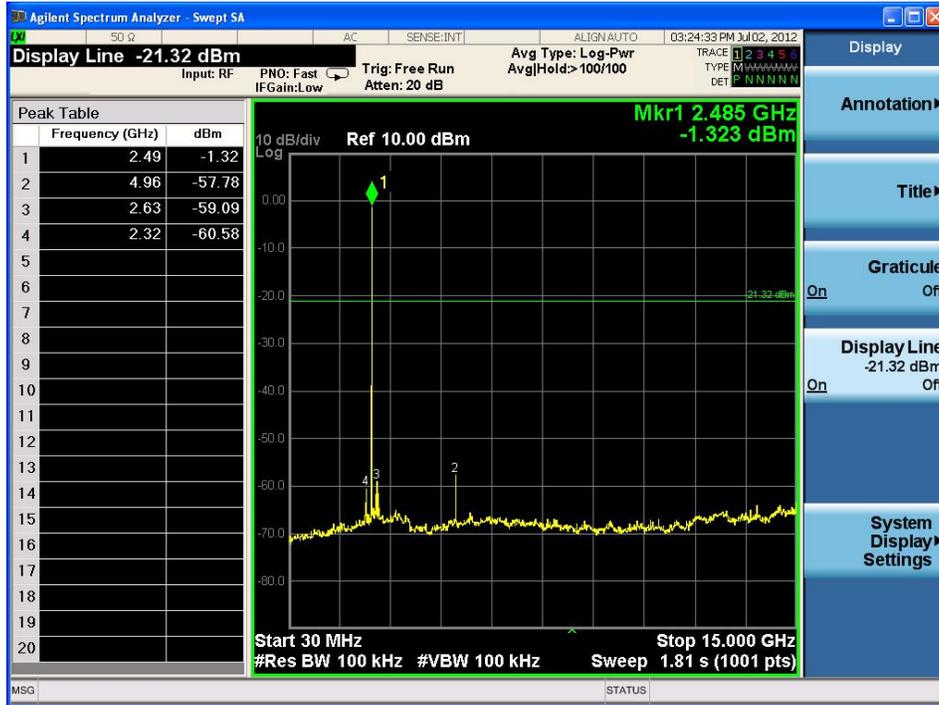
**Band – edge (at 20 dB blow) – Low channel  
Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
(GFSK : Worst-Case)**



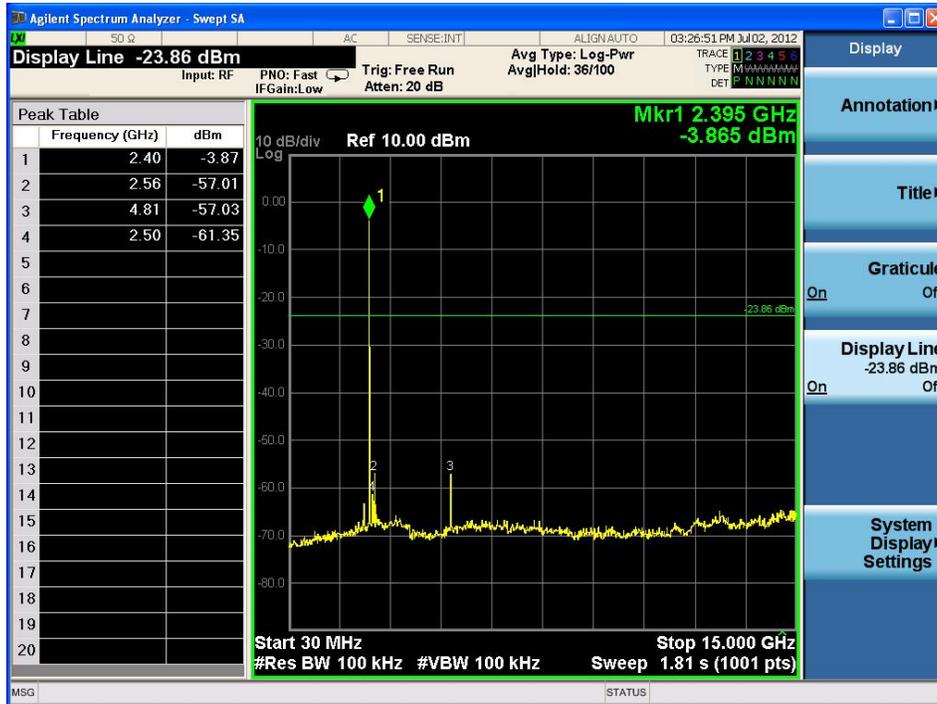
**Band – edge (at 20 dB blow) – Mid channel  
Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
(GFSK : Worst-Case)**



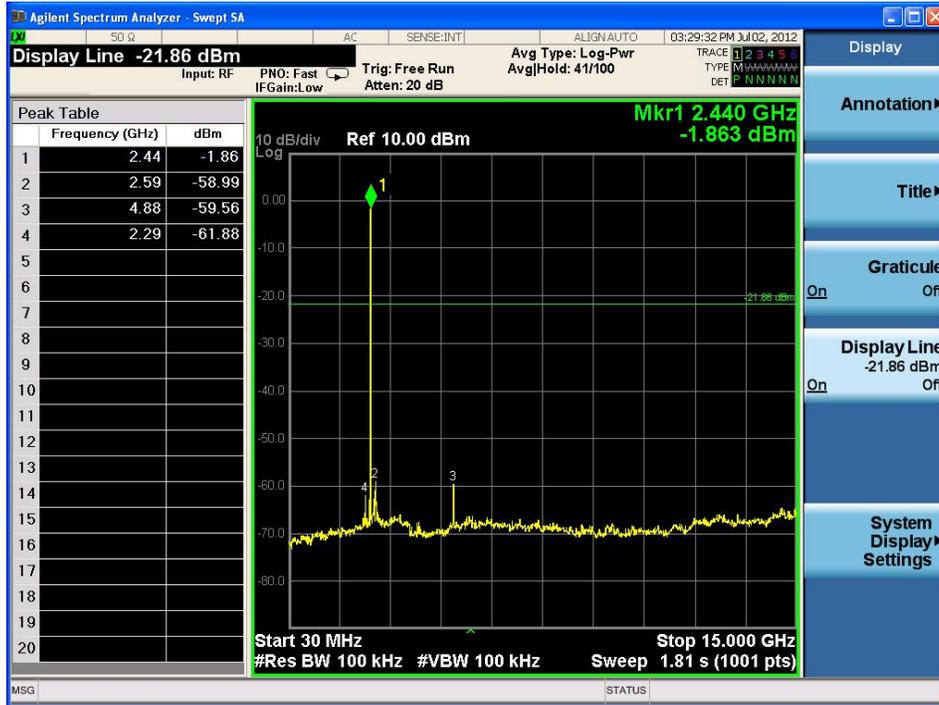
**Band – edge (at 20 dB blow) – High channel  
Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
(GFSK : Worst-Case)**



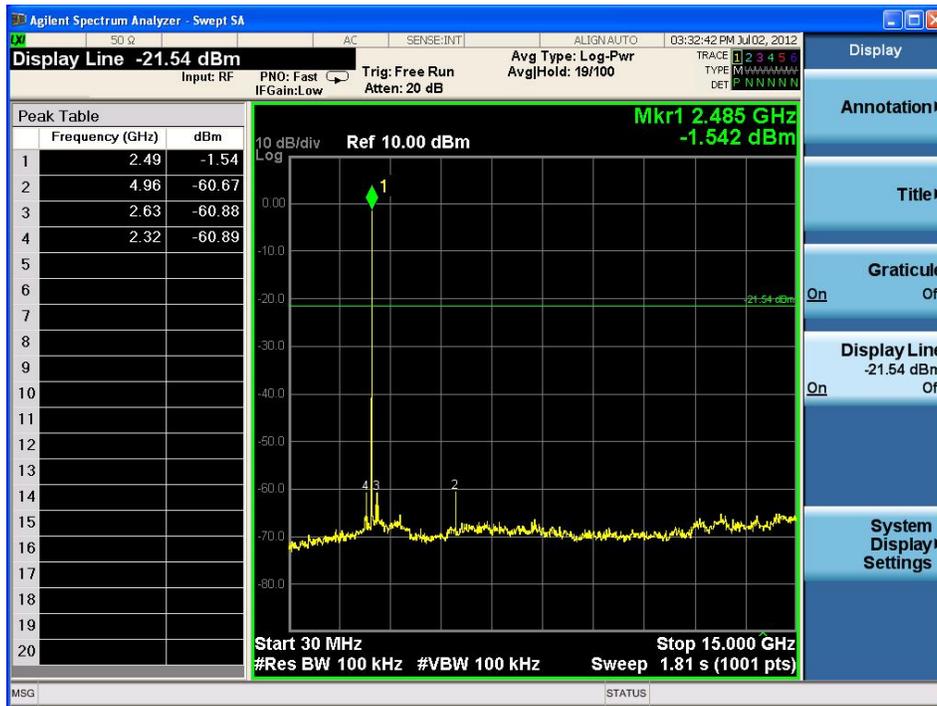
**Band – edge (at 20 dB blow) – Low channel  
 Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
 (DQPSK : Worst-Case)**



**Band – edge (at 20 dB blow) – Mid channel  
Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
(DQPSK : Worst-Case)**



**Band – edge (at 20 dB blow) – High channel  
 Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic  
 (DQPSK : Worst-Case)**



## 2.1.7 Field Strength of Emissions

### Test Location

Testing was performed at a test distance of 3 meter SAC

### Test Procedures

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic

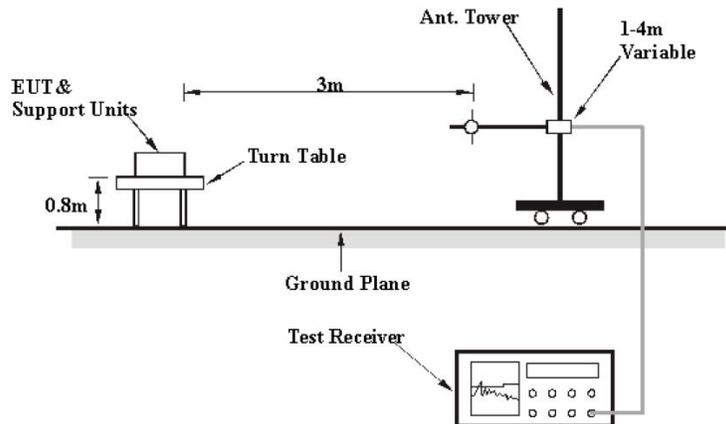
RBW = 120 kHz (30 MHz ~ 1 GHz) VBW ≥ RBW

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic)

Span = 100 MHz

Detector function = Quasi-peak

Trace = max hold



### Limit

#### - 15.209(a)

| Frequency(MHz) | Field Strength uV/m@3m | Field Strength dBuV/m@3m |
|----------------|------------------------|--------------------------|
| 30-88          | 100**                  | 40                       |
| 88-216         | 150**                  | 43.5                     |
| 216-960        | 200**                  | 46                       |
| Above 960      | 500                    | 54                       |

\*\* Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.



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## Test Results

**Test mode : Hopping(GFSK), CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

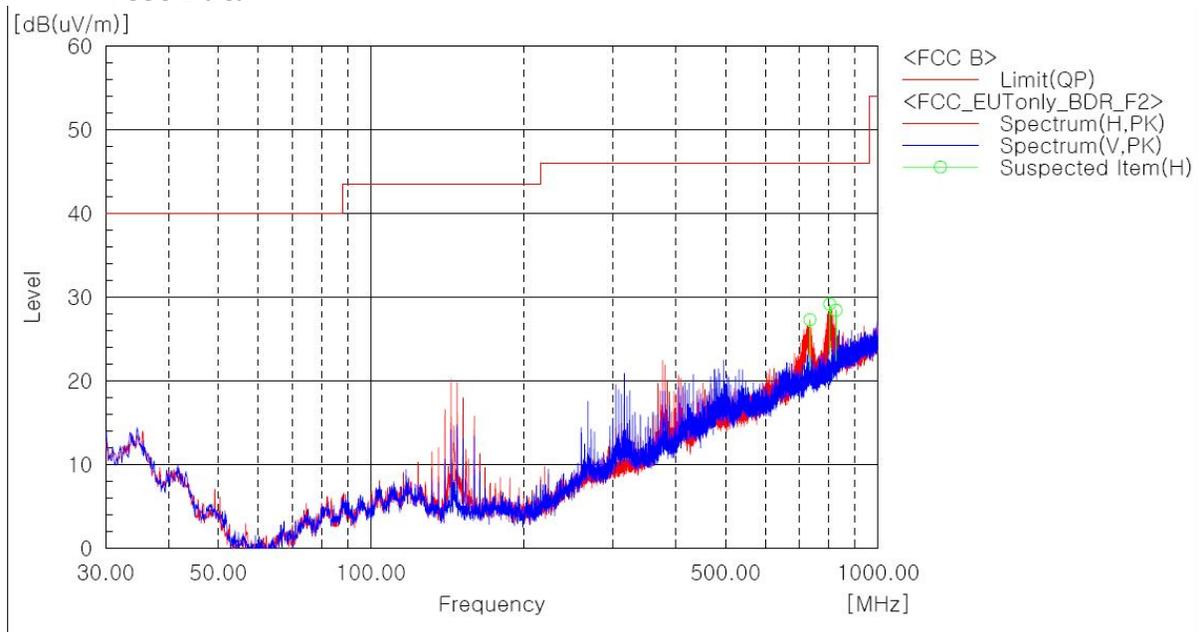
|           |                          |                    |                   |
|-----------|--------------------------|--------------------|-------------------|
| EUT       | Bluetooth stereo Headset | Measurement Detail |                   |
| Model     | MDR-1RBT                 | Frequency Range    | Below 1000MHz     |
| Test mode | GFSK (Worst case)        | Detector function  | Quasi-Peak / Peak |

The requirements are:

Complies

| Frequency (MHz) | Measured Data (dBUV/m) | Margin (dB) | Remark |
|-----------------|------------------------|-------------|--------|
| 802.969         | 29.2                   | 16.8        | Peak   |

## Test Data



Spectrum Selection

| No. | Frequency (P) | Reading  | c.f       | Result        | Limit         | Margin  | Height | Angle |
|-----|---------------|----------|-----------|---------------|---------------|---------|--------|-------|
|     | [MHz]         | [dB(uV)] | [dB(1/m)] | PK [dB(uV/m)] | QP [dB(uV/m)] | QP [dB] | [cm]   | [deg] |
| 1   | 733.493       | H 33.5   | -6.2      | 27.3          | 46.0          | 18.7    | 100.0  | 315.0 |
| 2   | 802.969       | H 34.2   | -5.0      | 29.2          | 46.0          | 16.8    | 100.0  | 128.0 |
| 3   | 826.249       | H 32.9   | -4.5      | 28.4          | 46.0          | 17.6    | 100.0  | 91.0  |

## Remark :

1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(X axis) and the worst case was recorded.



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## Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

|           |                          |                    |                |
|-----------|--------------------------|--------------------|----------------|
| EUT       | Bluetooth stereo Headset | Measurement Detail |                |
| Model     | MDR-1RBT                 | Frequency Range    | 1-25GHz        |
| Test Mode | GFSK (Worst case)        | Detector function  | Average / Peak |

## Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark         |
|-----------------|------------------------|-------------|----------------|
| 2483.5          | 49.5 / 53.8            | 4.5 / 20.2  | Average / Peak |

## Test Data

| Frequency [MHz]  | Reading [dBuV/m] | Pol. | Height [m] | Correction Factor |           |       | Limits [dBuV/m] | Result [dBuV/m] | Margin [dB] |
|--|------------------|------|------------|-------------------|-----------|-------|-----------------|-----------------|-------------|
|  |                  |      |            | Antenna           | Amp. Gain | Cable |                 |                 |             |
| No emissions were detected at a level greater than 20dB below limit. |                  |      |            |                   |           |       |                 |                 |             |

## Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

| Frequency [MHz] | Reading [dBuV/m] |      | Pol. | Height [m] | Correction Factor |           |       | Limits [dBuV/m] |      | Result [dBuV/m] |      | Margin [dB] |      |
|-----------------|------------------|------|------|------------|-------------------|-----------|-------|-----------------|------|-----------------|------|-------------|------|
|                 | AV               | Peak |      |            | Antenna           | Amp. Gain | Cable | AV              | Peak | AV              | Peak | AV          | Peak |
| 2483.50         | 49.2             | 53.5 | V    | 1.0        | 28.2              | 35.3      | 7.4   | 54.0            | 74.0 | 49.5            | 53.8 | 4.5         | 20.2 |
| 2329.70         | 40.0             | 43.9 | V    | 1.0        | 28.2              | 35.3      | 7.4   | 54.0            | 74.0 | 40.3            | 44.2 | 13.7        | 29.8 |



## Test Results

### Test mode : Receiver

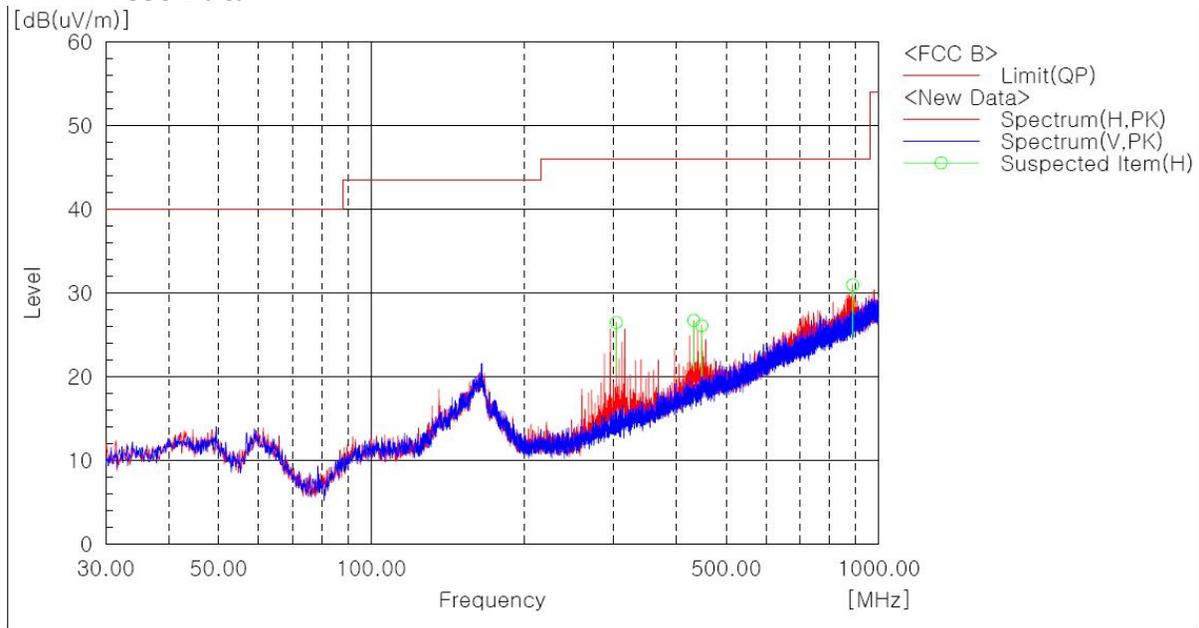
|           |                          |                    |                   |
|-----------|--------------------------|--------------------|-------------------|
| EUT       | Bluetooth stereo Headset | Measurement Detail |                   |
| Model     | MDR-1RBT                 | Frequency Range    | Below 1000MHz     |
| Test mode | GFSK (Worst case)        | Detector function  | Quasi-Peak / Peak |

The requirements are:

Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|-----------------|------------------------|-------------|--------|
| 888.086         | 31.0                   | 15.0        | Peak   |

### Test Data



#### Spectrum Selection

| No. | Frequency (P) [MHz] | Reading [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|-----|---------------------|------------------|---------------|----------------------|---------------------|----------------|-------------|-------------|
| 1   | 888.086             | H 27.7           | 3.3           | 31.0                 | 46.0                | 15.0           | 100.0       | 353.0       |
| 2   | 431.944             | H 32.7           | -6.0          | 26.7                 | 46.0                | 19.3           | 100.0       | 241.0       |
| 3   | 304.025             | H 36.6           | -10.1         | 26.5                 | 46.0                | 19.5           | 100.0       | 129.0       |
| 4   | 448.070             | H 31.6           | -5.5          | 26.1                 | 46.0                | 19.9           | 100.0       | 241.0       |

### Remark :

1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(X axis) and the worst case was recorded.



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## Test Results

### Test mode : Receiver

|           |                          |                    |                |
|-----------|--------------------------|--------------------|----------------|
| EUT       | Bluetooth stereo Headset | Measurement Detail |                |
| Model     | MDR-1RBT                 | Frequency Range    | 1-25GHz        |
| Test Mode | GFSK (Worst case)        | Detector function  | Average / Peak |

### Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

Complies

| Frequency (MHz)  | Measured Data (dBuV/m) | Margin (dB) | Remark |
|--|------------------------|-------------|--------|
| No emissions were detected at a level greater than 20dB below limit. |                        |             |        |

### Test Data

| Frequency [MHz]  | Reading [dBuV/m] AV / Peak | Pol. | Height [m] | Correction Factor |           |       | Limits [dBuV/m] AV / Peak | Result [dBuV/m] AV / Peak | Margin [dB] AV / Peak |
|--|----------------------------|------|------------|-------------------|-----------|-------|---------------------------|---------------------------|-----------------------|
|  |                            |      |            | Antenna           | Amp. Gain | Cable |                           |                           |                       |
| No emissions were detected at a level greater than 20dB below limit. |                            |      |            |                   |           |       |                           |                           |                       |

## 2.1.8 AC Conducted Emissions

### Test Location

Shielded Room

### Frequency Range of Measurement

150 kHz to 30 MHz

### Instrument Settings

IF Band Width: 9 kHz

### Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

### Limit

#### - 15.207(a)

| Frequency (MHz) | Conducted Limit (dBuV) |           |
|-----------------|------------------------|-----------|
|                 | Quasi-peak             | Average   |
| 0.15 ~ 0.5      | 66 to 56*              | 56 to 46* |
| 0.5 ~ 5         | 56                     | 46        |
| 5 ~ 30          | 60                     | 50        |

\* Decreases with the logarithm of the frequency.

### Test Results

The requirements are:

Complies

**Test mode :** Hopping mode(Worst Case)

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark  |
|-----------------|------------------------|-------------|---------|
| 24.0225         | 30.8                   | 19.2        | Average |



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## Test Data

[HOT]

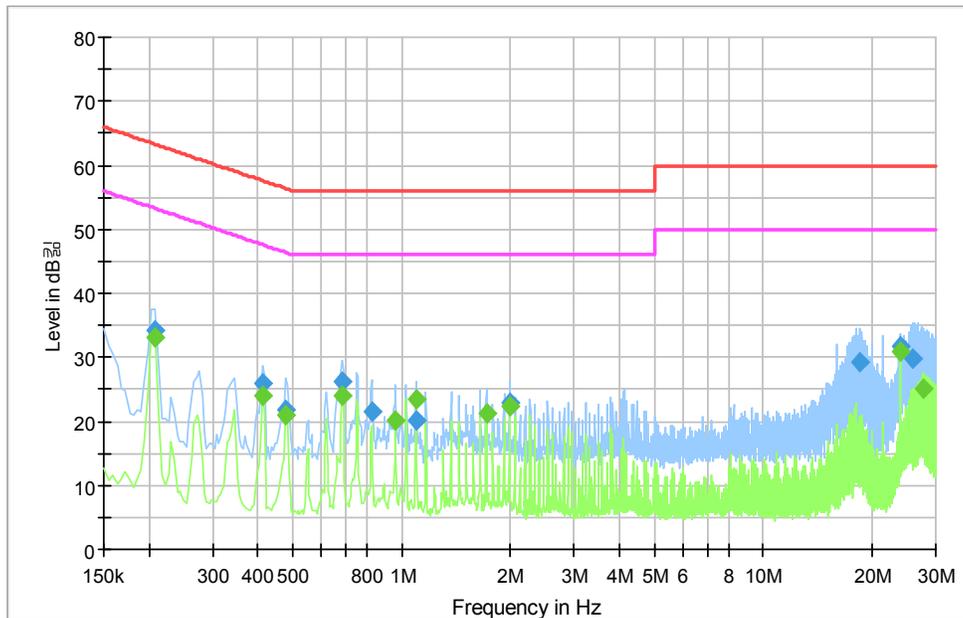
### Final Result 1

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|------------------------|-----------------|-----------------|--------|------|------------|-------------|--------------------|
| 0.208500        | 34.2                   | 1000.0          | 9.000           | On     | L1   | 10.1       | 29.0        | 63.3               |
| 0.411000        | 25.8                   | 1000.0          | 9.000           | On     | L1   | 10.0       | 31.8        | 57.6               |
| 0.478500        | 21.9                   | 1000.0          | 9.000           | On     | L1   | 10.0       | 34.5        | 56.4               |
| 0.685500        | 26.3                   | 1000.0          | 9.000           | On     | L1   | 10.1       | 29.7        | 56.0               |
| 0.825000        | 21.4                   | 1000.0          | 9.000           | On     | L1   | 10.1       | 34.6        | 56.0               |
| 1.095000        | 20.2                   | 1000.0          | 9.000           | On     | L1   | 10.0       | 35.8        | 56.0               |
| 1.990500        | 22.9                   | 1000.0          | 9.000           | On     | L1   | 9.9        | 33.1        | 56.0               |
| 18.478500       | 29.2                   | 1000.0          | 9.000           | On     | L1   | 9.8        | 30.8        | 60.0               |
| 24.022500       | 31.8                   | 1000.0          | 9.000           | On     | L1   | 9.9        | 28.2        | 60.0               |
| 25.894500       | 29.8                   | 1000.0          | 9.000           | On     | L1   | 10.0       | 30.2        | 60.0               |

### Final Result 2

| Frequency (MHz) | Average (dB $\mu$ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|-----------------|-----------------|--------|------|------------|-------------|--------------------|
| 0.208500        | 33.0                 | 1000.0          | 9.000           | On     | L1   | 10.1       | 20.2        | 53.3               |
| 0.411000        | 24.1                 | 1000.0          | 9.000           | On     | L1   | 10.0       | 23.5        | 47.6               |
| 0.478500        | 20.9                 | 1000.0          | 9.000           | On     | L1   | 10.0       | 25.5        | 46.4               |
| 0.685500        | 23.9                 | 1000.0          | 9.000           | On     | L1   | 10.1       | 22.1        | 46.0               |
| 0.960000        | 20.1                 | 1000.0          | 9.000           | On     | L1   | 10.0       | 25.9        | 46.0               |
| 1.099500        | 23.5                 | 1000.0          | 9.000           | On     | L1   | 10.0       | 22.5        | 46.0               |
| 1.716000        | 21.2                 | 1000.0          | 9.000           | On     | L1   | 9.9        | 24.8        | 46.0               |
| 1.990500        | 22.3                 | 1000.0          | 9.000           | On     | L1   | 9.9        | 23.7        | 46.0               |
| 24.022500       | 30.8                 | 1000.0          | 9.000           | On     | L1   | 9.9        | 19.2        | 50.0               |
| 27.816000       | 25.2                 | 1000.0          | 9.000           | On     | L1   | 10.0       | 24.8        | 50.0               |

3CE\_CISPR 22 Class B\_L1





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## [NEUTRAL]

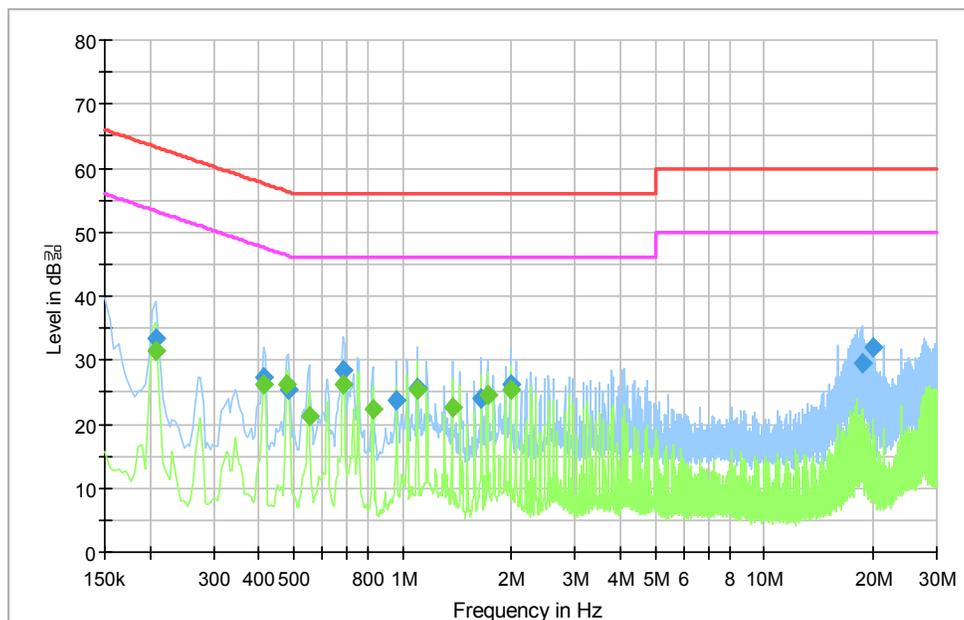
### Final Result 1

| Frequency (MHz) | QuasiPeak (dB $\mu$ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|------------------------|-----------------|-----------------|--------|------|------------|-------------|--------------------|
| 0.208500        | 33.3                   | 1000.0          | 9.000           | On     | N    | 10.2       | 30.0        | 63.3               |
| 0.411000        | 27.3                   | 1000.0          | 9.000           | On     | N    | 10.0       | 30.4        | 57.6               |
| 0.483000        | 25.3                   | 1000.0          | 9.000           | On     | N    | 9.9        | 31.0        | 56.3               |
| 0.685500        | 28.3                   | 1000.0          | 9.000           | On     | N    | 10.1       | 27.7        | 56.0               |
| 0.960000        | 23.6                   | 1000.0          | 9.000           | On     | N    | 10.0       | 32.4        | 56.0               |
| 1.099500        | 25.7                   | 1000.0          | 9.000           | On     | N    | 10.0       | 30.3        | 56.0               |
| 1.648500        | 24.0                   | 1000.0          | 9.000           | On     | N    | 9.9        | 32.0        | 56.0               |
| 1.990500        | 26.2                   | 1000.0          | 9.000           | On     | N    | 9.9        | 29.8        | 56.0               |
| 18.676500       | 29.5                   | 1000.0          | 9.000           | On     | N    | 9.9        | 30.5        | 60.0               |
| 20.022000       | 32.1                   | 1000.0          | 9.000           | On     | N    | 9.9        | 27.9        | 60.0               |

### Final Result 2

| Frequency (MHz) | Average (dB $\mu$ V) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V) |
|-----------------|----------------------|-----------------|-----------------|--------|------|------------|-------------|--------------------|
| 0.208500        | 31.5                 | 1000.0          | 9.000           | On     | N    | 10.2       | 21.7        | 53.3               |
| 0.411000        | 26.1                 | 1000.0          | 9.000           | On     | N    | 10.0       | 21.5        | 47.6               |
| 0.478500        | 26.1                 | 1000.0          | 9.000           | On     | N    | 9.9        | 20.2        | 46.4               |
| 0.550500        | 21.2                 | 1000.0          | 9.000           | On     | N    | 10.0       | 24.8        | 46.0               |
| 0.685500        | 26.1                 | 1000.0          | 9.000           | On     | N    | 10.1       | 19.9        | 46.0               |
| 0.825000        | 22.3                 | 1000.0          | 9.000           | On     | N    | 10.1       | 23.7        | 46.0               |
| 1.099500        | 25.3                 | 1000.0          | 9.000           | On     | N    | 10.0       | 20.7        | 46.0               |
| 1.374000        | 22.7                 | 1000.0          | 9.000           | On     | N    | 10.0       | 23.3        | 46.0               |
| 1.716000        | 24.5                 | 1000.0          | 9.000           | On     | N    | 9.9        | 21.5        | 46.0               |
| 1.990500        | 25.4                 | 1000.0          | 9.000           | On     | N    | 9.9        | 20.6        | 46.0               |

3CE\_CISPR 22 Class B\_N





## APPENDIX A – Test Equipment Used For Tests

|    | Name of Equipment             | Manufacturer    | Model No.   | Serial No.  | Due Date   |
|----|-------------------------------|-----------------|-------------|-------------|------------|
| 1  | Signal Analyzer               | Agilent         | N9020A      | MY48011598  | 2012-11-10 |
| 2  | Spectrum Analyzer             | Rohde & Schwarz | FSP-30      | 100994      | 2012-11-10 |
| 3  | ULTRA Broadband Antenna       | Rohde & Schwarz | HL562       | 361324/014  | 2013-11-03 |
| 4  | LOOP ANTENNA                  | EMCO            | 6502        | 9107-2652   | 2012-10-29 |
| 5  | Attenuator                    | HP              | 8498A       | 1801A06913  | 2012-11-14 |
| 6  | EPM Series Power Meter        | HP              | E4418A      | GB38272734  | 2012-11-10 |
| 7  | Power Sensor                  | HP              | 8487A       | 3318A03524  | 2013-07-10 |
| 8  | Audio Analyzer                | HP              | 8903B       | 2747A03432  | 2012-11-10 |
| 9  | ESG-D Series Signal Generator | Agilent         | E4432B      | US40054094  | 2012-11-21 |
| 10 | SYNTHESIZED SWEEPER           | HP              | 8341B       | 2819A01563  | 2012-11-10 |
| 11 | Modulation Analyzer           | HP              | 8901B       | 3438A05228  | 2012-11-18 |
| 12 | Attenuator                    | HP              | 8494A       | 3308A33351  | 2012-11-14 |
| 13 | Temp&Humi Chamber             | Kunpoong        | JT-TH-556-1 | 9QE5-002    | 2013-01-12 |
| 14 | DC POWER SUPPLY               | Agilent         | E3632A      | MY40011638  | 2012-11-10 |
| 15 | EMC Analyzer                  | Agilent         | E7405A      | MY45110859  | 2013-02-13 |
| 16 | Horn Antenna                  | ETS-Lindgren    | 3115        | 00078894    | 2013-03-22 |
| 17 | Horn Antenna                  | ETS-Lindgren    | 3115        | 00078895    | 2013-03-22 |
| 18 | Dipole Antenna                | SCHWARZBECK     | VHA 9103    | VHA91032557 | 2013-11-04 |
| 19 | Dipole Antenna                | SCHWARZBECK     | UHA 9105    | UHA91052417 | 2013-11-04 |
| 20 | OPT H64 AMPLIFIER             | HP              | 8447F       | 3113A06814  | 2013-03-27 |
| 21 | PREAMPLIFIER                  | Agilent         | 8449B       | 3008A02307  | 2012-11-17 |
| 22 | Radio Communication Tester    | Rohde & Schwarz | CMU200      | 106765      | 2013-02-09 |
| 23 | LISN                          | Rohde & Schwarz | ENV216      | 101235      | 2012-08-18 |
| 24 | LISN                          | Rohde & Schwarz | ENV216      | 101236      | 2012-08-18 |
| 25 | DC POWER SUPPLY               | Agilent         | E3632A      | MY40011638  | 2012-11-10 |
| 26 | EMI Test Receiver             | Rohde & Schwarz | ESCI3       | 100032      | 2013-02-09 |
| 27 | EMI Test Receiver             | Rohde & Schwarz | ESCI7       | 100816      | 2012-12-16 |