

Chris Harvey

From: Chris Harvey [charvey@ieee.org]
Sent: Wednesday, April 29, 2009 8:29 AM
To: '□□□'; '□□□ \ (SJLEE\)' ; 'Lucy Tsai(CCS)' ; 'Chris Harvey(CCS)'
Cc: '□□□□□ \ (HCT\)' ; 'Mike Kuo'; '□□□□□ (HCT)'
Subject: RE: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear Gye-Young Cha,

For the labeling of the enclosure, there needs to be a 'contains' label for the modem module that is installed in accordance with the FCC approval for that modem. Please confirm.

Since you have provided the Intermodulation for the repeater and the output is filtered for the transmit band (visible in the plots) there is no need to perform any additional spurious emissions test.

Best regards,

Chris Harvey
charvey@ieee.org
410-750-0860

From: □□□ [mailto:cgyloves@hct.co.kr]
Sent: Wednesday, April 29, 2009 12:57 AM
To: charvey@ieee.org; '□□□ \ (SJLEE\)' ; 'Lucy Tsai(CCS)' ; 'Chris Harvey'; 'Chris Harvey(CCS)'
Cc: '□□□□□ \ (HCT\)' ; 'Mike Kuo'; '□□□□□ (HCT)'
Subject: Re: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear Mr. Harvey,

Thank you for your help.

- 1) is the antenna used with this wireless modem already approved for use in its Certification (you state 7dBi max, but the modem grant states 5dBi max)?
- 2) -> They use the 5dBi antenna.
- 3) Do the repeater and modem transmit simultaneously into the same antenna?
- 4) -> Yes.
- 5) If yes, then you would also need to address Intermodulation with the Repeater and Modem transmitting together.
- 6) -> I'm waiting your reply.
- 7) Simultaneous MPE is described in FCC OET 65 (sum of the power density to limit ratios must be less than 1)
- 8) -> Please see the attachment, test report section 11, page 39 - 41.
- 9) Is the modem label (contains FCC ID: xxx) located on the repeater enclosure?
- 10) -> The modem label located only on the modem. If the label have to located on the repeater, I will notice to them.
- 11) Since the modem is modular approval, the approval is for the repeater with or without the modem installed.
- 12) -> The repeater with the modem installed.

Please check the answer and if you have other question, please do not hesitate to contact us.

Thank you & Best regards,
(Ms.)GYE-YOUNG CHA --- EMC Part
HCT Co., Ltd.
San 136-1, Ami-ri, Bubal-eup, Icheon-si,
Kyoungki-do, Korea 467-701
TEL : (82-31)639-8539 FAX : (82-31)639-8525

4/29/2009

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----- Original Message -----

From: [Chris Harvey](#)

To: [□□□](#); [Chris Harvey](#); '[□□□ \ \(SJLEE\\)](#)'; '[Lucy Tsai\(CCS\)](#)'; '[Chris Harvey](#)'; '[Chris Harvey\(CCS\)](#)'

Cc: '[□□□□□ \ \(HCT\\)](#)'; '[Mike Kuo](#)'; [□□□□□ \(HCT\)](#)

Sent: Wednesday, April 29, 2009 9:44 AM

Subject: Re: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear SJ Lee, we have been having internal discussions regarding this situation. I am aiming to finish this review tomorrow my time.

Best regards,

Chris Harvey

Sent via BlackBerry from T-Mobile

From: [□□□](#)

Date: Wed, 29 Apr 2009 09:24:40 +0900

To: Chris Harvey<charvey@ieee.org>; '[□□□ \ \(SJLEE\\)](#)'<sjlee@hct.co.kr>; 'Lucy Tsai\ (CCS\)'<lucy.tsai@ccsemc.com>; 'Chris Harvey'<chris.harvey@ccsemc.com>; 'Chris Harvey\ (CCS\)'<charvey-tcb@ccsemc.com>

Subject: Re: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1
RESEND.

It's very urgent project. As you know, we have to get the certificate by end of April.
Please reply as soon as possible.

Thank you.

----- Original Message -----

Dear Mr. Harvey,

Thank you for your help.

GRS-825DM-BC has Band Pass Filter, it's only for pass the 880 ~ 894 MHz (Downlink), 835 ~ 849 MHz (Uplink). In this case, doesn't need the test for Intermodulation with modem?

Please advise.

Thank you & Best Regards,
(Ms.) GYE-YOUNG CHA --- EMC Part
HCT Co., Ltd.
San 136-1, Ami-ri, Bubal-eup, Icheon-si,
Kyoungki-do, Korea 467-701
TEL : (82-31)639-8539 FAX : (82-31)639-8525

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----- Original Message -----

From: [Chris Harvey](#)

To: '[SJLEE](#)'; '[SJLEE](#)'; '[Lucy Tsai\(CCS\)](#)'; '[Chris Harvey](#)'; '[Chris Harvey\(CCS\)](#)'

Cc: '[HCT](#)'; '[Mike Kuo](#)'

Sent: Thursday, April 23, 2009 9:09 PM

Subject: RE: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear SJ Lee,

If the combined RF signals are designed such that there are no Intermodulation products then the additional Intermodulation test may not be necessary.

The combined MPE example you stated is correct only if the MPE limits of both transmitters is the same (for example 1 mW/cm²). If the limits are different, then you must add the ratios:

Here is a more detailed example:

Tx A measured 0.2mW/cm2, Limit (example) is 0.5mW/cm2, therefore the % of the limit is $0.2/0.5 = 40\%$ or ratio of 0.4
Tx B measured 0.5mW/cm2, Limit (example) is 1.0mW/cm2, therefore the % of the limit is $0.5/1.0 = 50\%$ or ratio of 0.5
The combined MPE ratios is $40\% + 50\% = 90\% < 100\%$ (or $0.4 + 0.5 = 0.9$ which is < 1.0)

Does that help?

Best regards,

Chris Harvey
charvey@ieee.org
410-750-0860

From: □□□ \ (SJLEE\) [mailto:sjlee@hct.co.kr]
Sent: Thursday, April 23, 2009 7:24 AM
To: Chris Harvey; '□□□'; 'Lucy Tsai(CCS)'; 'Chris Harvey'; 'Chris Harvey(CCS)'
Cc: '□□□□□ \ (HCT\)'; 'Mike Kuo'
Subject: Re: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear Mr. Harvey,

Thank you for your kind e-mail.

This repeater and modem transmit simultaneously into the same antenna.

1. In this case, should we test for intermodulation with repeater and modem additionally ?
2. So sorry, I didn't understand the ' Simultaneous MPE.'

For example, Power density of transmitter A = 0.2 mW/cm2
Power density of transmitter B = 0.5 mW/cm2

Sum of these = $A+B = 0.7 \text{ mW/cm}^2$ (is it right ?)
Ratio is $0.2 / 0.7 < 1$
 $0.5 / 0.7 < 1$ (is it right ?)

if no, please explain more easily.....

Thanks & Best Regards

Sang-Jun Lee

EMC & RF Team Leader
Product Compliance Division
HCT Co., Ltd.

□ Add. : San 136-1, Ami-ri, Bubal-eop, Icheon-si, Kyoungki-do, Korea
□ Phone : +82-31-639-8517
□ Mobile Phone : +82-10-6271-8364

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----- Original Message -----

From: [Chris Harvey](#)

To: '□□□'; '[Lucy Tsai\(CCS\)](#)'; '[Chris Harvey](#)'; '[Chris Harvey\(CCS\)](#)'

Cc: '□□□□□ \(\HCT\)'; '□□□□□ \(\HCT\)'; '[Mike Kuo](#)'

Sent: Wednesday, April 22, 2009 7:41 PM

Subject: RE: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear GyeYoung Cha, several things have come to mind as you describe the Modem.

- 13) is the antenna used with this wireless modem already approved for use in its Certification (you state 7dBi max, but the modem grant states 5dBi max)?
- 14) Do the repeater and modem transmit simultaneously into the same antenna?
- 15) If yes, then you would also need to address Intermodulation with the Repeater and Modem transmitting together.
- 16) Simultaneous MPE is described in FCC OET 65 (sum of the power density to limit ratios must be less than 1)
- 17) Is the modem label (contains FCC ID: xxx) located on the repeater enclosure?
- 18) Since the modem is modular approval, the approval is for the repeater with or without the modem installed.

From FCC may 2003 Workshop, Mobile session 8

- [mobile] devices operating in multiple frequency bands—co-located
 - multiple frequency exposure criteria, the ratio of field strength or power density to the applicable exposure limit at the exposure location should be determined for each transmitter and the sum of these ratios must not exceed 1.0

Best regards,

Chris Harvey
charvey@ieee.org
410-750-0860

From: □□□ [mailto:cgyloves@hct.co.kr]

Sent: Wednesday, April 22, 2009 4:54 AM

To: Chris Harvey; '[Lucy Tsai\(CCS\)](#)'; '[Chris Harvey](#)'; '[Chris Harvey\(CCS\)](#)'

Cc: '□□□□□ \(\HCT\)'; '□□□□□ \(\HCT\)'

Subject: Re: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear Mr. Harvey,

Thank you for your information.

The modem use same antenna with the repeater. So we will send the MPE report.

I have a question.

In this case, do I calculate output power of modem and repeater?

Thank you & Best regards,
(Ms.)GYE-YOUNG CHA --- EMC Part
HCT Co., Ltd.
San 136-1, Ami-ri, Bubal-eup, Icheon-si,
Kyoungki-do, Korea 467-701
TEL : (82-31)639-8539 FAX : (82-31)639-8525

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----- Original Message -----

From: [Chris Harvey](#)

To: '□□□'; '[Lucy Tsai\(CCS\)](#)'; '[Chris Harvey](#)'; '[Chris Harvey\(CCS\)](#)'

Cc: '[□□□□□\(HCT\)](#)'; '[□□□□□\(HCT\)](#)'

Sent: Tuesday, April 21, 2009 8:00 PM

Subject: RE: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear GyeYoung Cha, I will review the response in detail today.

For questions #1 please either:

- a) confirm that the Modem will not transmit when the repeater is transmitting
- OR
- b) provide an MPE exhibit that addresses the (emergency) simultaneous transmission.

Best regards,

Chris Harvey

charvey@ieee.org

410-750-0860

From: □□□ [mailto:cgyloves@hct.co.kr]

Sent: Tuesday, April 21, 2009 2:53 AM

To: Lucy Tsai(CCS); Chris Harvey; Chris Harvey(CCS)

Cc: □□□□□(HCT); □□□□□(HCT)

Subject: Fw: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

Dear Mr. Harvey,

Thank you for your cooperation.

As your questions, our answers as following blue letter for your comments.

Please let me know once you have any further questions.

Thank you & Best regards,

(Ms.)GYE-YOUNG CHA --- EMC Part

HCT Co., Ltd.

San 136-1, Ami-ri, Bubal-eup, Icheon-si,

Kyoungki-do, Korea 467-701
TEL : (82-31)639-8539 FAX : (82-31)639-8525

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>

> ----- Original Message -----

> From: <charvey-tcb@ccsemc.com>

> To: <sjlee@hct.co.kr>

> Cc: <chris.harvey@ccsemc.com>; <lucy.tsai@ccsemc.com>

> Sent: Monday, April 20, 2009 11:01 PM

> Subject: GS Instruments Co., Ltd., FCC ID: U88GRS-825DM-BC, Assessment NO.: AN09T9094, Notice#1

>

>

>> Dear SJ Lee,

>>

>> You are listed as the Technical Contact for the above referenced TCB application. The following item(s) need(s) to be resolved before the review can be continued:

>>

>> 1. The manual seems to indicate that there is a possible collocated wireless modem in this device. Please address this possible co-location of transmitters in this device.

-> **The modem is for emergency.**

When the repeater has a problem, the modem make a call to in charge of the repeater.

The modem got the FCC Certificate(FCC ID: 09EQ2438F-M)

>>

>> 2. The Users Manual indicates that the antenna gain should not exceed 12db (does not indicate if this is dBi or dBd) but the RF Exposure MPE calculation only calculates the 20cm safe distance using a 7dBi antenna gain. The manual should not recommend using an antenna gain any larger than the MPE calculation. If the manual is corrected to indicate 7dBi the following note will be placed on the Grant:

>> "Repeater. Power output is maximum single channel conducted. Professional installation is required. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Approval is for maximum gain 7 dBi antenna as shown in this filing. Installations with higher gain or co-located antennas require RF exposure to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 2.1307(b)(3)."

-> **The antenna gain is 7dBi. I've add the User Manual that end of the page about the 12dB.**

The 12dB is not for antenna gain, it is gain for cable loss for Antenna to Repeater.

Please see the attachment for new manual.

>>

>> Please note that the label exhibit supplied for the TCB application also contains an Industry Canada IC number, but the number does not fit the required format of RSS-GEN Issue 2 Section 5.2, Equipment Labels (the IC Number submitted has an extra '-').

-> **Thank you for your information. I've attached the new label. Please kindly check it.**

..

>> Please also note that I have added the first '-' in the FCC ID as entered onto the online application form, since all of the application documents have FCC ID: U88-GRS-825DM-BC. Please notify me if this is not correct.

-> You're correct. The FCC ID: U88-GRS-825DM-BC. Thank you for your checking.

>>

>> The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 30 days of the original e-mail date may result in application dismissal and forfeiture of the filing fee. Also, please note that partial responses increase processing time and should not be submitted. Any questions about the content of this correspondence should be directed to the e-mail address listed below the name of the sender.

>>

>> Best regards,

>>

>> Chris Harvey

>> Charvey-tcb@ccsemc.com

>>

>>

>>

>>

>

>