

TEST REPORT

of

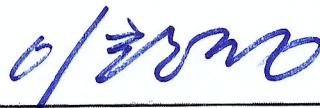
FCC Part 15 Subpart C §15.247

FCC ID: A3LSHVE170L

Equipment Under Test : Mobile Phone
 Model Name : SHV-E170L
 Serial No. : N/A
 Applicant : SAMSUNG ELECTRONICS CO., LTD.
 Manufacturer : SAMSUNG ELECTRONICS CO., LTD.
 Date of Test(s) : 2012. 05. 07 ~ 2012. 05. 07
 Date of Issue : 2012. 05. 07

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Logan Lee

Date

2012. 05. 07

Approved By:



Feel Jeong

Date

2012. 05. 07

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 413-15, Gomae-Dong Giheung-Gu, Yongin-Si, Gyeonggi-Do, South Korea.
- Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

www.ee.sgs.com/korea

Telephone : +82 31 428 5700

FAX : +82 31 427 2371

1.2. Details of Applicant

Applicant : SAMSUNG ELECTRONICS CO., LTD.

Address : 416, Maetan-3dong, Yeongtong, Suwon, Gyeonggi, Korea

Contact Person : Kwak, Heeseong

Phone No. : +82 +31 301 1084

1.3. Description of EUT

Kind of Product	Mobile Phone
Model Name	SHV-E170L
Serial Number	N/A
Power Supply	DC 3.8 V
Frequency Range	2 402 MHz ~ 2 480 MHz
Modulation Technique	GFSK
Number of Channels	40
Channel separation	2 MHz
Antenna Type	Internal type
Antenna Gain	-1.78 dB i

1.4. Declaration by the manufacturer

- SHV-E170L, H/W version: REV0.8, S/W version: E170L.001

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1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal Due.
Signal Generator	R&S	SMR40	100272	Jul. 15, 2012
Signal Generator	Agilent	8648D	3847M00534	Mar. 29, 2013
Spectrum Analyzer	R & S	FSV30	100955	Mar. 29, 2013
DC Power Supply	Agilent	U8002A	MY50070064	Mar. 29, 2013
Power Sensor	R & S	NRP-Z81	101341	Sep. 29, 2012
Attenuator	Mini-Circuits	BW-N20W5+	0950-1	Mar. 30, 2013

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1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part15		
Section	Test Item	Result
15.205(a) 15.247(d)	Conducted Spurious Emissions	Complied
15.247(a)(2)	6 dB Bandwidth	Complied
15.247(b)(3)	Maximum Peak Conducted Output Power	Complied
15.247(e)	Power Spectral Density	Complied

1.7. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL005528	Initial

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2. Conducted Spurious Emissions



2.1. Limit

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

2.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=100 kHz, VBW=100 kHz.

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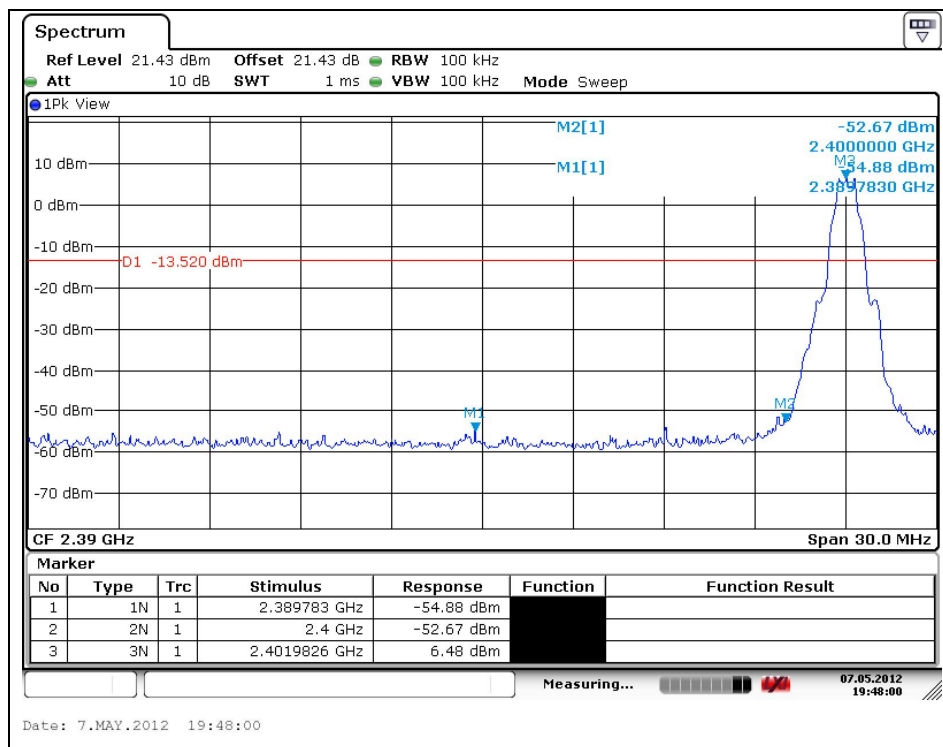
2.3. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

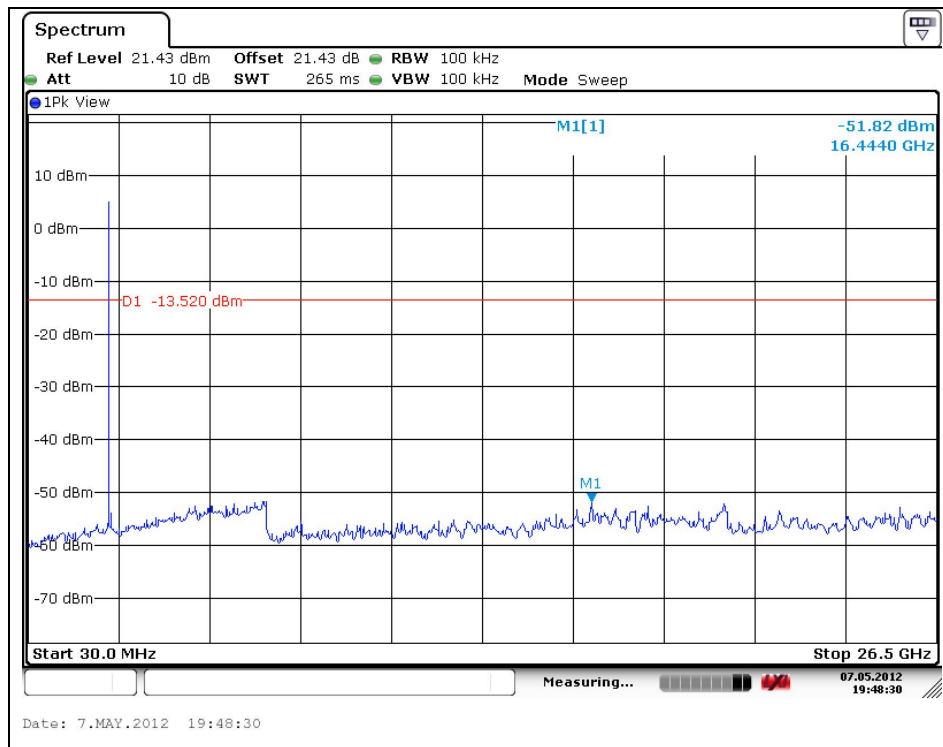
Plots of Conducted Spurious Emissions

Operating Mode: GFSK

Low Channel



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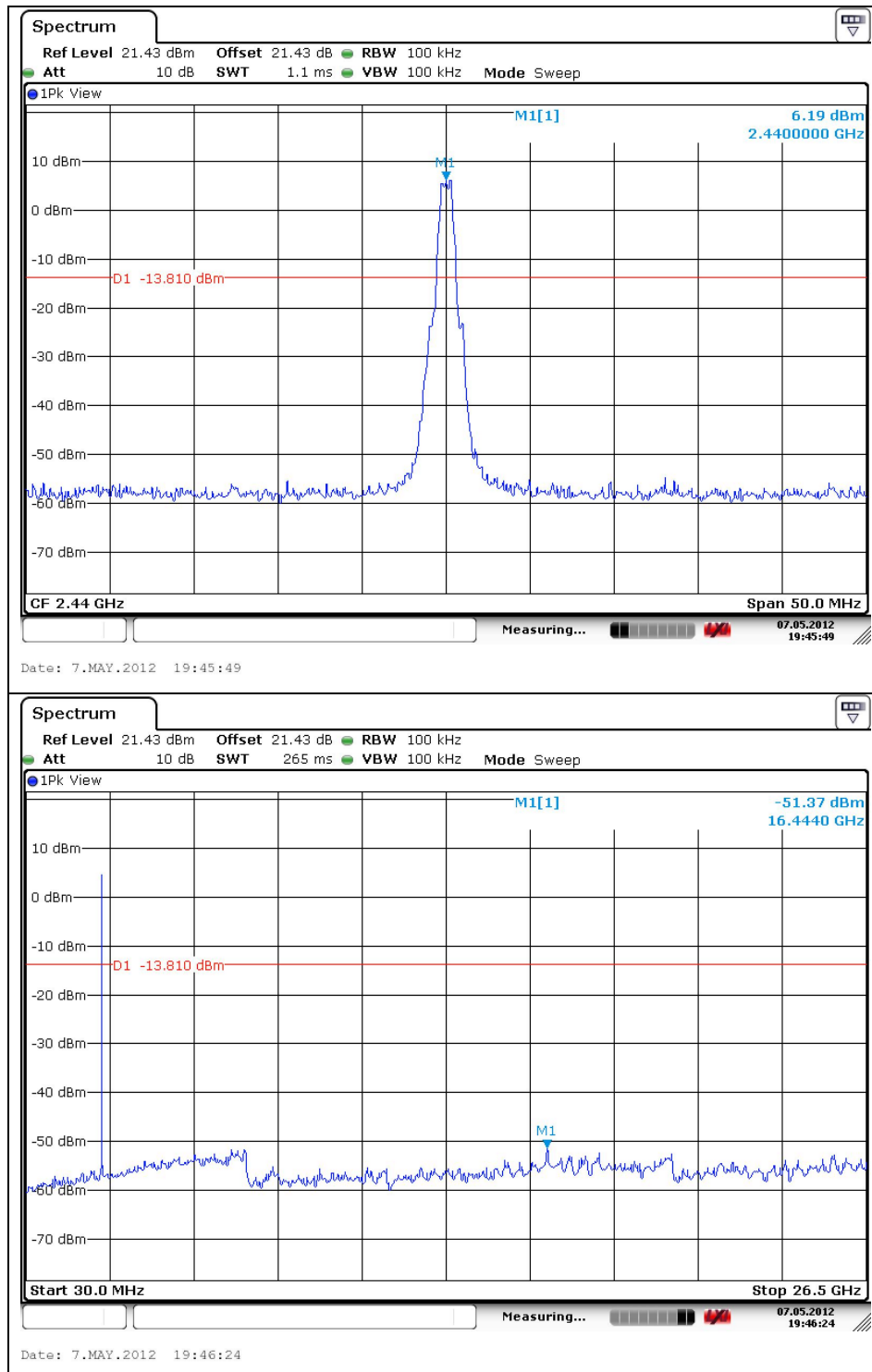
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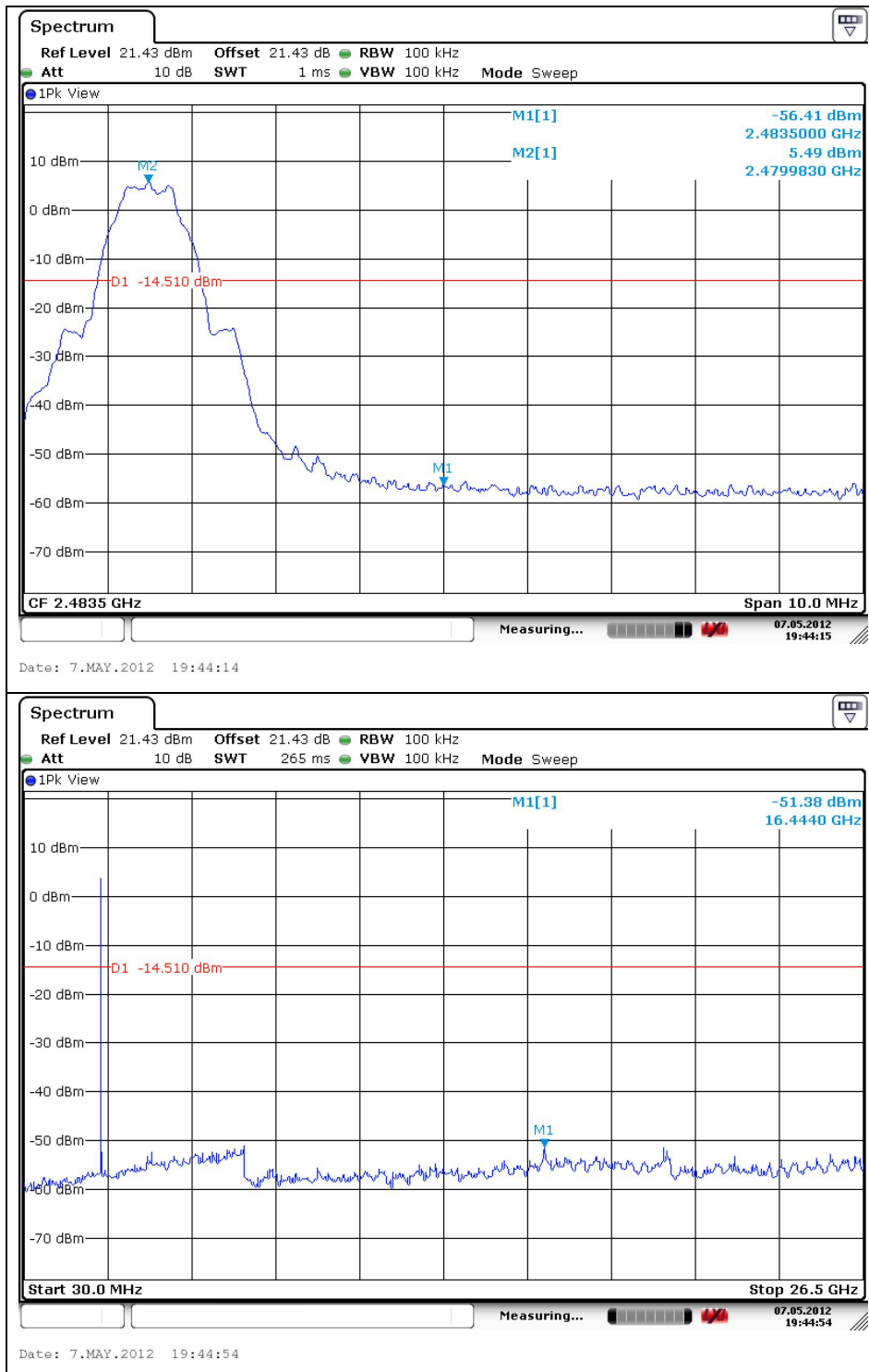
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Middle Channel



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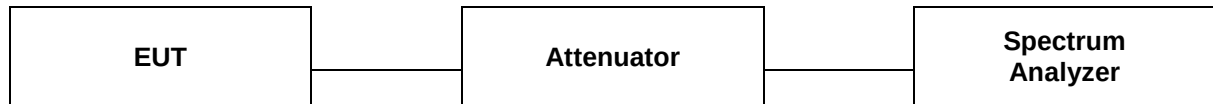
High Channel



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3. 6 dB Bandwidth of the channel

3.1. Test Setup



3.2. Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 ~928 MHz , 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 825 MHz bands. The minimum of 6 dB Bandwidth shall be at least 500 kHz

3.3. Test procedure

1. The 6 dB band width was measured with a spectrum analyzer connected to RF antenna connector(conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 6 dB band width of the emission was determined.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer
RBW = 30 kHz, VBW = 30 kHz, Span = 5 MHz, Sweep mode = sweep.

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3.4. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Operation Mode	Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)
GFSK	Low	2 402	0.601
	Middle	2 440	0.601
	High	2 480	0.608

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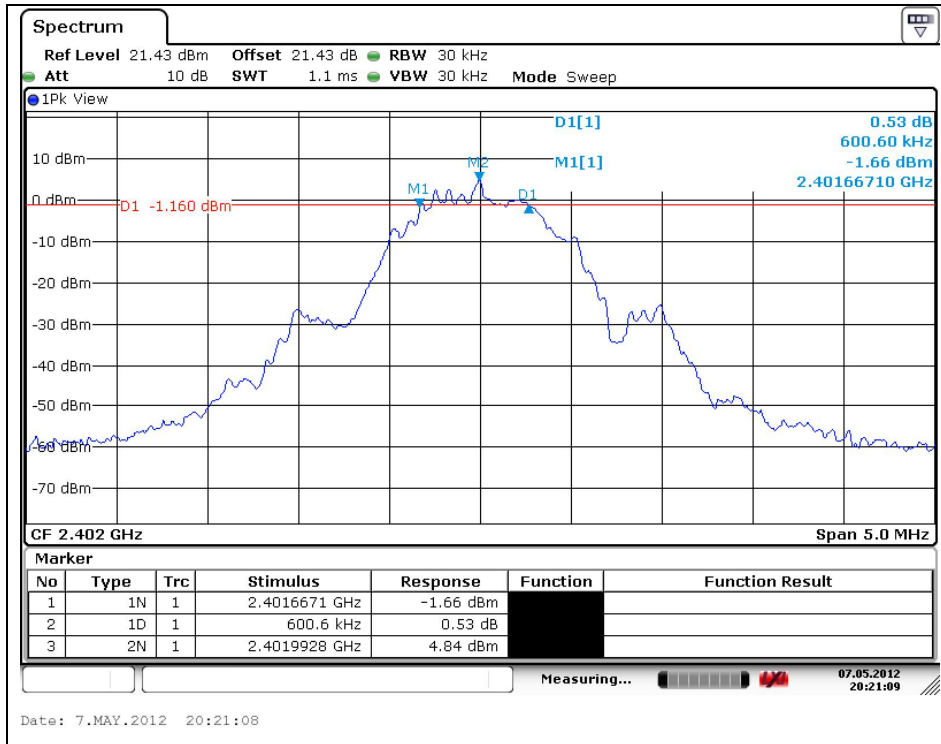
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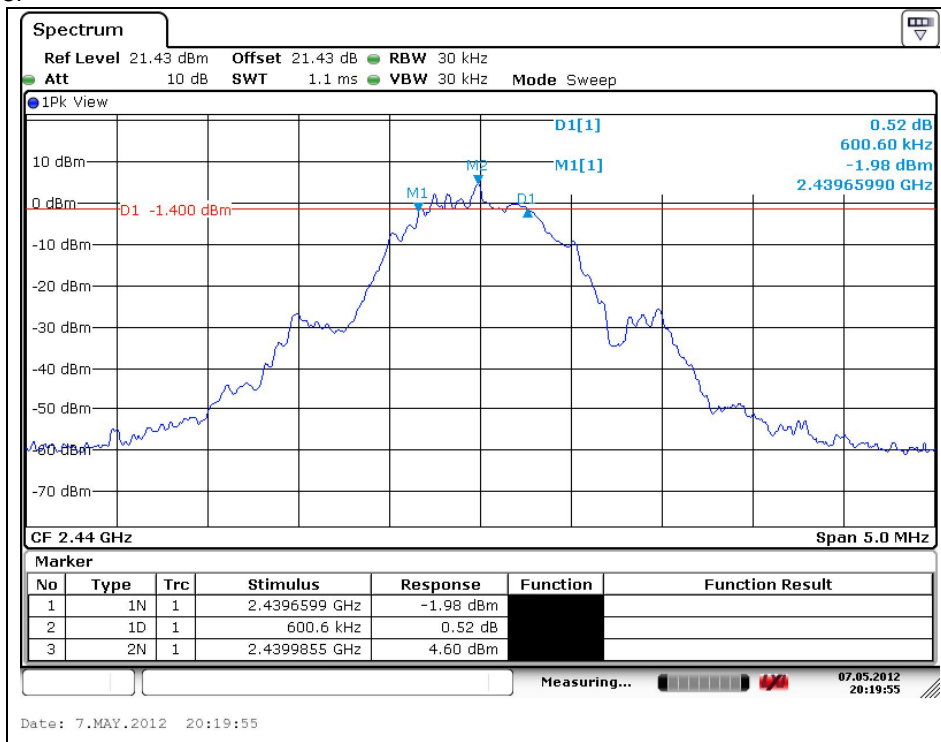
Plots of 6 dB Bandwidth

Operating Mode: GFSK

Low Channel

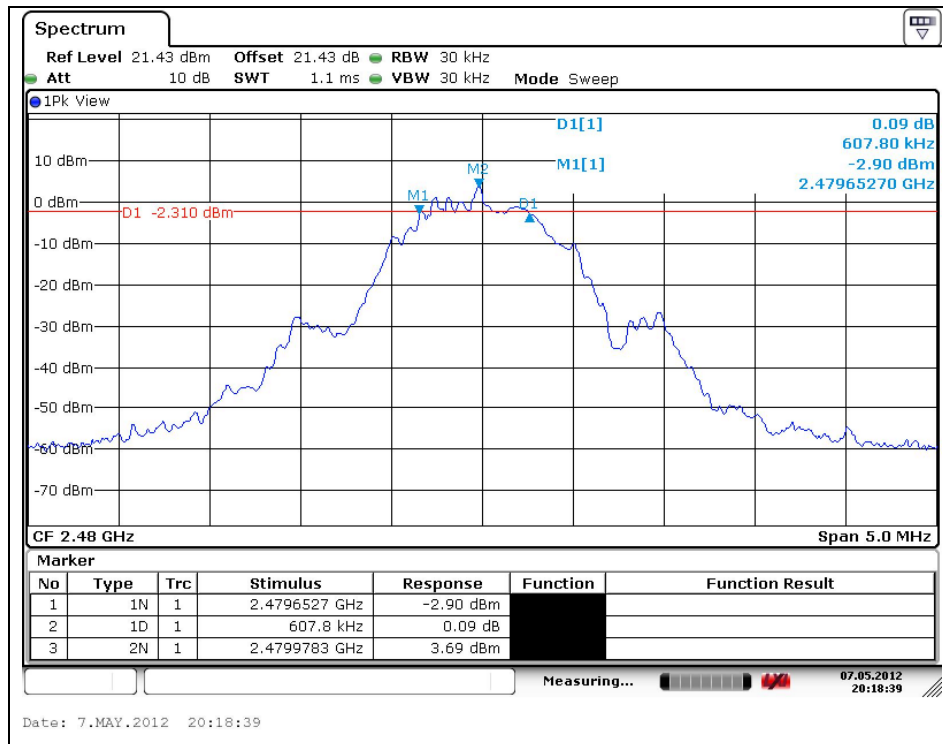


Middle Channel



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High Channel



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4. Maximum Peak Conducted Output Power

4.1. Test Setup



4.2. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:
§15.247(b)(3), For systems using digital modulation in the 2400-2483.5 MHz bands the limit is 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

4.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
3. Set the duty cycle of EUT by using time line of power sensor.
4. Test program : (S/W name : R&S Power Viewer, Version : 3.2.0)
5. Measure peak power each channel.

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4.4. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Operation Mode	Channel	Channel Frequency (MHz)	Attenuator + Cable offset (dB)	Peak Power Result (dB m)	Peak Power Limit (dB m)
GFSK	Low	2 402	21.35	7.94	30
	Middle	2 440	21.36	7.92	30
	High	2 480	21.40	7.90	30

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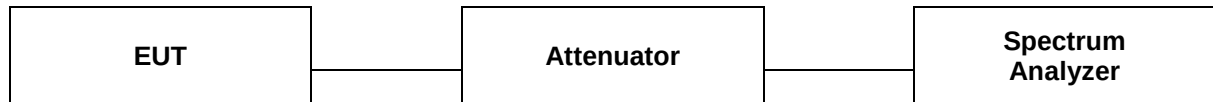
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5. Power Spectral Density

5.1. Test Setup



5.2. Limit

According to §15.247(e), For digitally modulated system, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph(b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density

5.3. Test procedure

1. Place the EUT on the table and set it in transmitting mode
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

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5.4. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Operation Mode	Channel	Frequency (MHz)	Final RF Power Level in 3 kHz BW (dB m)	Limit (dB m)
GFSK	Low	2 402	-7.11	8
	Middle	2 440	-7.37	
	High	2 480	-8.29	

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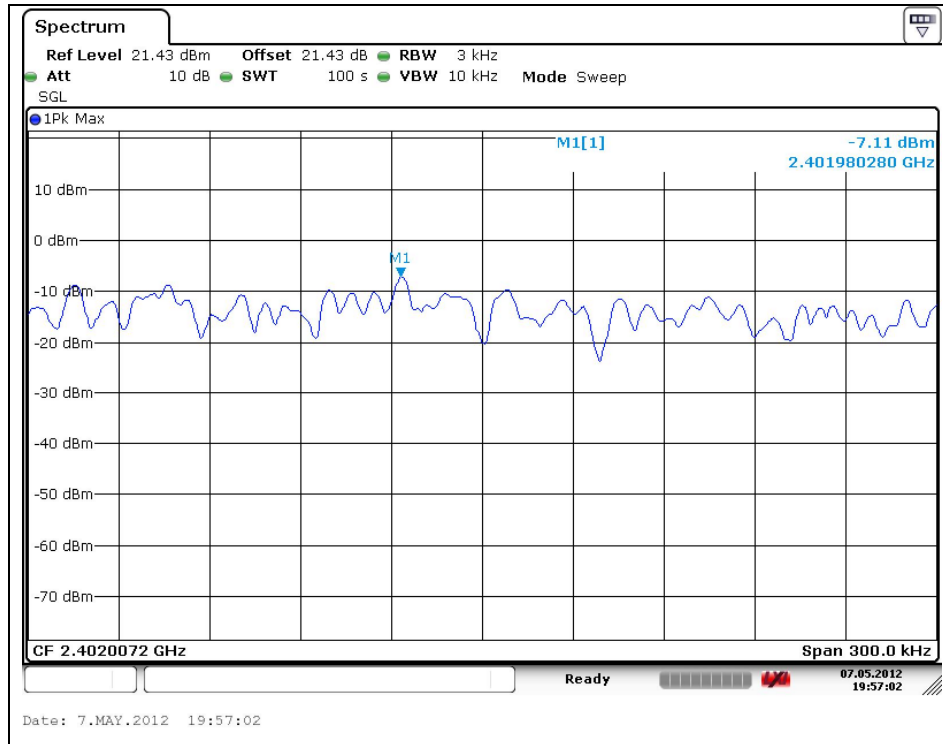
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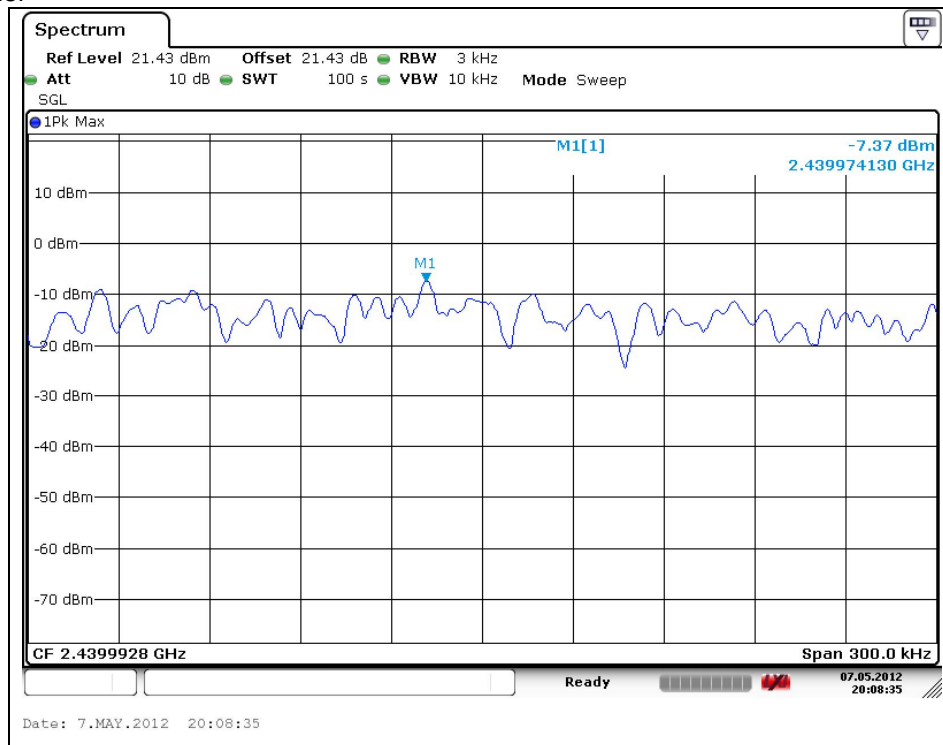
Plots of Power spectral density

Operating Mode: GFSK

Low Channel

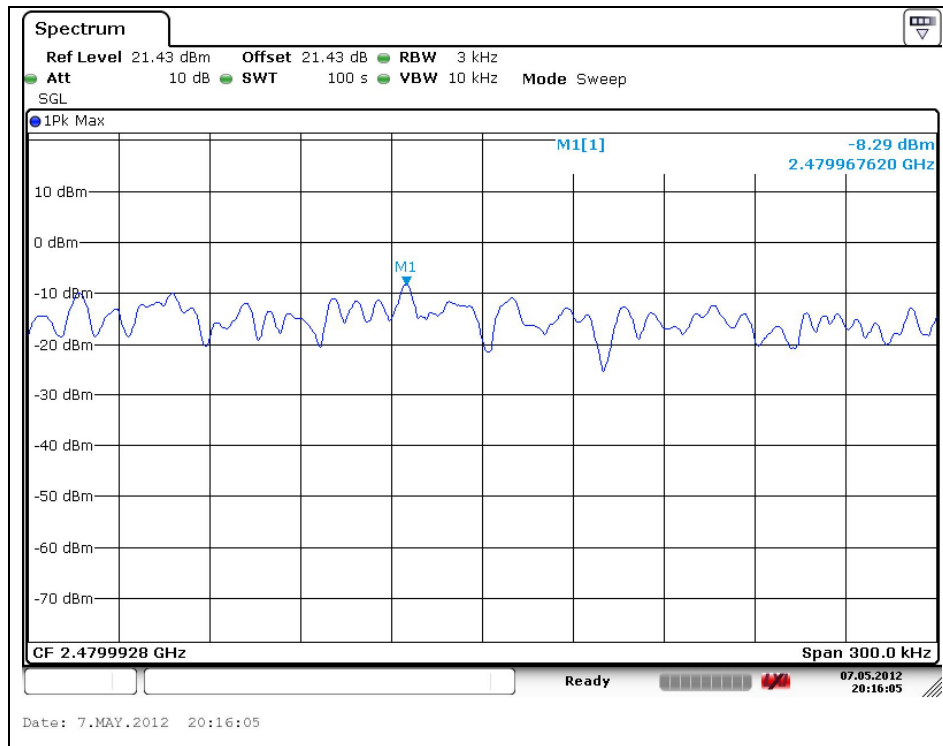


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High Channel



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6. Antenna Requirement

6.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.247 (b) if transmitting antennas of directional gain greater than 6 dB i are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dB i.

6.2. Antenna Connected Construction

Antenna used in this product is Internal type gain of -1.78 dB i.

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