HCT CO., LTD.
Product Compliance Division
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CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:

CASIO HITACHI Mobile Communications Co., Ltd.

2-229-1, Sakuragaoka, Higashiyamato-shi, Tokyo 207-8501, Japan

Date of Issue:
June 26, 2009
Location:
HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si, Kyungki-do, Korea
Test Report No.: HCT-RF09-0624
HCT FRN: 0005866421
IC Recognition No.: IC 5944A-1

FCC ID:	**TYKNX9270**
APPLICANT:	**CASIO HITACHI Mobile Communications Co., Ltd.**

Model(s):	C731
EUT Type:	Dual-Band CDMA/EVDO Phone with Bluetooth
Max. RF Output Power:	GFSK : -0.51 dBm(0.89 mW) , EDR : -1.77 dBm(0.67 mW)
Frequency Range:	2402 - 2480 MHz (Bluetooth)
Modulation type:	GFSK, PSK
FCC Classification:	FCC Part 15 Frequency Hopping Spread Spectrum Transceiver
FCC Rule Part(s):	Part 15 subpart C 15.247

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.862

Report prepared by	**Approved by**
: Hyo Sun Kwak	**: Sang Jun Lee**
Test engineer of RF Team	**Manager of RF Team**

Table of Contents

1. GENERAL INFORMATION

Applicant: CASIO HITACHI Mobile Communications Co., Ltd.
Address: 2-229-1, Sakuragaoka, Higashiyamato-shi, Tokyo 207-8501, Japan
FCC ID: TYKNX9270
EUT: Dual-Band CDMA/EVDO Phone with Bluetooth
Model: C731
Date of Test:
Contact person: Name: Tsuchida Masahiko
Phone #: +82-42-516-2183
Fax #: +82-42-516-2505

2. EUT DESCRIPTION

Product		Dual-Band CDMA/EVDO Phone with Bluetooth	
Model Name		C731	
Power Supply		DC 3.7 V	
Battery	**Model Name:** **Power Rating:** **Type:**	BTR731B(Standard) 3.7 V , 1150 mAh, 4.3 Wh Li-ion	BTE731B(Extended) 3.7 V ,1600 mAh, 6.0 Wh Li-ion
Frequency Range		2402 ~ 2480 MHz	
Transmit Power		GFSK : -0.51 dBm(0.89 mW) , EDR : -1.77 dBm(0.67 mW)	
Modulation Type		GFSK(Normal), PSK(EDR)	
Modulation Technique		FHSS	
Number of Channels		79 Channels	
Antenna Specification		Manufacturer: Murata Mfg.co.,Ltd. Antenna type: Chip Antenna AVE Gain : -3.0 dBi	

※ 15.247 Requirements for Bluetooth transmitter.

▪ This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudorandomly.

2) Each frequency is used equally on the average by each transmitter.

3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters

4) The receiver shifts frequencies in synchronization with the transmitted signals.

▪ 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.

▪ 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz(ANSI C63.4-2003) and FCC Public Notice DA 00-705 dated March 30, 2000 entitled “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” were used in the measurement of the **CASIO HITACHI Mobile Communications Co., Ltd. Dual-Band CDMA/EVDO Phone with Bluetooth FCC ID: TYKNX9270**

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 10, 2009(Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. FCC PART 15.247 REQUIREMENTS

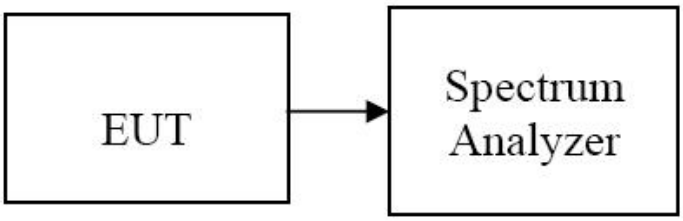
7.1 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902 ~ 928 MHz, 2400 ~ 2483.5 MHz, and 5725 ~ 5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode.

1. Span = 2 MHz (GFSK) / 5 MHz (8DPSK)
2. RBW = 1 MHz (GFSK) / 3 MHz (8DPSK)
3. VBW = 1 MHz (GFSK) / 3 MHz (8DPSK)
4. Sweep = auto
5. Packet type= DH5 (GFSK) / 3-DH5 (8DPSK)

TEST RESULTS

No non-compliance noted

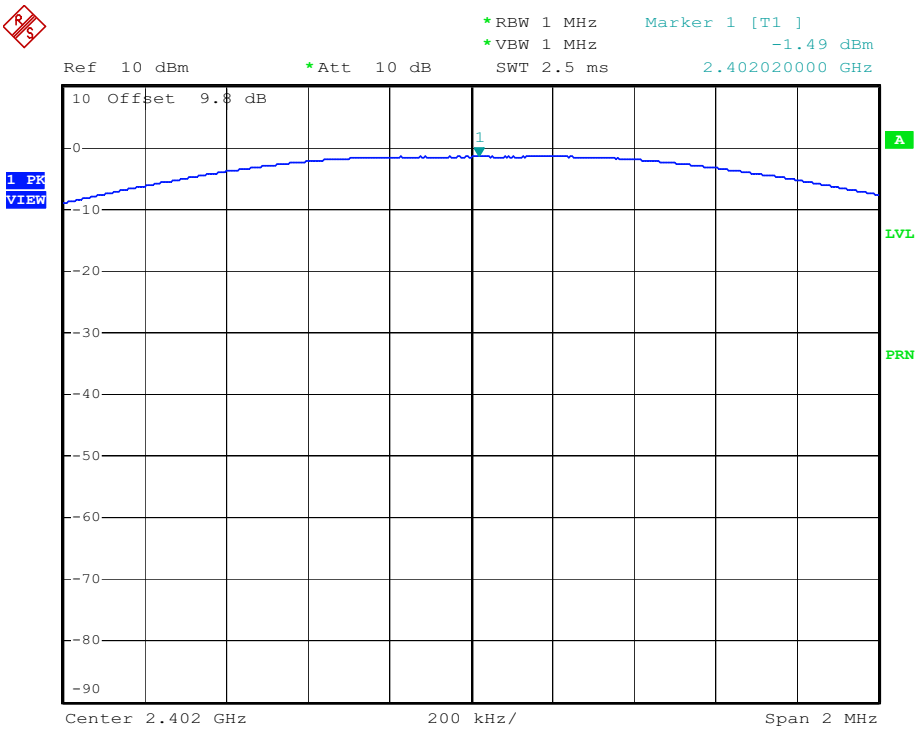
Test Data

Channel	Frequency (MHz)	Output Power(GFSK)		Output Power(8DPSK)		Limit (W)	Result
		(dBm)	(mW)	(dBm)	(mW)		
Low	2402	-1.49	0.71	-2.64	0.54	1	PASS
Mid	2441	-0.68	0.86	-1.77	0.67		PASS
High	2480	-0.51	0.89	-1.77	0.67		PASS

Test Plots

(GFSK)

Peak Power (Low CH)



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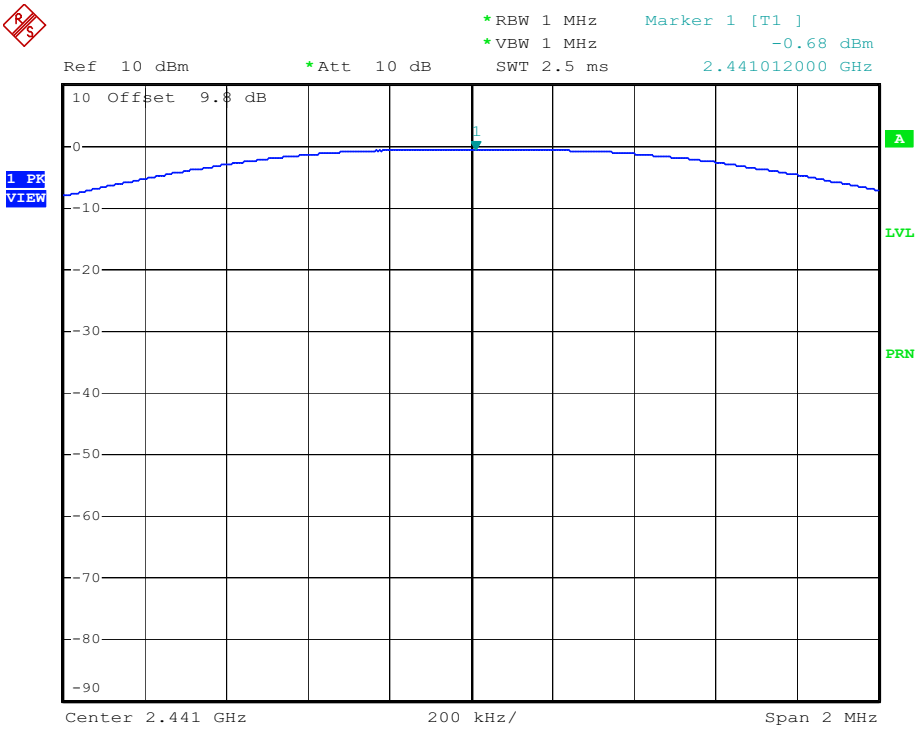
Peak Power (Mid CH)



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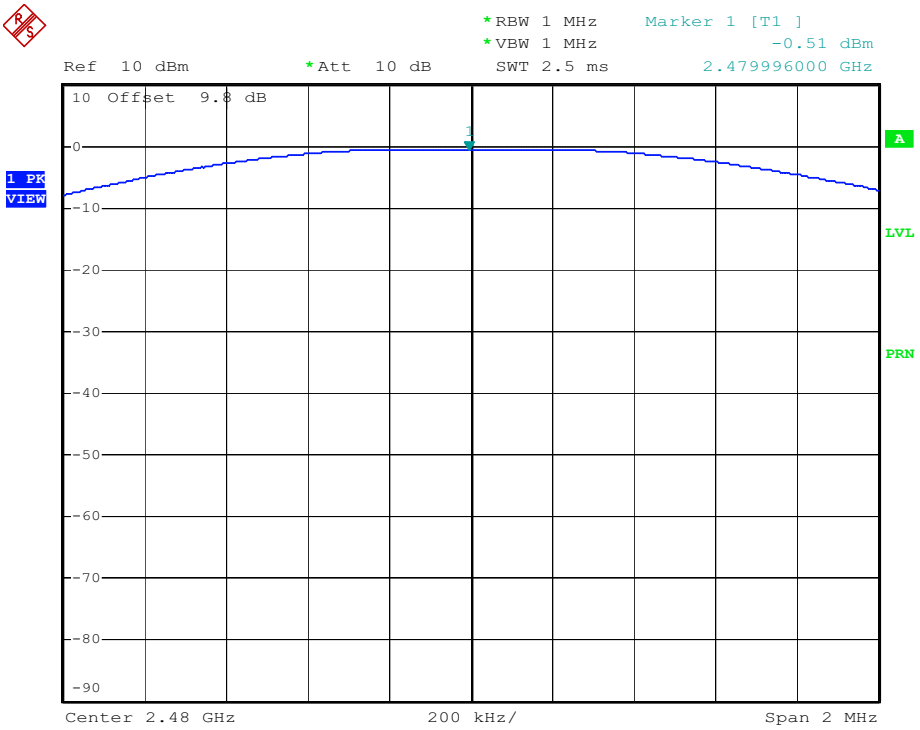
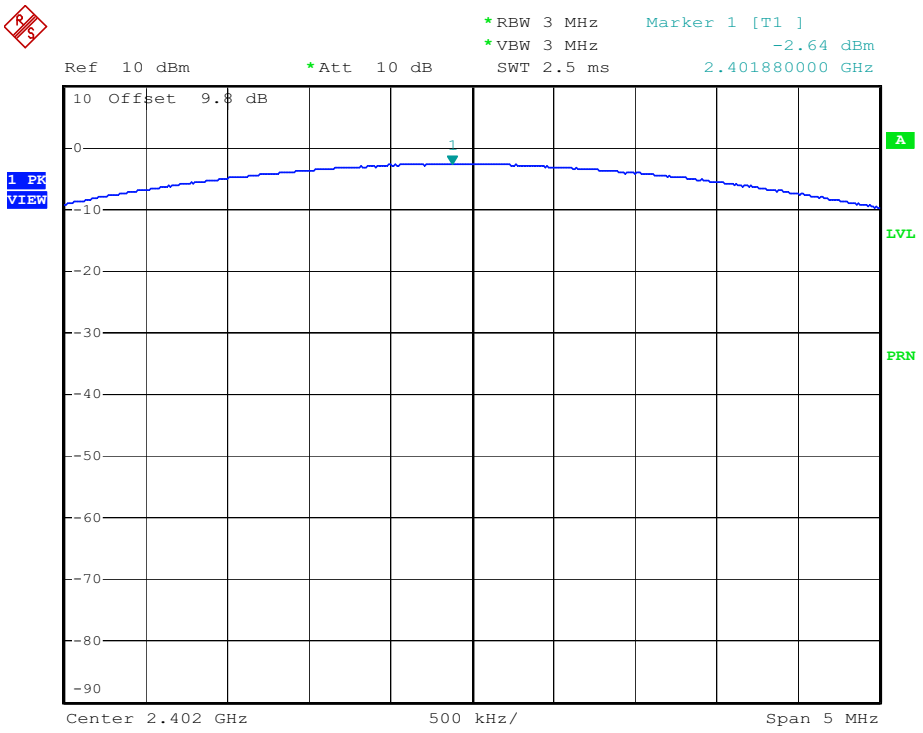
Peak Power (High CH)

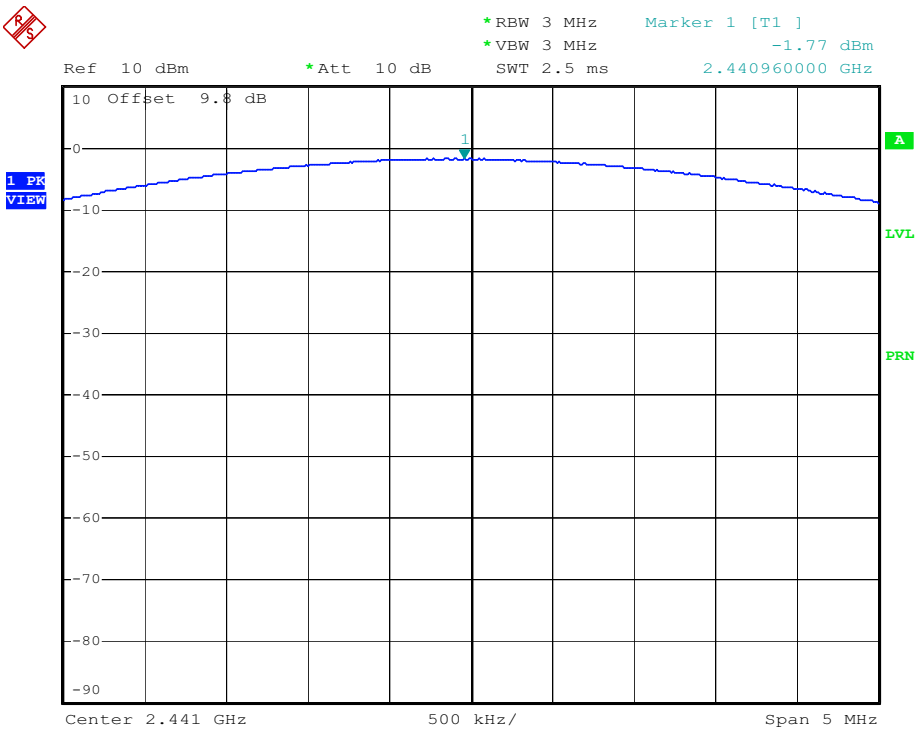


(8DPSK)

Peak Power (Low CH)



Peak Power (Mid CH)



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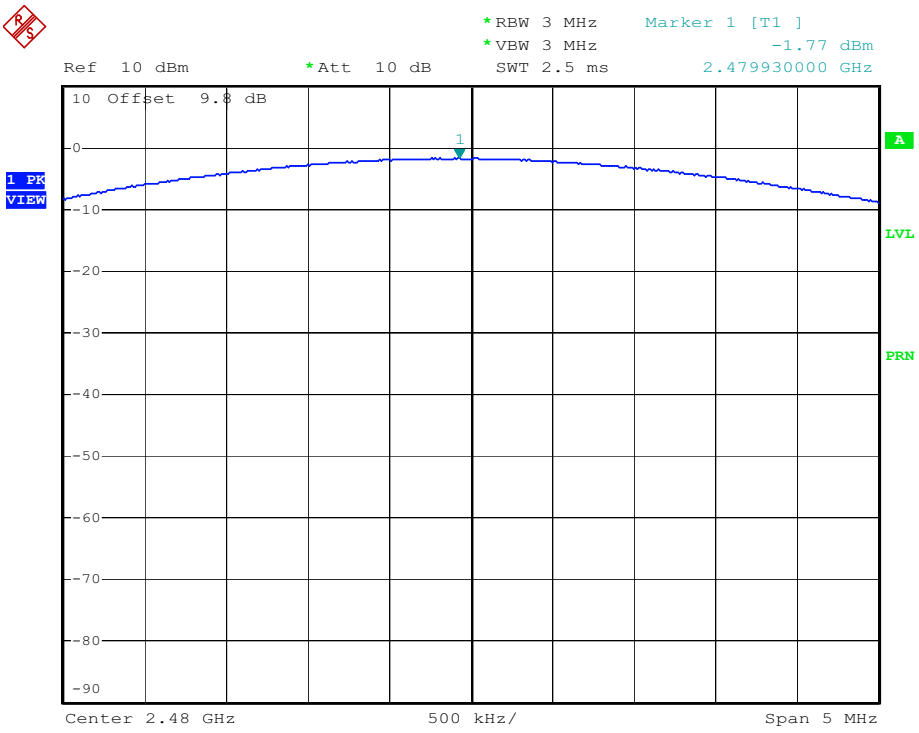
Peak Power (High CH)



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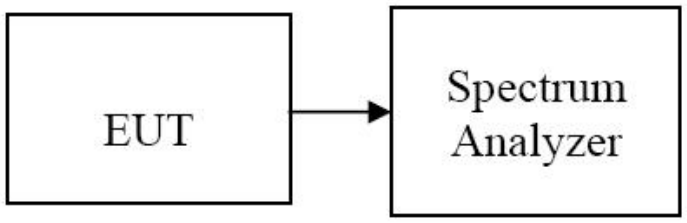
7.2 BAND EDGES MEASUREMENT

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.

Test Configuration



TEST PROCEDURE

The spectrum analyzer is set to :

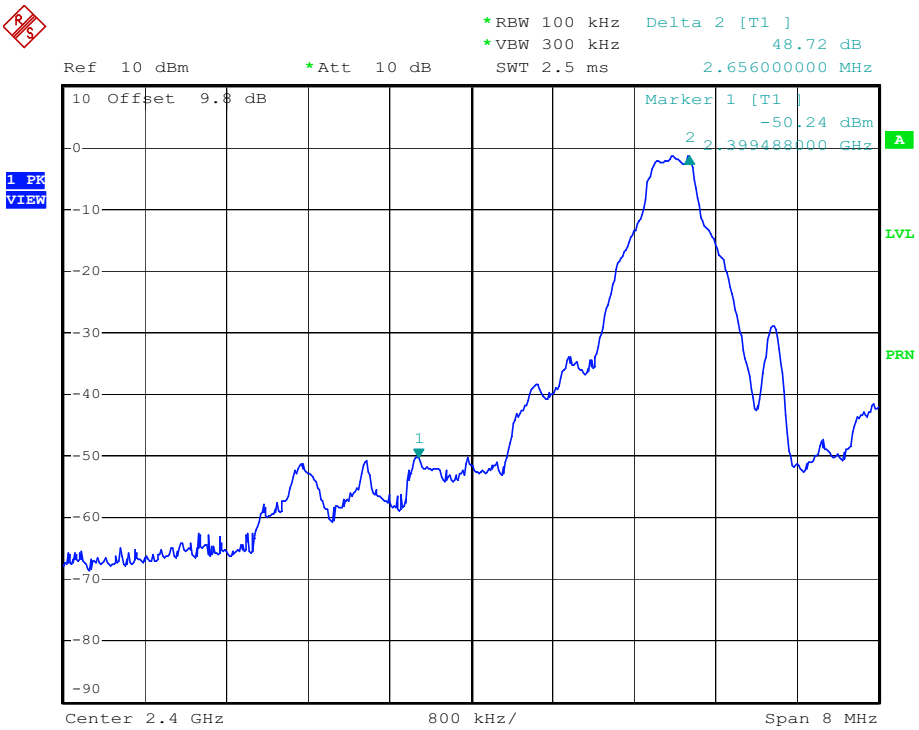
1. Span = 8 MHz
2. RBW = 100 kHz
3. VBW = 300 kHz
4. Sweep = auto
5. Detector Mode = Peak

TEST RESULTS

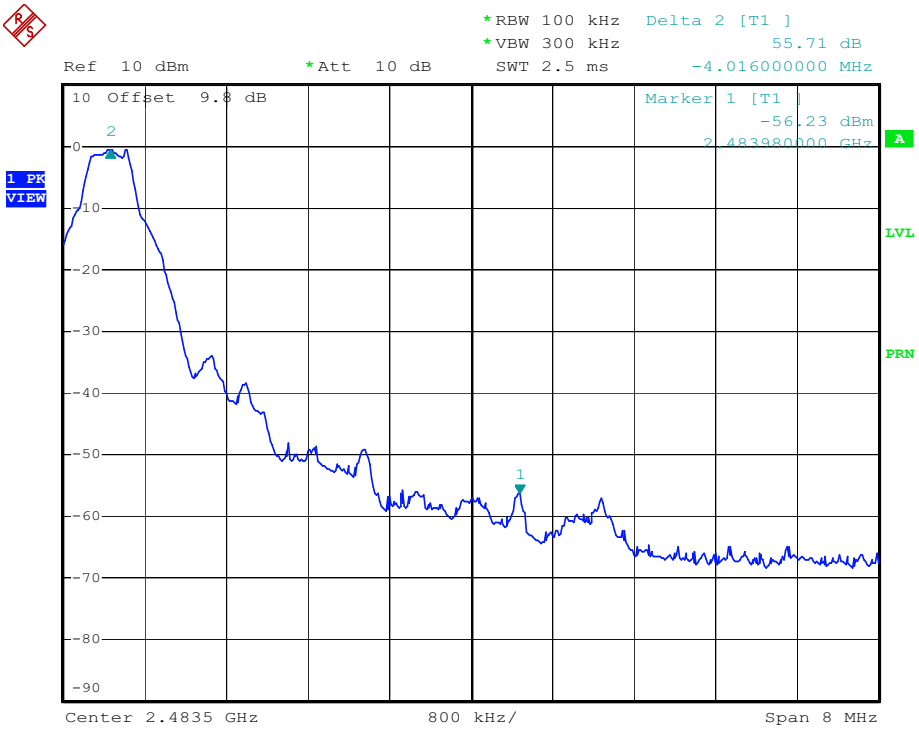
See attached.

Test Data (GFSK)

Band Edges (Low- CH)

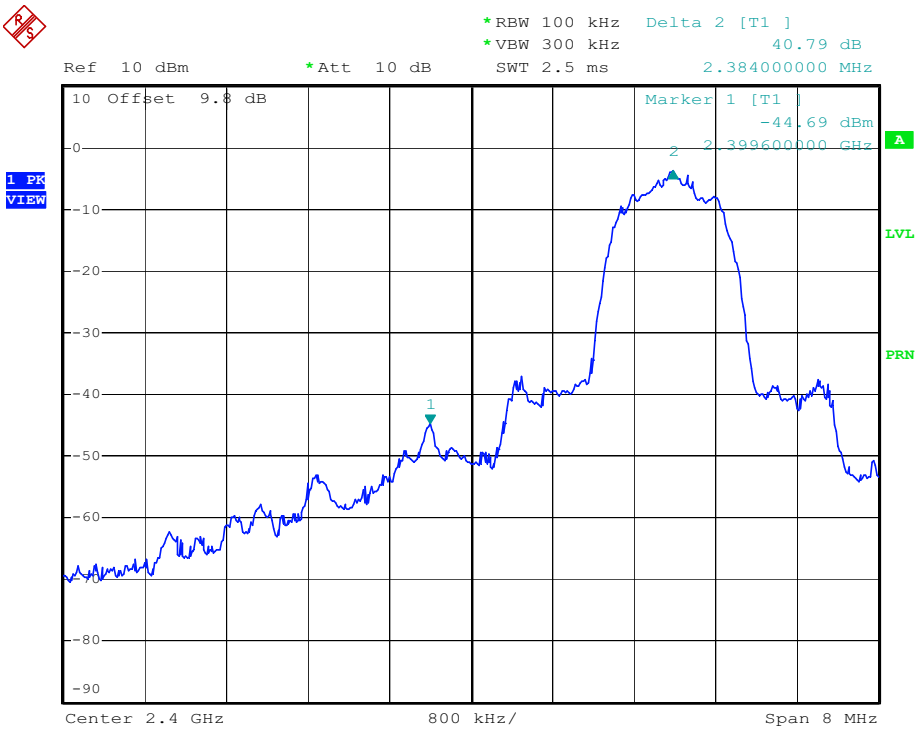


Band Edges (High-CH)



Test Data (8DPSK)

Band Edges (Low- CH)



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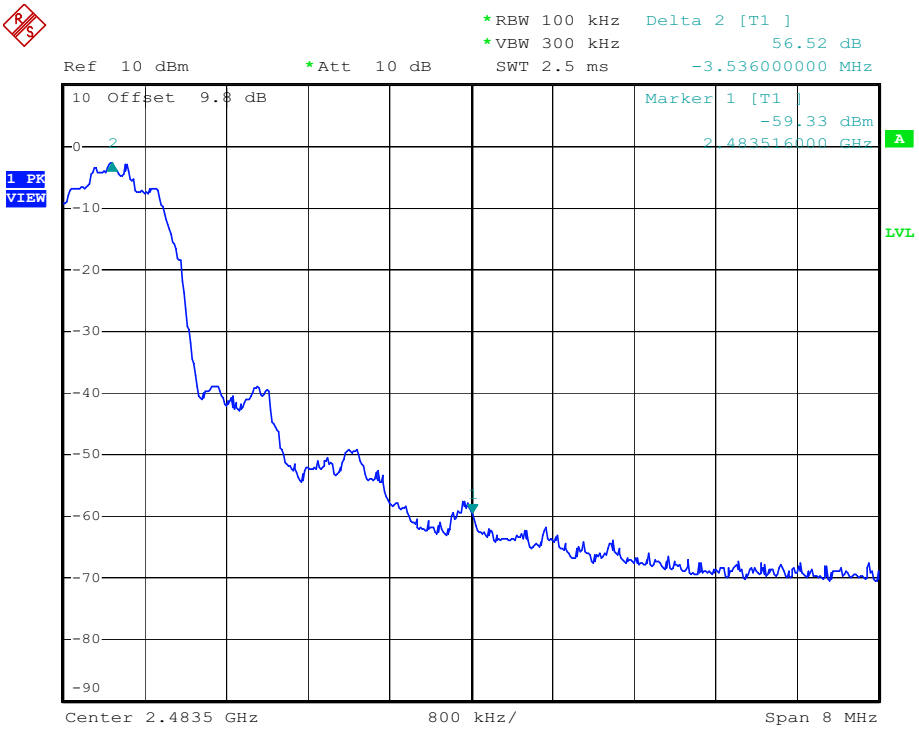
Band Edges (High-CH)



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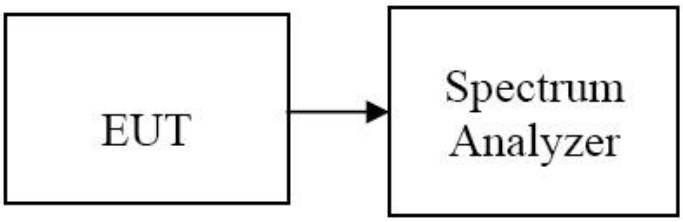
7.3 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Configuration



TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 3 MHz
2. RBW = 30 kHz
3. VBW = 100 kHz
4. Sweep = auto

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

TEST RESULTS

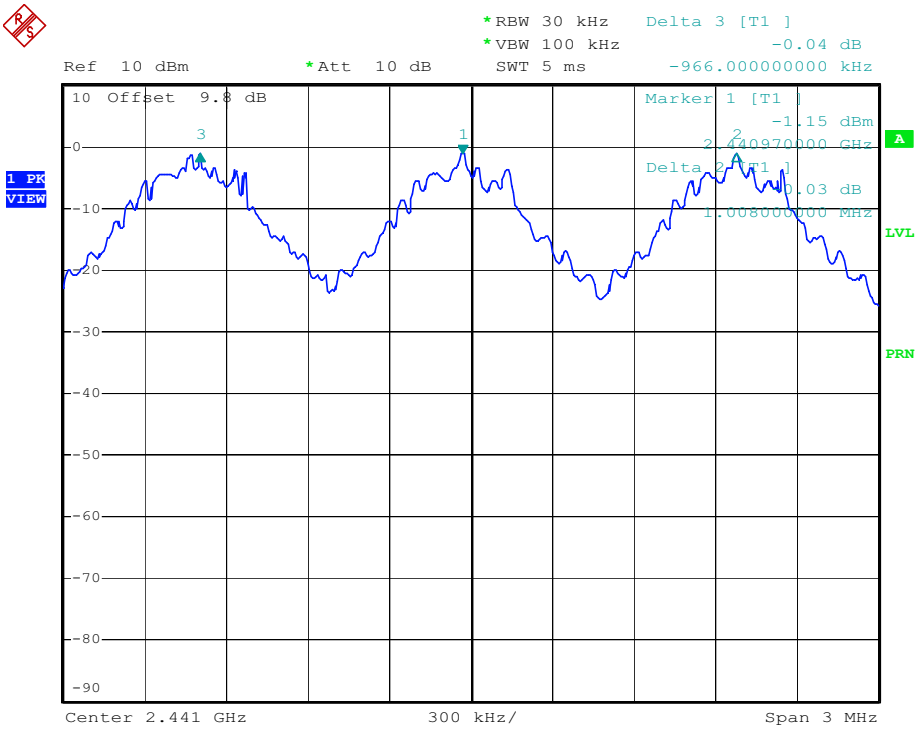
No non-compliance noted

Test Data

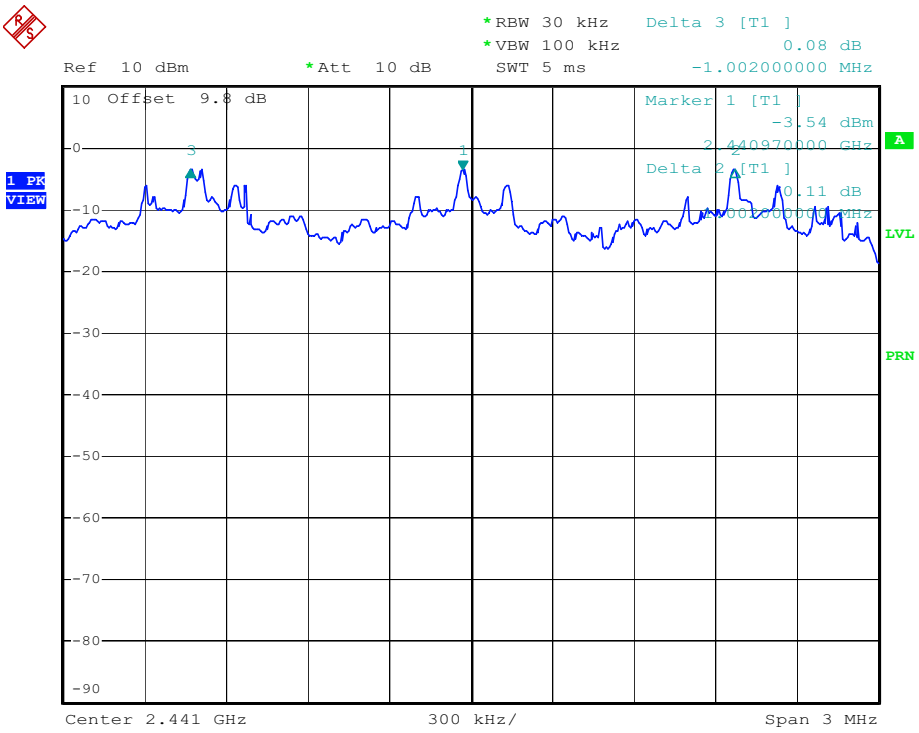
Channel Separation (kHz)		20dB Bandwidth (kHz)			Limit (kHz)	Result
GFSK	8DPSK	Channel	GFSK	8DPSK		
966	1002	Low CH	936	1284	>25 or >2/3 of the 20dB BW	Pass
		Middle CH	942	1290		
		High CH	936	1266		

Test Plot

Measurement of Channel Separation(GFSK)



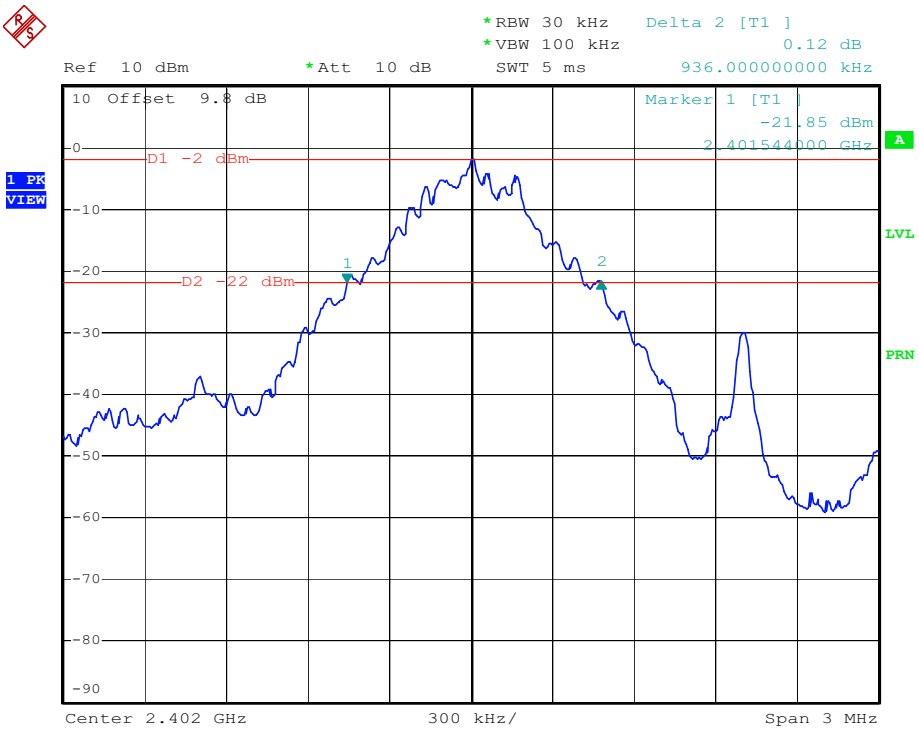
Measurement of Channel Separation(8DPSK)



Test Plot (GFSK)

20 dB bandwidth

(Low CH)



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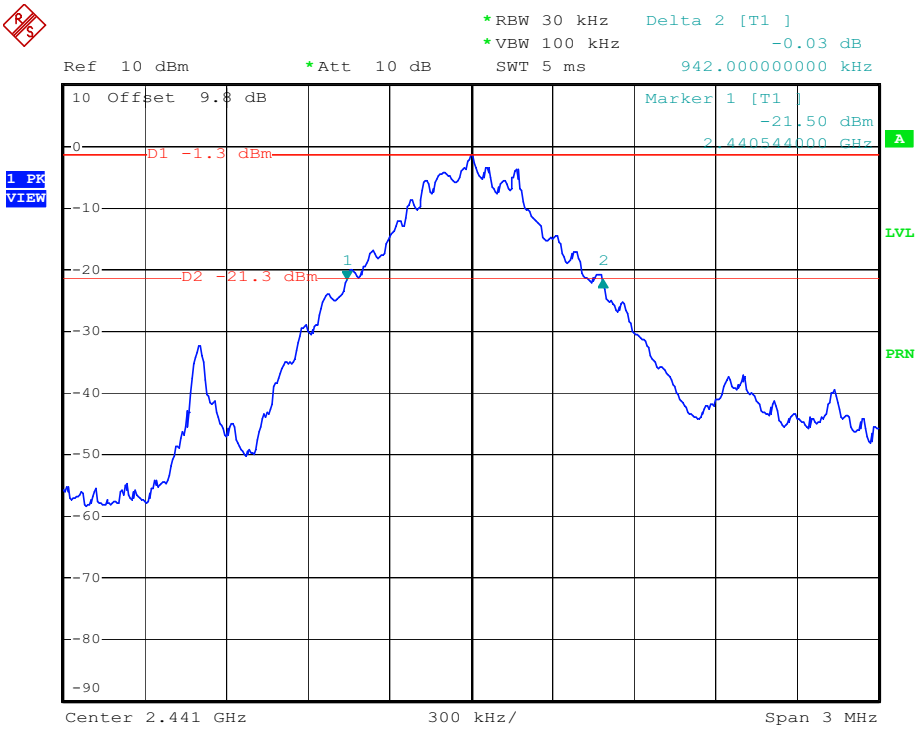
(Mid CH)



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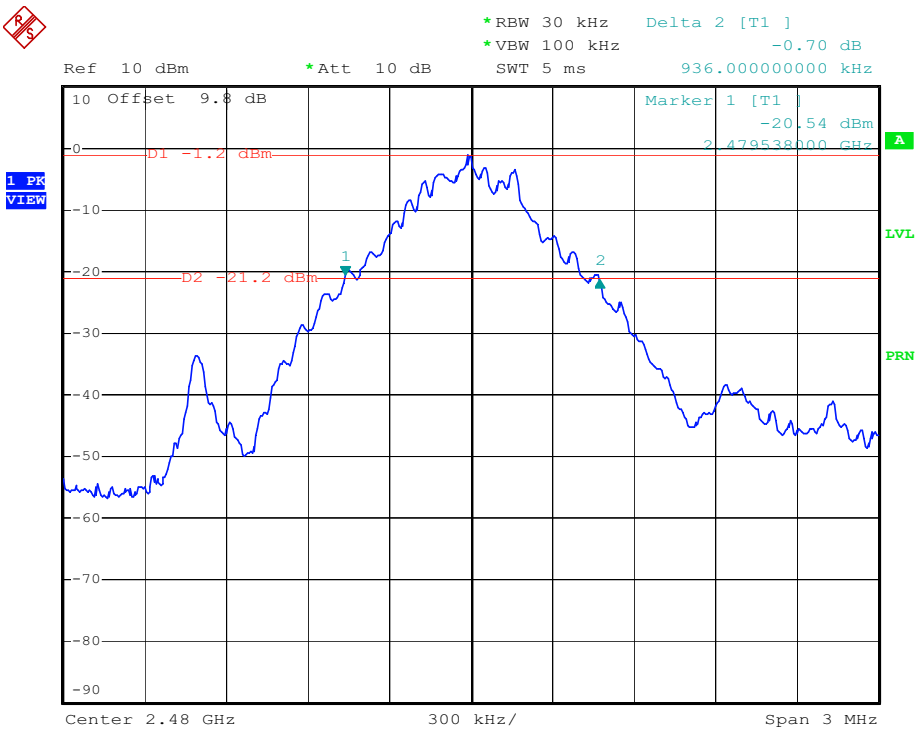
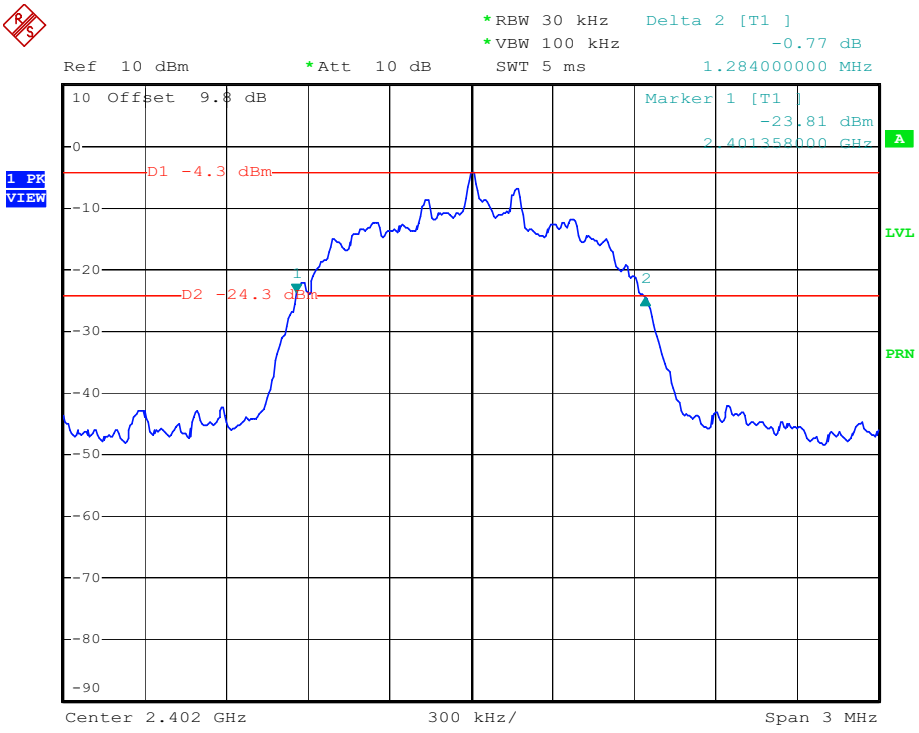
(High CH)



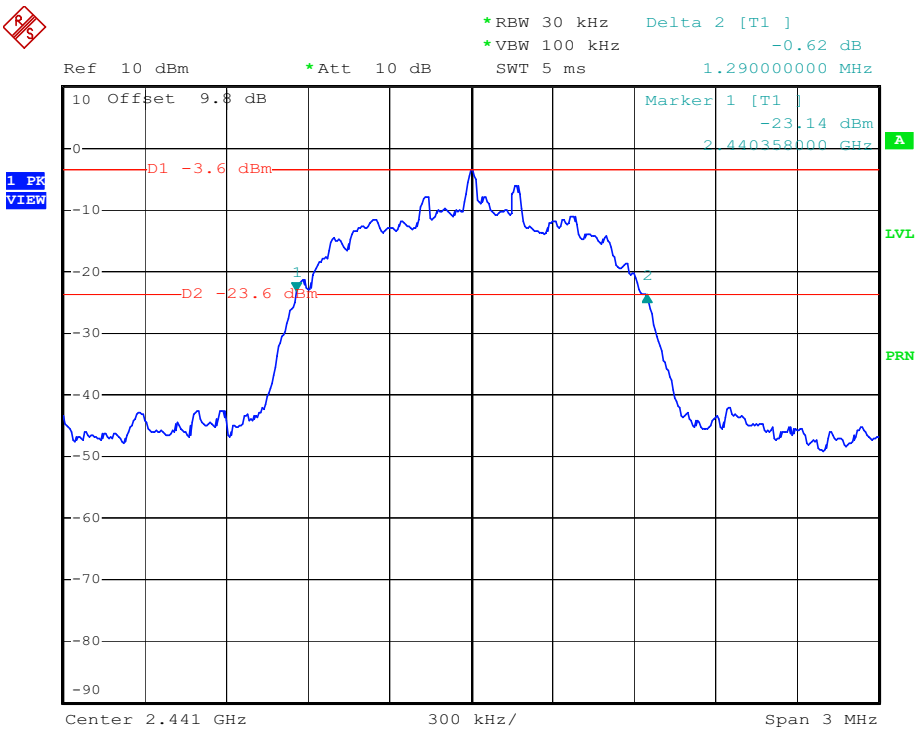
Test Plot (8DPSK)

20 dB bandwidth

(Low CH)



(Mid CH)



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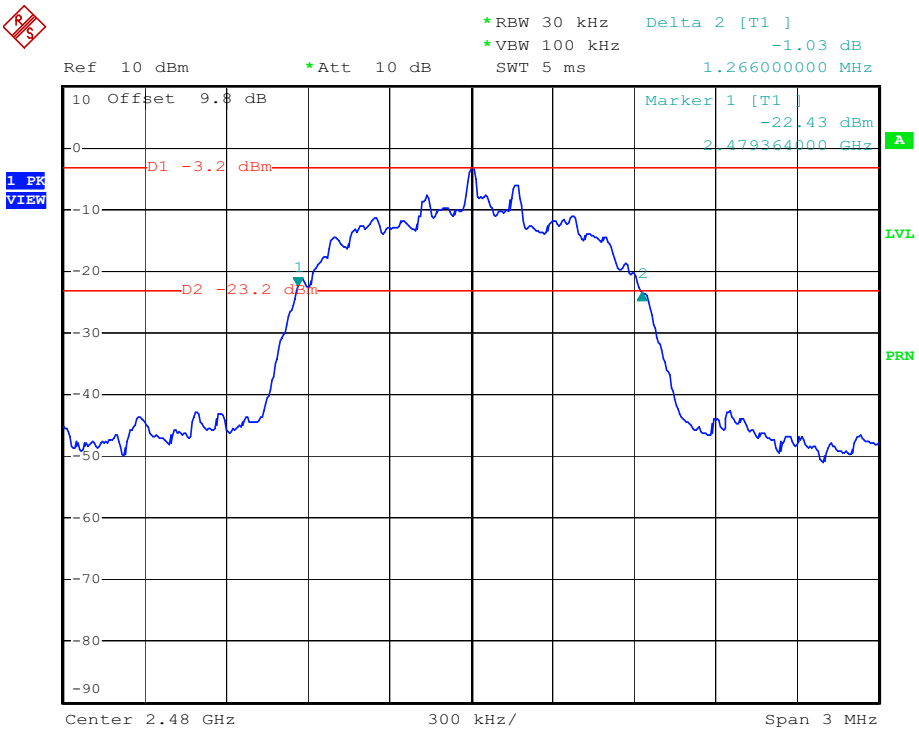
(High CH)



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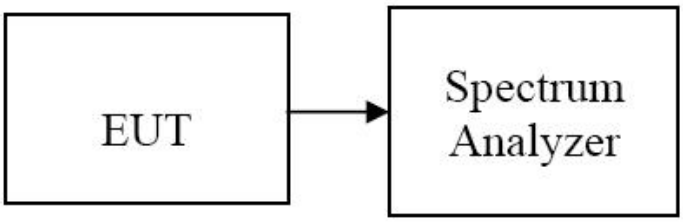
7.4 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



TEST PROCEDURE

The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer was set to :

1. Span = the frequency band of operation (Start = 2400 MHz, Stop = 2483.5 MHz)
2. RBW = 300 kHz
3. VBW = 300 kHz
4. Sweep = auto

The trace was allowed to stabilize.

TEST RESULTS

No non-compliance noted

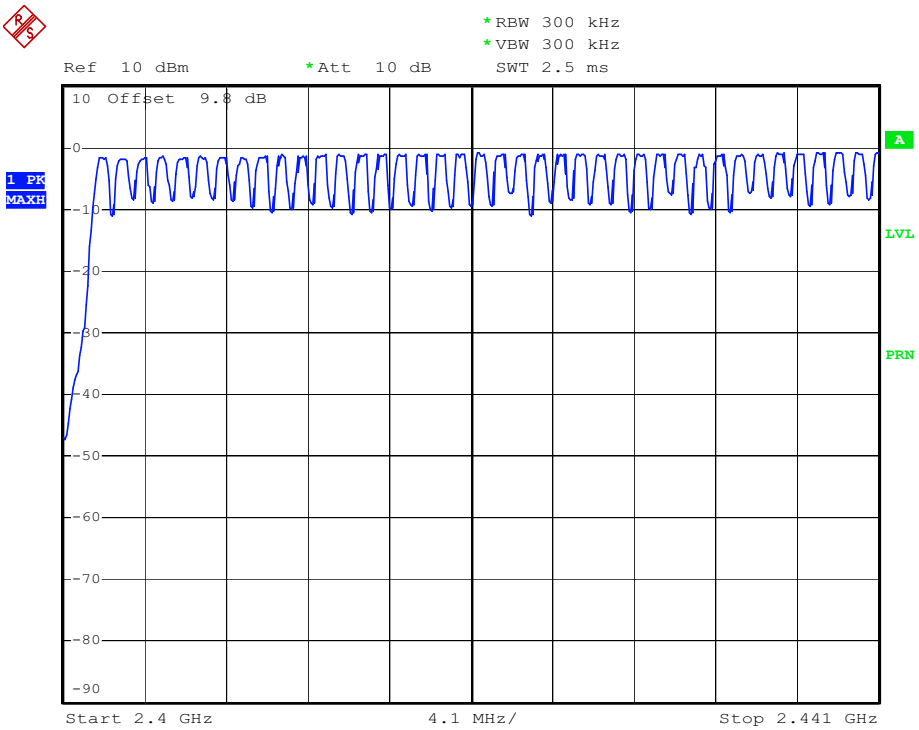
Test Data

Result (No. of CH)	Limit (No. of CH)	Result
79	>15	Pass

Test Plot

Number of Channels (GFSK)

2.4 GHz – 2.441 GHz



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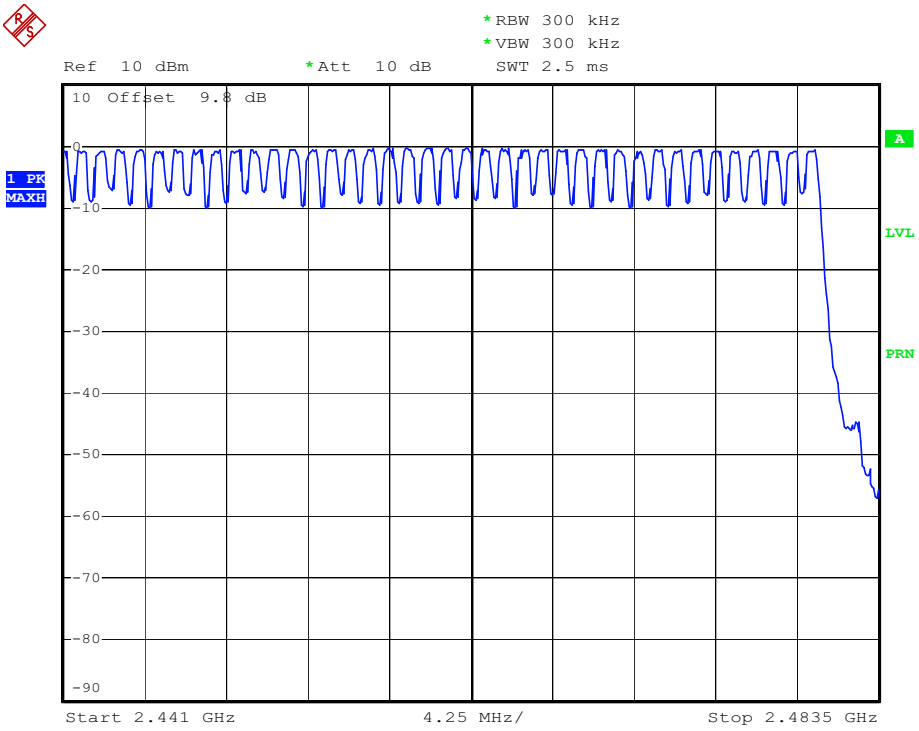
2.441 GHz – 2.4835 GHz



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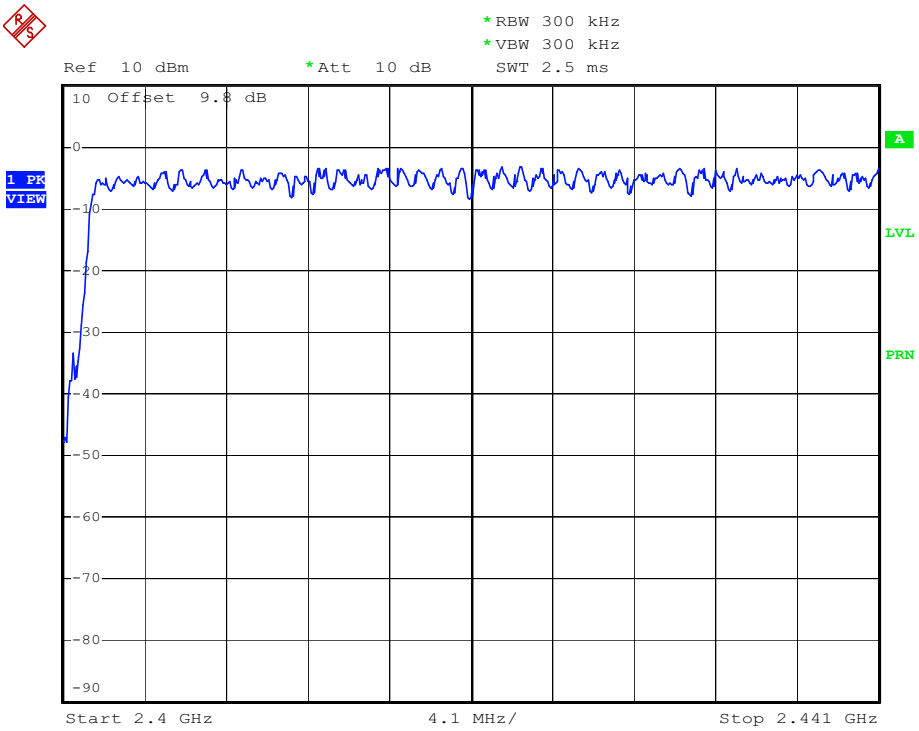
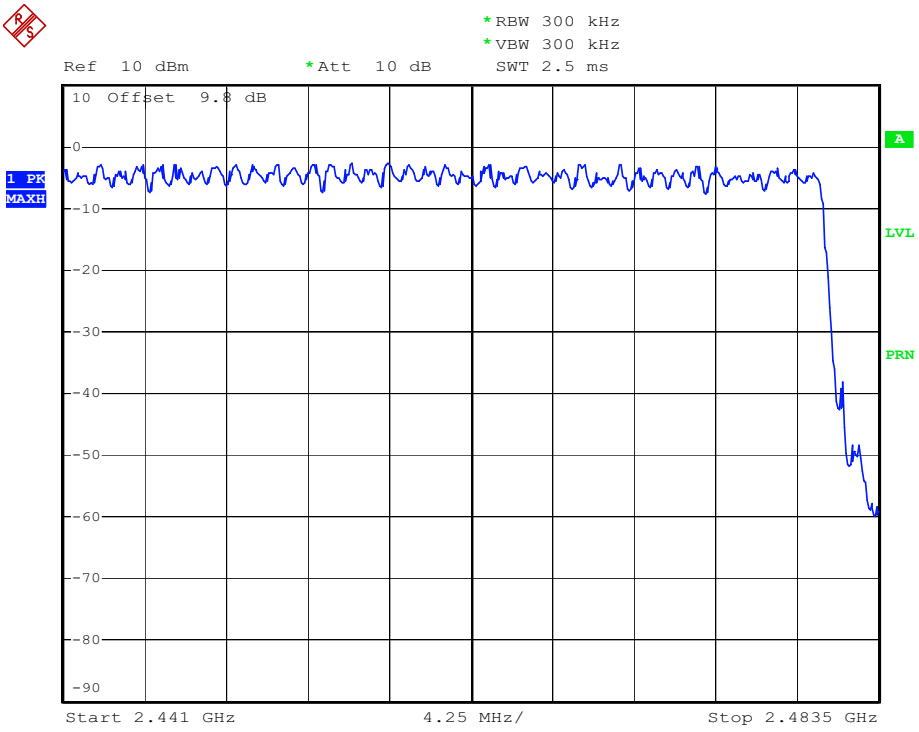
Number of Channels (8DPSK)

2.4 GHz – 2.441 GHz



2.441 GHz – 2.4835 GHz

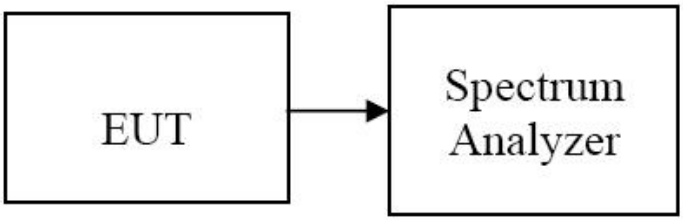


7.5 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



TEST PROCEDURE

EUT was set to transmit the longest packet type (DH5)

1. Span = zero span
2. RBW = 1 MHz
3. VBW = 1 MHz
4. Sweep = as necessary to capture the entire dwell time per channel

The marker-delta function was used to determine the dwell time.

TEST RESULTS

See the table.

DH 5(The longest packet type for GFSK)

CH Mid : 2.91 * (1600/6)/79 * 31.6 = 310.40 (ms)

3-DH 5(The longest packet type for 8DPSK)

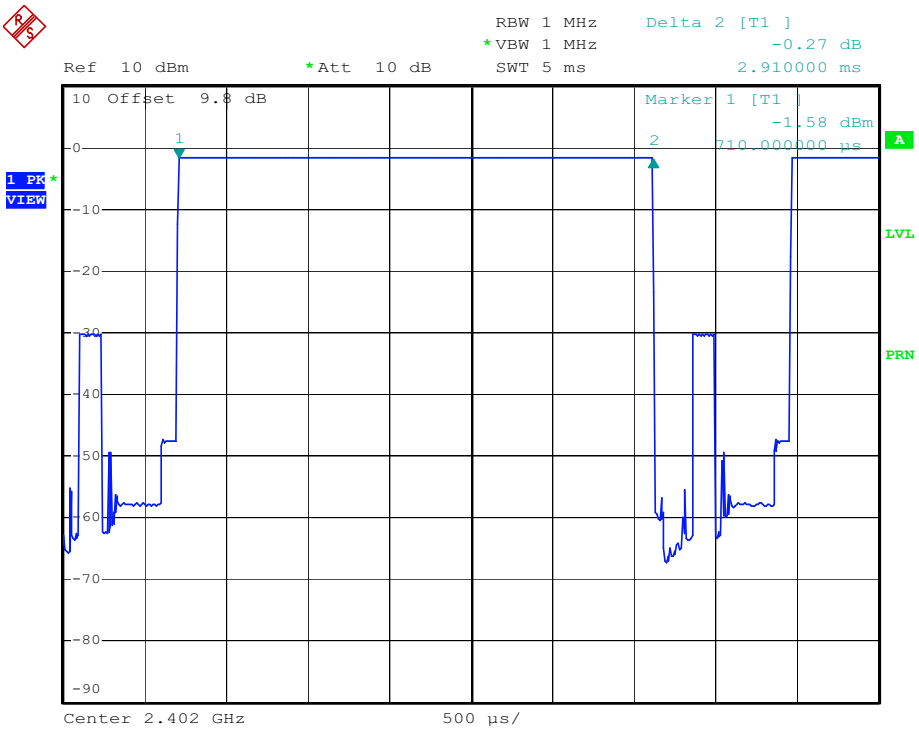
CH Mid : 2.92 * (1600/6)/79 * 31.6 = 311.47 (ms)

Channel	Pulse Time (ms)		Total of Dwell (ms)		Period Time (s)	Limit (ms)	Result
	GFSK	8DPSK	GFSK	8DPSK			
Low	2.91	2.92	310.40	311.47	31.6	400	PASS
Mid	2.91	2.92	310.40	311.47	31.6		PASS
High	2.91	2.92	310.40	311.47	31.6		PASS

Test Plots (GFSK)

DH 5

(Low CH)



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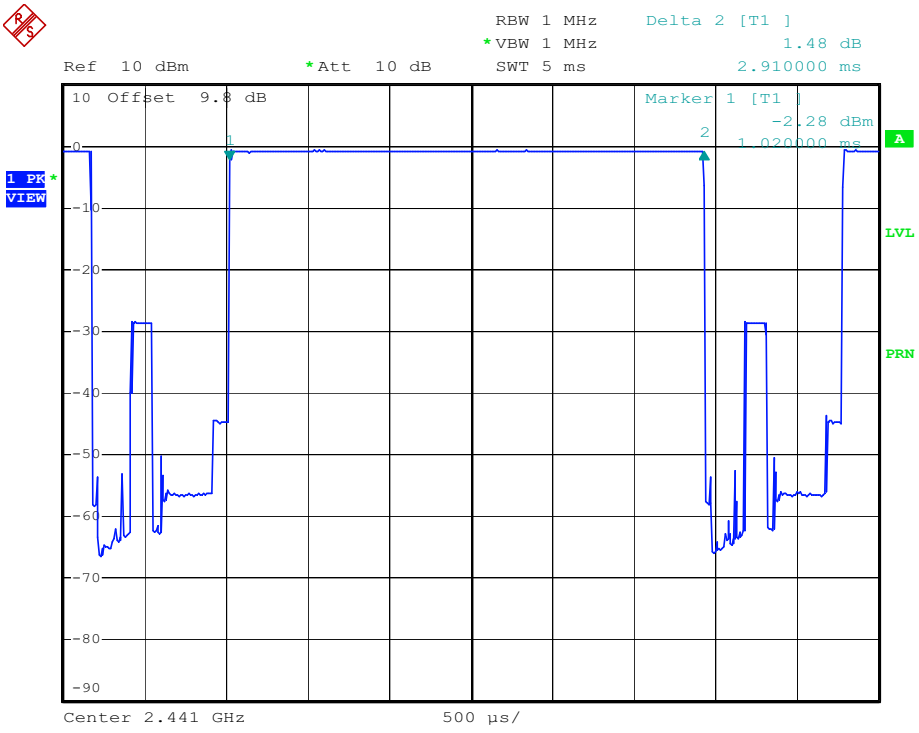
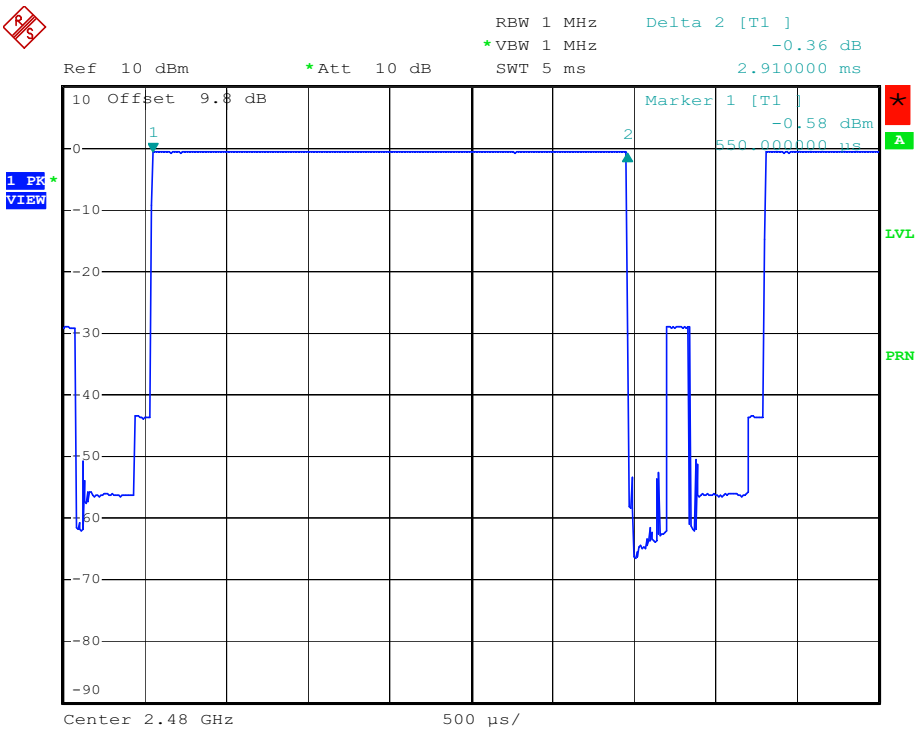
(Mid CH)



Date: 23.JUN.2009 14:01:01

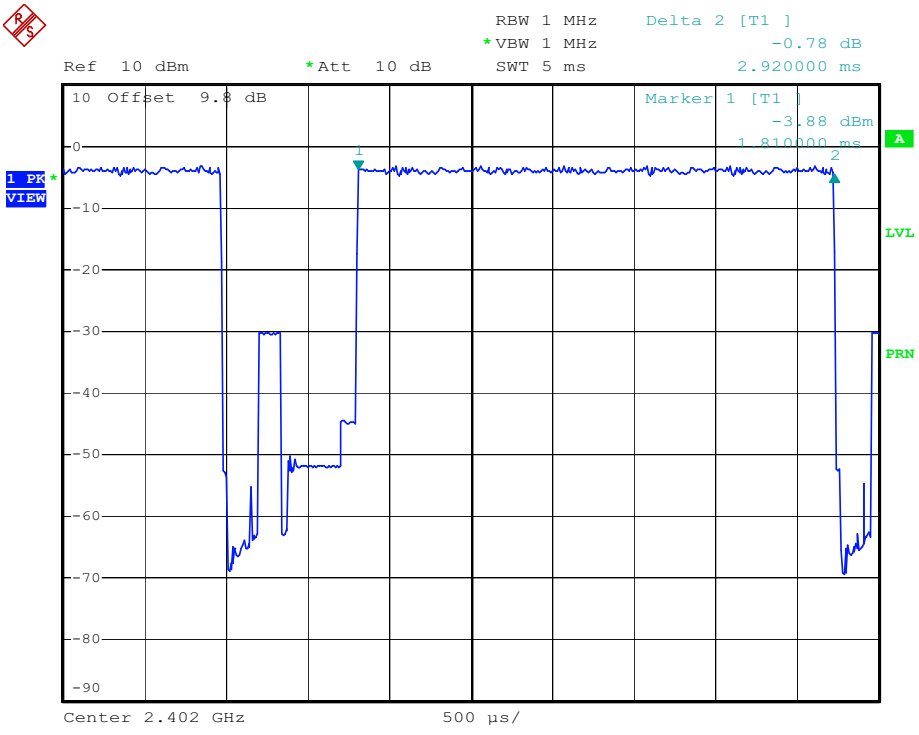
(CH High)



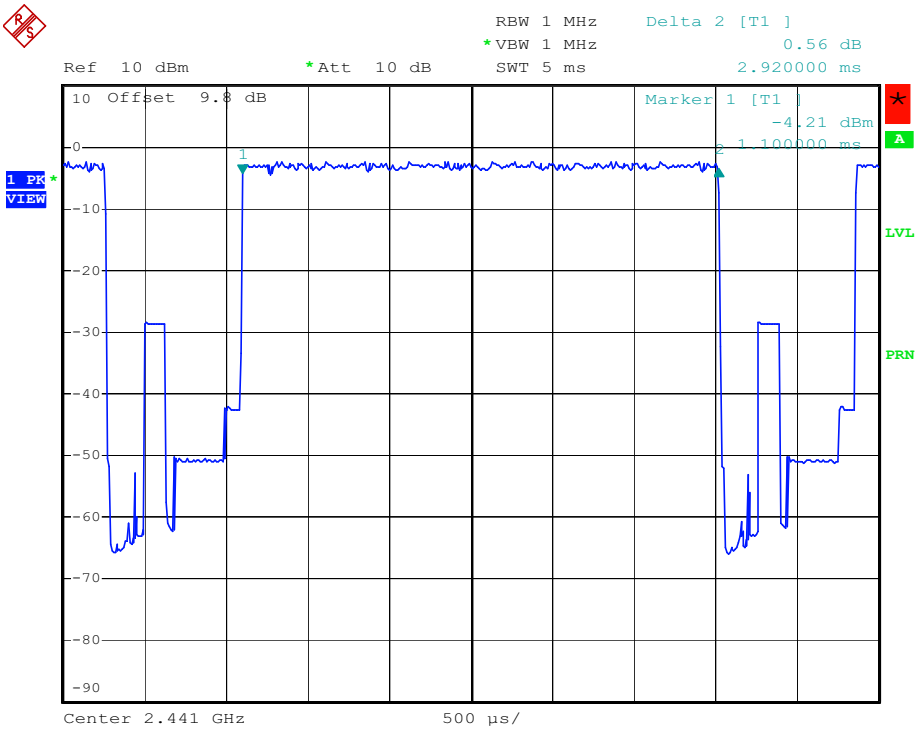
Test Plots (8DPSK)

3-DH 5

(Low CH)

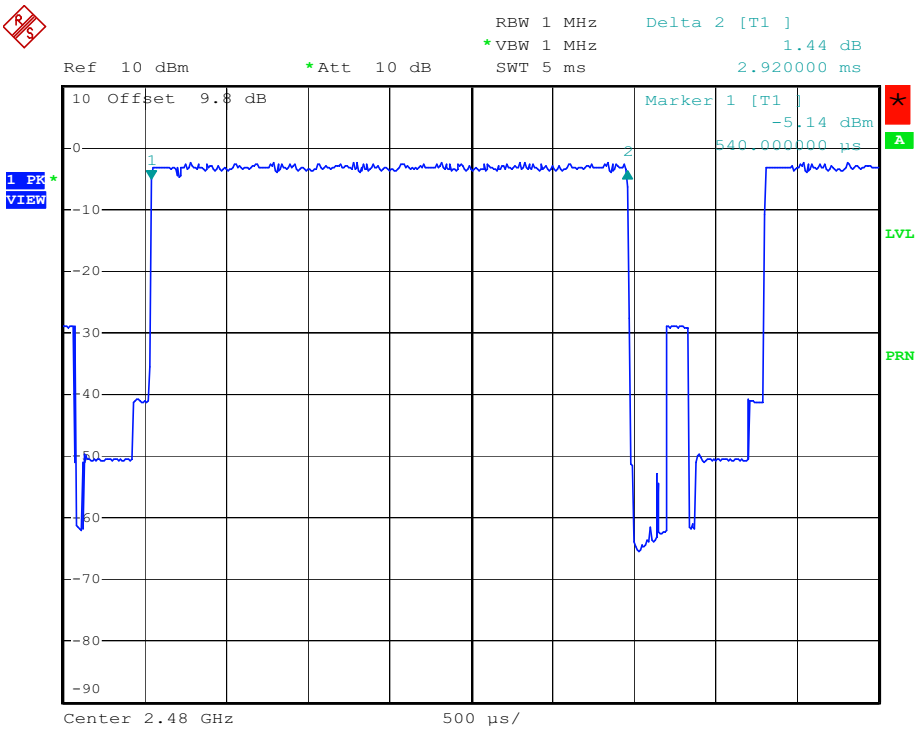


(Mid CH)



Date: 23.JUN.2009 14:03:01

(CH High)



Date: 23.JUN.2009 14:03:33

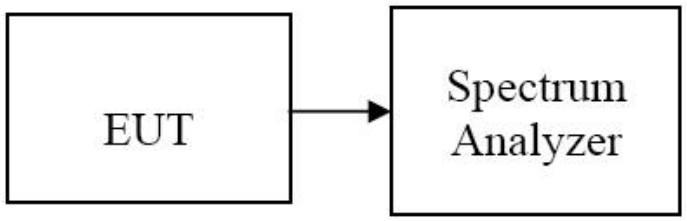
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Spurious Measurement

LIMIT

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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
Detector Mode is set to a peak detector Mode.

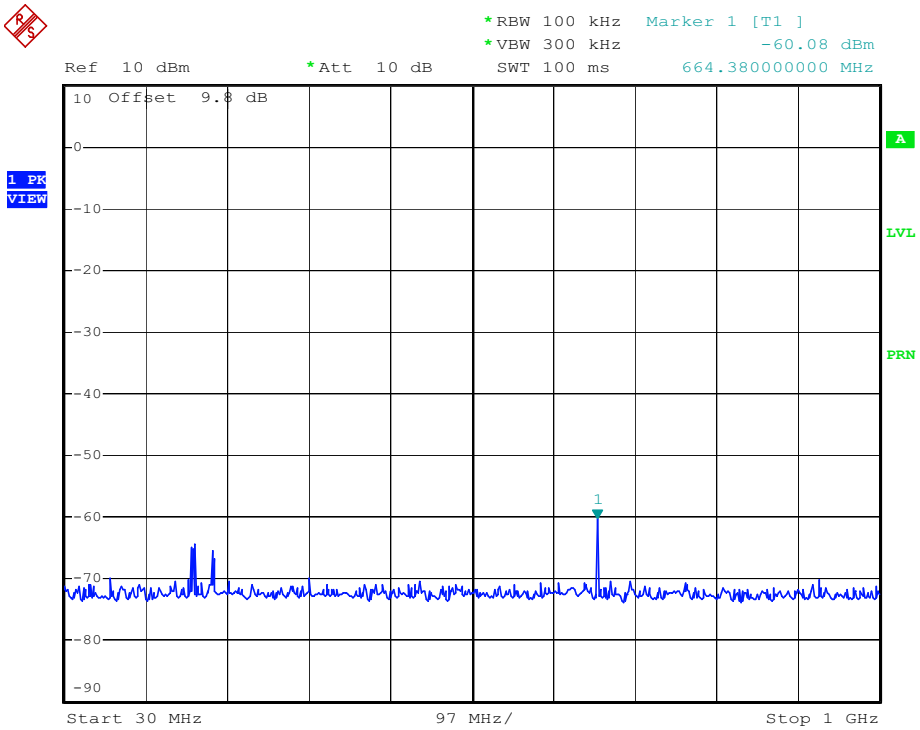
Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted

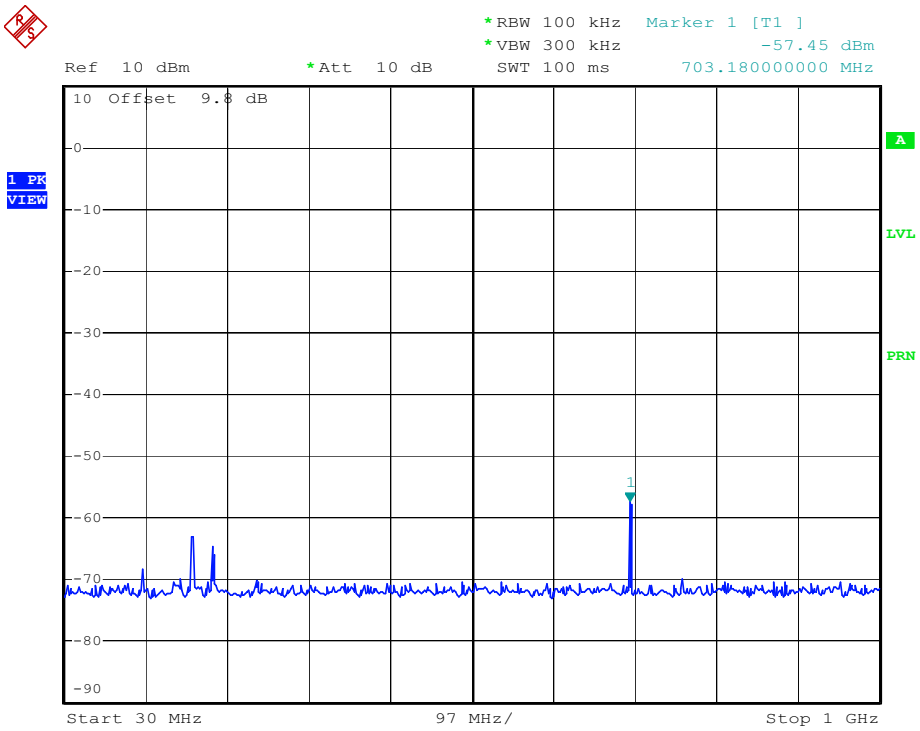
Test Plots (GFSK): – 30 MHz ~ 1 GHz

(Low CH) - 2402 MHz



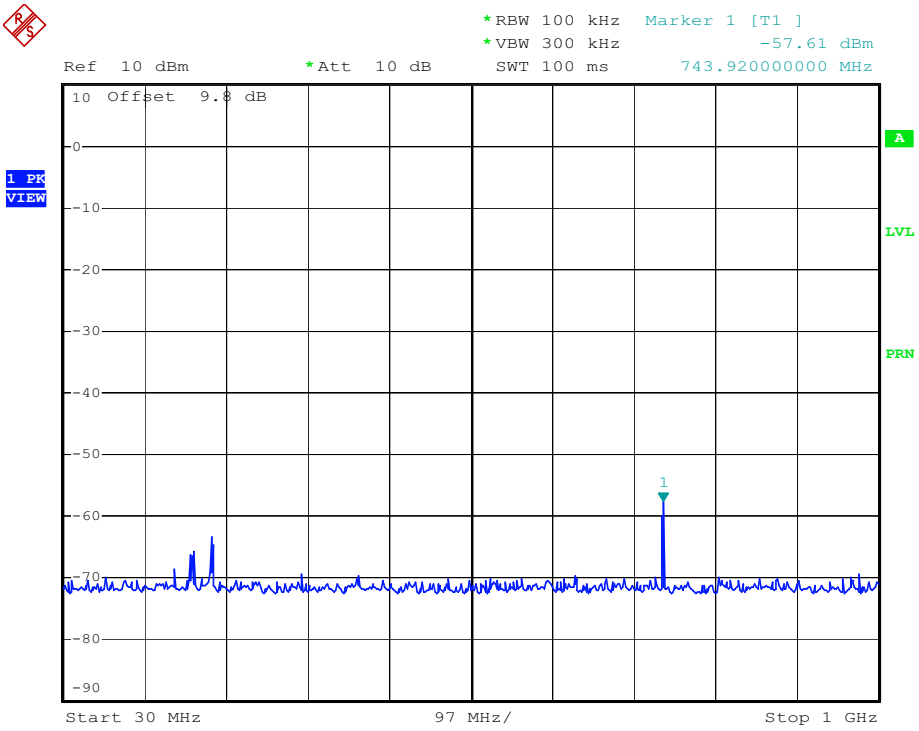
Date: 23.JUN.2009 14:04:13

(Mid CH) – 2441 MHz



Date: 23.JUN.2009 14:04:54

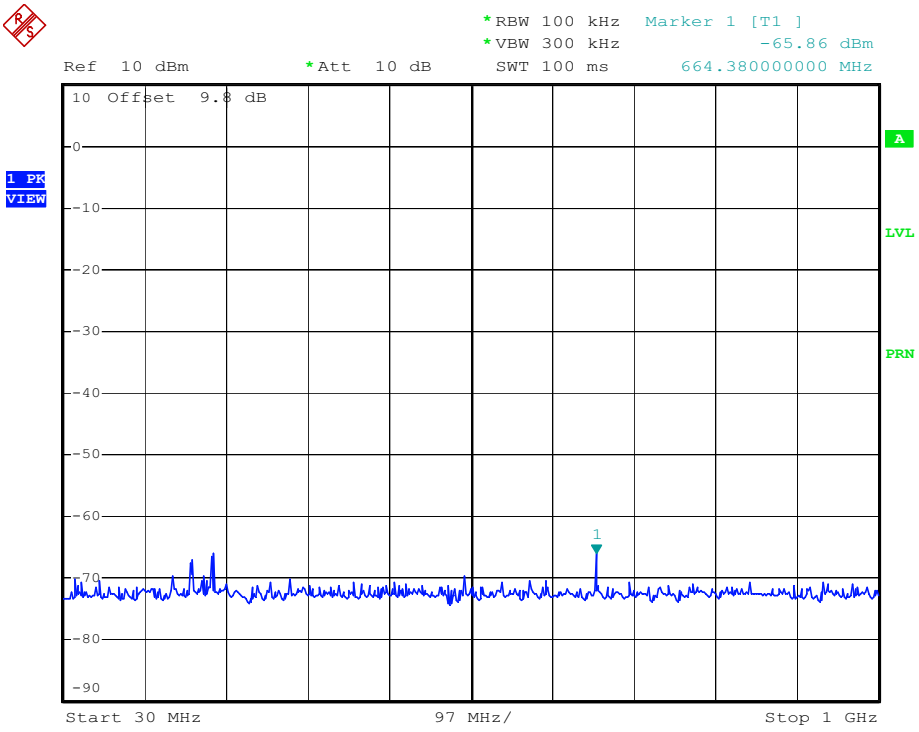
(High CH) – 2480 MHz



Date: 23.JUN.2009 14:05:45

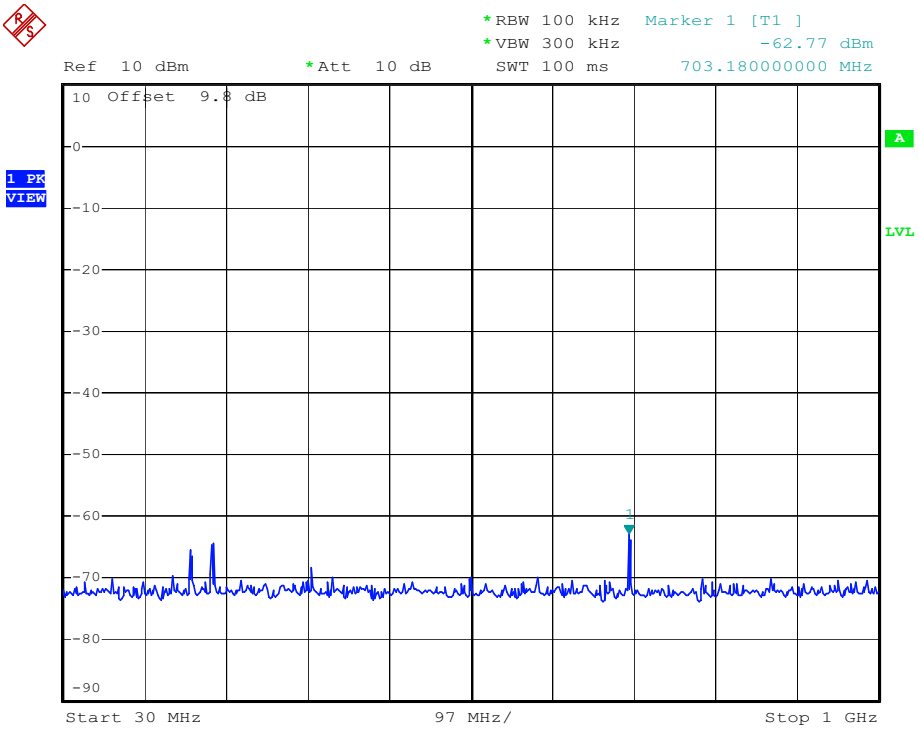
Test Plots (8DPSK): **– 30 MHz ~ 1 GHz**

(Low CH) – 2402 MHz



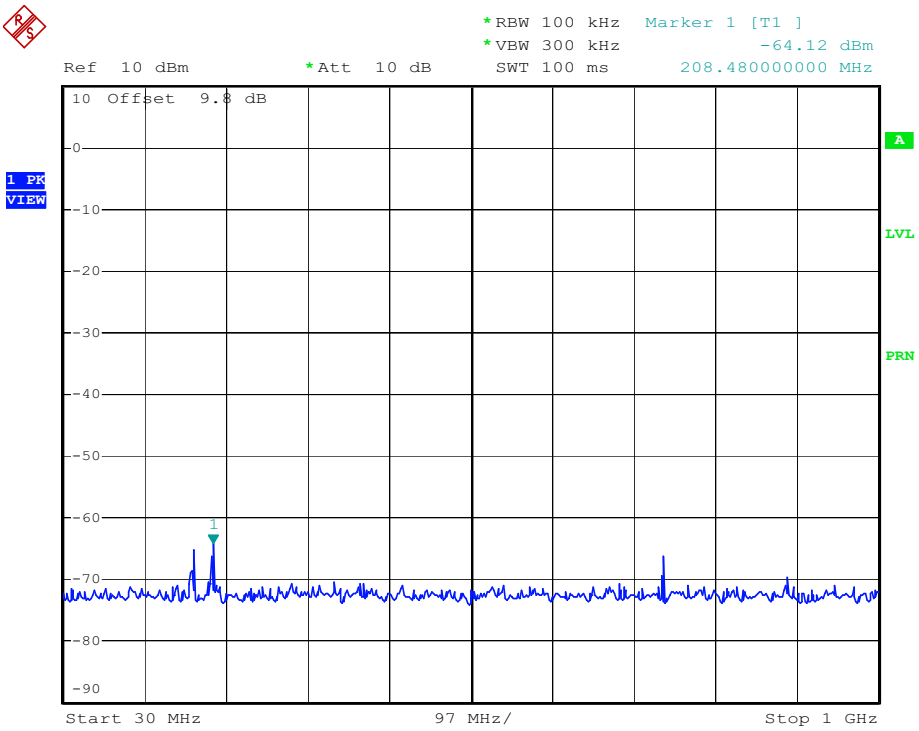
Date: 23.JUN.2009 14:06:13

(Mid CH) – 2441 MHz



Date: 23.JUN.2009 14:06:44

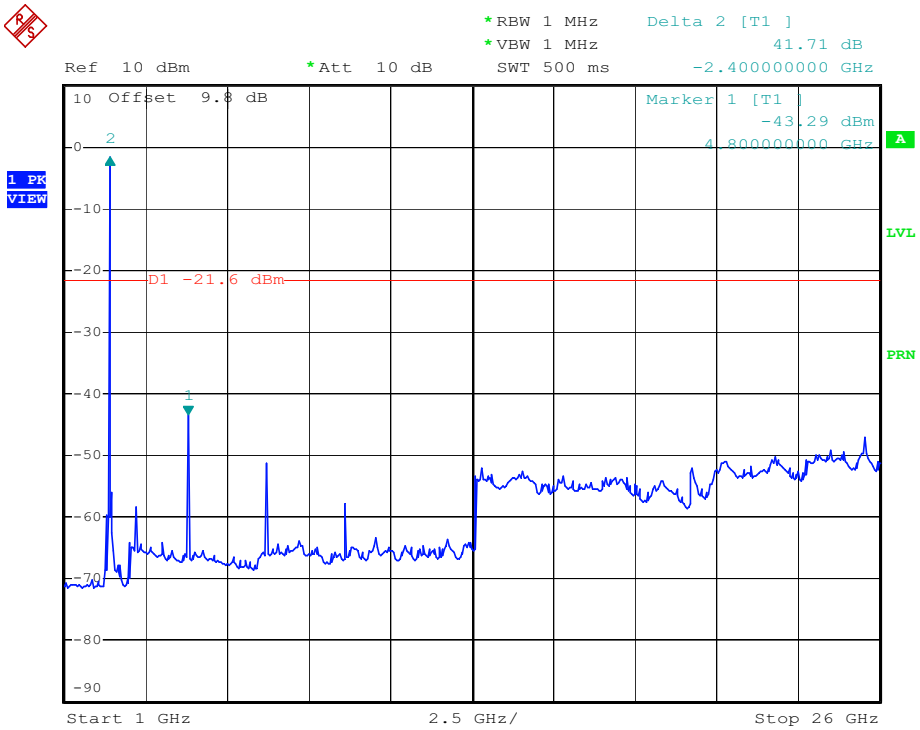
(High CH) – 2480 MHz



Date: 23.JUN.2009 14:09:29

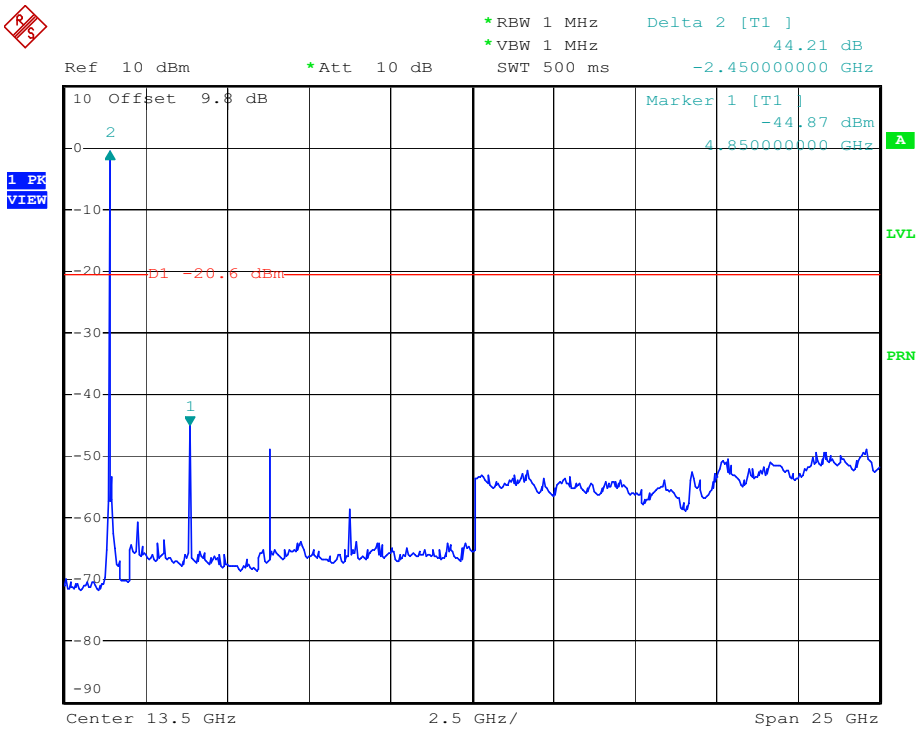
Test Plots (GFSK): – 1 GHz ~ 26 GHz

(Low CH) - 2402 MHz



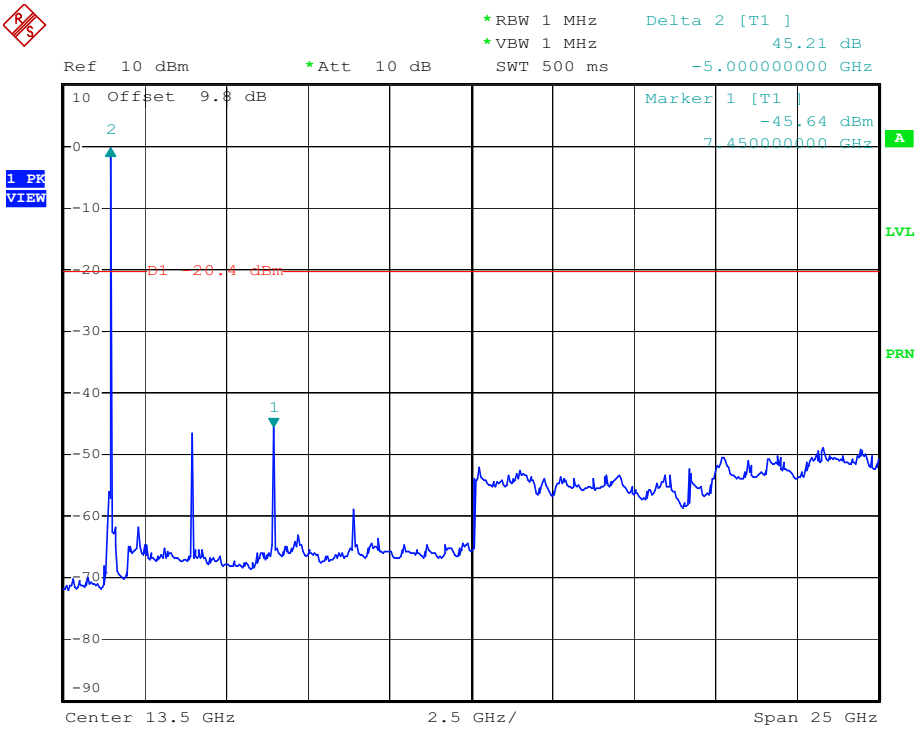
Date: 23.JUN.2009 14:10:25

(Mid CH) – 2441 MHz



Date: 23.JUN.2009 14:11:03

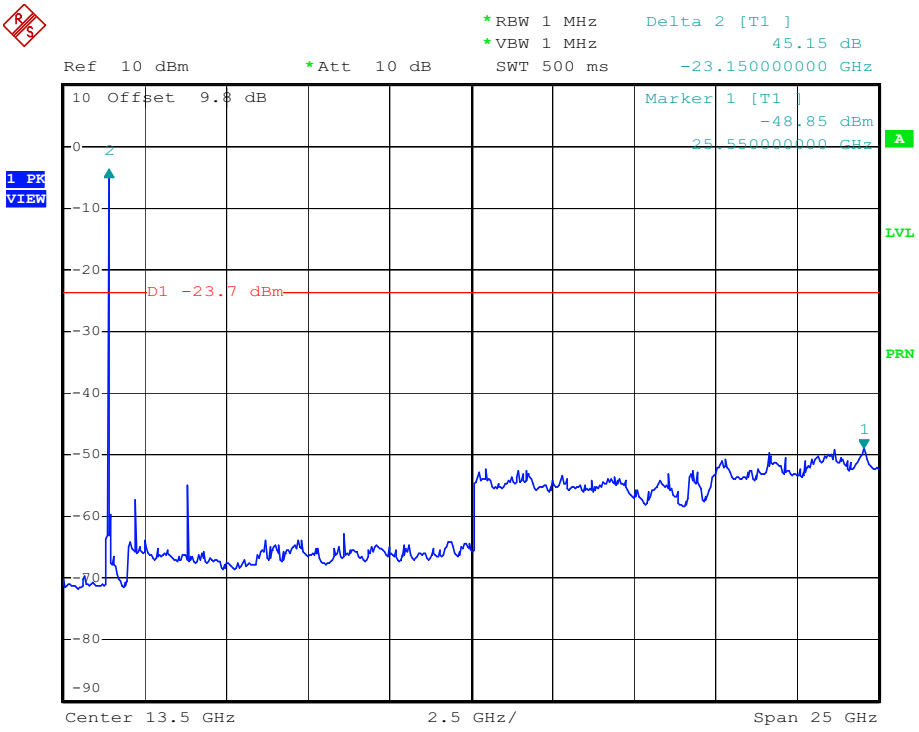
(High CH) – 2480 MHz



Date: 23.JUN.2009 14:11:40

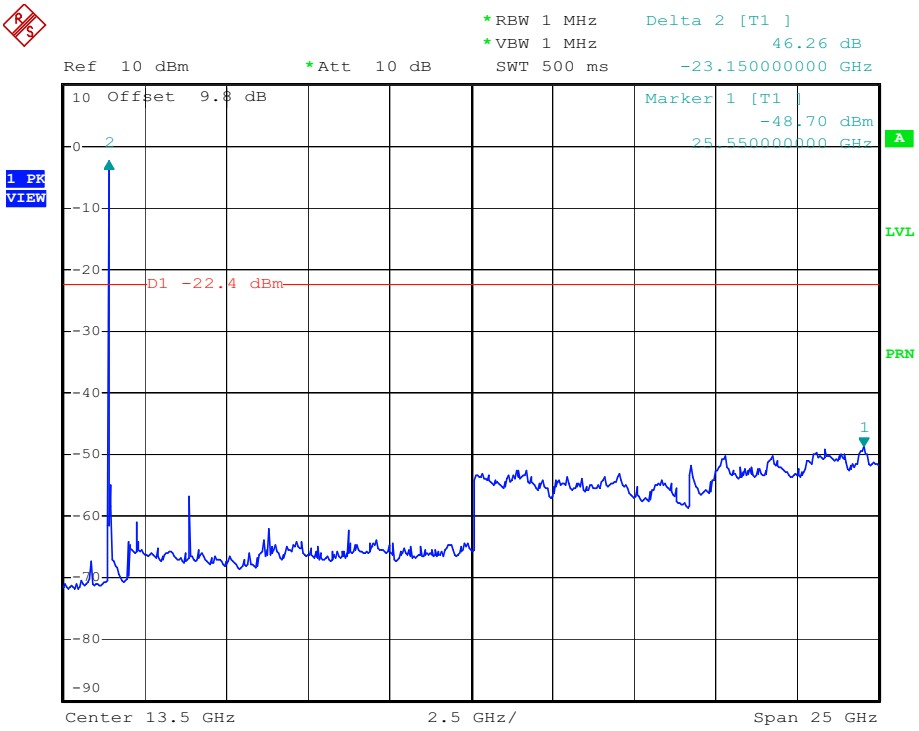
Test Plots (8DPSK): – 1 GHz ~ 26 GHz

(Low CH) – 2402 MHz



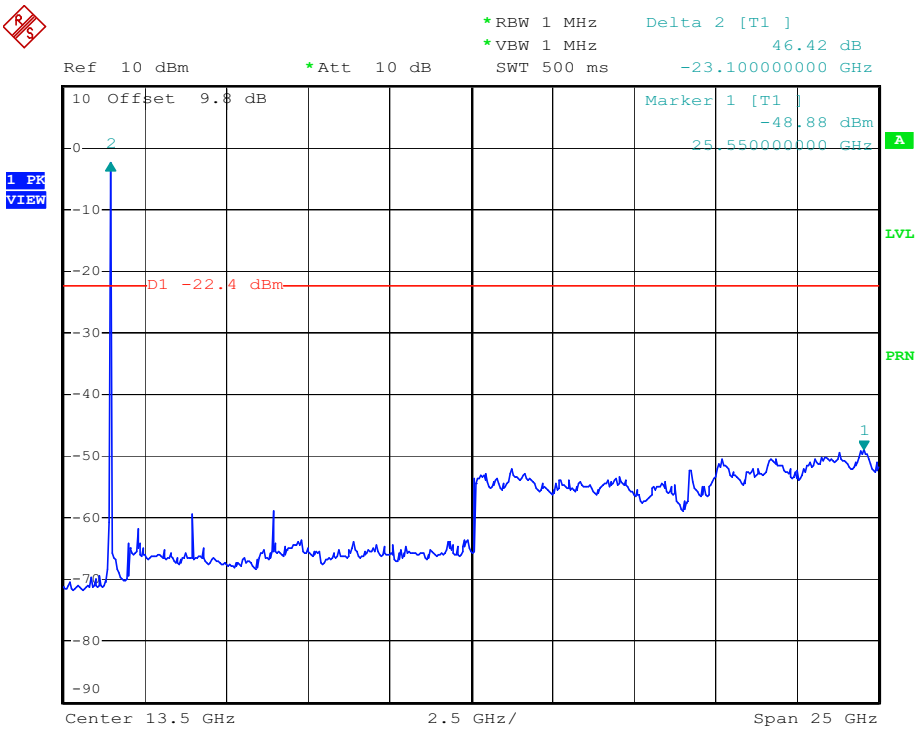
Date: 23.JUN.2009 14:12:18

(Mid CH) – 2441 MHz



Date: 23.JUN.2009 14:13:11

(High CH) – 2480 MHz



Date: 23.JUN.2009 14:13:56

7.6.2 Radiated Spurious Emissions

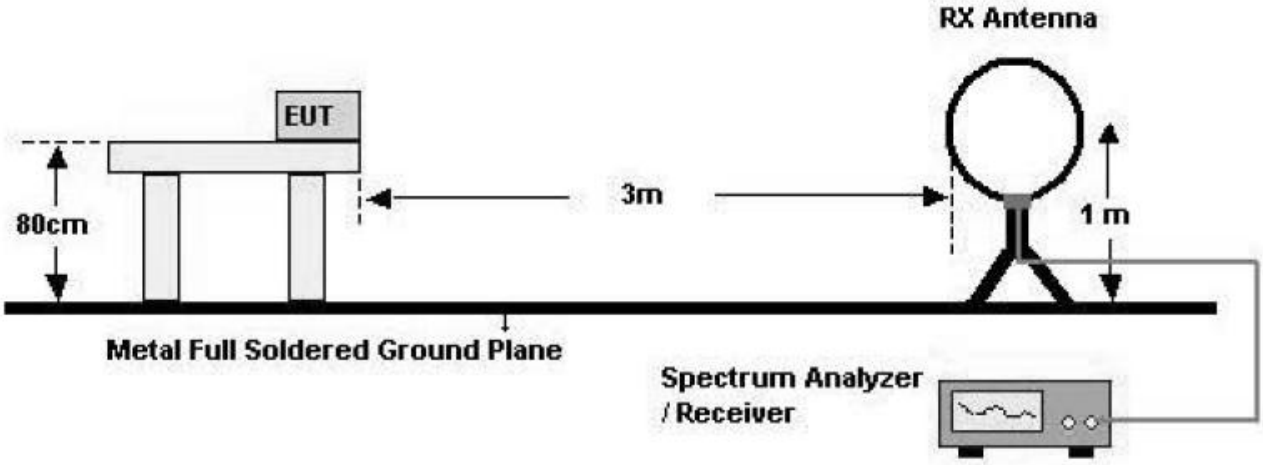
LIMIT

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

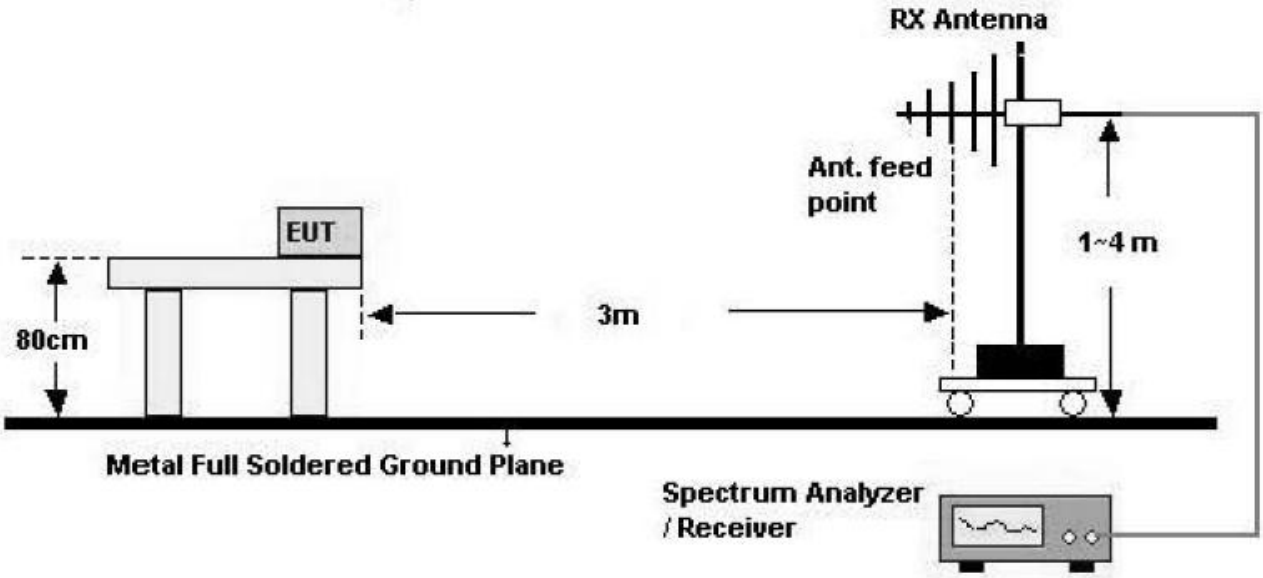
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30 (29.5 dBuV/m)	30
30-88	100 (40 dBuV/m)	3
88-216	150 (43.5 dBuV/m)	3
216-960	200 (46 dBuV/m)	3
Above 960	500 (54 dBuV/m)	3

Test Configuration

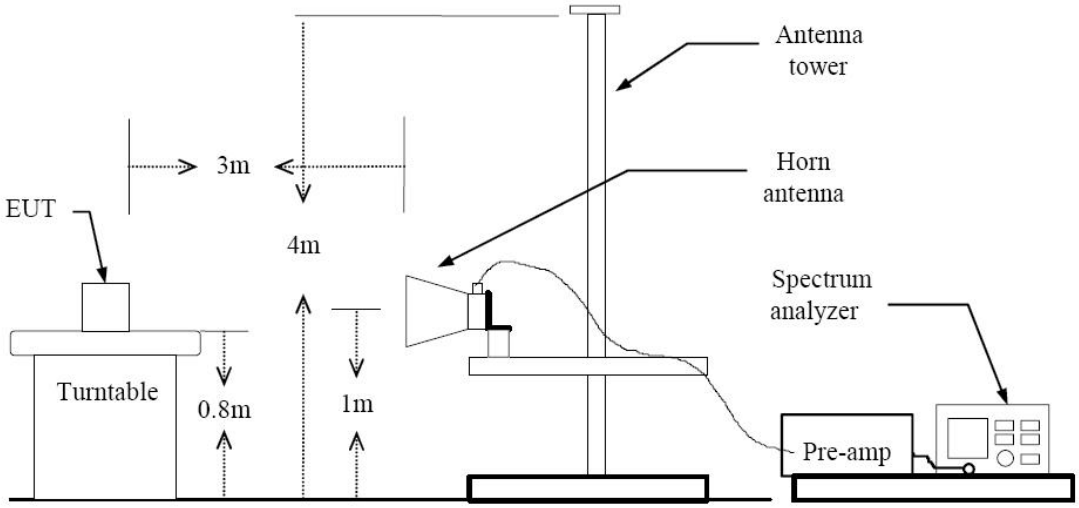
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Link

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. Detector : Qusi-peak
6. Preliminary Test performed the both normal & EDR and three channels(Low, Mid, High). The final test performed the worst case mode only.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link(Mid: 2441 MHz) -Standard Battery (BTR731B)

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
30.2	18.2	11.2	0.7	V	30.1	40.0	9.9
288.0	20.6	12.7	1.8	H	35.1	46.0	10.9
480.0	13.4	17.0	2.4	V	32.8	46.0	13.2
480.0	14.2	17.0	2.4	H	33.6	46.0	12.4
601.4	8.0	19.6	2.7	H	30.3	46.0	15.7
601.4	12.3	19.6	2.7	V	34.6	46.0	11.4

Operation Mode: Normal Link(Mid: 2441 MHz) -Extended Battery (BTE731B)

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
㎒	dB㎶	dB /m	dB	(H/V)	dB㎶/m	dB㎶/m	dB
30.2	18.1	11.2	0.7	V	30.0	40.0	10.0
288.0	20.8	12.7	1.8	H	35.3	46.0	10.7
480.0	13.5	17.0	2.4	V	32.9	46.0	13.1
480.0	14.1	17.0	2.4	H	33.5	46.0	12.5
601.4	8.0	19.6	2.7	H	30.3	46.0	15.7
601.4	12.3	19.6	2.7	V	34.6	46.0	11.4

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. RBW: 120 kHz, UBW: 300 kHz
4. Preliminary Test performed the both normal & EDR and three channels(Low, Mid, High). The final test performed the worst case mode only.

Above 1 GHz

Operation Mode: CH Low (Normal) – Standard Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	48.28	-4.79	V	43.49	74	30.51	PK
4804	36.11	-4.79	V	31.32	54	22.68	AV
7206	50.63	1.21	V	51.84	74	22.16	PK
7206	37.04	1.21	V	38.25	54	15.75	AV
4804	47.93	-4.79	H	43.14	74	30.86	PK
4804	34.90	-4.79	H	30.11	54	23.89	AV
7206	49.53	1.21	H	50.74	74	23.26	PK
7206	36.93	1.21	H	38.14	54	15.86	AV

Operation Mode: CH Low (Normal) – Extended Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	47.40	-4.79	V	42.61	74	31.39	PK
4804	36.09	-4.79	V	31.30	54	22.70	AV
7206	47.94	1.21	V	49.15	74	24.85	PK
7206	35.87	1.21	V	37.08	54	16.92	AV
4804	47.38	-4.79	H	42.59	74	31.41	PK
4804	34.61	-4.79	H	29.82	54	24.18	AV
7206	49.38	1.21	H	50.59	74	23.41	PK
7206	36.74	1.21	H	37.95	54	16.05	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:

a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.

b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Operation Mode: CH Mid (Normal) – Standard Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	49.30	-4.61	V	44.69	74	29.31	PK
4882	37.47	-4.61	V	32.86	54	21.14	AV
7323	50.63	1.62	V	52.25	74	21.75	PK
7323	37.31	1.62	V	38.93	54	15.07	AV
4882	48.43	-4.61	H	43.82	74	30.18	PK
4882	36.44	-4.61	H	31.83	54	22.17	AV
7323	50.06	1.62	H	51.68	74	22.32	PK
7323	37.22	1.62	H	38.84	54	15.16	AV

Operation Mode: CH Mid (Normal) – Extended Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	49.18	-4.61	V	44.57	74	29.43	PK
4882	38.70	-4.61	V	34.09	54	19.91	AV
7323	50.30	1.62	V	51.92	74	22.08	PK
7323	37.18	1.62	V	38.80	54	15.20	AV
4882	48.56	-4.61	H	43.95	74	30.05	PK
4882	36.42	-4.61	H	31.81	54	22.19	AV
7323	49.92	1.62	H	51.54	74	22.46	PK
7323	37.21	1.62	H	38.83	54	15.17	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Operation Mode: CH High (Normal) – Standard Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	48.07	-4.42	V	43.65	74	30.35	PK
4960	35.30	-4.42	V	30.88	54	23.12	AV
7440	50.43	2.04	V	52.47	74	21.53	PK
7440	37.38	2.04	V	39.42	54	14.58	AV
4960	48.69	-4.42	H	44.27	74	29.73	PK
4960	35.09	-4.42	H	30.67	54	23.33	AV
7440	50.32	2.04	H	52.36	74	21.64	PK
7440	37.45	2.04	H	39.49	54	14.51	AV

Operation Mode: CH High (Normal) – Extended Battery

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	49.46	-4.42	V	45.04	74	28.96	PK
4960	37.86	-4.42	V	33.44	54	20.56	AV
7440	50.18	2.04	V	52.22	74	21.78	PK
7440	37.45	2.04	V	39.49	54	14.51	AV
4960	48.67	-4.42	H	44.25	74	29.75	PK
4960	36.19	-4.42	H	31.77	54	22.23	AV
7440	50.39	2.04	H	52.43	74	21.57	PK
7440	37.45	2.04	H	39.49	54	14.51	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MH.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

7.6.3 Radiated Restricted Band Edge Measurements

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c).

Standard Battery

Operation Mode:	EDR(8DPSK)
Operating Frequency	2402, 2480 MHz
Channel No.	0, 78 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2365.20	48.80	-10.26	H	38.54	74	35.46	PK
2365.20	36.33	-10.26	H	26.07	54	27.93	AV
2374.48	49.51	-10.22	V	39.29	74	34.71	PK
2374.48	36.31	-10.22	V	26.09	54	27.91	AV
2494.89	49.03	-9.71	H	39.32	74	34.68	PK
2494.89	36.55	-9.71	H	26.84	54	27.16	AV
2489.80	49.13	-9.74	V	39.39	74	34.61	PK
2489.80	35.97	-9.74	V	26.23	54	27.77	AV

Notes:

1. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Extended Battery

Operation Mode:	EDR(8DPSK)
Operating Frequency	2402, 2480 MHz
Channel No.	0, 78 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2329.68	48.96	-10.41	H	38.55	74	35.45	PK
2329.68	36.55	-10.41	H	26.14	54	27.86	AV
2316.56	48.93	-10.47	V	38.46	74	35.54	PK
2316.56	36.13	-10.47	V	25.66	54	28.34	AV
2496.37	48.58	-9.71	H	38.87	74	35.13	PK
2496.37	36.41	-9.71	H	26.70	54	27.30	AV
2495.58	49.90	-9.71	V	40.19	74	33.81	PK
2495.58	36.58	-9.71	V	26.87	54	27.13	AV

Notes:

1. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

7.7 POWERLINE CONDUCTED EMISSIONS

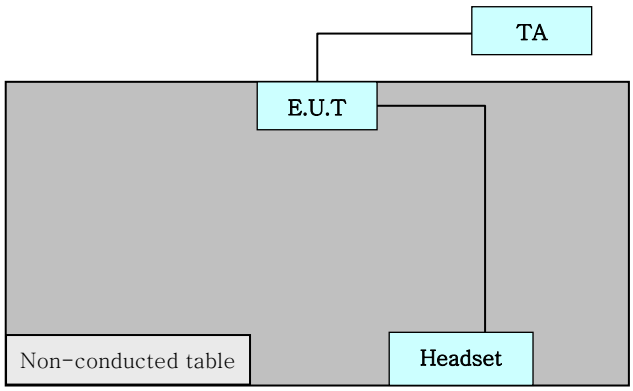
LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (HOT and NEUTRAL) and ground at the power terminals.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

* Normal & EDR

Test Plot - (Standard Battery)

Conducted emissions (Line 1 / Mid CH / EDR) – HOT

EUT : C731

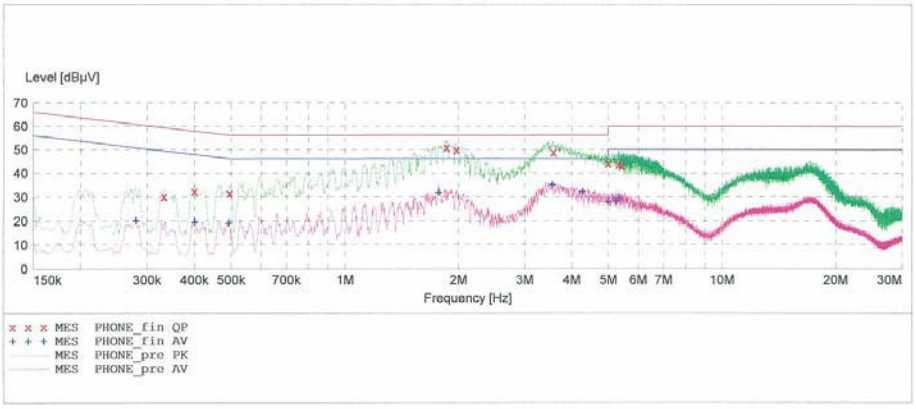
HCT

EMC TEST LAB.

```
EUT:                  C731( STD Bat_BTR731B)
Manufacturer:         CASIO HITACHI Mobile Communication Co., Ltd
Operating Condition:  Bluetooth mode
Test Site:            SHIELD ROOM
Operator:             YH-LEE
Test Specification:   CISPR 22 CLASS B
Comment:              H
```

SCAN TABLE: "CISPR 22 Voltage"

```
  Short Description:              CISPR 22 Voltage
  Start       Stop        Step        Detector   Meas.     IF       Transducer
  Frequency   Frequency   Width                  Time      Bandw.
  150.1 kHz   500.0 kHz   2.5 kHz     MaxPeak    10.0 ms   9 kHz    None
                                      Average
  500.0 kHz   5.0 MHz     4.0 kHz     MaxPeak    10.0 ms   9 kHz    None
                                      Average
  5.0 MHz     30.0 MHz    4.0 kHz     MaxPeak    10.0 ms   9 kHz    None
                                      Average
```



MEASUREMENT RESULT: "PHONE_fin QP"

6/23/2009 3:49PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.332600	30.20	10.1	59	29.2	---	---
0.400100	32.40	10.1	58	25.5	---	---
0.495100	31.50	10.2	56	24.6	---	---
1.860000	51.00	10.3	56	5.0	---	---
1.976000	49.90	10.4	56	6.1	---	---
3.580000	48.90	10.5	56	7.1	---	---
5.000000	44.30	10.7	56	11.7	---	---
5.328000	43.80	10.7	60	16.2	---	---
5.420000	43.30	10.7	60	16.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/23/2009 3:49PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.280100	20.20	10.1	51	30.6	---	---
0.400100	19.50	10.1	48	28.4	---	---

```
Page 1/2   6/23/2009  3:49PM   HCT EMC LAB
```

MEASUREMENT RESULT: "PHONE_fin AV"

(continued)

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.492600	19.10	10.2	46	27.0	---	---
1.768000	31.90	10.3	46	14.1	---	---
3.552000	35.10	10.5	46	10.9	---	---
4.268000	32.30	10.6	46	13.7	---	---
5.000000	27.80	10.7	46	18.2	---	---
5.244000	28.20	10.7	50	21.8	---	---
5.328000	29.30	10.7	50	20.7	---	---

Page 2/2 6/23/2009 3:49PM HCT EMC LAB

Conducted emissions (Line 2 / Mid CH / EDR) – NEUTRAL

EUT : C731

HCT

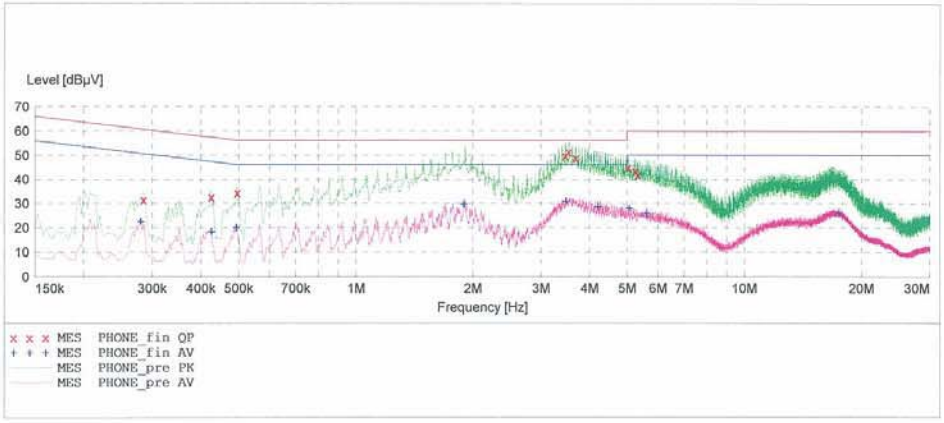
EMC TEST LAB.

```
EUT:                  C731( STD Bat_BTR731B)
Manufacturer:         CASIO HITACHI Mobile Communication Co., Ltd
Operating Condition:  Bluetooth mode
Test Site:            SHIELD ROOM
Operator:             YH-LEE
Test Specification:   CISPR 22 CLASS B
Comment:              N
```

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

6/23/2009 3:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.285100	31.60	10.1	61	29.0	---	---
0.425100	32.70	10.1	57	24.7	---	---
0.495100	34.30	10.2	56	21.8	---	---
3.468000	49.90	10.5	56	6.1	---	---
3.540000	51.40	10.5	56	4.6	---	---
3.688000	48.80	10.5	56	7.2	---	---
5.032000	45.00	10.7	60	15.0	---	---
5.244000	43.70	10.7	60	16.3	---	---
5.316000	41.90	10.7	60	18.1	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/23/2009 3:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.280100	22.70	10.1	51	28.1	---	---
0.425100	18.40	10.1	47	28.9	---	---

Page 1/2 6/23/2009 3:52PM HCT EMC LAB

MEASUREMENT RESULT: "PHONE_fin AV"

(continued)

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.492600	20.10	10.2	46	26.1	---	---
1.896000	29.80	10.3	46	16.2	---	---
3.480000	30.90	10.5	46	15.1	---	---
4.208000	28.80	10.6	46	17.2	---	---
5.052000	28.10	10.7	50	21.9	---	---
5.612000	25.90	10.7	50	24.1	---	---
17.472000	26.10	12.2	50	23.9	---	---

Page 2/2 6/23/2009 3:52PM HCT EMC LAB

Test Plot - (Extended Battery)

Conducted emissions (Line 1 / Mid CH / EDR) – HOT

EUT : C731

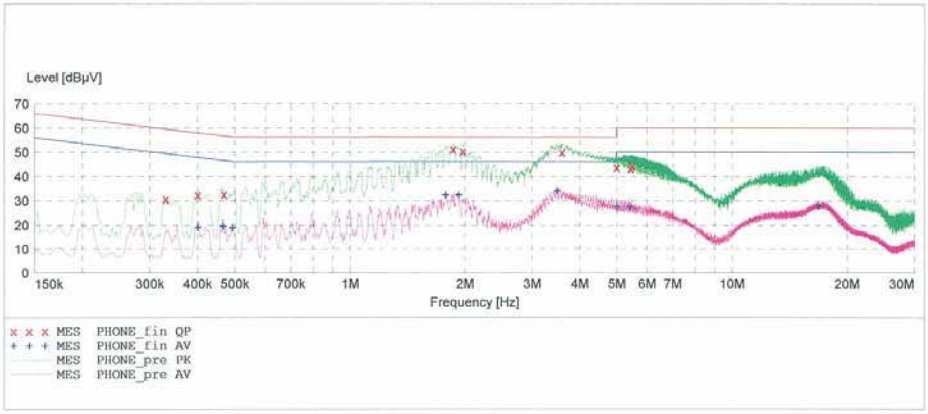
HCT

EMC TEST LAB.

```
EUT:                    C731( EXT Bat_BTR731B)
Manufacturer:           CASIO HITACHI Mobile Communication Co., Ltd
Operating Condition:    Bluetooth mode
Test Site:              SHIELD ROOM
Operator:               YH-LEE
Test Specification:     CISPR 22 CLASS B
Comment:                H
```

SCAN TABLE: "CISPR 22 Voltage"

```
  Short Description:              CISPR 22 Voltage
  Start       Stop        Step      Detector  Meas.     IF       Transducer
  Frequency   Frequency   Width               Time      Bandw.
  150.1 kHz   500.0 kHz   2.5 kHz   MaxPeak   10.0 ms   9 kHz    None
                                    Average
  500.0 kHz   5.0 MHz     4.0 kHz   MaxPeak   10.0 ms   9 kHz    None
                                    Average
  5.0 MHz     30.0 MHz    4.0 kHz   MaxPeak   10.0 ms   9 kHz    None
                                    Average
```



MEASUREMENT RESULT: "PHONE_fin QP"

6/23/2009 3:34PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.330100	30.70	10.1	59	28.8	---	---
0.400100	32.40	10.1	58	25.5	---	---
0.467600	32.70	10.2	57	23.8	---	---
1.860000	51.20	10.3	56	4.8	---	---
1.972000	50.40	10.4	56	5.6	---	---
3.592000	49.90	10.5	56	6.1	---	---
5.000000	43.70	10.7	56	12.3	---	---
5.436000	43.30	10.7	60	16.7	---	---
5.480000	44.30	10.7	60	15.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/23/2009 3:34PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.400100	19.30	10.1	48	28.6	---	---
0.465100	19.60	10.2	47	27.0	---	---

```
Page 1/2    6/23/2009   3:34PM    HCT EMC LAB
```

MEASUREMENT RESULT: "PHONE_fin AV"

(continued)

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.492600	19.10	10.2	46	27.1	---	---
1.776000	32.40	10.3	46	13.6	---	---
1.920000	32.50	10.4	46	13.5	---	---
3.484000	34.10	10.5	46	11.9	---	---
5.000000	27.70	10.7	46	18.3	---	---
5.400000	27.90	10.7	50	22.1	---	---
16.820000	28.10	12.2	50	21.9	---	---

Page 2/2 6/23/2009 3:34PM HCT EMC LAB

Conducted emissions (Line 2 / Mid CH / EDR) – NEUTRAL

EUT : C731

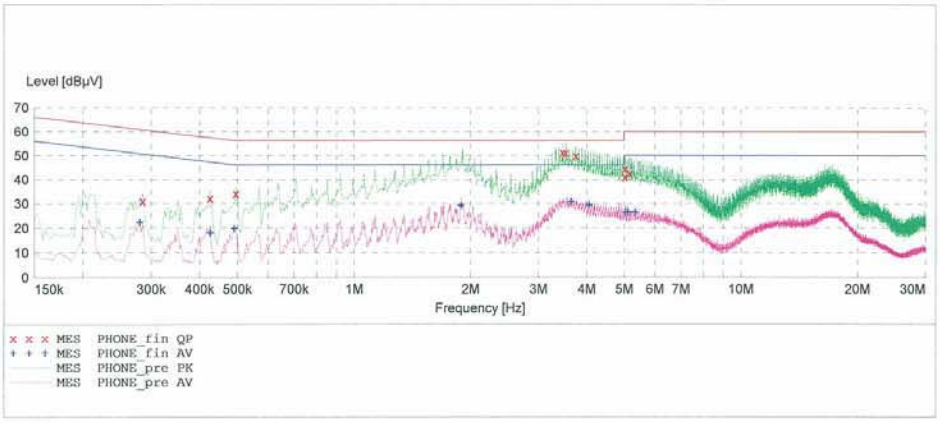
HCT

EMC TEST LAB.

```
EUT:                  C731( EXT Bat_BTR731B)
Manufacturer:         CASIO HITACHI Mobile Communication Co., Ltd
Operating Condition:  Bluetooth mode
Test Site:            SHIELD ROOM
Operator:             YH-LEE
Test Specification:   CISPR 22 CLASS B
Comment:              N
```

SCAN TABLE: "CISPR 22 Voltage"

```
  Short Description:              CISPR 22 Voltage
  Start      Stop       Step      Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.1 kHz  500.0 kHz  2.5 kHz   MaxPeak   10.0 ms   9 kHz    None
                                  Average
  500.0 kHz  5.0 MHz    4.0 kHz   MaxPeak   10.0 ms   9 kHz    None
                                  Average
  5.0 MHz    30.0 MHz   4.0 kHz   MaxPeak   10.0 ms   9 kHz    None
                                  Average
```



MEASUREMENT RESULT: "PHONE_fin QP"

6/23/2009 3:30PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.285100	31.10	10.1	61	29.5	---	---
0.425100	32.30	10.1	57	25.1	---	---
0.495100	34.10	10.2	56	22.0	---	---
3.464000	51.20	10.5	56	4.8	---	---
3.536000	51.20	10.5	56	4.8	---	---
3.748000	49.90	10.5	56	6.1	---	---
5.020000	41.20	10.7	60	18.8	---	---
5.028000	44.50	10.7	60	15.5	---	---
5.164000	42.60	10.7	60	17.4	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/23/2009 3:30PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.280100	22.50	10.1	51	28.3	---	---
0.425100	18.10	10.1	47	29.3	---	---

Page 1/2 6/23/2009 3:31PM HCT EMC LAB

MEASUREMENT RESULT: "PHONE_fin AV"

(continued)

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.490100	19.80	10.2	46	26.3	---	---
1.888000	29.40	10.3	46	16.6	---	---
3.640000	31.00	10.5	46	15.0	---	---
4.056000	29.60	10.6	46	16.4	---	---
5.040000	26.60	10.7	50	23.4	---	---
5.112000	26.70	10.7	50	23.3	---	---
5.324000	26.50	10.7	50	23.5	---	---

Page 2/2 6/23/2009 3:31PM HCT EMC LAB

8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	04/10/2010	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	Annual	06/13/2010	100329
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/18/2010	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	10/30/2009	375.8810.352
MITEQ	AMF-60-0010 1800-35-20P/AMP	Annual	05/20/2010	1200937
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	03/26/2010	147
Rohde & Schwarz	6502/Loop Antenna	Biennial	12/26/2009	9009-2536
Rohde & Schwarz	FSP30/Spectrum Analyzer	Annual	07/31/2009	839117/011
Agilent	E4416A /Power Meter	Annual	01/21/2010	GB41291412
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	06/28/2009	1
Hewlett Packard	11636B/Power Divider	Annual	12/24/2009	11377
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/07/2010	3110117