FCC PART 22 and 90
TEST REPORT

For

Sepura plc

9000 Cambridge Research Park Beach Drive, Waterbeach, Cambridge, United Kingdom

FCC ID: XX6SEM8040H

Report Type:	**Product Type:**
Class II permissive change	DMR Mobile Radio

Test Engineer:	Dean Liu
Report Number:	RDG150907003-00A1
Report Date:	2016-02-16
Reviewed By:	Sula Huang RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Sepura plc*'s product, model: *SEM8040H* (*FCC ID: XX6SEM8040H)* (the "EUT") in this report is a *DMR Mobile Radio*, which was measured approximately: 17.2 cm (L) x 19.5 cm (H) x 5.8 cm (T), rated input voltage: 13.6 VDC.

** All measurement and test data in this report was gathered from production sample serial number: 7PR531528GD0107 (assigned by applicant). The EUT was received on 2015-09-07.*

Objective

This test report is prepared on behalf of *Sepura plc* in accordance with Part 2, Part22, and Part 90 of the Federal Communications Commission rules.

This is the CIIPC application of the device. The difference between the original device and new device is as follows:

1. Updated the occupied bandwidth&emission mask
2. Updated the emission designator

Please refer to the Permissive Change Declaration Letter.

According to the changes, it will impact the test result of occupied bandwidth&emission mask, so in this report, we update the test data of occupied bandwidth&emission mask.

Related Submittal(s)/Grant(s)

Original submission with FCC ID: XX6SEM8040H which is granted on 2014-09-25.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 22 – Public Mobile Service
Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA-603-D.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a test mode.

EUT Specfication:

Operating Frequency Band	400-406 MHz; 406.1-470 MHz
Modulation Mode	FM, 4FSK
Channel Spacing	12.5 kHz
Transmitter Power	High power level: 40W Low power level: 25W

Equipment Modifications

No modifications were made to the unit tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Pro instrument	DC Power Supply	pps3300	N/A

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1091	Maximum Permissible Exposure	Compliant*
§2.1046; § 22.727;§90.205	RF Output Power	Compliant*
§2.1047;§90.207	Modulation Characteristic	Compliant*
§2.1049;§22.357;§ 22. 731;§90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliant
§2.1051; §22.861;§90.210	Spurious Emission at Antenna Terminal	Compliant*
§2.1053; §22.861;§90.210	Spurious Radiated Emissions	Compliant*
§2.1055; § 22.355;§90.213	Frequency Stability	Compliant*
§90.214	Transient Frequency Behavior	Compliant*

Compliance*: Please refer to the report number R2DG131112005-00 issued on 2014-08-21, with FCC ID: XX6SEM8040H.

FCC §2.1049& §22.357 & § 22.731 &§90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049, §22.357, § 22.731, §90.209 and §90.210

Applicable Emission Masks

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25	A or B	A or C
25-50	B	C
72-76	B	C
150-174	B, D, or E	C, D or E
150 paging only	B	C
220-222	F	F
421-512	B, D, or E	C, D, or E
450 paging only	B	G
806-809/851-854	B	H
809-824/854-869	B	G
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M
5850-5925		
All other bands	B	C

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd−2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
HP	RF Communications Test Set	8920A	00 235	2015-05-09	2016-05-09
AA-MCS	Attenuator(40dB)	CAT-50-40-200-Nm-Nf	0602-010	2015-05-08	2016-05-08
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06
Pasternack	RF Coaxial Cable	RF-01(30cm)	/	2015-05-06	2016-05-06
Pasternack	RF Coaxial Cable	RF-02(30cm)	/	2015-05-06	2016-05-06

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.0 °C
Relative Humidity:	48 %
ATM Pressure:	101.1 kPa

The testing was performed by Dean Liu on 2015-10-25.

Test Mode: Transmitting

Test Result: Compliant.Please refer to the following tables and plots.

FCC Part 90:

Modulation Mode	Channel Spacing	f_c	26 dB Bandwidth	99% Occupied Bandwidth	Power Level
	kHz	MHz	kHz	kHz	
FM	12.5	435	10.32	9.92	High
4FSK			9.32	7.52	
FM			10.32	9.92	Low
4FSK			9.42	7.31	

FCC Part 22:

Modulation Mode	Channel Spacing	f_c	26 dB Bandwidth	99% Occupied Bandwidth	Power Level
	kHz	MHz	kHz	kHz	
FM	12.5	458	10.32	9.92	High
4FSK			9.12	6.71	
FM			10.32	9.92	Low
4FSK			9.12	6.81	

Emission Designator

Per CFR 47 §2.201& §2.202&, Bn = 2M + 2D

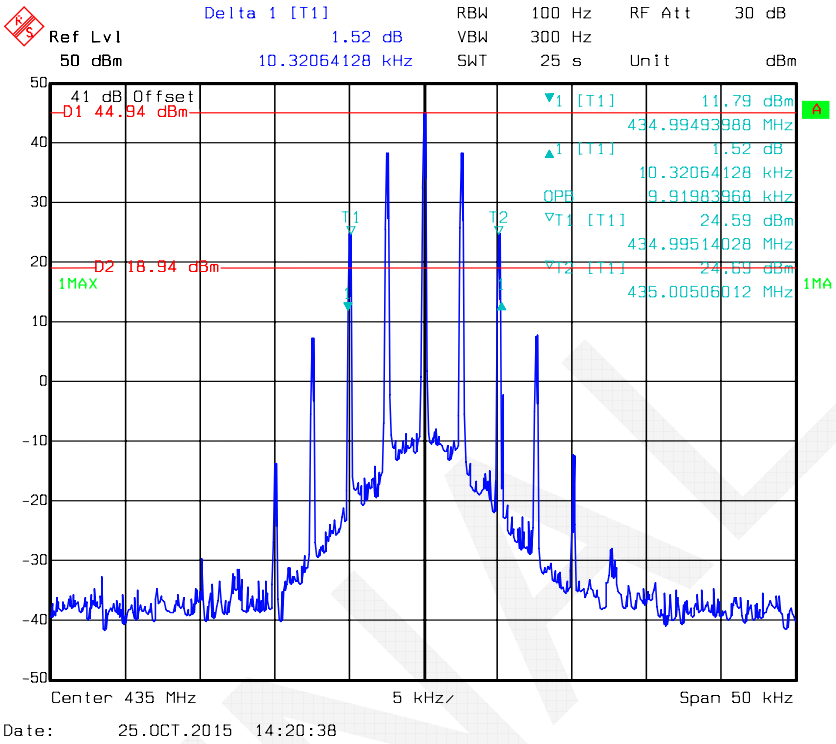
For FM Mode (Channel Spacing: 12.5 kHz)
Emission Designator 11K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = ➔11K0
F3E portion of the designator represents an FM voice transmission.
Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

For Digital Mode (Channel Spacing: 12.5 kHz)
Emission Designator 7K60FXD and 7K60FXW
The 99% energy rule (title 47CFR 2.1049) was used for digital mode. It basically states that 99% of the modulation energy falls within X kHz, in this case, 7.52 kHz. The emission mask was obtained from 47CFR 90.210(d).
FXD and FXW portion of the designator indicates digital information.
Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60FXD and 7K60FXW.

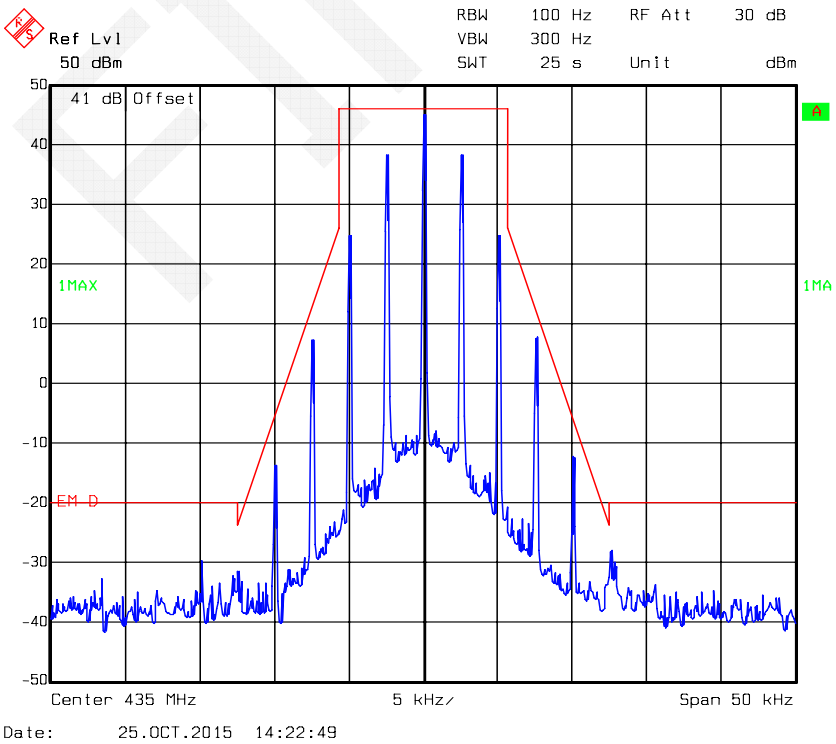
High Power Level

Part 90:

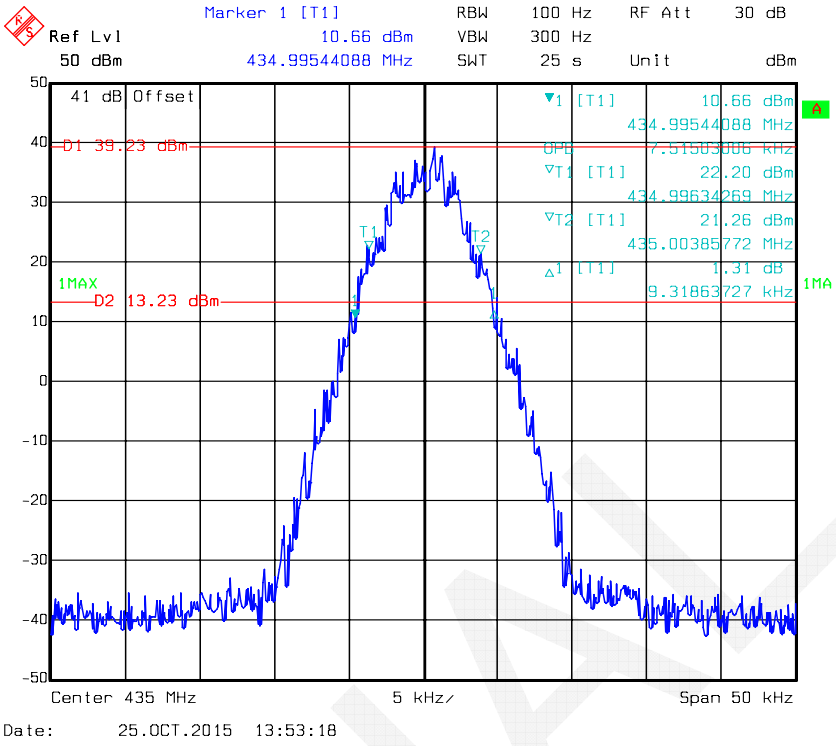
Occupied Bandwidth – FM



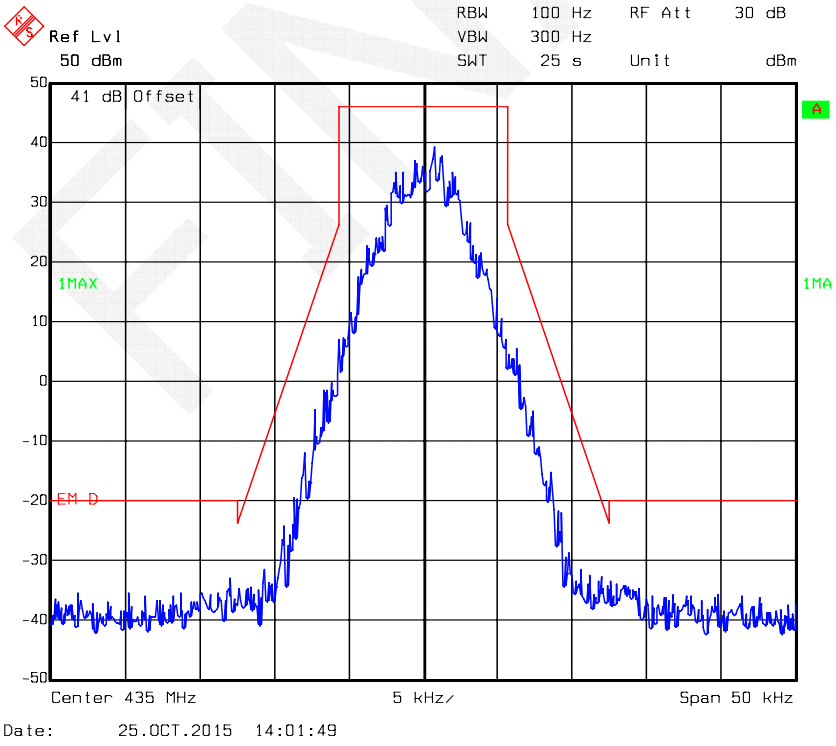
Emission Mask - Type D



Occupied Bandwidth –4FSK

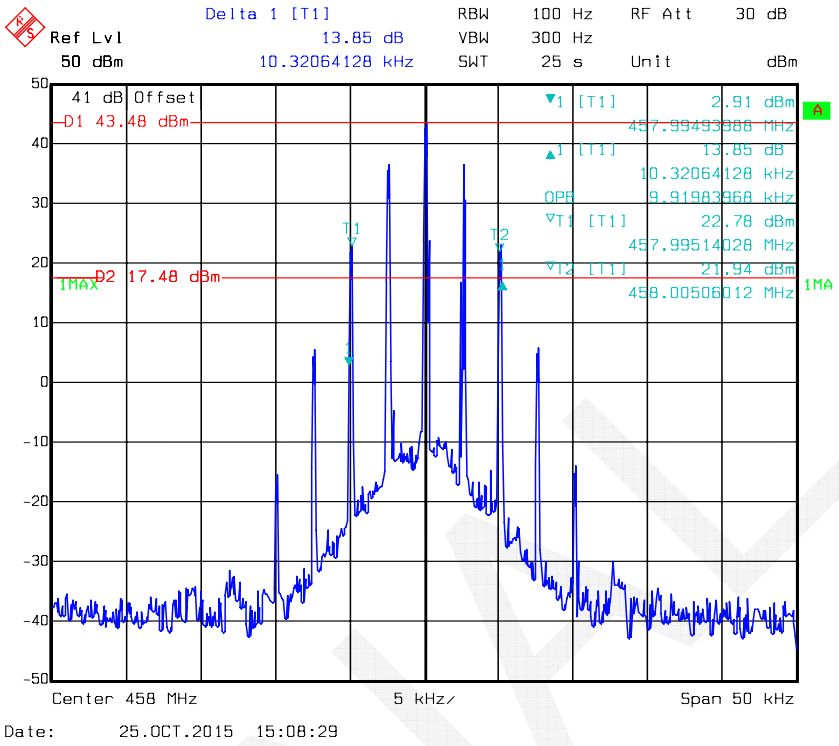


Emission Mask - Type D

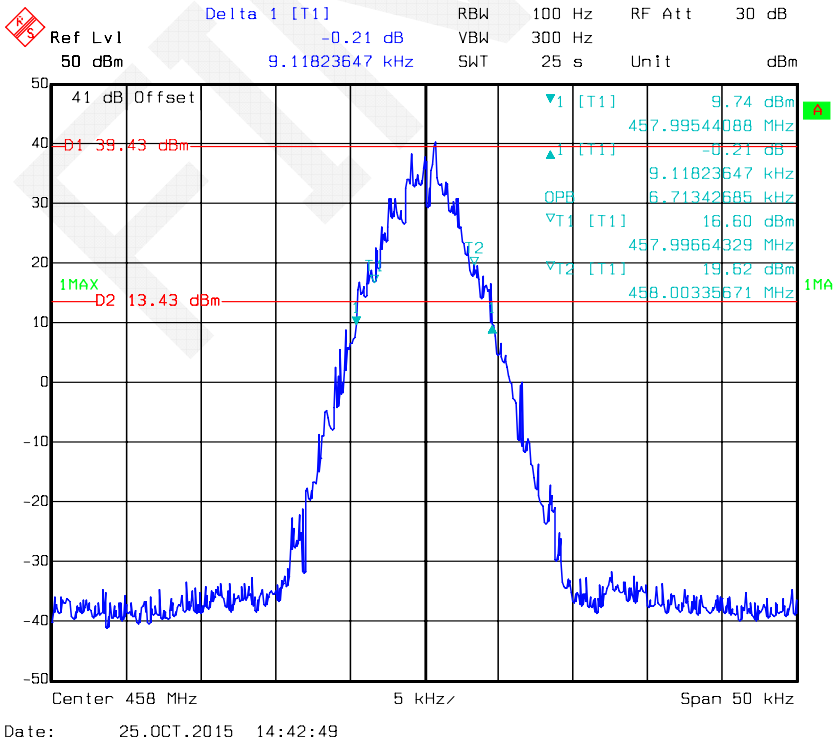


Part 22:

Occupied Bandwidth –FM



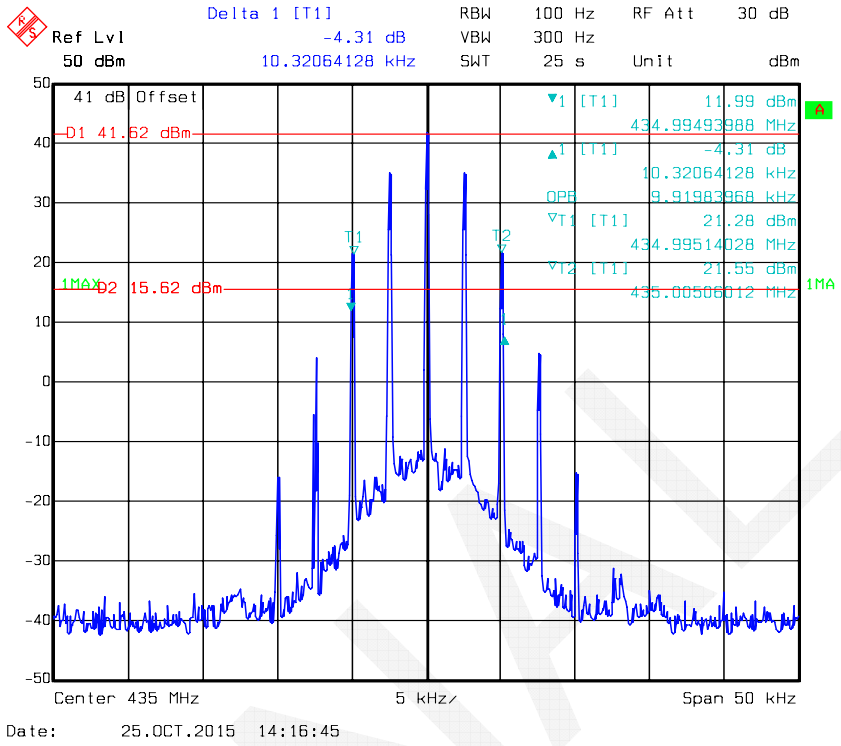
Occupied Bandwidth –4FSK



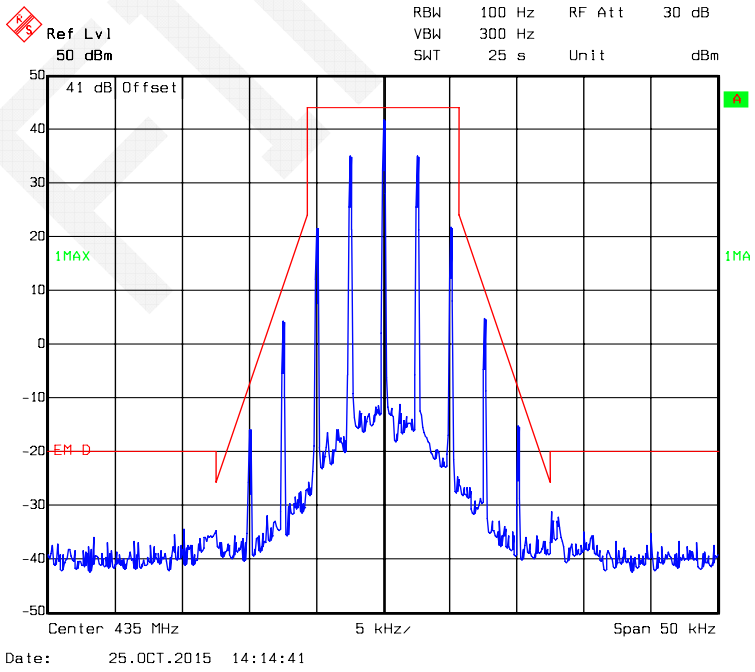
Low Power Level

Part 90:

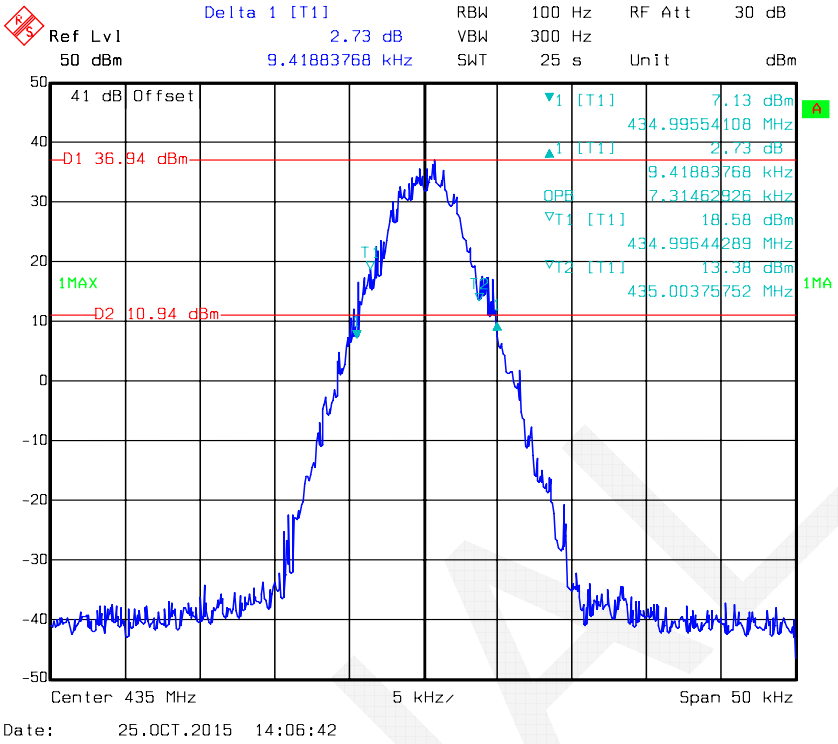
Occupied Bandwidth – FM



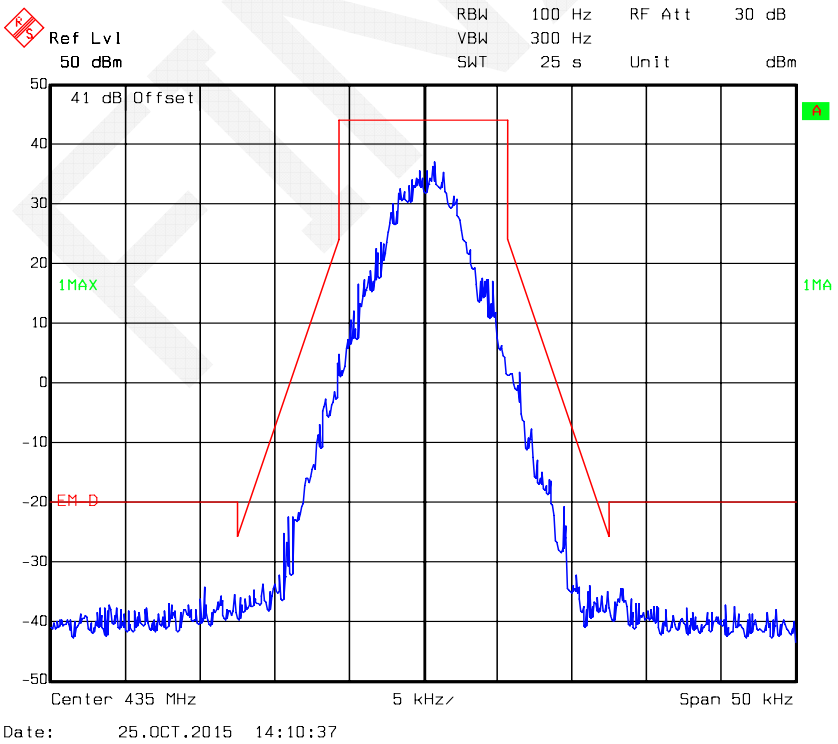
Emission Mask - Type D



Occupied Bandwidth –4FSK

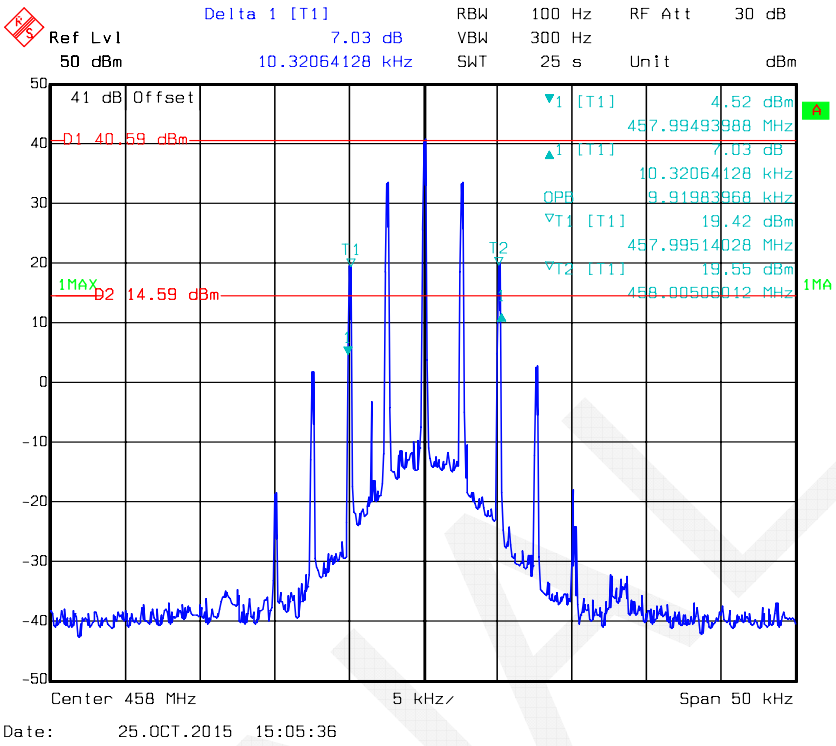


Emission Mask - Type D

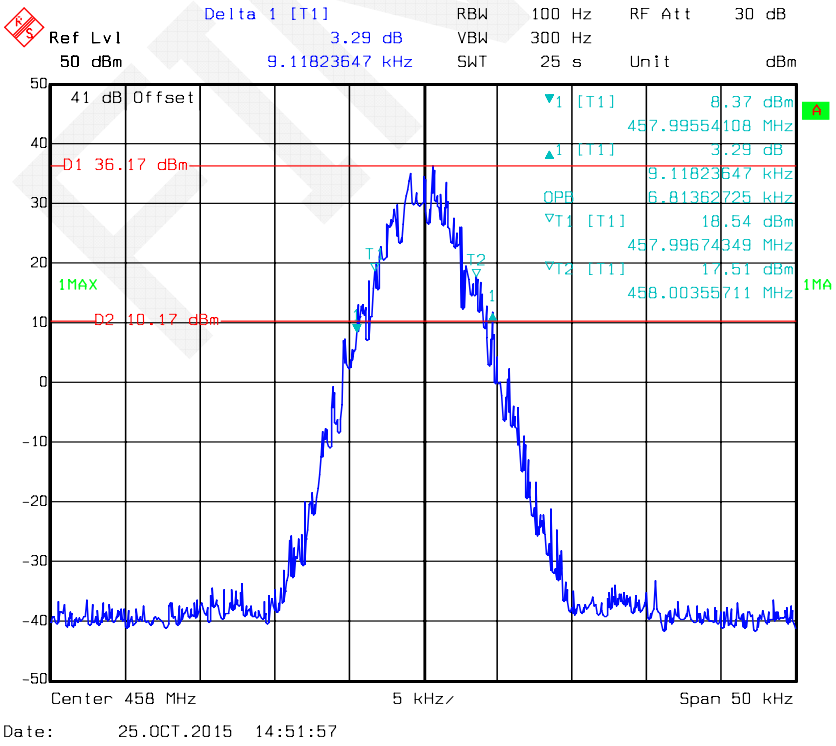


Part 22:

Occupied Bandwidth –FM



Occupied Bandwidth –4FSK



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