Deutscher Akkreditierungs Rat

DAR

No. DAT-P-114/01-10

TEST REPORT

No. FCC- 2005002

Test name	FCC Test
Product	CDMA Mobile Station
Model	CT300
Client	TCL Mobile Communication Co.,Ltd

Telecommunication Metrology Center

of Ministry of Information Industry

Notice

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Address: No. 52, Huayuanbei Road, Beijing, P. R. China
Post code: 100083 Cable: 04282
Telephone: +86 10 62302041 Fax: +86 10 62304793

Product	CDMA Mobile Station	**Model** / **Trade mark**	CT300
Client	TCL Mobile Communication Co.,Ltd		
Manufacturer	TCL Mobile Communication Co.,Ltd	**Arrival Date of sample**	Sep,12, 2005
Place of sampling	(Blank)	**Carrier of the samples**	Wan Jianhong
Quantity of the samples	2	**Date of product**	/
Base of the samples	(Blank)	**Items of test**	8
Series number			
Standard(s)	FCC Part 22		
Conclusion	**Final Judgment: Pass** (Stamp) **Date of issue:** Sep,29, 2005		
Comment	The test result relates only to the tested sample.		

Approved by (Lu Bingsong) **Reviewed by** (Zhang Rui) **Performed by** (Wu Di)

TABLE OF CONTENT

1 COMPETENCE AND WARRANTIES

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory accredited by DAR (DATech) – Deutschen Akkreditierungs Rat (Deutsche Akkreditierungsstelle Technik), for the tests indicated in the Certificate No. **DAT-P-114/01-10**.

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Telecommunication Metrology Center of Ministry of Information Industry is a testing laboratory competent to carry out the tests described in this report.

Telecommunication Metrology Center of Ministry of Information Industry guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at **Telecommunication Metrology Center of Ministry of Information Industry** at the time of execution of the test.

Telecommunication Metrology Center of Ministry of Information Industry is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

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2.3 This document is only valid if complete; no partial reproduction can be made without written approval of Telecommunication Metrology Center of Ministry of Information Industry.

2.4 This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of Telecommunication Metrology Center of Ministry of Information Industry and the Accreditation Bodies, if it applies.

3 ABOUT EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant's details (The Client)

Name or Company	TCL Mobile Communication Co.,Ltd
Address/Post	No.23 Zone,Zhongkai High Technology Development Zone,Huizhou,guangdong
City	Huizhou
Postal Code	516006
Country	China
Telephone	0752- 2636729
Fax	0752- 2636525

Table 2: Manufacturer's details

Name or Company	TCL Mobile Communication Co.,Ltd
Address/Post	No.23 Zone,Zhongkai High Technology Development Zone,Huizhou,guangdong
City	Huizhou
Postal Code	516006
Country	China
Telephone	0752- 2636729
Fax	0752- 2636525

3.2 Equipment under test (EUT)

Model	CT300
Description	CDMA mobile station
SN number	EUT1: 3E61252B;
Hardware status	V2.2
Software status	CD03-1TW_0825
Frequency	Tx frequency:824.70 - 848.31 MHz (CDMA) Rx frequency: 869.70 - 893.31 MHz (CDMA)
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	23.26dBm(0.21W) maximum ERP
Extreme vol. Limits	3.3VDC to 4.2VDC (nominal: 3.7 VDC)
Extreme temp. Tolerance	-30°C to +50°C

3.3 Photographs of Equipment under test

Photographs of MS Hand Telephone Set and Charger are respectively shown in ANNEX B of this test report.

4 LABORATORY ENVIRONMENT

Semi-anechoic chamber (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 26 to 1000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %

Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 26 to 1000 MHz

5 SUMMARY OF TEST RESULTS

Abbreviations used in this clause:	
P	Pass
NA	Not applicable
F	Fail

Clause	List	Clause in FCC rules	Verdict
1	POWER OUTPUT	22.913(a)	P
2	FREQUENCY STABILITY	2.1055	P
3	OCCUPIED BANDWIDTH	2.1049(h)(i)	P
4	EMISSION BANDWIDTH	22.917(b)	P
5	EMISSION LIMIT	2.1051/22.917	P
6	BAND EDGE COMPLIANCE	22.917(b)	P
7	CONDUCTED SPURIOUS EMISSIONS	2.1057/22.917	P
8	CONDUCTED EMISSIONS	15.107/207	P

6 MAIN TEST INSTRUMENTS

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER
1	Test Receiver	ESS	847151/015	R&S
2	Test Receiver	ESI40	831564/002	R&S
3	BiLog Antenna	3142B	9908-1403	EMCO
4	BiLog Antenna	3142B	9908-1405	EMCO
5	Signal Generator	SMT06	831285/005	R&S
6	Signal Generator	SMP04	100070	R&S
7	LISN	ESH2-Z5	829991/012	R&S
8	Spectrum Analyzer	E4440A	MY41000262	Agilent
9	Universal Radio Communication Tester	CMU200	100680	R&S
10	Dual-Ridge Waveguide Horn Antenna	3115	9906-5827	EMCO
11	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO
12	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO
13	Climatic chamber	SH-241	92003546	ESPEC

7 TEST PERIOD

The performed test started on Sep, 12, 2005 and finished on Sep, 29, 2005.

8 TEST LOCATION

Safety & EMC laboratory of Telecommunication Metrology Center of Ministry of Information Industry.

ANNEX A MEASUREMENT RESULTS

A.1 OUTPUT POWER (§22.913(a))

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max power transmission and proper modulation.
This result contains conducted output power and ERP for the EUT.
In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

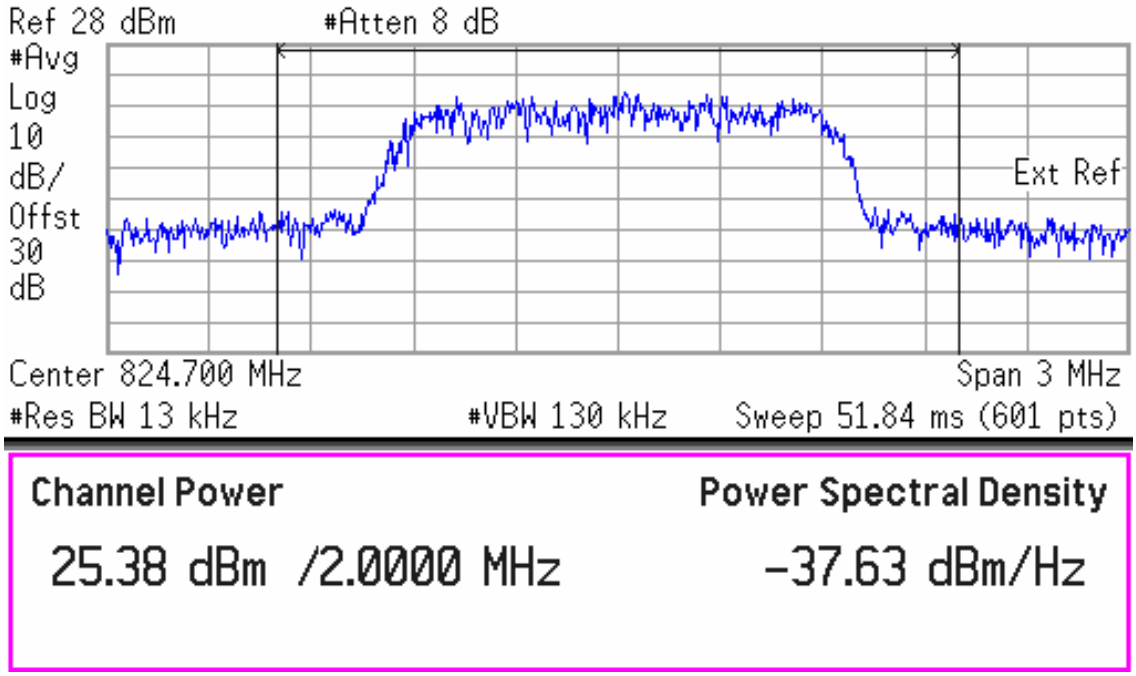
The EUT was set up for the max output power.
The channel power was measured with Agilent Spectrum Analyzer E4440A.
These measurements were done at 3 channels, 1013, 363 and 777 .

Measurement result

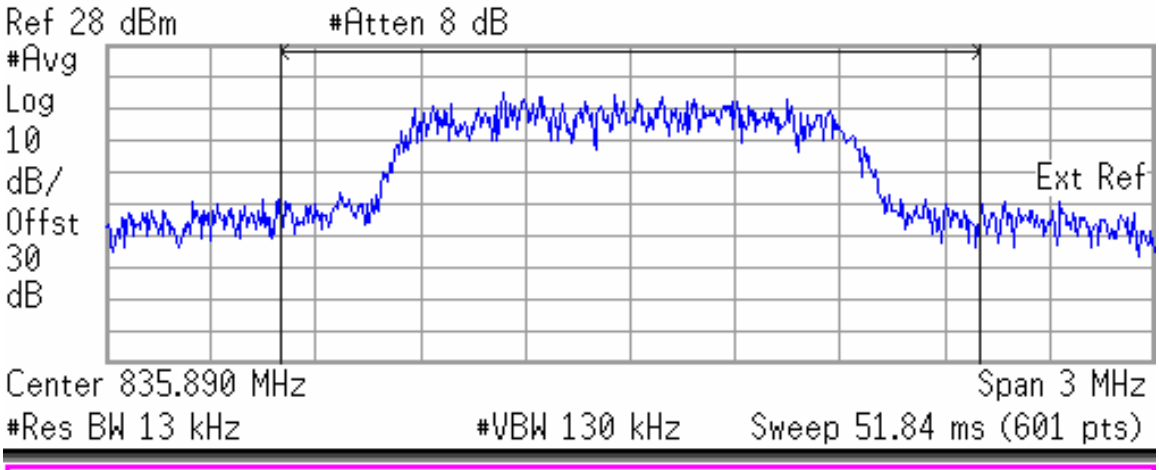
EUT1:3E61252B

Channel	Frequency(MHz)	Channel power(dBm)
1013	824.70	25.38
363	835.89	25.23
777	848.31	25.53

Channel 1013

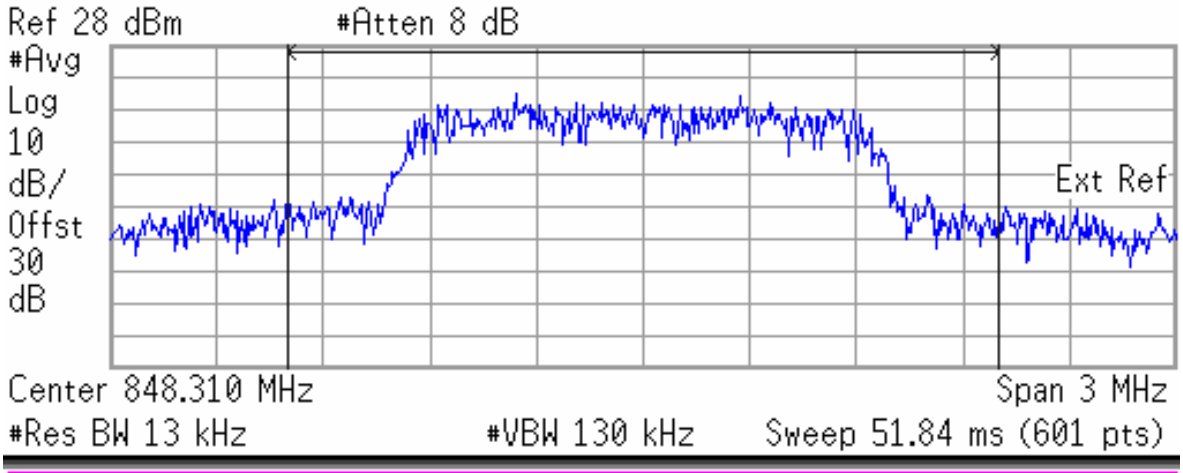


Channel 363



Channel Power	Power Spectral Density
25.23 dBm /2.0000 MHz	-37.78 dBm/Hz

Channel 777



Channel Power	Power Spectral Density
25.53 dBm /2.0000 MHz	-37.48 dBm/Hz

A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 22.913(a) specifies ”Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

A.1.3.2 Method of Measurement

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as Pin + 2.15 - Pr.
3. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
5. The EUT is then put into pulse mode at its maximum power level.
6. "Gated mode" power measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

ERP 22.913(a)

Measurement result

Channel	Frequency(MHz)	ERP(dBm)
1013	824.70	21.28
363	835.89	20.75
777	848.31	23.26

A.2 FREQUENCY STABILITY (§2.1055)

A.2.1 Method of Measurement

In order to measure the carrier frequency, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO

COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. EUT was powered via nominal voltage and connected to the CMU200. CMU200 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing..

A.2.2 Measurement Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.00025 (±2.5ppm) of the center frequency.

A.2.3 Measurement results

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.3	15	0.018
3.7	10	0.012
4.2	19	0.023

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	31	0.037
-20	25	0.030
-10	24	0.029
0	25	0.030
10	12	0.014
20	17	0.020
30	19	0.023
40	20	0.024
50	25	0.030

A.3 OCCUPIED BANDWIDTH (§2.1049(h)(i))

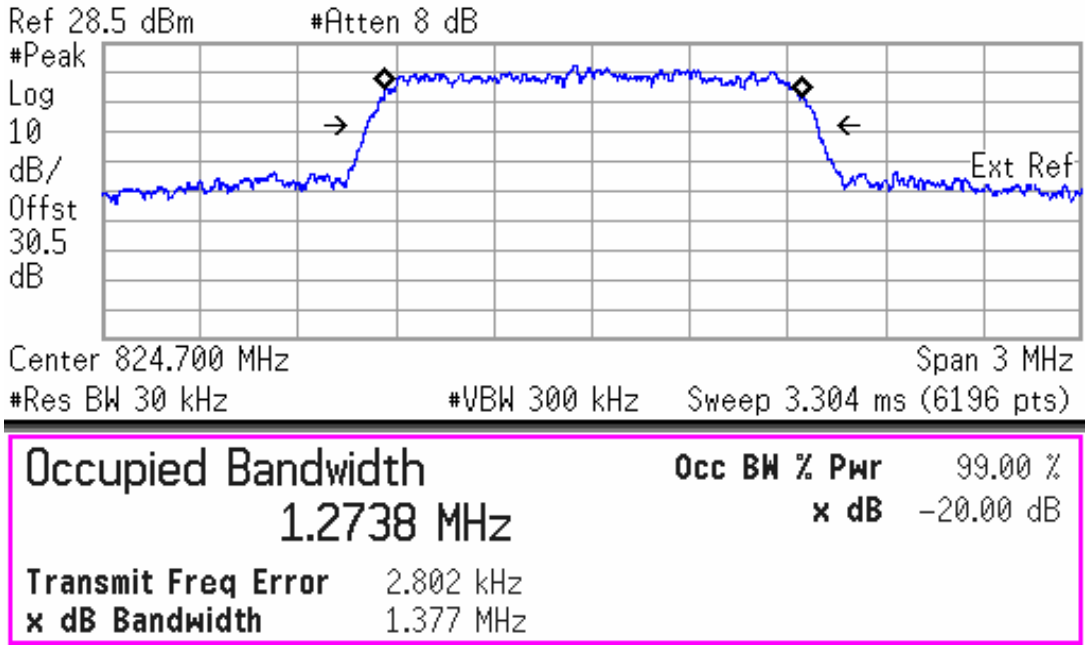
A.3.1 Occupied Bandwidth Results

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. The table below lists the measured -20dBc BW (99%). Spectrum analyzer plots are included on the following pages.

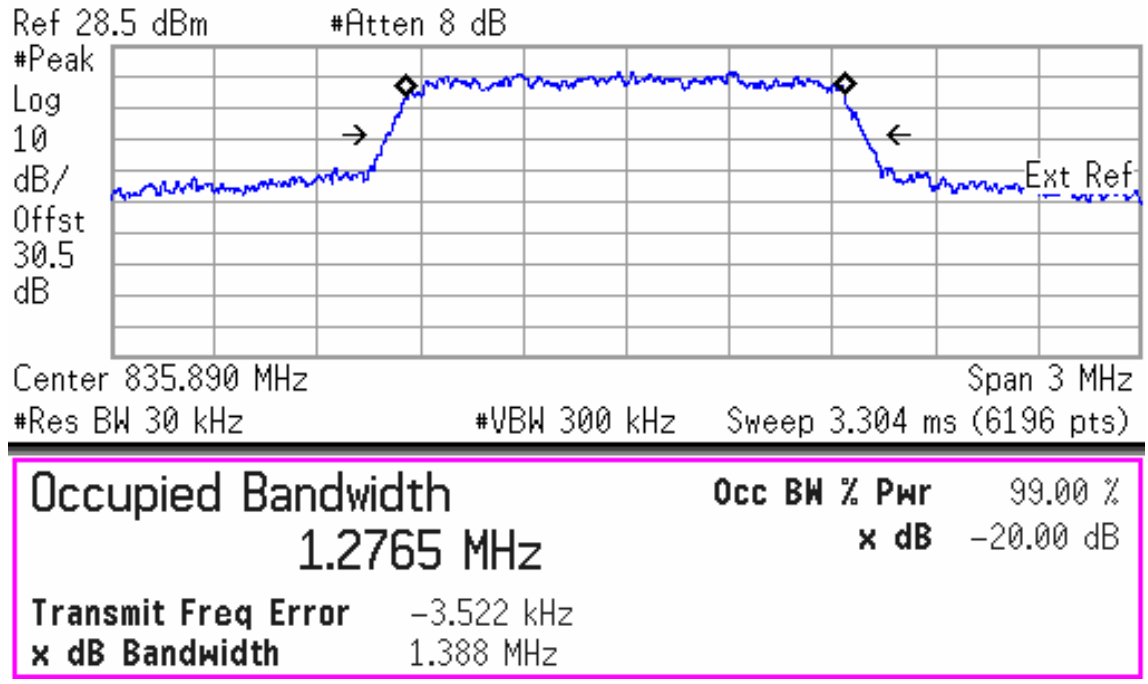
EUT1: 3E61252B

Channel	Frequency(MHz)	Occupied Bandwidth (–20dBc BW)(MHz)
1013	824.70	1.377
363	835.89	1.388
777	848.31	1.386

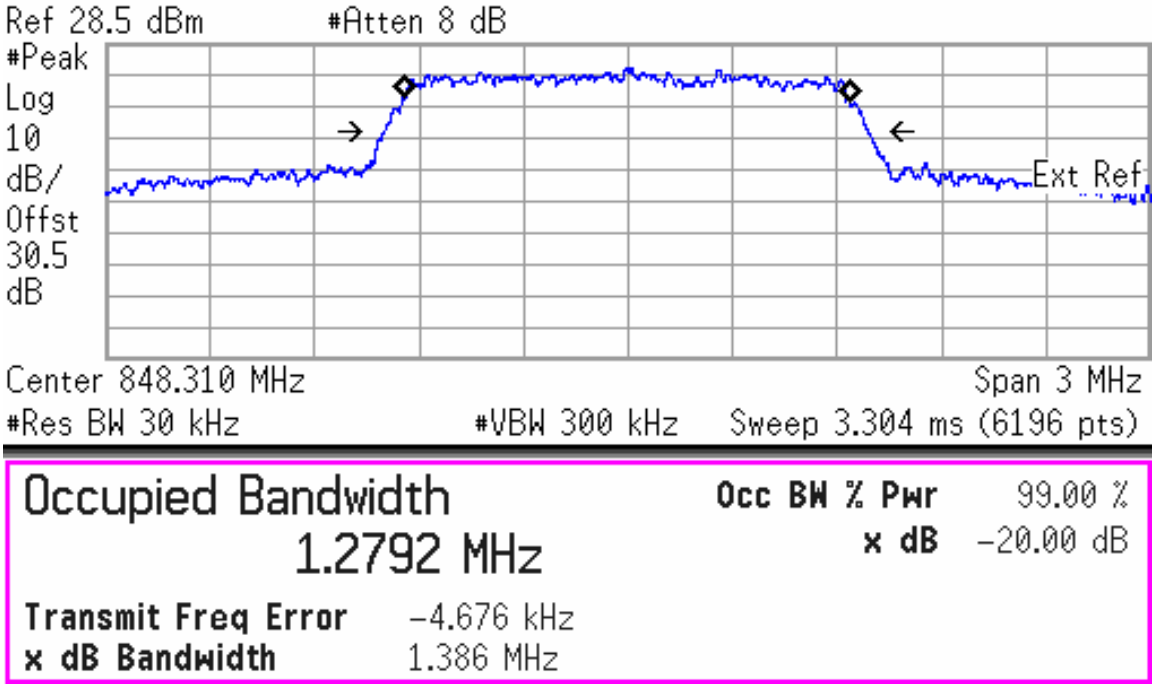
Channel 1013-Occupied Bandwidth (-20dBc BW)



Channel 363-Occupied Bandwidth (-20dBc BW)



Channel 777-Occupied Bandwidth (-20dBc BW)



A.4 EMISSION BANDWIDTH (§22.917(b))

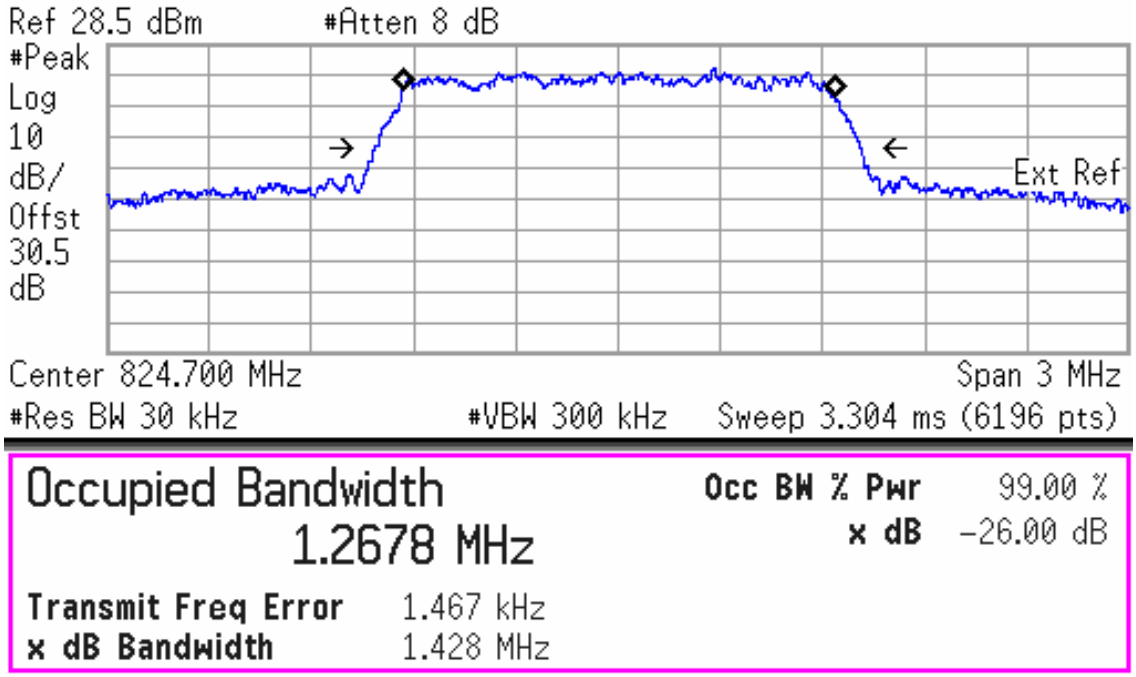
A.4.1Emission Bandwidth Results

Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Spectrum analyzer plots are included on the following pages.

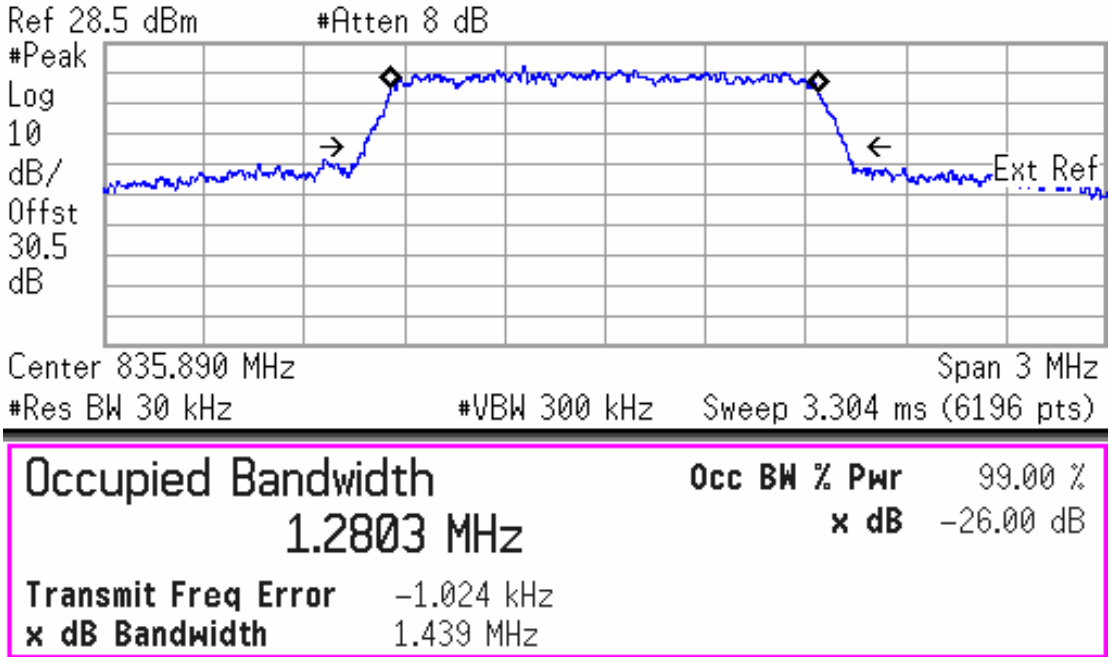
EUT1: 3E61252B

Channel	Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(MHz)
1013	824.70	1.428
363	835.89	1.439
777	848.31	1.451

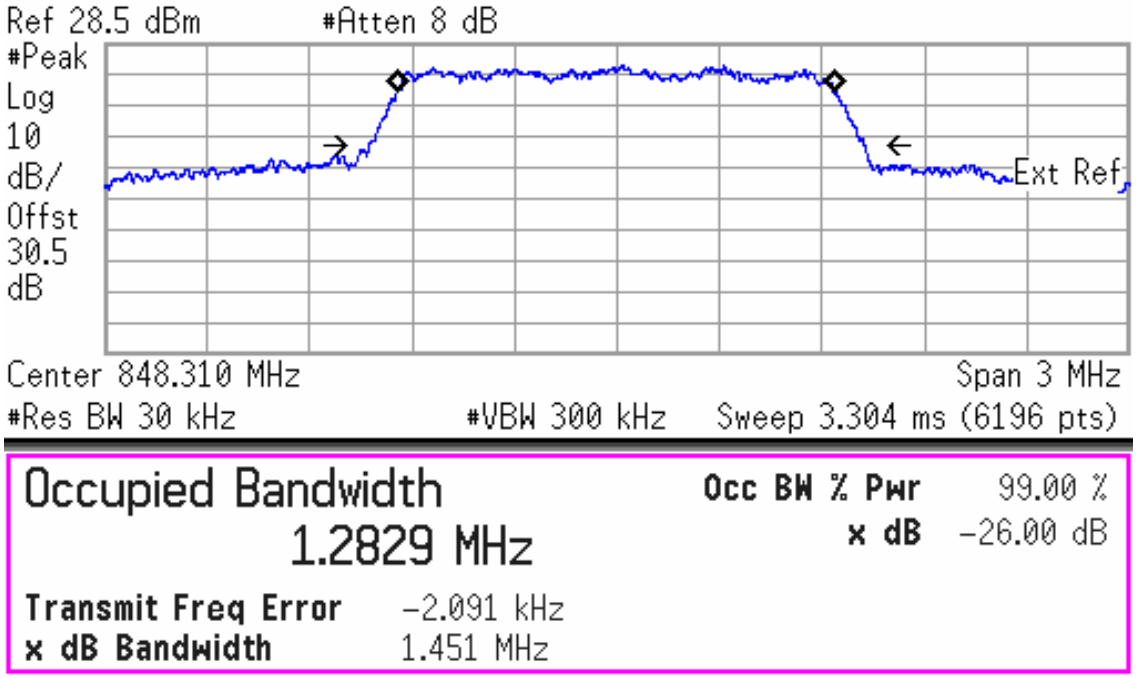
Channel 1013-Occupied Bandwidth (-26dBc BW)



Channel 363-Occupied Bandwidth (-26dBc BW)



Channel 777-Occupied Bandwidth (-26dBc BW)



A.5 EMISSION LIMIT (§2.1051)

A.5.1 Measurement Method

The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognized by the FCC. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 849 MHz. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the operating band.

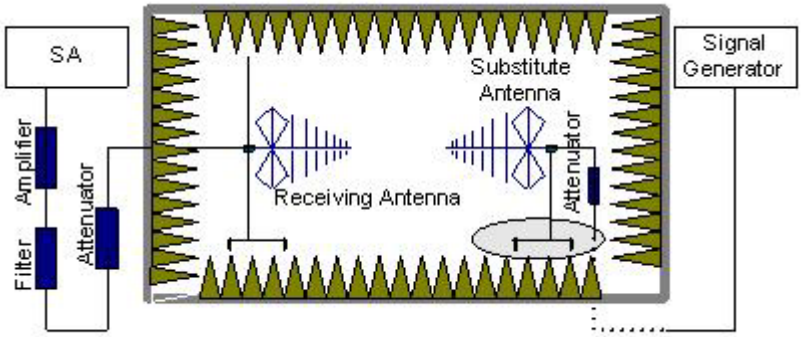
The procedure of radiated spurious emissions is as follows:

a) Pre-calibration

With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as,

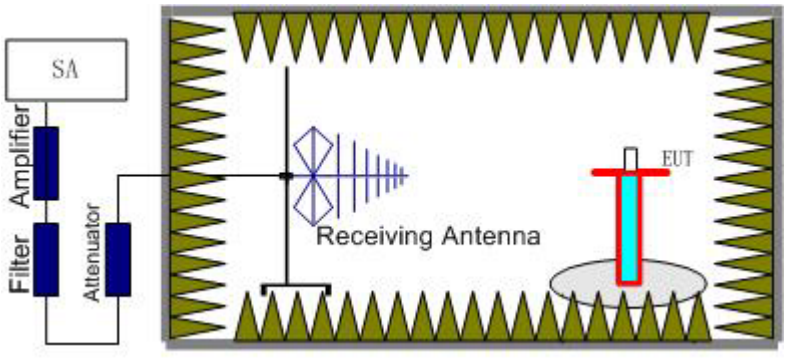
RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）

The SA is calibrated using following setup.



b) EUT test

EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



A.5.2 Measurement Limit

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.5.3 Measurement Results

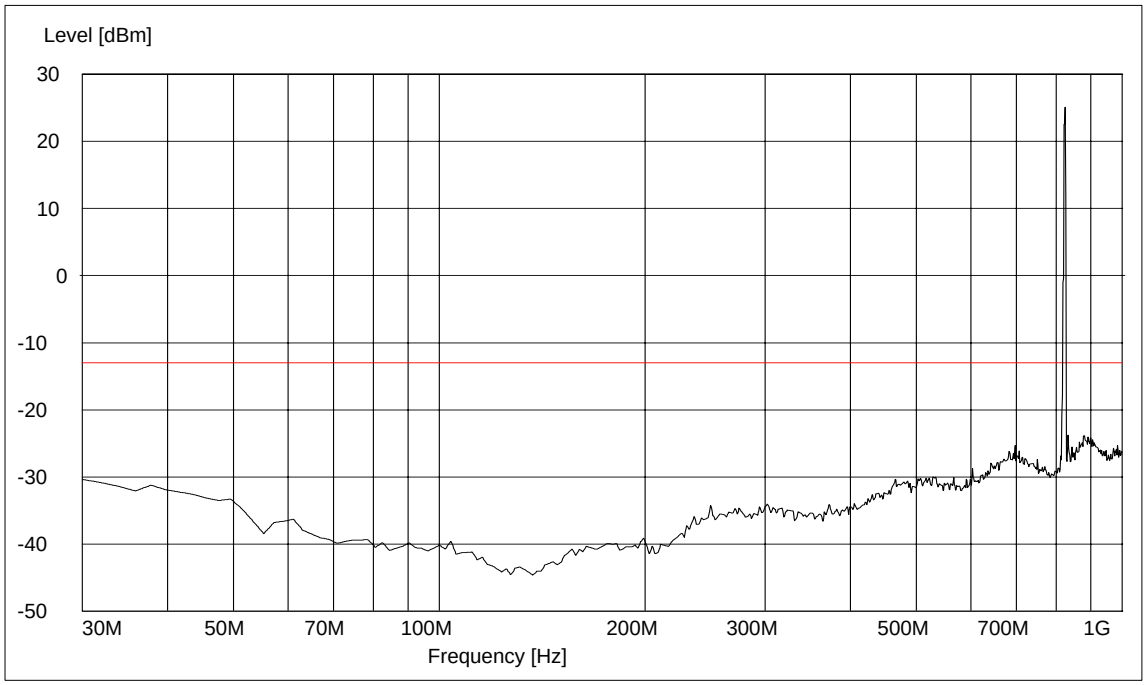
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the band (824.7 MHz, 835.89 MHz and 848.31 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the cellular band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

NOTE: The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels.

A.5.3.1 RADIATED SPURIOUS EMISSIONS-Channel 1013: 30MHz –1GHz

Radiated spurious emission limit :-13dBm.

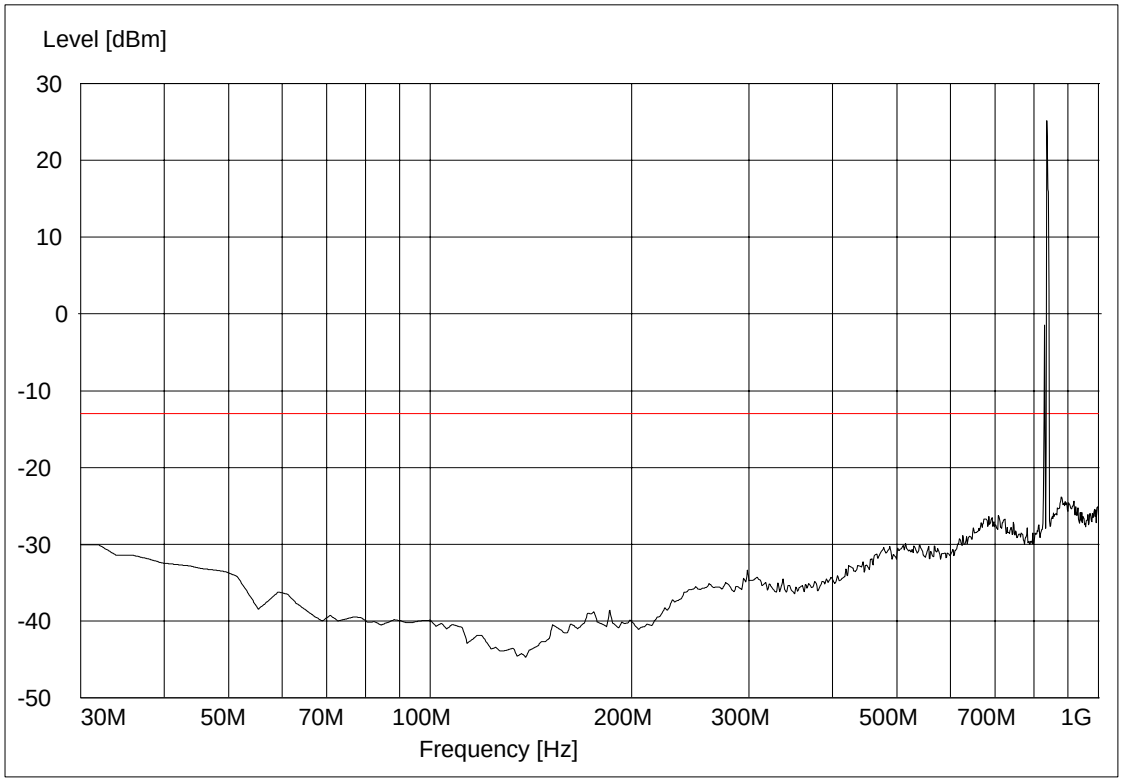
NOTE: peak above the limit line is the Carrier frequency @ ch-1013



A.5.3.2 RADIATED SPURIOUS EMISSIONS-Channel 363: 30MHz – 1GHz

Radiated spurious emission limit :-13dBm.

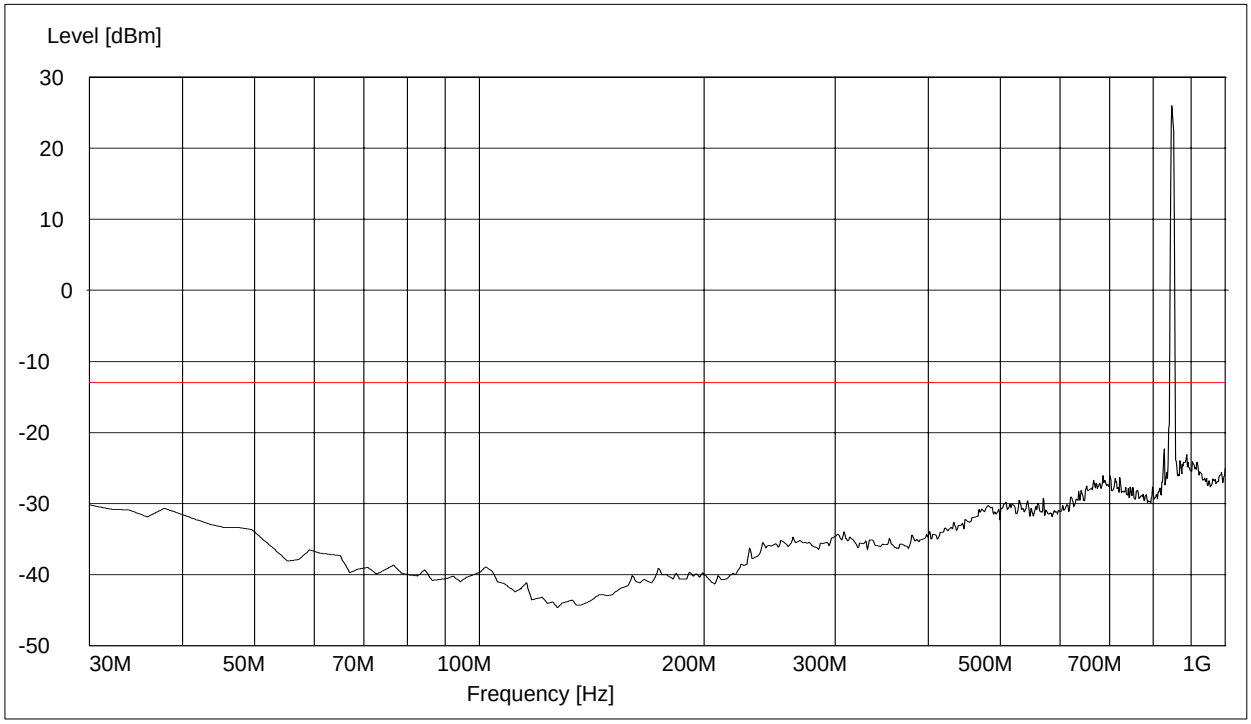
NOTE: peak above the limit line is the Carrier frequency @ ch-363



A.5.3.3 RADIATED SPURIOUS EMISSIONS-Channel 777: 30MHz – 1GHz

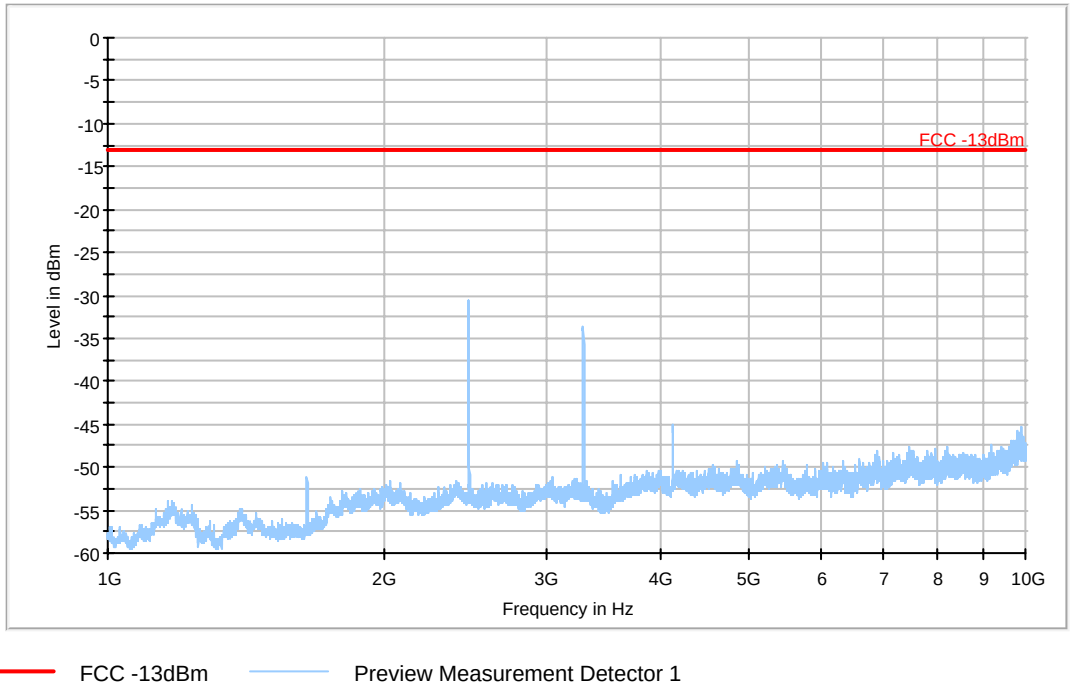
Radiated spurious emission limit :-13dBm.

NOTE: peak above the limit line is the Carrier frequency @ ch-777



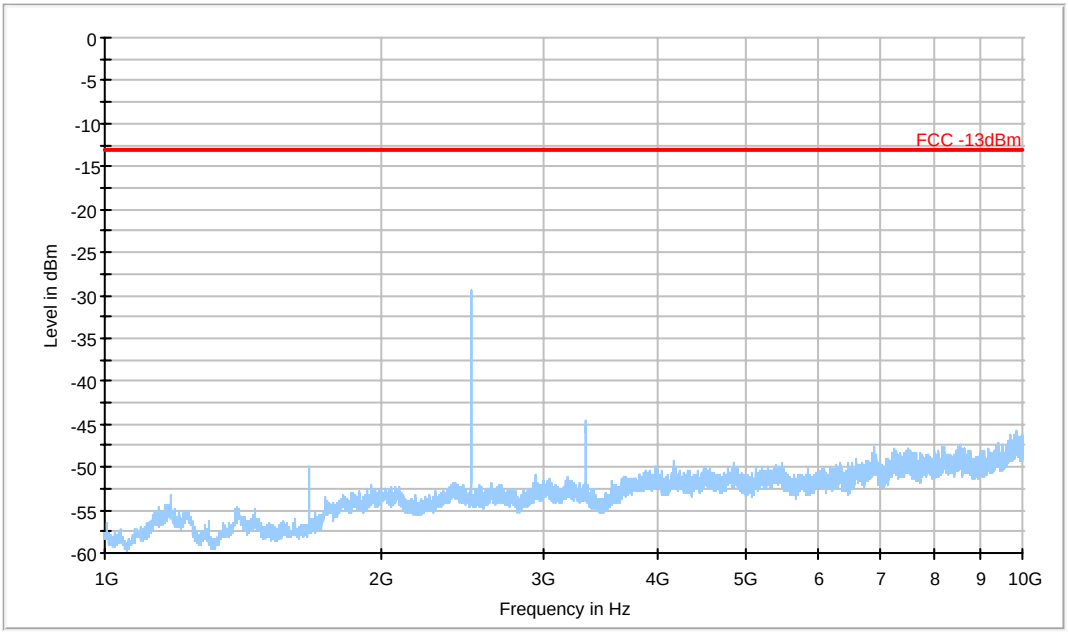
A.5.3.4 RADIATED SPURIOUS EMISSIONS-Channel 1013: 1GHz – 10GHz

Radiated spurious emission limit :-13dBm.



A5.3.5 RADIATED SPURIOUS EMISSIONS-Channel 363: 1GHz – 10GHz

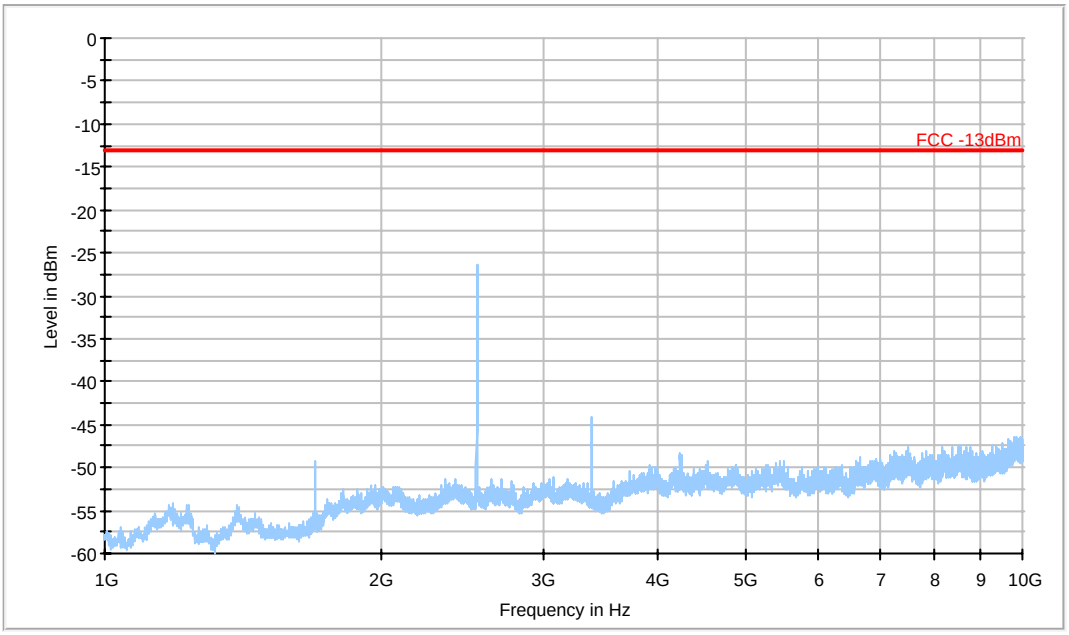
Radiated spurious emission limit :-13dBm.



FCC -13dBm Preview Measurement Detector 1

A.5.3.6 RADIATED SPURIOUS EMISSIONS-Channel 777: 1GHz – 10GHz

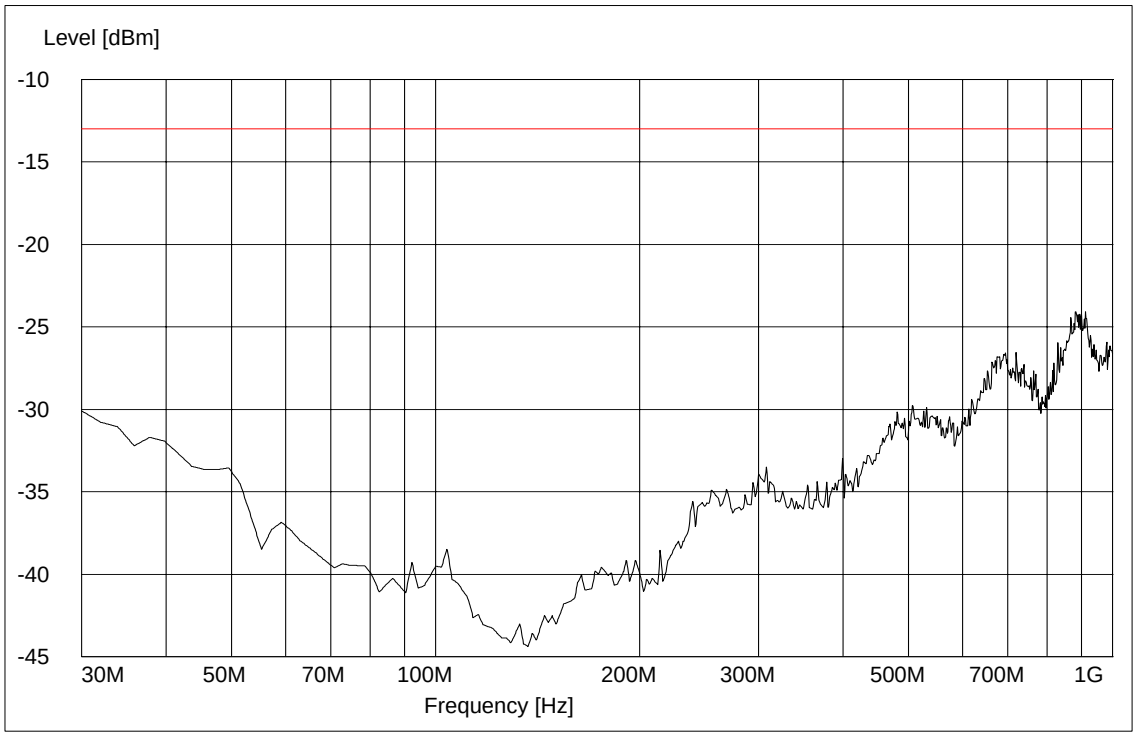
Radiated spurious emission limit :-13dBm.



FCC -13dBm Preview Measurement Detector 1

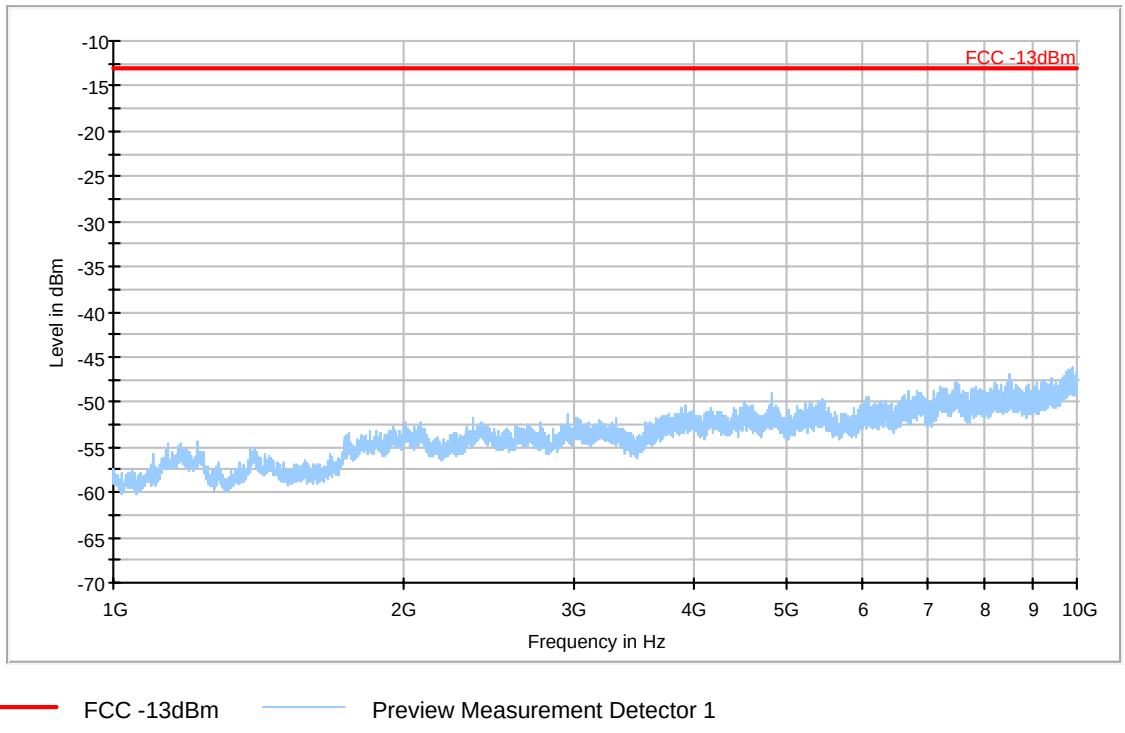
A.5.3.7 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 1GHz

Radiated spurious emission limit :-13dBm.



A.5.3.8 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 1GHz – 10GHz

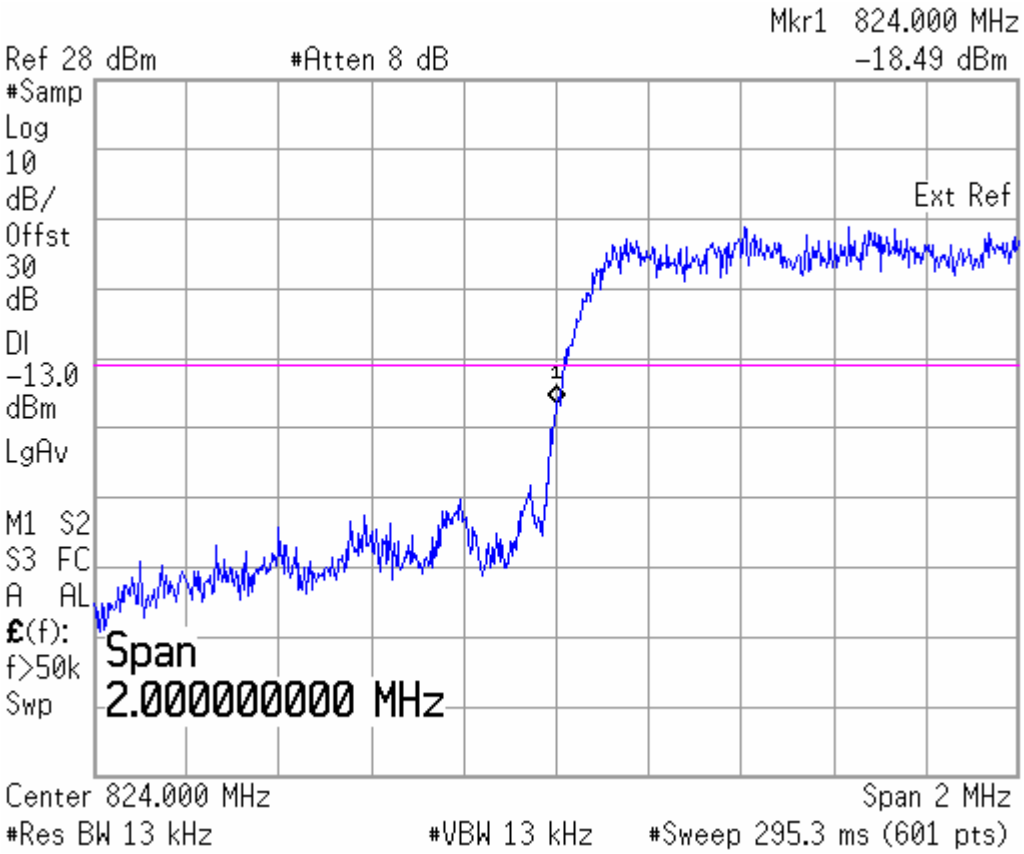
Radiated spurious emission limit :-13dBm.

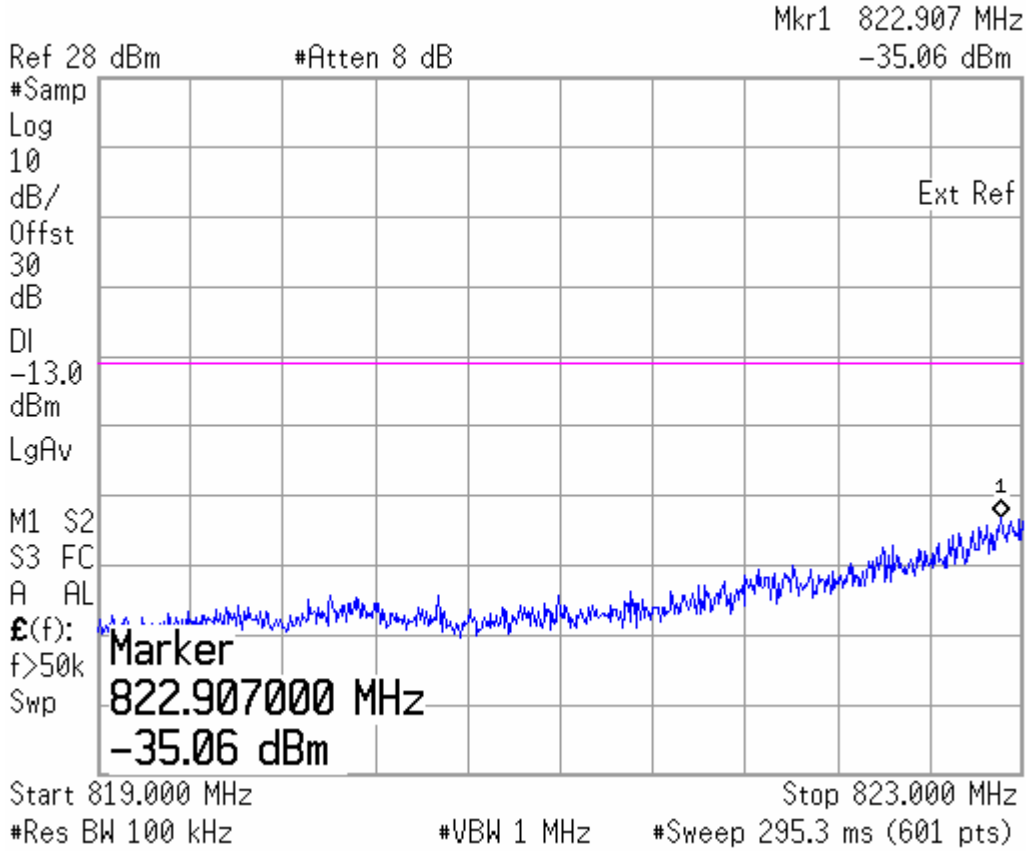


A.6 BAND EDGE COMPLIANCE (§22.917(b))

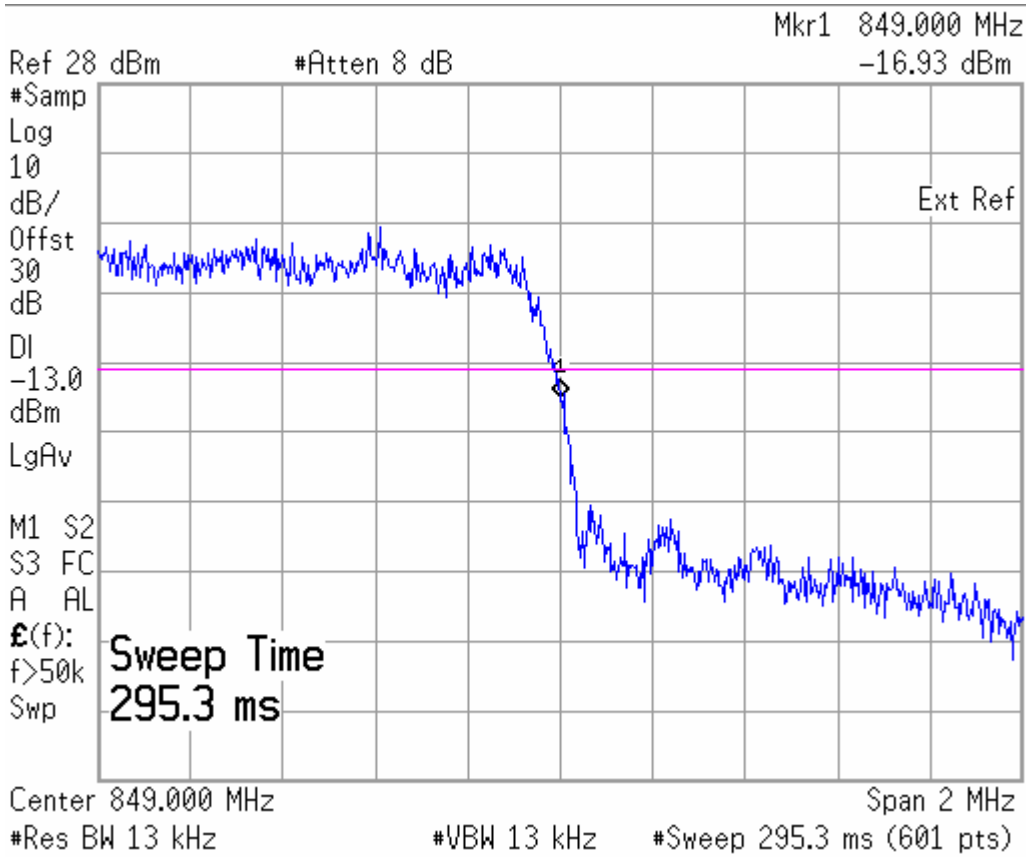
(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth(i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power..

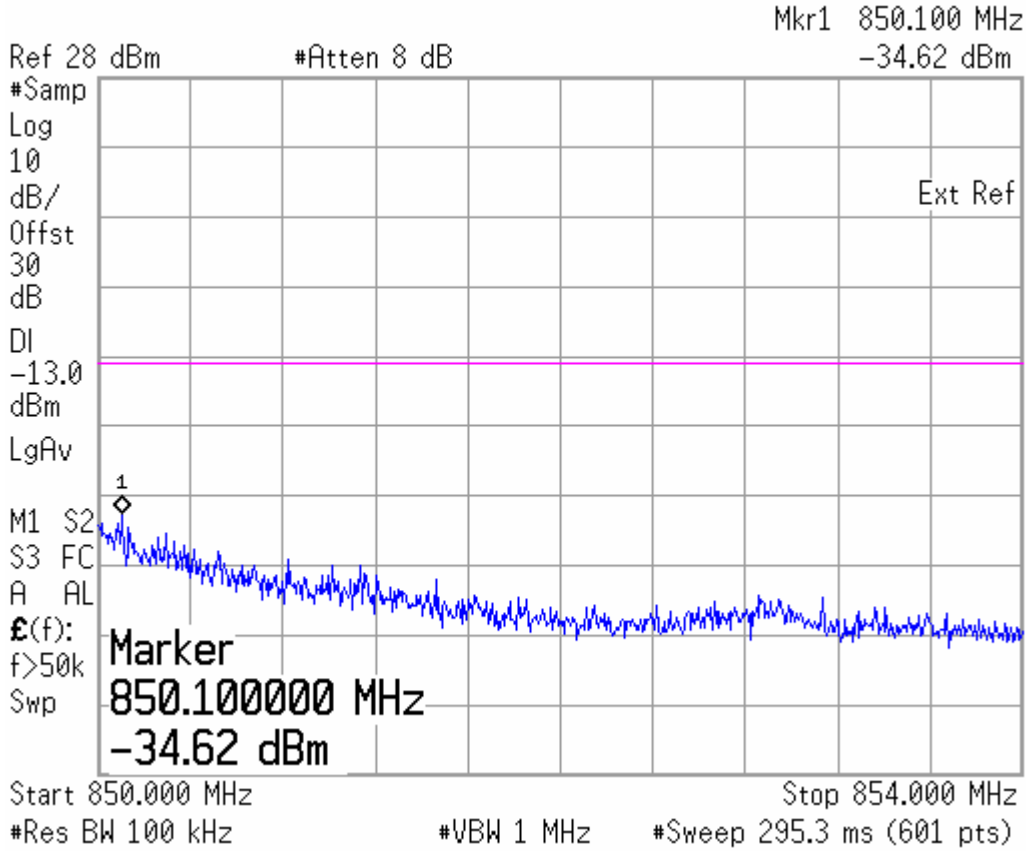
BAND EDGE BLOCK-Channel 1013



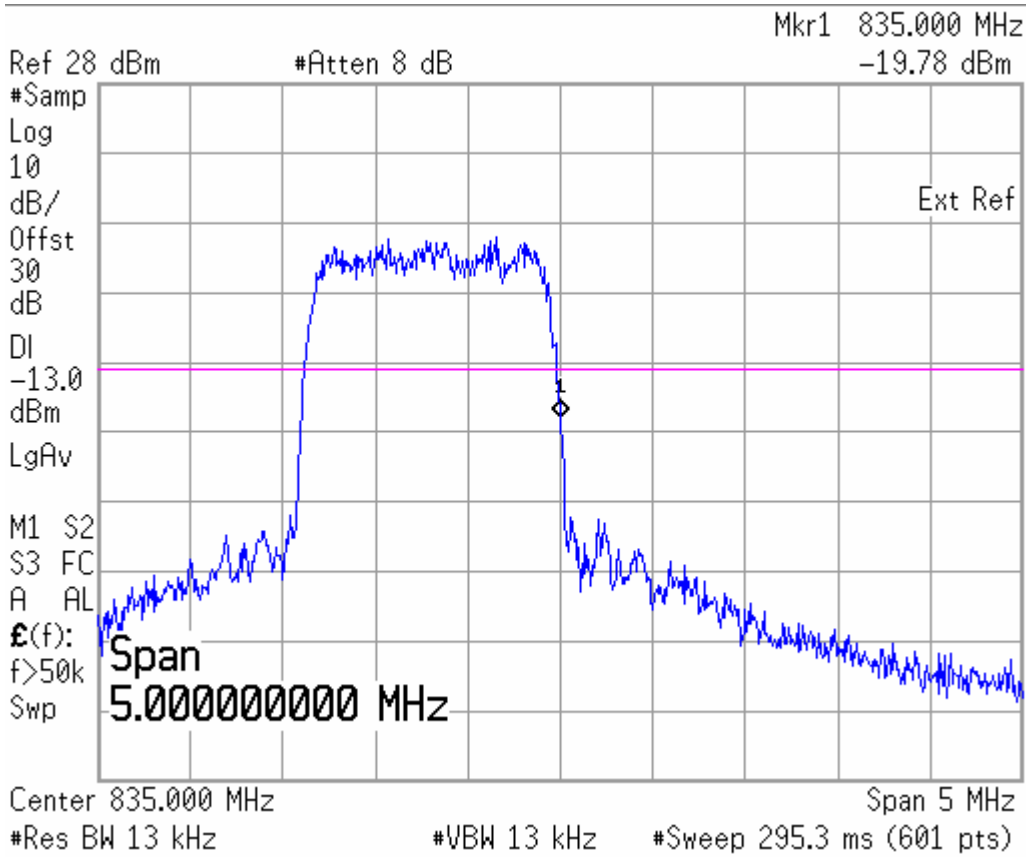


BAND EDGE BLOCK-Channel 777

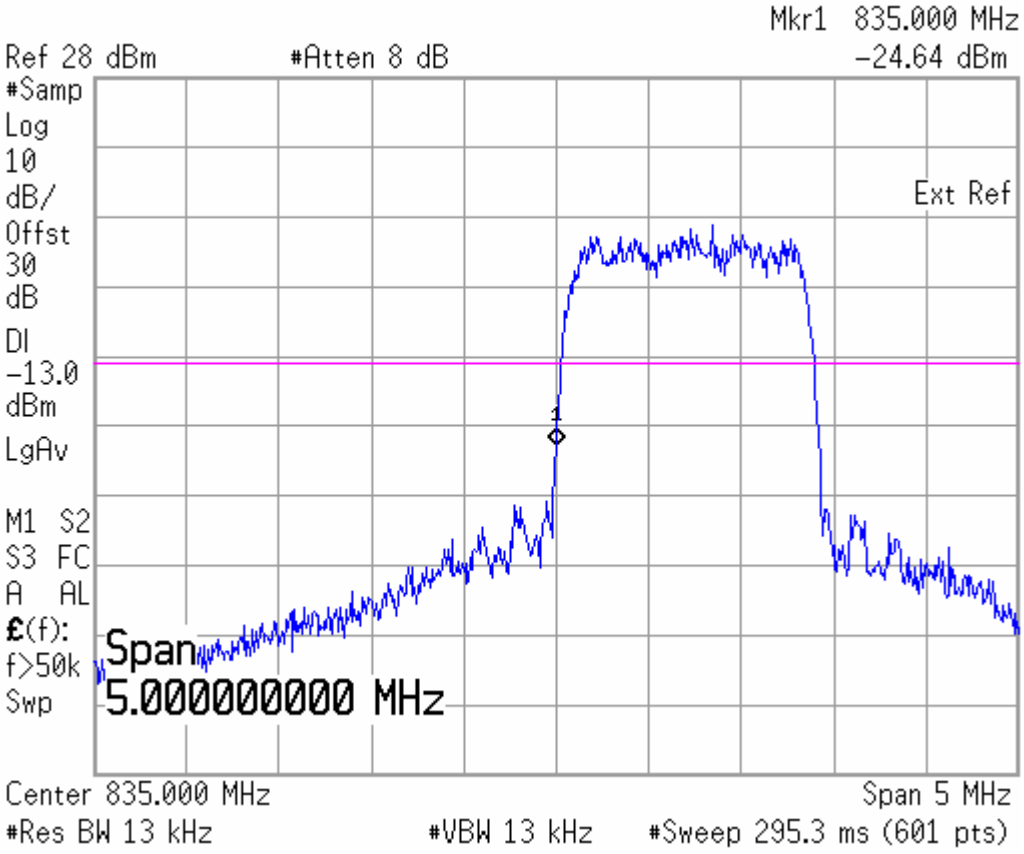




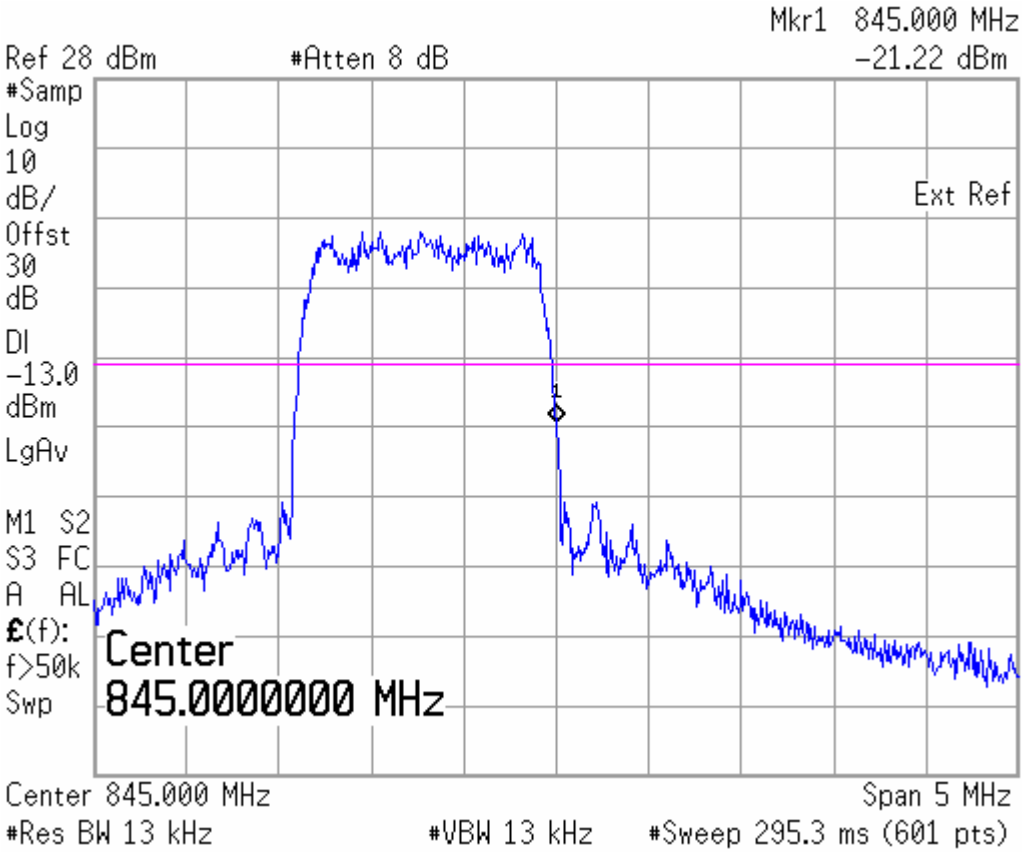
BAND EDGE BLOCK-Channel 310



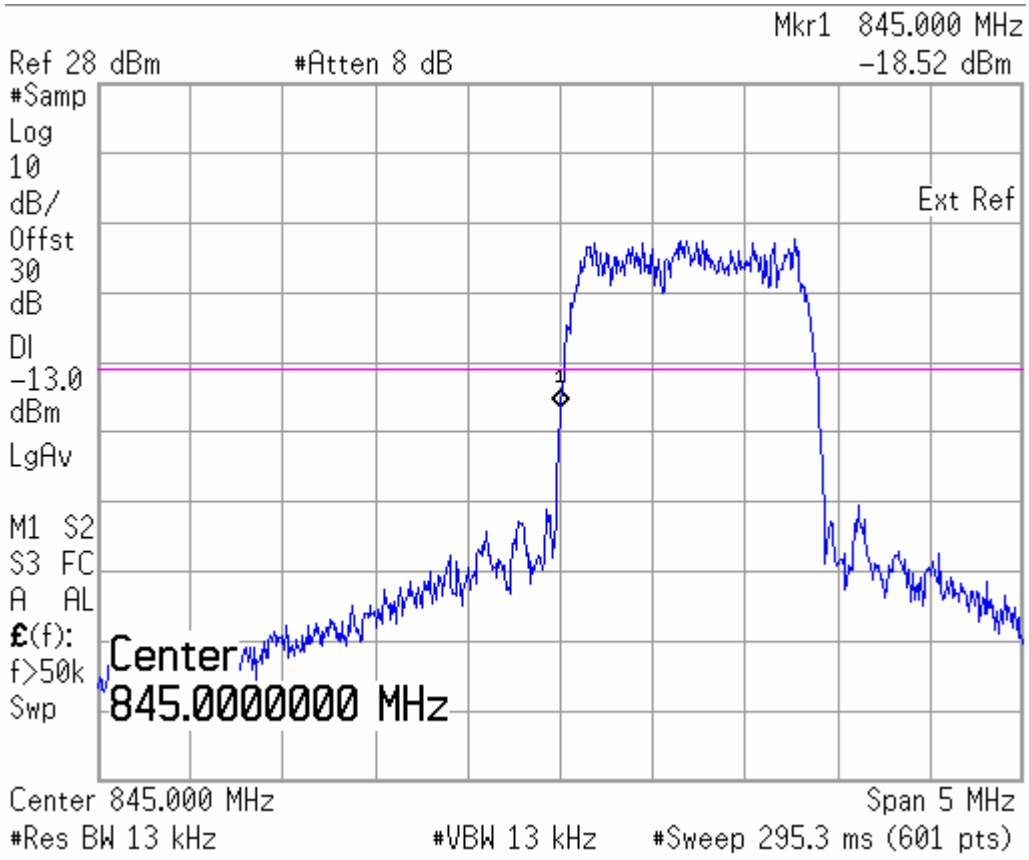
BAND EDGE BLOCK-Channel 357



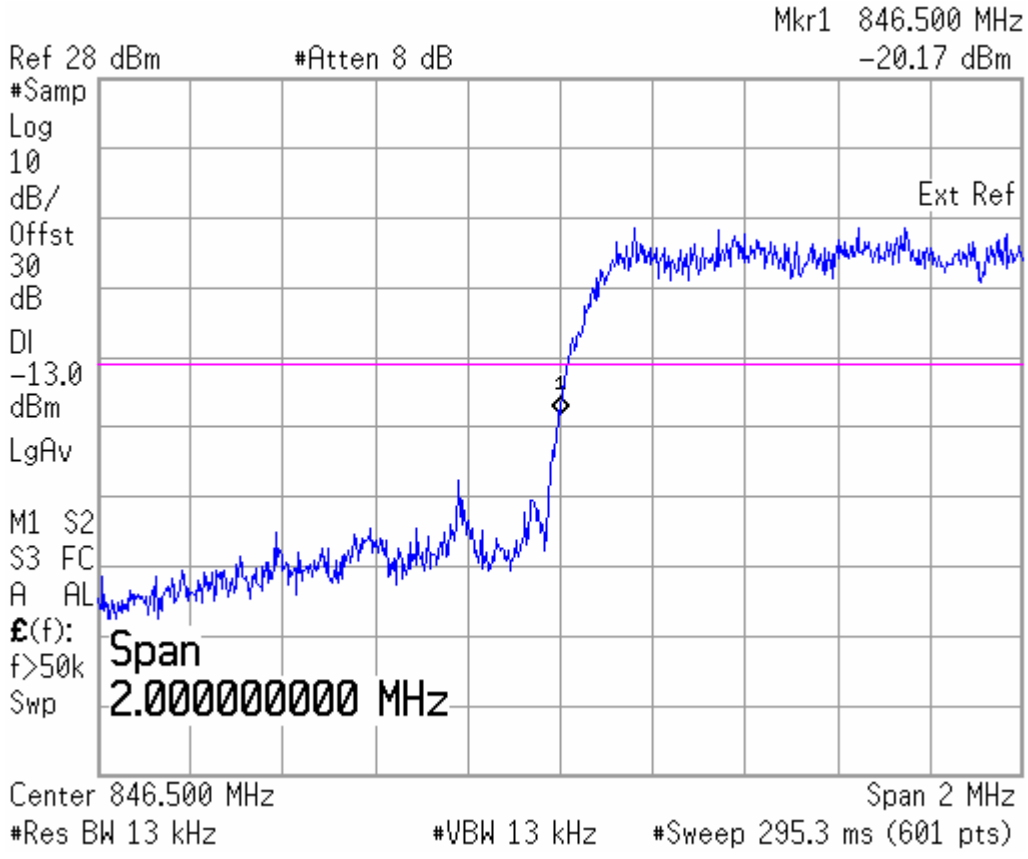
BAND EDGE BLOCK-Channel 643



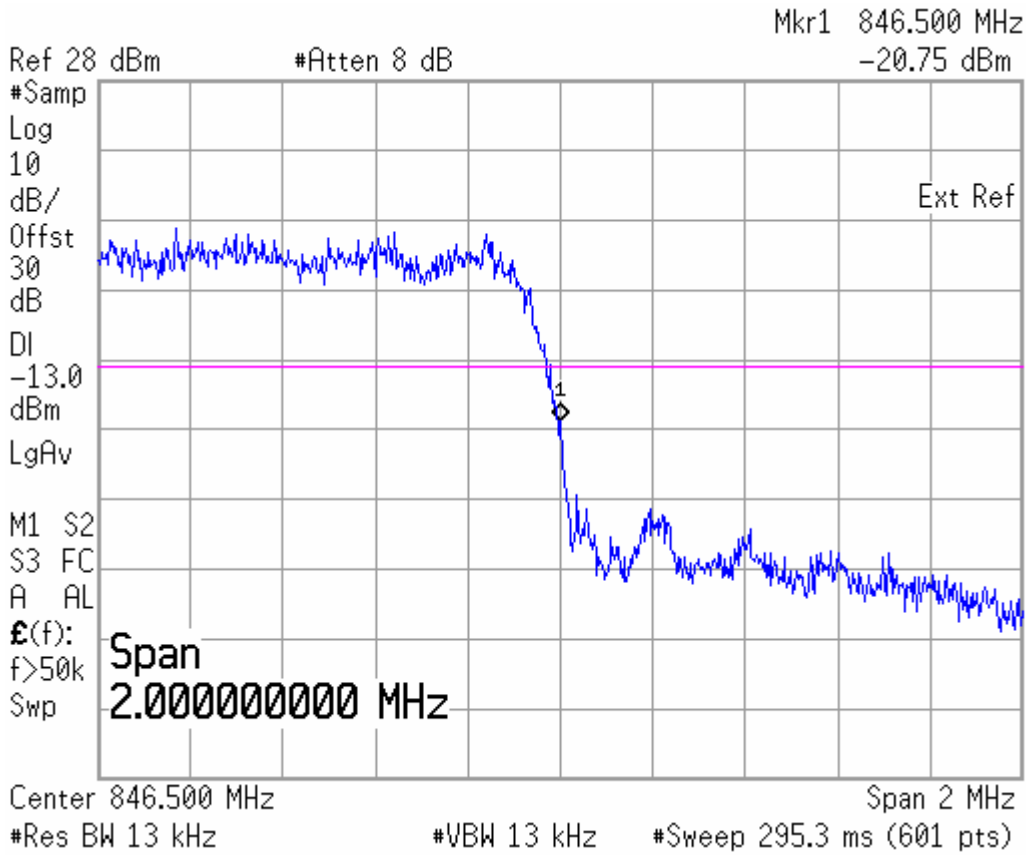
BAND EDGE BLOCK-Channel 690



BAND EDGE BLOCK-Channel 740



BAND EDGE BLOCK-Channel 693



A.7 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917)

A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

Channel	Frequency (MHz)
1013	824.70
363	835.89
777	848.31

A.7.2 Measurement Limit

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

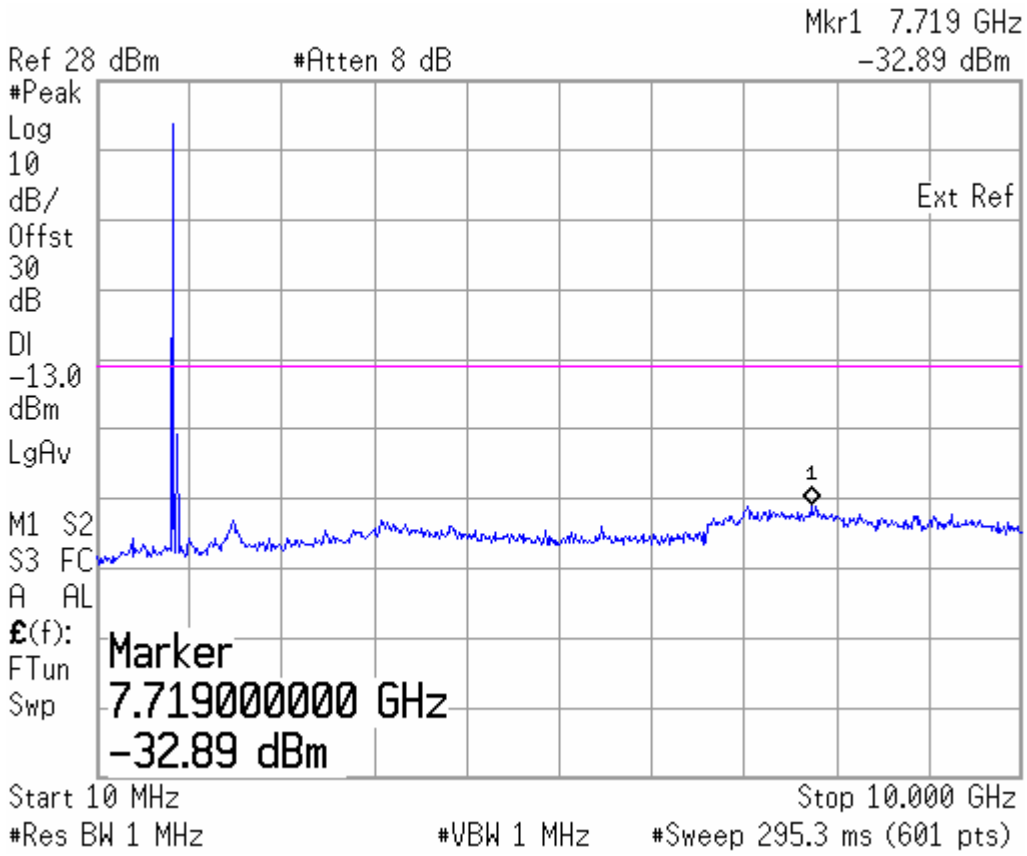
A.7.3 Measurement result

Harmonic	Tx ch. 1013 Freq. (MHz)	Level (dBm)	Tx ch. 363 Freq. (MHz)	Level (dBm)	Tx ch. 777 Freq. (MHz)	Level (dBm)
2	1649.4	nf	1671.78	nf	1696.62	nf
3	2474.1	nf	2507.67	nf	2544.93	nf
4	3298.8	nf	3343.56	nf	3393.24	nf
5	4123.5	nf	4179.45	nf	4241.55	nf
6	4948.2	nf	5015.34	nf	5089.86	nf
7	5772.9	nf	5851.23	nf	5938.17	nf
8	6597.6	nf	6687.12	nf	6786.48	nf
9	7422.3	nf	7523.01	nf	7634.79	nf
10	8247	nf	8358.9	nf	8483.1	nf
nf: Noise floor						

A.7.3.1 Channel 1013: 10MHz – 10GHz

Spurious emission limit –13dBm.

NOTE: peak above the limit line is the carrier frequency.



A.7.3.2 Channel 363: 10MHz – 10GHz

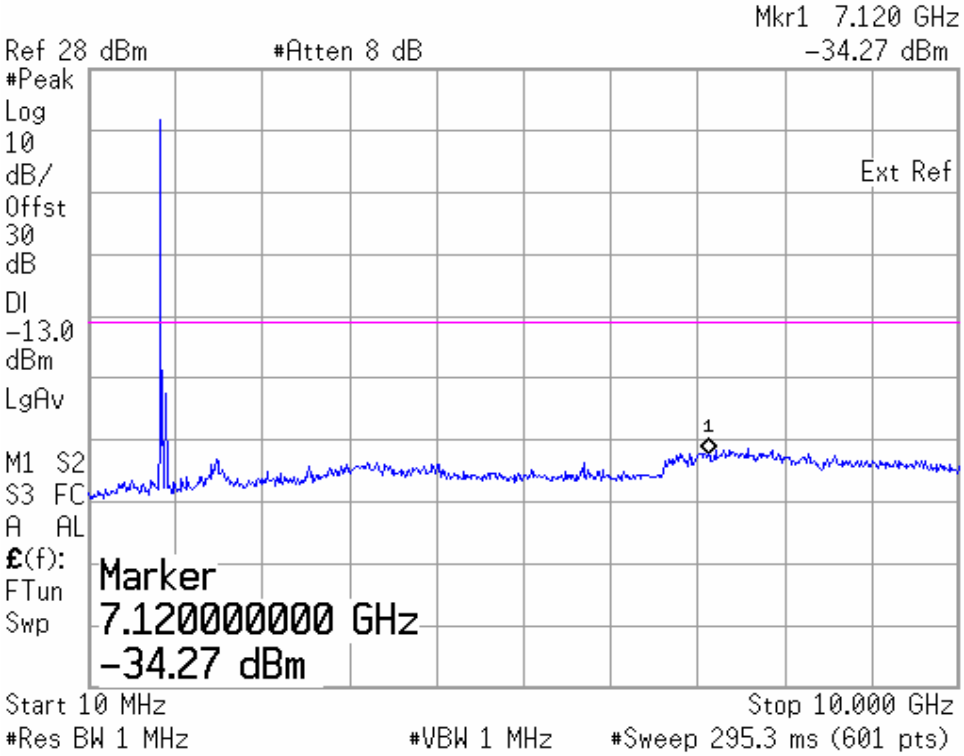
Spurious emission limit –13dBm.

NOTE: peak above the limit line is the carrier frequency.

A.7.3.3 Channel 777: 10MHz – 10GHz

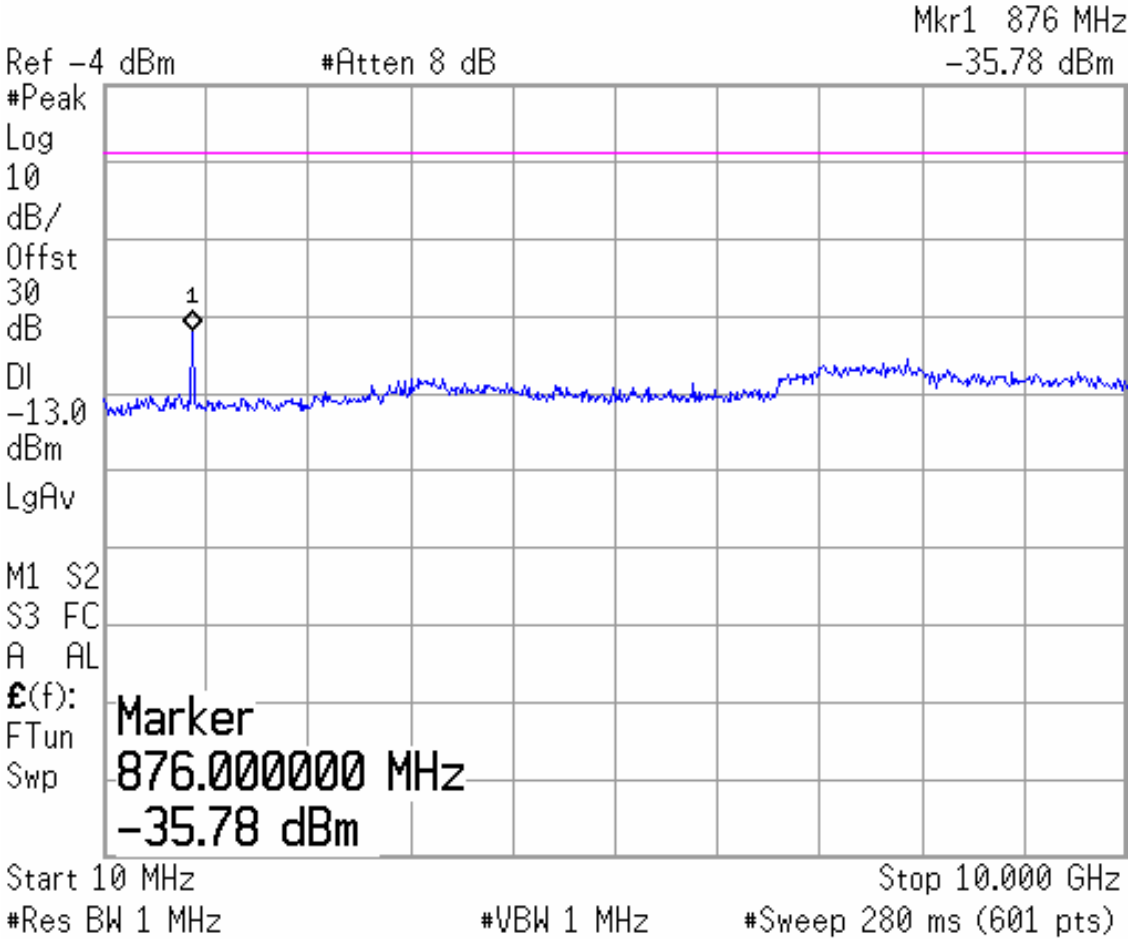
Spurious emission limit –13dBm

NOTE: peak above the limit line is the carrier frequency.



A.7.3.4 Idle mode: 10MHz – 10GHz

Spurious emission limit –13dBm.

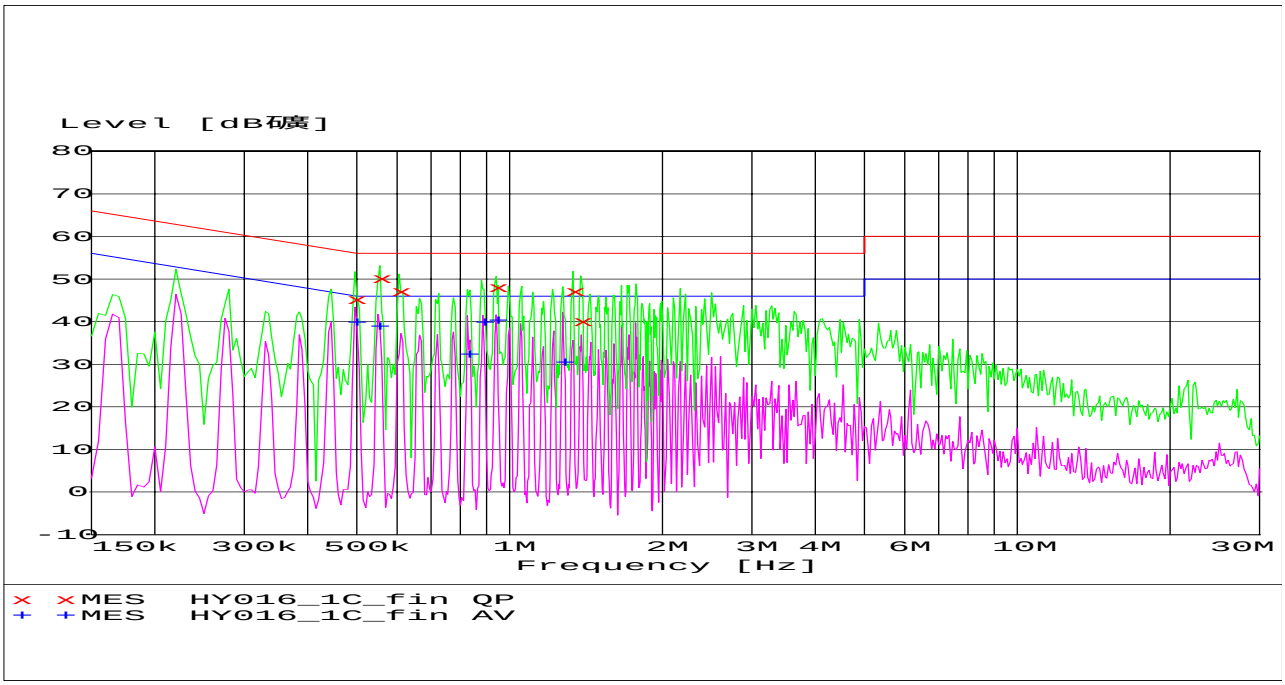


A.8 CONDUCTED EMISSION (§15.107/§207)

A.8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi -Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

A.8.2 Measurement result



MEASUREMENT RESULT: "HY016_1C_fin QP"

9/15/2005 13:06

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.495000	45.10	10.1	56	11.0	N	FLO
0.555000	50.20	10.1	56	5.8	L1	GND
0.605000	47.00	10.1	56	9.0	L1	GND
0.940000	48.10	10.1	56	7.9	L1	FLO
1.330000	47.00	10.1	56	9.0	L1	FLO
1.380000	40.10	10.1	56	16.0	N	FLO

MEASUREMENT RESULT: "HY016_1C_fin AV"

9/15/2005 13:06

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.495000	39.70	10.1	46	6.4	L1	GND
0.550000	38.90	10.1	46	7.1	L1	GND
0.825000	32.20	10.1	46	13.8	L1	GND
0.885000	39.80	10.1	46	6.2	L1	FLO
0.940000	40.20	10.1	46	5.8	L1	GND
1.270000	30.30	10.1	46	15.7	N	GND

ANNEX B PHOTOGRAPH OF EUT

External Photo

Mobile Phone

Mobile Phone

Mobile Phone

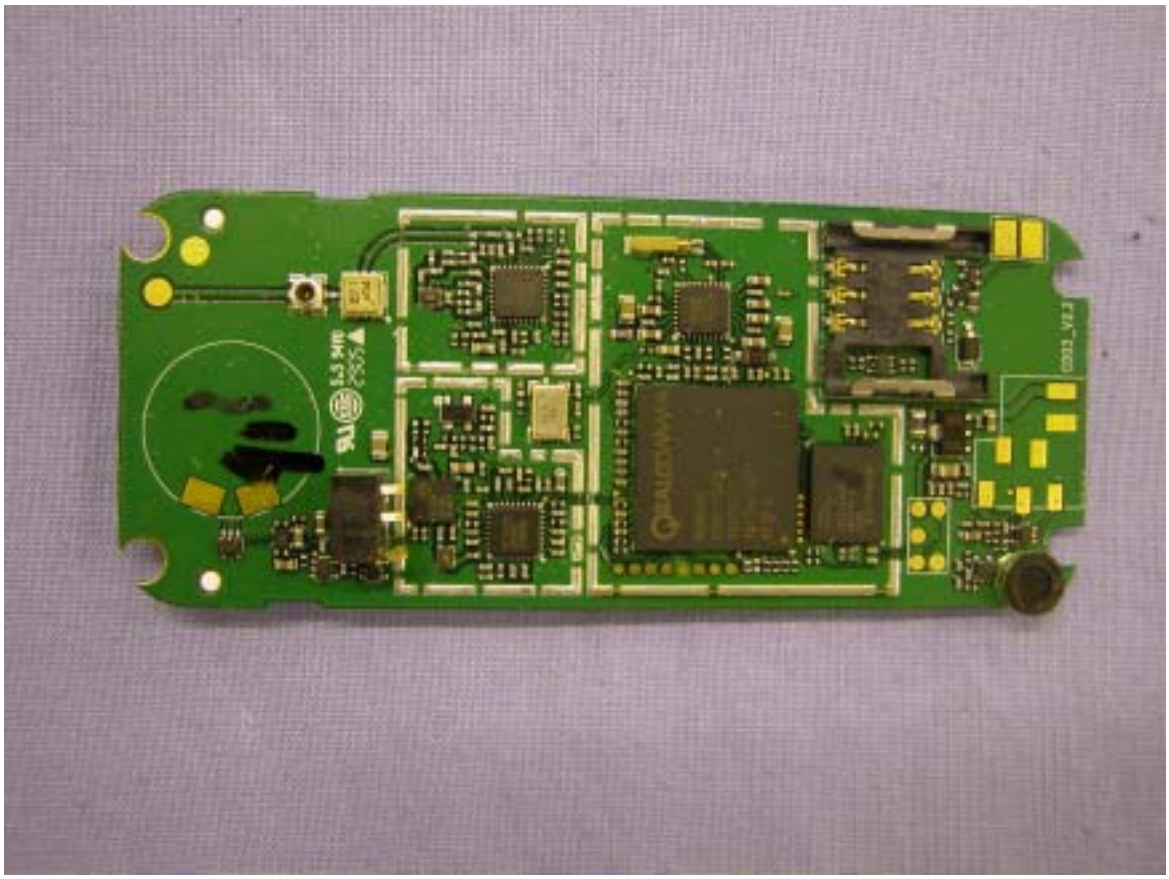
Mobile phone

Charger (AC/DC Adapter)

Charger (AC/DC Adapter)

Internal Photo

Mobile phone Disassembly



mobile phone PCB front view

ANNEX C TEST LAYOUT

Pic1 Conducted Emission

Pic2 Radiated Spurious Emission

*****END OF REPORT BODY*****